(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
19 April 2001 (19.04.2001)

PCT

(10) International Publication Number
WO 01/27857 A2

(51) International Patent Classification[7]: G06F 19/00

(21) International Application Number: PCT/US00/28413

(22) International Filing Date: 13 October 2000 (13.10.2000)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:

60/159,176	13 October 1999 (13.10.1999)	US
60/217,658	10 July 2000 (10.07.2000)	US
60/217,251	10 July 2000 (10.07.2000)	US
09/663,968	19 September 2000 (19.09.2000)	US

(63) Related by continuation (CON) or continuation-in-part (CIP) to earlier applications:

US	60/159,176 (CIP)
Filed on	13 October 1999 (13.10.1999)
US	60/217,658 (CIP)
Filed on	10 July 2000 (10.07.2000)
US	09/663,968 (CIP)
Filed on	19 September 2000 (19.09.2000)
US	60/217,251 (CIP)
Filed on	10 July 2000 (10.07.2000)

(71) Applicant *(for all designated States except US)*: **SEQUENOM, INC.** [US/US]; 11555 Sorrento Valley Road, San Diego, CA 92121-1331 (US).

(72) Inventors; and

(75) Inventors/Applicants *(for US only)*: **BRAUN, Andreas** [DE/US]; 11237-6 Carmel Creek Road, San Diego, CA 92130 (US). **KÖSTER, Hubert** [DE/US]; 8636-C Via Mallorca Drive, La Jolla, CA 92037 (US). **VAN DEN BOOM, Dirk** [DE/DE]; Eppendorfer Weg 205 D, D-20253 Hamburg (DE). **PING, Yip** [US/US]; 3641 Copley Avenue, San Diego, CA 92116 (US). **RODI, Charlie** [US/US]; 13823 Recuerdo Drive, Del Mar, CA 92014 (US). **HE, Liyan** [CN/US]; 10948 Creek Bridge Place, San Diego, CA 92128 (US). **CHIU, Norman** [CA/US]; 1128 Caminito Alvarez, San Diego, CA 92126 (US). **JURINKE, Christian** [DE/DE]; Rombergstrasse 22, 20255 Hamburg (DE).

(74) Agents: **SEIDMAN, Stephanie, L.** et al.; Heller Ehrman White & McAuliffe, Suite 700, 4250 Executive Square, La Jolla, CA 92037 (US).

(81) Designated States *(national)*: AE, AG, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.

(84) Designated States *(regional)*: ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

Published:

— *Without international search report and to be republished upon receipt of that report.*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

WO 01/27857 A2

(54) Title: METHODS FOR GENERATING DATABASES AND DATABASES FOR IDENTIFYING POLYMORPHIC GENETIC MARKERS

(57) Abstract: Process and methods for creating a database of genomic samples from healthy human donors, methods that use the database to identify and correlate polymorphic genetic markers and other markers with diseases and conditions are provided.

METHODS FOR GENERATING DATABASES AND DATABASES FOR IDENTIFYING POLYMORPHIC GENETIC MARKERS

RELATED APPLICATIONS

Benefit of priority to the following applications is claimed herein: U.S. provisional application Serial No. 60/217,658 to Andreas Braun, Hubert Koster; Dirk Van den Boom, filed July 10, entitled "METHODS FOR GENERATING DATABASES AND DATABASES FOR IDENTIFYING POLYMORPHIC GENETIC MARKERS"; U.S. provisional application Serial No. 60/159,176 to Andreas Braun, Hubert Koster, Dirk Van den Boom, filed October 13, 1999, entitled "METHODS FOR GENERATING DATABASES AND DATABASES FOR IDENTIFYING POLYMORPHIC GENETIC MARKERS"; U.S. provisional application Serial No. 60/217,251, filed July 10, 2000, to Andreas Braun, entitled "POLYMORPHIC KINASE ANCHOR PROTEIN GENE SEQUENCES, POLYMORPHIC KINASE ANCHOR PROTEINS AND METHODS OF DETECTING POLYMORPHIC KINASE ANCHOR PROTEINS AND NUCLEIC ACIDS ENCODING THE SAME"; and U.S. application Serial No. 09/663,968, to Ping Yip, filed September 19, 2000, entitled "METHOD AND DEVICE FOR IDENTIFYING A BIOLOGICAL SAMPLE."

Where permitted that above-noted applications and provisional applications are incorporated by reference in their entirety.

FIELD OF THE INVENTION

Process and methods for creating a database of genomic samples from healthy human donors. Methods that use the database to identify and correlate with polymorphic genetic markers and other markers with diseases and conditions are provided.

BACKGROUND

Diseases in all organisms have a genetic component, whether inherited or resulting from the body's response to environmental stresses, such as viruses and toxins. The ultimate goal of ongoing genomic research is to use this information to develop new ways to identify, treat and potentially cure these diseases. The first step has been to screen disease tissue and identify genomic changes at the level of individual samples. The identification of these "disease"

markers has then fueled the development and commercialization of diagnostic tests that detect these errant genes or polymorphisms. With the increasing numbers of genetic markers, including single nucleotide polymorphisms (SNPs), microsatellites, tandem repeats, newly mapped introns and exons, the challenge to the medical and pharmaceutical communities is to identify genotypes which not only identify the disease but also follow the progression of the disease and are predictive of an organism's response to treatment.

Currently the pharmaceutical and biotechnology industries find a disease and then attempt to determine the genomic basis for the disease. This approach is time consuming and expensive and in many cases involves the investigator guessing as to what pathways might be involved in the disease.

Genomics

Presently the two main strategies employed in analyzing the available genomic information are the technology driven reverse genetics brute force strategy and the knowledge-based pathway oriented forward genetics strategy. The brute force approach yields large databases of sequence information but little information about the medical or other uses of the sequence information. Hence this strategy yields intangible products of questionable value. The knowledge-based strategy yields small databases that contain a lot of information about medical uses of particular DNA sequences and other products in the pathway and yield tangible products with a high value.

Polymorphisms

Polymorphisms have been known since 1901 with the identification of blood types. In the 1950's they were identified on the level of proteins using large population genetic studies. In the 1980's and 1990's many of the known protein polymorphisms were correlated with genetic loci on genomic DNA. For example, the gene dose of the apolipoprotein E type 4 allele was correlated with the risk of Alzheimer's disease in late onset families (see, *e.g.*, Corder *et al.* (1993) *Science 261*: 921-923; mutation in blood coagulation factor V was associated with resistance to activated protein C (see, *e.g.*, Bertina *et al.* (1994) *Nature 369*:64-67); resistance to HIV-1 infection has been shown in caucasian individuals bearing mutant alleles of the CCR-5 chemokine receptor gene (see,

e.g., Samson *et al.* (1996) *Nature 382*:722-725); and a hypermutable tract in antigen presenting cells (APC, such as macrophages), has been identified in familial colorectal cancer in individuals of Ashkenzi jewish background (see, *e.g.*, Laken *et al.* (1997) *Nature Genet. 17*:79-83). There may be more than three million polymorphic sites in the human genome. Many have been identified, but not yet characterized or mapped or associated with a marker.

Single nucleotide polymorphisms (SNPs)

Much of the focus of genomics has been in the identification of SNPs, which are important for a variety of reasons. They allow indirect testing (association of haplotypes) and direct testing (functional variants). They are the most abundant and stable genetic markers. Common diseases are best explained by common genetic alterations, and the natural variation in the human population aids in understanding disease, therapy and environmental interactions.

Currently, the only available method to identify SNPs in DNA is by sequencing, which is expensive, difficult and laborious. Furthermore, once a SNP is discovered it must be validated to determine if it is a real polymorphism and not a sequencing error. Also, discovered SNPs must then be evaluated to determine if they are associated with a particular phenotype. Thus, there is a need to develop new paradigms for identifying the genomic basis for disease and markers thereof. Therefore, it is an object herein to provide methods for identifying the genomic basis of disease and markers thereof.

SUMMARY

Databases and methods using the databases are provided herein. The databases comprise sets of parameters associated with subjects in populations selected only on the basis of being healthy (*i.e.*, where the subjects are mammals, such as humans, they are selected based upon apparent health and no detectable infections). The databases can be sorted based upon one or more of the selected parameters.

The databases are preferably relational databases, in which an index that represents each subject serves to relate parameters, which are the data, such as age, ethnicity, sex, medical history, etc. and ultimately genotypic information,

that was inputted into and stored in the database. The database can then be sorted according to these parameters. Initially, the parameter information is obtained from a questionnaire answered by each subject from whom a body tissue or body fluid sample is obtained. As additional information about each sample is obtained, this information can be entered into the database and can serve as a sorting parameter.

The databases obtained from healthy individuals have numerous uses, such as correlating known polymorphisms with a phenotype or disease. The databases can be used to identify alleles that are deleterious, that are beneficial, and that are correlated with diseases.

For purposes herein, genotypic information can be obtained by any method known to those of skill in the art, but is preferably obtained using mass spectrometry.

Also provided herein, is a new use for existing databases of subjects and genotypic and other parameters, such as age, ethnicity, race, and gender. Any database can be sorted according to the methods herein and alleles that exhibit statistically significant correlations with any of the sorting parameters can be identified. It is noted, however, is noted, that the databases provided herein and randomly selected databases will perform better in these methods, since disease-based databases suffer numerous limitations, including their relatively small size, the homogeneity of the selected disease population, and the masking effect of the polymorphism associated with the markers for which the database was selected. Hence, the healthy database provided herein, provides advantages not heretofore recognized or exploited. However, the methods provided herein can be used with a selected database, including disease-based databases, with or without sorting for the discovery and correlation of polymorphisms. In addition, the databases provided herein represent a greater genetic diversity than the unselected databases typically utilized for the discovery of polymorphisms and thus allow for the enhanced discovery and correlation of polymorphisms.

The databases provided herein can be used for taking an identified polymorphism, and ascertaining whether it changes in frequency when the data is sorted according to a selected parameter.

One use of these methods is correlating a selected marker with a particular parameter by following the occurrence of known genetic markers and then, having made this correlation, determining or identifying correlations with diseases. Examples of this use are p53 and Lipoprotein Lipase polymorphism. As exemplified herein, known markers are shown to have particular correlation with certain groups, such as a particular ethnicity or race or one sex. Such correlations will then permit development of better diagnostic tests and treatment regimens.

These methods are valuable for identifying one or more genetic markers whose frequency changes within the population as a function of age, ethnic group, sex or some other criteria. This can allow the identification of previously unknown polymorphisms and ultimately a gene or pathway involved in the onset and progression of disease.

The databases and methods provided herein permit, among other things, identification of components, particularly key components, of a disease process by understanding its genetic underpinnings and also permit an understanding of processes, such as individual drug responses. The databases and methods provided herein also can be used in methods involving elucidation of pathological pathways, in developing new diagnostic assays, identifying new potential drug targets, and in identifying new drug candidates.

The methods and databases can be used with experimental procedures, including, but are not limited to, *in silico* SNP identification, *in vitro* SNP identification/verification, genetic profiling of large populations, and in biostatistical analyses and interpretations.

Also provided herein, are combinations that contain a database provided herein and a biological sample from a subject in the database, and preferably biological samples from all subjects or a plurality of subjects in the database. Collections of the tissue and body fluid samples are also provided.

Also, provided herein, are methods for determining a genetic marker that correlates with age, comprising identifying a polymorphism and determining the frequency of the polymorphism with increasing age in a healthy population.

Further provided herein are methods for determining whether a genetic marker correlates with susceptibility to morbidity, early mortality, or morbidity and early mortality, comprising identifying a polymorphism and determining the frequency of the polymorphism with increasing age in a healthy population.

Any of the methods herein described can be used out in a multiplex format.

Also provided are an apparatus and process for accurately identifying genetic information. It is another object of the herein that genetic information be extracted from genetic data in a highly automated manner. Therefore, to overcome the deficiencies in the known conventional systems, a method and apparatus for identifying a biological sample is proposed.

Briefly, the method and system for identifying a biological sample generates a data set indicative of the composition of the biological sample. In a particular example, the data set is DNA spectrometry data received from a mass spectrometer. The data set is denoised, and a baseline is deleted. Since possible compositions of the biological sample may be known, expected peak areas may be determined. Using the expected peak areas, a residual baseline is generated to further correct the data set. Probable peaks are then identifiable in the corrected data set, which are used to identify the composition of the biological sample. In a disclosed example, statistical methods are employed to determine the probability that a probable peak is an actual peak, not an actual peak, or that the data too inconclusive to call.

Advantageously, the method and system for identifying a biological sample accurately makes composition calls in a highly automated manner. In such a manner, complete SNP profile information, for example, may be collected efficiently. More importantly, the collected data is analyzed with highly accurate results. For example, when a particular composition is called, the result may be relied upon with great confidence. Such confidence is provided by the robust computational process employed .

DESCRIPTION OF THE DRAWINGS

Figure 1 depicts an exemplary sample bank. Panel 1 shows the samples as a function of sex and ethnicity. Panel 2 shows the caucasians as a function of age. Panel 3 shows the Hispanics as a function of age.

Figures 2A and 2C show an age- and sex-distribution of the 291S allele of the lipoprotein lipase gene in which a total of 436 males and 589 females were investigated. Figure 2B shows an age distribution for the 436 males.

Figure 3 is an exemplary questionnaire for population-based sample banking.

Figure 4 depicts processing and tracking of blood sample components.

Figure 5 depicts the allelic frequency of "sick" alleles and "healthy" alleles as a function of age. It is noted that the relative frequency of healthy alleles increases in a population with increasing age.

Figure 6 depicts the age-dependent distribution of ApoE genotypes (see, Schächter *et al.* (1994) *Nature Genetics 6*:29-32).

Figure 7A-D depicts age-related and genotype frequency of the p53 (tumor suppressor) codon 72 among the caucasian population in the database. *R72 and *P72 represent the frequency of the allele in the database population. R72, R72P, and P72 represent the genotypes of the individuals in the population. The frequency of the homozygous P72 allele drops from 6.7% to 3.7% with age.

Figure 8 depicts the allele and genotype frequencies of the p21 S31R allele as a function of age.

Figure 9 depicts the frequency of the FVII Allele 353Q in pooled versus individual samples.

Figure 10 depicts the frequency of the CETP (cholesterol ester transfer protein) allele in pooled versus individual samples

Figure 11 depicts the frequency of the plasminogen activator inhibitor-1 (PAI-1) 5G in pooled versus individual samples

Figure 12 shows mass spectra of the samples and the ethnic diversity of the PAI-1 alleles.

Figure 13 shows mass spectra of the samples and the ethnic diversity of the CETP 405 alleles.

Figure 14 shows mass spectra of the samples and the ethnic diversity of the Factor VII 353 alleles.

Figure 15 shows ethnic diversity of PAI-1, CETP and Factor VII using the pooled DNA samples.

Figure 16 shows the p53-Rb pathway and the relationships among the various factors in the pathway.

Figure 17, which is a block diagram of a computer constructed to provide and process the databases described herein, depicts a typical computer system for storing and sorting the databases provided herein and practicing the methods provided herein.

Figure 18 is a flow diagram that illustrates the processing steps performed using the computer illustrated in Figure 17, to maintain and provide access to the databases for identifying polymorphic genetic markers.

Figure 19 is a histogram showing the allele and genotype distribution in the age and sex stratified Caucasian population for the AKAP10-1 locus. Bright green bars show frequencies in individuals younger than 40 years. Dark green bars show frequencies in individuals older than 60 years.

Figure 20 is a histogram showing the allele and genotype distribution in the age and sex stratified Caucasian population for the AKAP10-5 locus. Bright green bars show frequencies in individuals younger than 40 years; dark green bars show frequencies in individuals older than 60 years.

Figure 21 is a histogram showing the allele and genotype distribution in the age and sex stratified Caucasian population for the h-msrA locus. Genotype difference between male age groups is significant. Bright green bars show frequencies in individuals younger than 40 years. Dark green bars show frequencies in individuals older than 60 years.

Figure 22A-D is a sample data collection questionnaire used for the healthy database.

Figure 23 is a flowchart showing processing performed by the computing device of Figure 24 when performing genotyping of sense strands and antisense strands from assay fragments.

Figure 24 is a block diagram showing a system in accordance with the present invention;

Figure 25 is a flowchart of a method of identifying a biological sample in accordance with the present invention;

Figure 26 is a graphical representation of data from a mass spectrometer;

Figure 27 is a diagram of wavelet transformation of mass spectrometry data;

Figure 28 is a graphical representation of wavelet stage 0 hi data;

Figure 29 is a graphical representation of stage 0 noise profile;

Figure 30 is a graphical representation of generating stage noise standard deviations;

Figure 31 is a graphical representation of applying a threshold to data stages;

Figure 32 is a graphical representation of a sparse data set;

Figure 33 is a formula for signal shifting;

Figure 34 is a graphical representation of a wavelet transformation of a denoised and shifted signal;

Figure 35 is a graphical representation of a denoised and shifted signal;

Figure 36 is a graphical representation of removing peak sections;

Figure 37 is a graphical representation of generating a peak free signal ;

Figure 38 is a block diagram of a method of generating a baseline correction;

Figure 39 is a graphical representation of a baseline and signal;

Figure 40 is a graphical representation of a signal with baseline removed;

Figure 41 is a table showing compressed data;

Figure 42 is a flowchart of method for compressing data;

Figure 43 is a graphical representation of mass shifting;

Figure 44 is a graphical representation of determining peak width;

Figure 45 is a graphical representation of removing peaks;

Figure 46 is a graphical representation of a signal with peaks removed;

Figure 47 is a graphical representation of a residual baseline;

Figure 48 is a graphical representation of a signal with residual baseline removed;

Figure 49 is a graphical representation of determining peak height;

Figure 50 is a graphical representation of determining signal-to-noise for each peak;

Figure 51 is a graphical representation of determining a residual error for each peak;

Figure 52 is a graphical representation of peak probabilities;

Figure 53 is a graphical representation of applying an allelic ratio to peak probability;

Figure 54 is a graphical representation of determining peak probability

Figure 55 is a graphical representation of calling a genotype;

Figure 56 is a flowchart showing a statistical procedure for calling a genotype;

Figure 57 is a flowchart showing processing performed by the computing device of Figure 1 when performing standardless genotyping; and

Figure 58 is graphical representation of applying an allelic ratio to peak probability for standardless genotype processing.

DETAILED DESCRIPTION

Definitions

Unless defined otherwise, all technical and scientific terms used herein have the same meaning as is commonly understood by one of ordinary skill in the art to which this invention belongs. All patents, applications, published applications and other publications and sequences from GenBank and other databases referred to herein throughout the disclosure are incorporated by reference in their entirety.

As used herein, a biopolymer includes, but is not limited to, nucleic acid, proteins, polysaccharides, lipids and other macromolecules. Nucleic acids include DNA, RNA, and fragments thereof. Nucleic acids may be derived from genomic DNA, RNA, mitochondrial nucleic acid, chloroplast nucleic acid and other organelles with separate genetic material.

As used herein, morbidity refers to conditions, such as diseases or disorders, that compromise the health and well-being of an organism, such as an animal. Morbidity susceptibility or morbidity-associated genes are genes that, when altered, for example, by a variation in nucleotide sequence, facilitate the expression of a specific disease clinical phenotype. Thus, morbidity susceptibility genes have the potential, upon alteration, of increasing the likelihood or general risk that an organism will develop a specific disease.

As used herein, mortality refers to the statistical likelihood that an organism, particularly an animal, will not survive a full predicted lifespan. Hence, a trait or a marker, such as a polymorphism, associated with increased mortality is observed at a lower frequency in older than younger segments of a population.

As used herein, a polymorphism, e.g. genetic variation, refers to a variation in the sequence of a gene in the genome amongst a population, such as allelic variations and other variations that arise or are observed. Thus, a polymorphism refers to the occurrence of two or more genetically determined alternative sequences or alleles in a population. These differences can occur in coding and non-coding portions of the genome, and can be manifested or detected as differences in nucleic acid sequences, gene expression, including, for example transcription, processing, translation, transport, protein processing, trafficking, DNA synthesis, expressed proteins, other gene products or products of biochemical pathways or in post-translational modifications and any other differences manifested amongst members of a population. A single nucleotide polymorphism (SNP) refers to a polymorphism that arises as the result of a single base change, such as an insertion, deletion or change in a base.

A polymorphic marker or site is the locus at which divergence occurs. Such site may be as small as one base pair (an SNP). Polymorphic markers include, but are not limited to, restriction fragment length polymorphisms, variable number of tandem repeats (VNTR's), hypervariable regions, minisatellites, dinucleotide repeats, trinucleotide repeats, tetranucleotide repeats and other repeating patterns, simple sequence repeats and insertional elements, such as Alu. Polymorphic forms also are manifested as different mendelian

alleles for a gene. Polymorphisms may be observed by differences in proteins, protein modifications, RNA expression modification, DNA and RNA methylation, regulatory factors that alter gene expression and DNA replication, and any other manifestation of alterations in genomic nucleic acid or organelle nucleic acids.

As used herein, a healthy population, refers to a population of organisms, including but are not limited to, animals, bacteria, viruses, parasites, plants, eubacteria, and others, that are disease free. The concept of disease-free is a function of the selected organism. For example, for mammals it refers to a subject not manifesting any disease state. Practically a healthy subject, when human, is defined as human donor who passes blood bank criteria to donate blood for eventual use in the general population. These criteria are as follows: free of detectable viral, bacterial, mycoplasma, and parasitic infections; not anemic; and then further selected based upon a questionnaire regarding history (see Figure 3). Thus, a healthy population represents an unbiased population of sufficient health to donate blood according to blood bank criteria, and not further selected for any disease state. Typically such individuals are not taking any medications. For plants, for example, it is a plant population that does not manifest diseases pathology associated with plants. For bacteria it is a bacterial population replicating without environmental stress, such as selective agents, heat and other pathogens.

As used herein, a healthy database (or healthy patient database) refers to a database of profiles of subjects that have not been pre-selected for any particular disease. Hence, the subjects that serve as the source of data for the database are selected, according to predetermined criteria, to be healthy. In contrast to other such databases that have been pre-selected for subjects with a particular disease or other characteristic, the subjects for the database provided herein are not so-selected. Also, if the subjects do manifest a disease or other condition, any polymorphism discovered or characterized should be related to an independent disease or condition. In a preferred embodiment, where the subjects are human, a healthy subject manifests no disease symptoms and meets criteria, such as those set by blood banks for blood donors.

Thus, the subjects for the database are a population of any organism, including, but are not limited to, animals, plants, bacteria, viruses, parasites and any other organism or entity that has nucleic acid. Among preferred subjects are mammals, preferably, although not necessarily, humans. Such a database can capture the diversity of the a population, thus providing for discovery of rare polymorphisms.

As used herein, a profile refers to information relating to, but not limited to and not necessarily including all of, age, sex, ethnicity, disease history, family history, phenotypic characteristics, such as height and weight and other relevant parameters. A sample collect information form is shown in Figure 22, which illustrates profile intent.

As used herein, a disease state is a condition or abnormality or disorder that may be inherited or result from environmental stresses, such as toxins, bacterial, fungal and viral infections.

As used herein, set of non-selected subjects means that the subjects have not been pre-selected to share a common disease or other characteristic. They can be selected to be healthy as defined herein.

As used herein, a phenotype refers to a set of parameters that includes any distinguishable trait of an organism. A phenotype can be physical traits and can be, in instances in which the subject is an animal, a mental trait, such as emotional traits. Some phenotypes can be determined by observation elicited by questionnaires (see, *e.g.*, Figures 3 and 22) or by referring to prior medical and other records. For purposes herein, a phenotype is a parameter around which the database can be sorted.

As used herein, a parameter is any input data that will serve as a basis for sorting the database. These parameters will include phenotypic traits, medical histories, family histories and any other such information elicited from a subject or observed about the subject. A parameter may describe the subject, some historical or current environmental or social influence experienced by the subject, or a condition or environmental influence on someone related to the subject. Paramaters include, but are not limited to, any of those described herein, and known to those of skill in the art.

As used herein, haplotype refers referes to two or polymorphism located on a single DNA strand. Hence, haplotyping refers to identification of two or more polymorphisms on a single DNA strand. Haplotypes can be indicative of a phenotype. For some disorders a single polymorphism may suffice to indicate a trait; for others a plurality (i.e., a haplotype) may be needed. Haplotyping can be performed by isolating nucleic acid and separating the strands. In addition, when using enzymes such a certain nucleases, that produce, different size fragments from each strand, strand separation is not needed for haplotyping.

As used herein, used herein, pattern with reference to a mass spectrum or mass spectrometric analyses, refers to a characteristic distribution and number of signals (such peaks or digital representations thereof).

As used herein, signal in the context of a mass spectrum and analysis thereof refers to the output data, which the number or relative number of moleucles having a particular mass. Signals include "peaks" and digital representations thereof.

As used herein, adaptor, when used with reference to haplotyping use Fen ligase, refers to a nucleic acid that specifically hybridizes to a polymorphism of insterest. An adaptor can be partially double-stranded. An adaptor complex is formed when an adaptor hybridizes to its target.

As used herein, a target nucleic acid refers to any nucleic acid of interest in a sample. It can contain one or more nucleotides.

As used herein, standardless analysis refers to a determination based upon an internal standard. For example, the frequency of a polymorphism can be determined herein by comparing signals within a single mass spectrum.

As used herein, amplifying refers to means for increasing the amount of a bipolymer, especially nucleic acids. Based on the 5′ and 3′ primers that are chosen, amplication also serves to restrict and define the region of the genome which is subject to analysis. Amplification can be by any means known to those skilled in the art, including use of the polymerase chain reaction (PCR) etc. Amplification, e.g., PCR must be done quantitatively when the frequency of polymorphism is required to be determined.

As used herein, cleaving refers to non-specific and specific fragmentation of a biopolymer.

As used herein, multiplexing refers to the simultaneous detection of more than one polymorphism. Methods for performing multiplexed reactions, particularly in conjunction with mass spectrometry are known (see, *e.g.*, U.S. Patent Nos. 6,043,031, 5,547,835 and International PCT application No. WO 97/37041).

As used herein, reference to mass spectrometry encompasss any suitable mass spectrometric format known to those of skill in the art. Such formats cinlude, but are not limited to, Matrix-Assisted Laser Desorption/Ionization, Time-of-Flight (MALDI-TOF), Electrospray (ES), IR-MALDI (see, *e.g.*, published International PCT application No.99/57318 and U.S. Patent No. 5,118,937), Ion Cyclotron Resonance (ICR), Fourier Transform and combinations thereof. MALDI, particular UV and IR, are among the preferred formats.

As used herein, mass spectrum refers to the presentation of data obtained from analyzing a biopolymer or fragment thereof by mass spectrometry either graphically or encoded numerically.

As used herein, a blood component is a component that is separated from blood and includes, but is not limited to red blood cells and platelets, blood clotting factors, plasma, enzymes, plasminogen, immunoglobulins. A cellular blood component is a component of blood, such as a red blood cell, that is a cell. A blood protein is a protein that is normally found in blood. Examples of such proteins are blood factors VII and VIII. Such proteins and components are well-known to those of skill in the art.

As used herein, plasma can be prepared by any method known to those of skill in the art. For example, it can be prepared by centrifuging blood at a force that pellets the red cells and forms an interface between the red cells and the buffy coat, which contains leukocytes, above which is the plasma. For example, typical platelet concentrates contain at least about 10% plasma.

Blood may be separated into its components, including, but not limited to, plasma, platelets and red blood cells by any method known to those of skill in the art. For example, blood can be centrifuged for a sufficient time and at a

sufficient acceleration to form a pellet containing the red blood cells. Leukocytes collect primarily at the interface of the pellet and supernatant in the buffy coat region. The supernatant, which contains plasma, platelets, and other blood components, may then be removed and centrifuged at a higher acceleration, whereby the platelets pellet.

As used herein, p53 is a cell cycle control protein that assesses DNA damage and acts as a transcription factor regulation gene which control cell growth, DNA repair and apoptosis. The p53 mutations have been found in a wide variety of different cancers, including all of the different types of leukemia, with varying frequency. The loss of normal p53 functions results in genomic instability and uncontrolled growth of the host cell.

As used herein, p21 is a cyclin-dependent kinase inhibitor, associated with G1 phase arrest of normal cells. Expression triggers apoptosis or programmed cell death and has been associated with Wilms' tumor, a pediatric kidney cancer.

As used herein, Factor VII is a serine protease involved the extrinsic blood coagulation cascade. This factor is activated by thrombin and works with tissue factor (Factor III) in the processing of Factor X to Factor Xa. Evidence has supported an association between polymorphisms in the gene and increase Factor VII activity which can result in an elevated risk of ischemic cardiovascular disease including myocardial infarction.

As used herein, a relational database stores information in a form representative of matrices, such as two-dimensional tables, including rows and columns of data, or higher dimensional matrices. For example, in one embodiment, the relational database has separate tables each with a parameter. The tables are linked with a record number, which also acts as an index. The database can be searched or sorted by using data in the tables and is stored in any suitable storage medium, such as floppy disk, CD rom disk, hard drive or other suitable medium.

As used herein, a bar codes refers any array of optically readable marks of any desired size and shape that are arranged in a reference context or frame of, preferably, although not necessarily, one or more columns and one or more

rows. For purposes herein, the bar code refers to any symbology, not necessary "bar" but may include dots, characters or any symbol or symbols.

As used herein, symbology refers to an identifier code or symbol, such as a bar code, that is linked to a sample. The index will reference each such symbology. The symbology is any code known or designed by the user. The symbols are associated with information stored in the database. For example, each sample can be uniquely identified with an encoded symbology. The parameters, such as the answers to the questions and subsequent genotypic and other information obtained upon analysis of the samples is included in the database and associated with the symbology. The database is stored on any suitable recording medium, such as a hard drive, a floppy disk, a tape, a CD ROM, a DVD disk and any other suitable medium.

DATABASES

Human genotyping is currently dependent on collaborations with hospitals, tissues banks and research institutions that provide samples of disease tissue. This approach is based on the concept that the onset and/or progression of diseases can be correlated with the presence of a polymorphisms or other genetic markers. This approach does not consider that disease correlated with the presence of specific markers and the absence of specific markers. It is shown herein that identification and scoring of the appearance and disappearance of markers is possible only if these markers are measured in the background of healthy subjects where the onset of disease does not mask the change in polymorphism occurrence. Databases of information from disease populations suffer from small sample size, selection bias and heterogeneity. The databases provided herein from healthy populations solve these problems by permitting large sample bands, simple selection methods and diluted heterogeneity.

Provided herein are first databases of parameters, associated with non-selected, particularly healthy, subjects. Also provided are combinations of the databases with indexed samples obtained from each of the subjects. Further provided are databases produced from the first databases. These contain in addition to the original parameters information, such as genotypic information,

including, but are not limited to, genomic sequence information, derived from the samples.

The databases, which are herein designated healthy databases, are so-designated because they are not obtained from subjects pre-selected for a particular disease. Hence, although individual members may have a disease, the collection of individuals is not selected to have a particular disease.

The subjects from whom the parameters are obtained comprise either a set of subjects who are randomly selected across, preferably, all populations, or are pre-selected to be disease-free or healthy. As a result, the database is not selected to be representative of any pre-selected phenotype, genotype, disease or other characteristic. Typically the number of subjects from which the database is prepared is selected to produce statistically significant results when used in the methods provided herein. Preferably, the number of subjects will be greater than 100, more preferably greater than 200, yet more preferably greater than 1000. The precise number can be empirically determined based upon the frequency of the parameter(s) that be used to sort the database. Generally the population can have at least 50, at least 100, at least 200, at least 500, at least 1000, at least 5000 or at least 10,000 or more subjects.

Upon identification of a collection of subjects, information about each subject is recorded and associated with each subject as a database. The information associated with each of the subjects, includes, but is not limited to, information related to historical characteristics of the subjects, phenotypic characteristics and also genotypic characteristics, medical characteristics and any other traits and characteristics about the subject that can be determined. This information will serve as the basis for sorting the database.

In an exemplary embodiment, the subjects are mammals, such as humans, and the information relates to one or more of parameters, such as age, sex, medical history, ethnicity and any other factor. Such information, when the animals are humans, for example, can be obtained by a questionnaire, and by observations about the individual, such as hair color, eye color and other characteristics. Genotypic information will be obtained from tissue or other body and body fluid samples from the subject.

The healthy genomic database can include profiles and polymorphisms from healthy individuals from a library of blood samples where each sample in the library is an individual and separate blood or other tissue sample. Each sample in the database is profiled as to the sex, age, ethnic group, and disease history of the donor.

The databases are generated by first identifying healthy populations of subjects and obtaining information about each subject that will serve as the sorting parameters for the database. This information is preferably entered into a storage medium, such as the memory of a computer.

The information obtained about each subject in a population used for generating the database is stored in a computer memory or other suitable storage medium. The information is linked to an identifier associated with each subject. Hence the database will identify a subject, for example by a datapoint representative of a bar code, and then all information, such as the information from a questionnaire, regarding the individual is associated with the datapoint. As the information is collected the database is generated.

Thus, for example, profile information, such as subject histories obtained from questionnaires, is collected in the database. The resulting database can be sorted as desired, using standard software, such as by age, sex and/or ethnicity. An exemplary questionnaire for subjects from whom samples are to be obtained is shown in Figures 22A-D. Each questionnaire preferably is identified by a bar code, particularly a machine readable bar code for entry into the database. After a subject provides data and is deemed to be healthy (*i.e.*, meets standards for blood donation), the data in the questionnaire is entered into the database and is associated with the bar code. A tissue, cell or blood sample is obtained from the subject.

Figure 4 exemplifies processing and tracking of blood sample components. Each component is tracked with a bar code, dated, is entered into the database and associated with the subject and the profile of the subject. Typically, the whole blood is centrifuged to produce plasma, red blood cells (which pellet) and leukocytes found in the buffy coat which layers in between.

Various samples are obtained and coded with a bar code and stored for use as needed.

Samples are collected from the subjects. The samples include, but are not limited to, tissues, cells, and fluids, such as nucleic acid, blood, plasma, amniotic fluid, synovial fluid, urine, saliva, aqueous humor, sweat, sperm samples and cerebral spinal fluid. It is understood that the particular set of samples depends upon the organisms in the population.

Once samples are obtained the collection can be stored and, in preferred embodiments, each sample is indexed with an identifier, particularly a machine readable code, such as a bar code. For analyses, the samples or components of the samples, particularly biopolymers and small molecules, such as nucleic acids and/or proteins and metabolites, are isolated.

After samples are analyzed, this information is entered into the database in the memory of the storage medium and associated with each subject. This information includes, but is not limited to, genotypic information. Particularly, nucleic acid sequence information and other information indicative of polymorphisms, such as masses of PCR fragments, peptide fragment sequences or masses, spectra of biopolymers and small molecules and other indicia of the structure or function of a gene, gene product or other marker from which the existence of a polymorphism within the population can be inferred.

In an exemplary embodiment, a database can be derived from a collection of blood samples. For example, Figure 1 (see, also Figure 10) shows the status of a collection of over 5000 individual samples. The samples were processed in the laboratory following SOP (standard operating procedure) guidelines. Any standard blood processing protocol may be used.

For the exemplary database described herein, the following criteria were used to select subjects:

No testing is done for infectious agents.

Age: At least 17 years old

Weight: Minimum of 110 pounds

Permanently Disqualified:

History of hepatitis (after age 11)

Leukemia Lymphoma

Human immunodeficiency virus (HIV),AIDS

Chronic kidney disease

Temporarily Disqualified:

Pregnancy - until six weeks after delivery, miscarriage or abortion

Major surgery or transfusions - for one year

Mononucleosis - until complete recovery

Prior whole blood donation - for eight weeks

Antibiotics by injection for one week; by mouth, for forty-eight hours, except antibiotics for skin complexion;

5 year Deferment:

Internal cancer and skin cancer if it has been removed, is healed and there is no recurrence

These correspond to blood bank criteria for donating blood and represent a healthy population as defined herein for a human healthy database.

Structure of the database

Any suitable database structure and format known to those of skill in the art may be employed. For example, a relational database is a preferred format in which data is stored as matrices or tables of the parameters linked by an indexer that identifies each subject. Software for preparing and manipulating, including sorting the database, can be readily developed or adapted from commercially available software, such as Microsoft Access.

Quality control

Quality control procedures can be implemented. For example, after collection of samples, the quality of the collection in the bank can be assessed. For example, mix-up of samples can be checked by testing for known markers, such as sex. After samples are separated by ethnicity, samples are randomly tested for a marker associated with a particular ethnicity, such as HLA DQA1 group specific component, to assess whether the samples have been properly sorted by ethnic group. An exemplary sample bank is depicted in Figure 4.

Obtaining genotypic data and other parameters for the database

After informational and historical parameters are entered into the database, material from samples obtained from each subject, is analyzed. Analyzed material include proteins, metabolites, nucleic acids, lipids and any other desired constituent of the material. For example, nucleic acids, such as genomic DNA, can be analyzed by sequencing.

Sequencing can be performed using any method known to those of skill in the art. For example, if a polymorphism is identified or known, and it is desired to assess its frequency or presence among the subjects in the database, the region of interest from each sample can be isolated, such as by PCR or restriction fragments, hybridization or other suitable method known to those of skill in the art and sequenced. For purposes herein, sequencing analysis is preferably effected using mass spectrometry (see, *e.g.*, U.S. Patent Nos. 5,547,835, 5,622,824, 5,851,765, and 5,928,906). Nucleic acids can also be sequence by hybridization (see, *e.g.*, U.S. Patent Nos. 5,503,980, 5,631,134, 5,795,714) and including analysis by mass spectrometry (see, U.S. application Serial Nos. 08/419,994 and 09/395,409).

In other detection methods, it is necessary to first amplify prior to identifying the allelic variant. Amplification can be performed, e.g., by PCR and/or LCR, according to methods known in the art. In one embodiment, genomic DNA of a cell is exposed to two PCR primers and amplification for a number of cycles sufficient to produce the required amount of amplified DNA. In preferred embodiments, the primers are located between 150 and 350 base pairs apart.

Alternative amplification methods include: self sustained sequence replication (Guatelli, J. C. et al., 1990, Proc. Natl. Acad. Sci. U.S.A. 87:1874-1878), transcriptional amplification system (Kwoh, D. Y. et al., 1989, Proc. Natl. Acad. Sci. U.S.A. 86:1173-1177), Q-Beta Replicase (Lizardi, P. M. et al., 1988, Bio/Technology 6:1197), or any other nucleic acid amplification method, followed by the detection of the amplified molecules using techniques well known to those of skill in the art. These detection schemes are especially

useful for the detection of nucleic acid molecules if such molecules are present in very low numbers.

Nucleic acids can also be analyzed by detection methods and protocols, particularly those that rely on mass spectrometry (see, *e.g.*, U.S. Patent No. 5,605,798, 6,043,031, allowed copending U.S. application Serial No. 08/744,481, U.S. application Serial No. 08/990,851 and International PCT application No. WO 99/31273, International PCT application No. WO 98/20019). These methods can be automated (see, *e.g.*, copending U.S. application Serial No. 09/285,481 and published International PCT application No. PCT/US00/08111, which describes an automated process line). Preferred among the methods of analysis herein are those involving the primer oligo base extension (PROBE) reaction with mass spectrometry for detection (described herein and elsewhere, see *e.g.*, U.S. Patent No. 6,043,031; see, also U.S. application Serial Nos. 09/287,681, 09/287,682, 09/287,141 and 09/287,679, allowed copending U.S. application Serial No. 08/744,481, International PCT application No. PCT/US97/20444, published as International PCT application No. WO 98/20019, and based upon U.S. application Serial Nos. 08/744,481, 08/744,590, 08/746,036, 08/746,055, 08/786,988, 08/787,639, 08/933,792, 08/746,055, 08/786,988 and 08/787,639; see, also U.S. application Serial No. 09/074,936, U.S. Patent No. 6,024,925, and U.S. application Serial Nos. 08/746,055 and 08/786,988, and published International PCT application No. WO 98/20020)

A preferred format for performing the analyses is a chip based format in which the biopolymer is linked to a solid support, such as a silicon or silicon-coated substrate, preferably in the form of an array. More preferably, when analyses are performed using mass spectrometry, particularly MALDI, small nanoliter volumes of sample are loaded on, such that the resulting spot is about, or smaller than, the size of the laser spot. It has been found that when this is achieved, the results from the mass spectrometric analysis are quantitative. The area under the signals in the resulting mass spectra are proportional to concentration (when normalized and corrected for background). Methods for preparing and using such chips are described in U.S. Patent No. 6,024,925, co-

pending U.S. application Serial Nos. 08/786,988, 09/364,774, 09/371,150 and 09/297,575; see, also U.S. application Serial No. PCT/US97/20195, which published as WO 98/20020. Chips and kits for performing these analyses are commercially available from SEQUENOM under the trademark MassARRAY. MassArray relies on the fidelity of the enzymatic primer extension reactions combined with the miniaturized array and MALDI-TOF (Matrix-Assisted Laser Desorption Ionization-Time of Flight) mass spectrometry to deliver results rapidly. It accurately distinguishes single base changes in the size of DNA fragments associated with genetic variants without tags.

The methods provided herein permit quantitative determination of alleles. The areas under the signals in the mass spectra can be used for quantitative determinations. The frequency is determined from the ratio of the signal to the total area of all of the spectrum and corrected for background. This is possible because of the PROBE technology as described in the above applications incorporated by reference herein.

Additional methods of analyzing nucleic acids include amplification- based methods including polymerase chain reaction (PCR), ligase chain reaction (LCR), mini-PCR, rolling circle amplification, autocatalytic methods, such as those using Qβ replicase, TAS, 3SR, and any other suitable method known to those of skill in the art.

Other methods for analysis and identification and detection of polymorphisms, include but are not limited to, allele specific probes, Southern analyses, and other such analyses.

The methods described below provide ways to fragment given amplified or non-amplified nucleotide sequences thereby producing a set of mass signals when mass spectrometry is used to analyze the fragment mixtures. Amplified fragments are yielded by standard polymerase chain methods (US 4,683,195 and 4,683,202). The fragmentation method involves the use of enzymes that cleave single or double strands of DNA and enzymes that ligate DNA. The cleavage enzymes can be glycosylases, nickases, and site-specific and non site-specific nucleases with the most preferred enzymes being glycosylases, nickases, and site-specific nucleases.

Glycosylase Fragmentation Method

DNA glycosylases specifically remove a certain type of nucleobase from a given DNA fragment. These enzymes can thereby produce abasic sites, which can be recognized either by another cleavage enzyme, cleaving the exposed phosphate backbone specifically at the abasic site and producing a set of nucleobase specific fragments indicative of the sequence, or by chemical means, such as alkaline solutions and or heat. The use of one combination of a DNA glycosylase and its targeted nucleotide would be sufficient to generate a base specific signature pattern of any given target region.

Numerous DNA glcosylases are known, For example, a DNA glycosylase can be uracil-DNA glycolsylase (UDG) , 3-methyladenine DNA glycosylase, 3-methyladenine DNA glycosylase II, pyrimidine hydrate-DNA glycosylase, FaPy-DNA glycosylase, thymine mismatch-DNA glycosylase, hypoxanthine-DNA glycosylase, 5-Hydroxymethyluracil DNA glycosylase (HmUDG), 5-Hydroxymethylcytosine DNA glycosylase, or 1,N6-ethenoadenine DNA glycosylase (see, *e.g.*,, U.S. Patent Nos. 5,536,649, 5,888, 795, 5,952,176 and 6,099,553, International PCT application Nos. WO 97/03210, WO 99/54501; see, also, Eftedal et al. (1993) Nucleic Acids Res 21:2095-2101, Bjelland and Seeberg (1987) Nucleic Acids Res. 15:2787-2801, Saparbaev et al. (1995) Nucleic Acids Res. 23:3750-3755, Bessho (1999) Nucleic Acids Res. 27:979-983) corresponding to the enzyme's modified nucleotide or nucleotide analog target. A preferred glycosylase is uracil-DNA glycolsylase (UDG).

Uracil, for example, can be incorporated into an amplified DNA molecule by amplifying the DNA in the presence of normal DNA precursor nucleotides (e.g. dCTP, dATP, and dGTP) and dUTP. When the amplified product is treated with UDG, uracil residues are cleaved. Subsequent chemical treatment of the products from the UDG reaction results in the cleavage of the phosphate backbone and the generation of nucleobase specific fragments. Moreover, the separation of the complementary strands of the amplified product prior to glycosylase treatment allows complementary patterns of fragmentation to be generated. Thus, the use of dUTP and Uracil DNA glycosylase allows the generation of T specific fragments for the complementary strands, thus providing

information on the T as well as the A positions within a given sequence. Similar to this, a C-specific reaction on both (complementary) strands (i.e. with a C-specific glycosylase) yields information on C as well as G positions within a given sequence if the fragmentation patterns of both amplification strands are analyzed separately. Thus, with the glycosylase method and mass spectrometry, a full series of A, C, G and T specific fragmentation patterns can be analyzed.

Nickase Fragmentation Method

A DNA nickase, or DNase, can be used recognize and cleave one strand of a DNA duplex. Numerous nickases are known. Among these, for example, are nickase NY2A nickase and NYS1 nickase (Megabase) with the following cleavage sites:

NY2A: 5'...R AG...3'

3'...Y TC...5' where R = A or G and Y = C or T

NYS1: 5'... CC[A/G/T]...3'

3'... GG[T/C/A]...5'.

Fen-Ligase Fragmentation Method

The Fen-ligase method involves two enzymes: Fen-1 enzyme and a ligase. The Fen-1 enzyme is a site-specific nuclease known as a "flap" endonuclease (US 5,843,669, 5,874,283, and 6,090,606). This enzymes recognizes and cleaves DNA "flaps" created by the overlap of two oligonucleotides hybridized to a target DNA strand. This cleavage is highly specific and can recognize single base pair mutations, permitting detection of a single homologue from an individual heterozygous at one SNP of interest and then genotyping that homologue at other SNPs occurring within the fragment. Fen-1 enzymes can be Fen-1 like nucleases e.g. human, murine, and Xenopus XPG enzymes and yeast RAD2 nucleases or Fen-1 endonucleases from, for example, *M. jannaschii*, *P. furiosus*, and *P. woesei*. Among preferred enzymes are the Fen-1 enzymes.

The ligase enzyme forms a phosphodiester bond between two double stranded nucleic acid fragments. The ligase can be DNA Ligase I or DNA Ligase III (see, *e.g.*, U.S. Patent Nos. US 5,506,137, 5,700,672, 5,858,705 and 5,976,806; see, also, Waga, *et al.* (1994) J. Biol. Chem. 269:10923-10934, Li

et al. (1994) Nucleic Acids Res. 22:632-638, Arrand et al. (1986) J. Biol. Chem. 261:9079-9082, Lehman (1974) Science 186:790-797, Higgins and Cozzarelli (1979) Methods Enzymol. 68:50-71, Lasko et al. (1990) Mutation Res. 236:277-287, and Lindahl and Barnes (1992) Ann. Rev. Biochem. 61:251-281).

Thermostable ligase (Epicenter Technologies), where "thermostable" denotes that the ligase retains activity even after exposure to temperatures necessary to separate two strands of DNA, are among preferred ligases for use herein.

Type IIS Enzyme Fragmentation Method

Restriction enzymes bind specifically to and cleave double-stranded DNA at specific sites within or adjacent to a particular recognition sequence. These enzymes have been classified into three groups (e.g. Types I, II, and III) as known to those of skill in the art. Because of the properties of type I and type III enzymes, they have not been widely used in molecular biological applications. Thus, for this invention type II enzymes are preferred. Of the thousands of restriction enzymes known in the arts, there are 179 different type II specificities. Of the 179 unique type II restriction endonucleases, 31 have a 4-base recognition sequence, 11 have a 5-base recognition sequence, 127 have a 6-base recognition sequence, and 10 have recognition sequences of greater than six bases (US 5,604,098). Of category type II enzymes, type IIS is preferred.

Type IIS enzymes can be *Alw* XI, *Bbv* I, *Bce* 83, *Bpm* I, *Bsg* I, *Bsm* AI, *Bsm* FI, *Bsa* I, *Bcc* I, *Bcg* I, *Ear* I, *Eco* 57I, *Esp* 3I, *Fau* I, *Fok* I, *Gsu* I, *Hga* I, *Mme* I, *Mbo* II, *Sap* I, and the like. The preferred type IIS enzyme is Fok I.

The Fok I enzyme endonuclease is an exemplary well characterized member of the Type IIS class (see, *e.g.*, U.S. Patent Nos. 5,714,330, 5,604,098, 5,436,150, 6,054,276 and 5,871,911; see, also, Szybalski et al. (1991) Gene 100:13-26, Wilson and Murray (1991) Ann. Rev. Genet. 25:585-627, Sugisaki et al. (1981) Gene 16:73-78, Podhajska and Szalski (1985) Gene 40:175-182. Fok I recognizes the sequence 5'GGATG-3' and cleaves DNA accordingly. Type IIS restriction sites can be introduced into DNA targets by incorporating the site into primers used to amplify such targets. Fragments produced by digestion with Fok I are site specific and can be analyzed by mass

spectrometry methods such as MALDI-TOF mass spectrometry, ESI-TOF mass spectrometry, and any other type of mass spectrometry well known to those of skill in the art.

Once a polymorphism has been found to correlatate with a parameter such as age. The possibility of false results due to allelic dropout is examined by doing comparative PCR in an adjacent region of the genome.

Analyses

In using the database, allelic frequencies can be determined across the population by analyzing each sample in the population individually, determining the presence or absence of allele or marker of interest in each individual sample, and then determining the frequency of the marker in the population. The database can then be sorted (stratified) to identify any correlations between the allele and a selected parameter using standard statistical analysis. If a correlation is observed, such as a decrease in a particular marker with age or correlation with sex or other parameter, then the marker is a candidate for further study, such as genetic mapping to identify a gene or pathway in which it is involved. The marker may then be correlated, for example, with a disease. Haplotying can also be carried out. Genetic mapping can be effected using standard methods and may also require use of databases of others, such as databases previously determined to be associated with a disorder.

Exemplary analyses have been performed and these are shown in the figures, and discussed herein.

Sample pooling

It has been found that using the databases provided herein, or any other database of such information, substantially the same frequencies that were obtained by examining each sample separately can be obtained by pooling samples, such as in batches of 10, 20, 50, 100, 200, 500, 1000 or any other number. A precise number may be determined empirically if necessary, and can be as low as 3.

In one embodiment, the frequency of genotypic and other markers can be obtained by pooling samples. To do this a target population and a genetic variation to be assessed is selected, a plurality of samples of biopolymers are obtained from members of the population, and the biopolymer from which the marker or genotype can be inferred is determined or detected. A comparison of samples tested in pools and individually and the sorted results therefrom are shown in Figure 9, which shows frequency of the factor VII Allele 353Q. Figure 10 depicts the frequency of the CETP Allele CETP in pooled versus individual samples. Figure 15 shows ethnic diversity among various ethnic groups in the database using pooled DNA samples to obtain the data. Figures 12-14 show mass spectra for these samples.

Pooling of test samples has application not only to the healthy databases provided herein, but also to use in gathering data for entry into any database of subjects and genotypic information, including typical databases derived from diseased populations. What is demonstrated herein, is the finding that the results achieved are statistically the same as the results that would be achieved if each sample is analyzed separately. Analysis of pooled samples by a method, such as the mass spectrometric methods provided herein, permits resolution of such data and quantitation of the results.

For factor VII the R53Q acid polymorphism was assessed. In Figure 9, the "individual" data represent allelic frequency observed in 92 individuals reactions. The pooled data represent the allelic frequency of the same 92 individuals pooled into a single probe reaction. The concentration of DNA in the samples of individual donors is 250 nanograms. The total concentration of DNA in the pooled samples is also 250 nanograms, where the concentration of any individual DNA is 2.7 nanograms.

It also was shown that it is possible to reduce the DNA concentration of individuals in a pooled samples from 2.7 nanograms to 0.27 nanograms without any change in the quality of the spectrum or the ability to quantitate the amount of sample detected. Hence low concentrations of sample may be used in the pooling methods.

Use of the databases and markers identified thereby

The successful use of genomics requires a scientific hypothesis (*i.e.*, common genetic variation, such as a SNP), a study design (*i.e.*, complex disorders), samples and technology, such as the chip-based mass spectrometric analyses (see, *e.g.*, U.S. Patent No. 5,605,798, U.S. Patent No. 5,777,324, U.S. Patent No. 6,043,031, allowed copending U.S. application Serial No. 08/744,481, U.S. application Serial No. 08/990,851, International PCT application No. WO 98/20019, copending U.S. application Serial No. 09/285,481, which describes an automated process line for analyses; see, also, U.S. application Serial Nos. 08/617,256, 09/287,681, 09/287,682, 09/287,141 and 09/287,679, allowed copending U.S. application Serial No. 08/744,481, International PCT application No. PCT/US97/20444, published as International PCT application No. WO 98/20019, and based upon U.S. application Serial Nos. 08/744,481, 08/744,590, 08/746,036, 08/746,055, 08/786,988, 08/787,639, 08/933,792, 08/746,055, 09/266,409, 08/786,988 and 08/787,639; see, also U.S. application Serial No. 09/074,936). All of these aspects can be used in conjunction with the databases provided herein and samples in the collection.

The databases and markers identified thereby can be used, for example, for identification of previously unidentified or unknown genetic markers and to identify new uses for known markers. As markers are identified, these may be entered into the database to use as sorting parameters from which additional correlations may be determined.

Previously unidentified or unknown genetic markers

The samples in the healthy databases can be used to identify new polymorphisms and genetic markers, using any mapping, sequencing, amplification and other methodologies, and in looking for polymorphisms among the population in the database. The thus-identified polymorphism can then be entered into the database for each sample, and the database sorted (stratified) using that polymorphism as a sorting parameter to identify any patterns and correlations that emerge, such as age correlated changes in the frequency of the identified marker. If a correlation is identified, the locus of the marker can be mapped and its function or effect assessed or deduced.

Thus, the databases here provide means for:

identification of significantly different allelic frequencies of genetic factors by comparing the occurrence or disappearance of the markers with increasing age in population and then associating the markers with a disease or a biochemical pathway;

identification of significantly different allelic frequencies of disease causing genetic factors by comparing the male with the female population or comparing other selected stratified populations and associating the markers with a disease or a biochemical pathway;

identification of significantly different allelic frequencies of disease causing genetic factors by comparing different ethnic groups and associating the markers with a disease or a biochemical pathway that is known to occur in high frequency in the ethnic group;

profiling potentially functional variants of genes through the general panmixed population stratified according to age, sex, and ethnic origin and thereby demonstrating the contribution of the variant genes to the physical condition of the investigated population;

identification of functionally relevant gene variants by gene disequilibrium analysis performed within the general panmixed population stratified according to age, sex, and ethnic origin and thereby demonstrating their contribution to the physical condition of investigated population;

identification of potentially functional variants of chromosomes or parts of chromosomes by linkage disequilibrium analysis performed within the general panmixed population stratified according to age, sex, and ethnic origin and thereby demonstrating their contribution to the physical condition of investigated population.

Uses of the identified markers and known markers

The databases may also be used in conjunction with known markers and sorted to identify any correlations. For example, the databases can be used for:

determination and evaluation of the penetrance of medically relevant polymorphic markers;

determination and evaluation of the diagnostic specificity of medically relevant genetic factors;

determination and evaluation of the positive predictive value of medically relevant genetic factors;

determination and evaluation of the onset of complex diseases, such as, but are not limited to, diabetes, hypertension, autoimmune diseases, arteriosclerosis, cancer and other diseases within the general population with respect to their causative genetic factors;

delineation of the appropriate strategies for preventive disease treatment;

delineation of appropriate timelines for primary disease intervention;

validation of medically relevant genetic factors identified in isolated populations regarding their general applicability;

validation of disease pathways including all potential target structures identified in isolated populations regarding their general applicability; and

validation of appropriate drug targets identified in isolated populations regarding their general applicability.

Among the diseases and disorders for which polymorphisms may be linked include, those linked to inborn errors of metabolism, acquired metabolic disorders, intermediary metabolism, oncogenesis pathways, blood clotting pathways, and DNA synthetic and repair pathways DNA repair/replication/transcription factors and activities, *e.g.*, such as genes related to oncogenesis, aging and genes involved in blood clotting and the related biochemical pathways that are related to thrombosis, embolism, stroke, myocardial infarction, angiogenesis and oncogenesis.

For example, a number of diseases are caused by or involve deficient or defective enzymes in intermediary metabolism (see, e.g., Tables 1 and 2, below) that result, upon ingestion of the enzyme substrates, in accumulation of harmful metabolites that damage organs and tissues, particularly an infant's developing brain and other organs, resulting in mental retardation and other developmental disorders.

Identification of markers and genes for such disorders is of great interest.

Model systems

Several gene systems, p21, p53 and Lipoprotein Lipase polymorphism (N291S), were selected. The p53 gene is a tumor suppressor gene that is mutated in diverse tumor types. One common allelic variant occurs at codon 72. A polymorphism that has been identified in the p53 gene, i.e., the R72P allele, results in an amino acid exchange, arginine to proline, at codon 72 of the gene.

Using diseased populations, it has been shown that there are ethnic differences in the allelic distribution of these alleles among African-Americans and Caucasians in the U.S. The results here support this finding and also demonstrate that the results obtained with a healthy database are meaningful (see, Figure 7B).

The 291S allele leads to reduced levels of high density lipoprotein cholesterol (HDL-C) that is associated with an increased risk of males for arteriosclerosis and in particular myocardial infarction (see, Reymer *et al.* (1995) *Nature Genetics 10*:28-34).

Both genetic polymorphisms were profiled within a part of the Caucasian population-based sample bank. For the polymorphism located in the lipoprotein lipase gene a total of 1025 unselected individuals (436 males and 589 females) were tested. Genomic DNA was isolated from blood samples obtained from the individuals.

As shown in the Examples and figures, an exemplary database containing about 5000 subjects, answers to the questionnaire (see Figure 3), and genotypic information has been stratified. A particular known allele has been selected, and the samples tested for the marker using mass spectrometric analyses, particularly PROBE (see the EXAMPLES) to identify polymorphisms in each sample. The population in the database has been sorted according to various parameters and correlations have been observed. For example, FIGURES 2A-C, show sorting of the data by age and sex for the Lipoprotein Lipase gene in the Caucasian population in the database. The results show a decrease in the frequency of the allele with age in males but no such decrease in females. Other

alleles that have been tested against the database, include, alleles of p53, p21 and factor VII. Results when sorted by age are shown in the figures.

These examples demonstrate an effect of altered frequency of disease causing genetic factors within the general population. The scientific interpretation of those results allows prediction of medical relevance of polymorphic genetic alterations. In addition, conclusions can be drawn with regard to their penetrance, diagnostic specificity, positive predictive value, onset of disease, most appropriate onset of preventive strategies, and the general applicability of genetic alterations identified in isolated populations to panmixed populations.

Therefore, an age- and sex-stratified population-based sample bank that is ethnically homogenous is a suitable tool for rapid identification and validation of genetic factors regarding their potential medical utility.

Exemplary computer system for creating, storing and processing the databases

Systems

Systems, including computers, containing the databases are provided herein. The computers and databases can be used in conjunction, for example, with the APL system (see, copending U.S. application Serial No. 09/285,481), which is an automated system for analyzing biopolymers, particularly nucleic acids. Results from the APL system can be entered into the database.

Any suitable computer system may be used. The computer system may be integrated into systems for sample analysis, such as the automated process line described herein (see, *e.g.*, copending U.S. application Serial No. 09/285,481).

Figure 17 is a block diagram of a computer constructed in to provide and process the databases described herein. The processing that maintains the database and performs the methods and procedures may be performed on multiple computers all having a similar construction, or may be performed by a single, integrated computer. For example, the computer through which data is added to the database may be separate from the computer through which the database is sorted, or may be integrated with it. In either arrangement, the

computers performing the processing may have a construction as illustrated in Figure 17.

Figure 17 is a block diagram of an exemplary computer 1700 that maintains the database described above and performs the methods and procedures. Each computer 1700 operates under control of a central processor unit (CPU) 1702, such as a "Pentium" microprocessor and associated integrated circuit chips, available from Intel Corporation of Santa Clara, California, USA. A computer user can input commands and data from a keyboard and display mouse 1704 and can view inputs and computer output at a display 1706. The display is typically a video monitor or flat panel display device. The computer 1700 also includes a direct access storage device (DASD) 1707, such as a fixed hard disk drive. The memory 1708 typically comprises volatile semiconductor random access memory (RAM). Each computer preferably includes a program product reader 1710 that accepts a program product storage device 1712, from which the program product reader can read data (and to which it can optionally write data). The program product reader can comprise, for example, a disk drive, and the program product storage device can comprise removable storage media such as a magnetic floppy disk, an optical CD-ROM disc, a CD-R disc, a CD-RW disc, or a DVD data disc. If desired, the computers can be connected so they can communicate with each other, and with other connected computers, over a network 1713. Each computer 1700 can communicate with the other connected computers over the network 1713 through a network interface 1714 that enables communication over a connection 1716 between the network and the computer.

The computer 1700 operates under control of programming steps that are temporarily stored in the memory 1708 in accordance with conventional computer construction. When the programming steps are executed by the CPU 1702, the pertinent system components perform their respective functions. Thus, the programming steps implement the functionality of the system as described above. The programming steps can be received from the DASD 1707, through the program product reader 1712, or through the network connection 1716. The storage drive 1710 can receive a program product, read

programming steps recorded thereon and transfer the programming steps into the memory 1708 for execution by the CPU 1702. As noted above, the program product storage device 1710 can comprise any one of multiple removable media having recorded computer-readable instructions, including magnetic floppy disks and CD-ROM storage discs. Other suitable program product storage devices can include magnetic tape and semiconductor memory chips. In this way, the processing steps necessary for operation can be embodied on a program product.

Alternatively, the program steps can be received into the operating memory 1708 over the network 1713. In the network method, the computer receives data including program steps into the memory 1708 through the network interface 1714 after network communication has been established over the network connection 1716 by well-known methods that will be understood by those skilled in the art without further explanation. The program steps are then executed by the CPU 1702 to implement the processing of the Garment Database system.

It should be understood that all of the computers of the system preferably have a construction similar to that shown in Figure 17, so that details described with respect to the Figure 17 computer 1700 will be understood to apply to all computers of the system 1700. This is indicated by multiple computers 1700 shown connected to the network 1713. Any one of the computers 1700 can have an alternative construction, so long as they can communicate with the other computers and support the functionality described herein.

Figure 18 is a flow diagram that illustrates the processing steps performed using the computer illustrated in Figure 17, to maintain and provide access to the databases, such as for identifying polymorphic genetic markers. In particular, the information contained in the database is stored in computers having a construction similar to that illustrated in Figure 17. The first step for maintaining the database, as indicated in Figure 18, is to identify healthy members of a population. As noted above, the population members are subjects that are selected only on the basis of being healthy, and where the subjects are mammals, such as humans, they are preferably selected based upon apparent

health and the absence of detectable infections. The step of identifying is represented by the flow diagram box numbered 1802.

The next step, represented by the flow diagram box numbered 1804, is to obtain identifying and historical information and data relating to the identified members of the population. The information and data comprise parameters for each of the population members, such as member age, ethnicity, sex, medical history, and ultimately genotypic information. Initially, the parameter information is obtained from a questionnaire answered by each member, from whom a body tissue or body fluid sample also is obtained. The step of entering and storing these parameters into the database of the computer is represented by the flow diagram box numbered 1806. As additional information about each population member and corresponding sample is obtained, this information can be inputted into the database and can serve as a sorting parameter.

In the next step, represented by the flow diagram box numbered 1808, the parameters of the members are associated with an indexer. This step may be executed as part of the database storage operation, such as when a new data record is stored according to the relational database structure and is automatically linked with other records according to that structure. The step 1806 also may be executed as part of a conventional data sorting or retrieval process, in which the database entries are searched according to an input search or indexing key value to determine attributes of the data. For example, such search and sort techniques may be used to follow the occurrence of known genetic markers and then determine if there is a correlation with diseases for which they have been implicated. Examples of this use are for assessing the frequencies of the p53 and Lipoprotein Lipase polymorphisms.

Such searching of the database also may be valuable for identifying one or more genetic markers whose frequency changes within the population as a function of age, ethnic group, sex, or some other criteria. This can allow the identification of previously unknown polymorphisms and, ultimately, identification of a gene or pathway involved in the onset and progression of disease.

In addition, the database can be used for taking an identified polymorphism and ascertaining whether it changes in frequency when the data is sorted according to a selected parameter.

In this way, the databases and methods provided herein permit, among other things, identification of components, particularly key components, of a disease process by understanding its genetic underpinnings, and also an understanding of processes, such as individual drug responses. The databases and methods provided herein also can be used in methods involving elucidation of pathological pathways, in developing new diagnostic assays, identifying new potential drug targets, and in identifying new drug candidates.

Morbidity and/or early mortality associated polymorphisms

A database containing information provided by a population of healthy blood donors who were not selected for any particular disease to can be used to identify polymorphisms and the alleles in which they are present, whose frequency decreases with age. These may represent morbidity susceptibility markers and genes.

Polymorphisms of the genome can lead to altered gene function, protein function or genome instability. To identify those polymorphisms which have a clinical relevance/utility is the goal of a world-wide scientific effort. It can be expected that the discovery of such polymorphisms will have a fundamental impact on the identification and development of novel drug compounds to cure diseases. However, the strategy to identify valuable polymorphisms is cumbersome and dependent upon the availability of many large patient and control cohorts to show disease association. In particular, genes that cause a general risk of the population to suffer from any disease (morbidity susceptibility genes) will escape these case/control studies entirely.

Here described is a screening strategy to identify morbidity susceptibility genes underlying a variety of different diseases. The definition of a morbidity susceptibility gene is a gene that is expressed in many different cell types or tissues (housekeeping gene) and its altered function can facilitate the expression of a clinical phenotype caused by disease-specific susceptibility genes that are involved in a pathway specific for this disorder. In other words, these morbidity

susceptibility genes predispose people to develop a distinct disease according to their genetic make-up for this disease.

Candidates for morbidity susceptibility genes can be found at the bottom level of pathways involving transcription, translation, heat-shock proteins, protein trafficking, DNA repair, assembly systems for subcellular structures (e.g. mitochondria, peroxysomes and other cellular microbodies), receptor signaling cascades, immunology, etc. Those pathways control the quality of life at the cellular level as well as for the entire organism. Mutations/polymorphisms located in genes encoding proteins for those pathways can reduce the fitness of cells and make the organism more susceptible to express the clinical phenotype caused by the action of a disease-specific susceptibility gene. Therefore, these morbidity susceptibility genes can be potentially involved in a whole variety of different complex diseases if not in all. Disease-specific susceptibility genes are involved in pathways that can be considered as disease-specific pathways like glucose-, lipid, hormone metabolism, etc.

The exemplified method permit, among other things, identification of genes and/or gene products involved in a man's general susceptibility to morbidity and/or mortality; use of these genes and/or gene products in studies to elucidate the genetic underpinnings of human diseases; use of these genes and/or gene products in combinatorial statistical analyses without or together with disease-specific susceptibility genes; use of these genes and/or gene products to predict penetrance of disease susceptibility genes; use of these genes and/or gene products in predisposition and/or acute medical diagnostics and use of these genes and/or gene products to develop drugs to cure diseases and/or to extend the life span of humans.

SCREENING PROCESS

The healthy population stratified by age, gender and ethnicity, etc. is a very efficient and a universal screening tool for morbidity associated genes. Changes of allelic frequencies in the young compared to the old population are expected to indicate putative morbidity susceptibility genes. Individual samples of this healthy population base can be pooled to further increase the throughput. In a proof of principle experiment pools of young and old Caucasian females and

males were applied to screen more than 400 randomly chosen single nucleotide polymorphisms located in many different genes. Candidate polymorphisms were identified if the allelic difference was greater than 8% between young and old for both or only one of the genders. The initial results were assayed again in at least one independent subsequent experiments. Repeated experiments are necessary to recognize unstable biochemical reactions, which occur with a frequency of about 2-3% and can mimic age-related allelic frequency differences. Average frequency differences and standard deviations are calculated after successful reproducibility of initial results. The final allelic frequency is then compared to a reference population of Caucasian CEPH sample pool. The result should show similar allelic frequencies in the young Caucasian population. Subsequently, the exact allele frequencies of candidates including genotype information were obtained by analyzing all individual samples. This procedure is straight forward with regard to time and cost. It enables the screening of an enormous number of SNPs. So far, several markers with a highly significant association to age were identified and described below.

In general at least 5 individual in a stratified population need to be screened to produce statistically significant results. The frequency of the allele is determined for an age stratified population. Chi square analysis is then performed on the allelic frequencies to determine if the difference between age groups is statistically significant. A p value less than of 0.1 is considered to represent a statistically significant difference. More preferably the p value should be less than 0.05.

Clinical Trials

The identification of markers whose frequency in a population decreases with age also allows for better designed and balanced clinical trials. Currently, if a clinical trial utilizes a marker as a significant endpoint in a study and the marker disappears with age, then the results of the study may be inaccurate. By using methods provided herein, it can be ascertained that if a marker decreases in frequency with age. This information considered and controlled when designing the study. For, example, an age independent marker could be substituted in its place.

The following examples are included for illustrative purposes only and are not intended to limit the scope of the invention.

EXAMPLE 1

This example describes the use of a database containing information provided by a population of healthy blood donors who were not selected for any particular disease to determine the distribution of allelic frequencies of known genetic markers with age and by sex in a Caucasian subpopulation of the database. The results described in this example demonstrate that a disease-related genetic marker or polymorphism can be identified by sorting a healthy database by a parameter or parameters, such as age, sex and ethnicity.

Generating a database

Blood was obtained by venous puncture from human subjects who met blood bank criteria for donating blood. The blood samples were preserved with EDTA at pH 8.0 and labeled. Each donor provided information such as age, sex, ethnicity, medical history and family medical history. Each sample was labeled with a barcode representing identifying information. A database was generated by entering, for each donor, the subject identifier and information corresponding to that subject into the memory of a computer storage medium using commercially available software, e.g., Microsoft Access.

Model genetic markers

The frequencies of polymorphisms known to be associated at some level with disease were determined in a subpopulation of the subjects represented in the database. These known polymporphisms occur in the p21, p53 and Lipoprotein Lipase genes. Specifically, the N291S polymorphism (N291S) of the Lipoprotein Lipase gene, which results in a substitution of a serine for an asparagine at amino acid codon 291, leads to reduced levels of high density lipoprotein cholesterol (HDL-C) that is associated with an increased risk of males for arteriosclerosis and in particular myocardial infarction (see, Reymer *et al.* (1995) *Nature Genetics 10*:28-34).

The p53 gene encodes a cell cycle control protein that assesses DNA damage and acts as a transcription factor regulating genes that control cell growth, DNA repair and apoptosis (programmed cell death). Mutations in the

p53 gene have been found in a wide variety of different cancers, including different types of leukemia, with varying frequency. The loss of normal p53 function results in genomic instability an uncontrolled cell growth. A polymorphism that has been identified in the p53 gene, i.e., the R72P allele, results in the substitution of a proline for an arginine at amino acid codon 72 of the gene.

The p21 gene encodes a cyclin-dependent kinase inhibitor associated with G1 phase arrest of normal cells. Expression of the p21 gene triggers apoptosis. Polymorphisms of the p21 gene have been associated with Wilms' tumor, a pediatric kidney cancer. One polymorphism of the p21 gene, the S31R polymorphism, results in a substitution of an arginine for a serine at amino acid codon 31.

Database analysis

Sorting of subjects according to specific parameters

The genetic polymorphisms were profiled within segments of the Caucasian subpopulation of the sample bank. For p53 profiling, the genomic DNA isolated from blood from a total of 1277 Caucasian subjects age 18-59 years and 457 Caucasian subjects age 60-79 years was analyzed. For p21 profiling, the genomic DNA isolated from blood from a total of 910 Caucasian subjects age 18-49 years and 824 Caucasian subjects age 50-79 years was analyzed. For lipoprotein lipase gene profiling, the genomic DNA from a total of 1464 Caucasian females and 1470 Caucasian males under 60 years of age and a total of 478 Caucasian females and 560 Caucasian males over 60 years of age was analyzed.

Isolation and analysis of genomic DNA

Genomic DNA was isolated from blood samples obtained from the individuals. Ten milliliters of whole blood from each individual was centrifuged at 2000 x g. One milliliter of the buffy coat was added to 9 ml of 155 mM NH_4Cl, 10 mM $KHCO_3$, and 0.1 mM Na_2EDTA, incubated 10 min at room temperature and centrifuged for 10 min at 2000 x g. The supernatant was removed, and the white cell pellet was washed in 155 mM NH_4Cl, 10 mM $KHCO_3$ and 0.1 mM Na_2EDTA and resuspended in 4.5 ml of 50 mM Tris, 5 mM

EDTA and 1% SDS. Proteins were precipitated from the cell lysate by 6 mM ammonium acetate, pH 7.3, and then separated from the nucleic acids by centrifugation at 3000 x g. The nucleic acid was recovered from the supernatant by the addition of an equal volume of 100% isopropanol and centrifugation at 2000 x g. The dried nucleic acid pellet was hydrated in 10 mM Tris, pH 7.6, and 1 mM Na_2EDTA and stored at 4° C.

Assays of the genomic DNA to determine the presence or absence of the known genetic markers were developed using the BiomassPROBE™ detection method (primer oligo base extension) reaction. This method uses a single detection primer followed by an oligonucleotide extension step to give products, which can be readily resolved by mass spectrometry, and, in particular, MALDI-TOF mass spectrometry. The products differ in length depending on the presence or absence of a polymorphism. In this method, a detection primer anneals adjacent to the site of a variable nucleotide or sequence of nucleotides and the primer is extended using a DNA polymerase in the presence of one or more dideoxyNTPs and, optionally, one or more deoxyNTPs. The resulting products are resolved by MALDI-TOF mass spectrometry. The mass of the products as measured by MALDI-TOF mass spectrometry makes possible the determination of the nucleotide(s) present at the variable site.

First, each of the Caucasian genomic DNA samples was subjected to nucleic acid amplification using primers corresponding to sites 5' and 3' of the polymorphic sites of the p21 (S31R allele), p53 (R72P allele) and Lipoprotein Lipase (N291S allele) genes. One primer in each primer pair was biotinylated to permit immobilization of the amplification product to a solid support. Specifically, the polymerase chain reaction primers used for amplification of the relevant segments of the p21, p53 and lipoprotein lipase genes are shown below: US4p21c31-2F (SEQ ID NO: 9) and US5p21-2R (SEQ ID NO: 10) for p21 gene amplification; US4-p53-ex4-F (also shown as p53-ex4US4 (SEQ ID NO: 2)) and US5-p53/2-4R (also shown as US5P53/4R (SEQ ID NO: 3)) for p53 gene amplification; and US4-LPL-F2 (SEQ ID NO: 16) and US5-LPL-R2 (SEQ ID NO: 17) for lipoprotein lipase gene amplification.

Amplification of the respective DNA sequences was conducted according to standard protocols. For example, primers may be used in a concentration of 8 pmol. The reaction mixture (e.g., total volume 50 μl) may contain Taq-polymerase including 10x buffer and dTNPs. Cycling conditions for polymerase chain reaction amplification may typically be initially 5 min. at 95°C, followed by 1 min. at 94°C, 45 sec at 53°C, and 30 sec at 72°C for 40 cycles with a final extension time of 5 min at 72°C. Amplification products may be purified by using Qiagen's PCR purification kit (No. 28106) according to manufacturer's instructions. The elution of the purified products from the column can be done in 50 μl TE-buffer (10mM Tris, 1 mM EDTA, pH 7.5).

The purified amplification products were immobilized via a biotin-avidin linkage to streptavidin-coated beads and the double-stranded DNA was denatured. A detection primer was then annealed to the immobilized DNA using conditions such as, for example, the following: 50 μl annealing buffer (20 mM Tris, 10 mM KCl, 10 mM $(NH_4)_2SO_4$, 2 mM $MgSO_2$, 1% Triton X-100, pH 8) at 50°C for 10 min, followed by washing of the beads three times with 200 μl washing buffer (40 mM Tris, 1 mM EDTA, 50 mM NaCl, 0.1% Tween 20, pH 8.8) and once in 200 μl TE buffer.

The PROBE extension reaction was performed, for example, by using some components of the DNA sequencing kit from USB (No. 70770) and dNTPs or ddNTPs from Pharmacia. An exemplary protocol could include a total reaction volume of 45 μl, containing of 21 μl water, 6 μl Sequenase-buffer, 3 μl 10 mM DTT solution, 4.5 μl, 0.5 mM of three dNTPs, 4.5 μl, 2 mM the missing one ddNTP, 5.5 μl glycerol enzyme dilution buffer, 0.25 μl Sequenase 2.0, and 0.25 pyrophosphatase. The reaction can then by pipetted on ice and incubated for 15 min at room temperature and for 5 min at 37°C. The beads may be washed three times with 200 μl washing buffer and once with 60 μl of a 70 mM NH_4-Citrate solution.

The DNA was denatured to release the extended primers from the immobilized template. Each of the resulting extension products was separately analyzed by MALDI-TOF mass spectrometry using 3-hydroxypicolinic acid (3-HPA) as matrix and a UV laser.

Specifically, the primers used in the PROBE reactions are as shown below: P21/31-3 (SEQ ID NO: 12) for PROBE analysis of the p21 polymorphic site; P53/72 (SEQ ID NO: 4) for PROBE analysis of the p53 polymorphic site; and LPL-2 for PROBE analysis of the lipoprotein lipase gene polymorphic site. In the PROBE analysis of the p21 polymorphic site, the extension reaction was performed using dideoxy-C. The products resulting from the reaction conducted on a "wild-type" allele template (wherein codon 31 encodes a serine) and from the reaction conducted on a polymorphic S31R allele template (wherein codon 31 encodes an arginine) are shown below and designated as P21/31-3 Ser (wt) (SEQ ID NO: 13) and P21/31-3 Arg (SEQ ID NO: 14), respectively. The masses for each product as can be measured by MALDI-TOF mass spectrometry are also provided (i.e., 4900.2 Da for the wild-type product and 5213.4 Da for the polymorphic product).

In the PROBE analysis of the p53 polymorphic site, the extension reaction was performed using dideoxy-C. The products resulting from the reaction conducted on a "wild-type" allele template (wherein codon 72 encodes an arginine) and from the reaction conducted on a polymorphic R72P allele template (wherein codon 72 encodes a proline) are shown below and designated as Cod72 G Arg (wt) and Cod72 C Pro, respectively. The masses for each product as can be measured by MALDI-TOF mass spectrometry are also provided (i.e., 5734.8 Da for the wild-type product and 5405.6 Da for the polymorphic product).

In the PROBE analysis of the lipoprotein lipase gene polymorphic site, the extension reaction was performed using a mixture of ddA and ddT. The products resulting from the reaction conducted on a "wild-type" allele template (wherein codon 291 encodes an asparagine) and from the reaction conducted on a polymorphic N291S allele template (wherein codon 291 encodes a serine) are shown below and designated as 291Asn and 291Ser, respectively. The masses for each product as can be measured by MALDI-TOF mass spectrometry are also provided (i.e., 6438.2 Da for the wild-type product and 6758.4 Da for the polymorphic product).

P53-1 (R72P)

PCR Product length: 407 bp (SEQ ID NO: 1)

```
                                                US4-p53-ex4-F
                                                ctg aggacctggt cctctgactg
ctcttttcac ccatctacag tccccccttgc cgtcccaagc aatggatgat ttgatgctgt
ccccggacga tattgaacaa tggttcactg aagacccagg tccagatgaa gctcccagaa
 P53/72                 72R
tgccagaggc tgctccccgc gtggcccctg caccagcagc tcctacaccg gcggcccctg
                      c 72P
caccagcccc ctcctggccc ctgtcatctt ctgtcccttc ccagaaaacc taccagggca
gctacggttt ccgtctgggc ttcttgcatt ctgggacagc caagtctgtg acttgcacgg
tcagttgccc tgaggggctg gcttccatga gacttcaa
                                 US5-p53/2-4R
```

Primers (SEQ ID NOs: 2-4)

p53-ex4FUS4 ccc agt cac gac gtt gta aaa cgc tga gga cct ggt cct ctg ac

US5P53/4R agc gga taa caa ttt cac aca ggt tga agt ctc atg gaa gcc

P53/72 gcc aga ggc tgc tcc cc

Masses

Allele	Product Termination: ddC	SEQ #	Length	Mass
P53/72	gccagaggctgctcccc	5	17	5132.4
Cod72 G Arg (wt)	gccagaggctgctccccgc	6	19	5734.8
Cod72 C Pro	gccagaggctgctccccc	7	18	5405.6

Biotinylated US5 primer is used in the PCR amplification.

LPL-1 (N291S)

Amino acid exchange asparagine to serine at codon 291 of the lipoprotein lipase gene.

PCR Product length: 251 bp (SEQ ID NO: 15)

US4-LPL-F2 (SEQ ID NO: 16)

```
gcgctccatt catctcttca tcgactctct gttgaatgaa gaaaatccaa gtaaggccta
caggtgcagt tccaaggaag cctttgagaa agggctctgc ttgagttgta gaaagaaccg
           LPL-2              291N
ctgcaacaat ctgggctatg agatcaataa agtcagagcc aaaagaagca gcaaaatgta
                              g 291S
cctgaagact cgttctcaga tgccc
               US4-LPL-R2
```

Primers (SEQ ID NOs: 16-18):

US4-LPL-F2 ccc agt cac gac gtt gta aaa cgg cgc tcc att cat ctc ttc

US5-LPL-R2 agc gga taa caa ttt cac aca ggg ggc atc tga gaa cga gtc

LPL-2 caa tct ggg cta tga gat ca

Masses

Allele	Product Termination: ddA, ddT	SEQ #	Length	Mass
LPL-2	caatctgggctatgagatca	19	20	6141
291 Asn	caatctgggctatgagatcaa	20	21	6438.2
291 Ser	caatctgggctatgagatcagt	21	22	6758.4

Biotinylated US5 primer is used in the PCR amplification.

P21-1 (S31R)

Amino acid exchange serine to arginine at codon 31 of the tumor suppressor gene p21. Product length: 207 bp (SEQ ID NO: 8)

US4p21c31-2F

gtcc gtcagaaccc atgcggcagc
p21/31-3 31S
aaggcctgcc gccgcctctt cggcccagtg gacagcgagc agctgagccg cgactgtgat
a 31R
gcgctaatgg cgggctgcat ccaggaggcc cgtgagcgat ggaacttcga ctttgtcacc
gagacaccac tggaggg
US5p21-2R

Primers (SEQ ID NOs: 9-11)

US4p21c31-2F ccc agt cac gac gtt gta aaa cgg tcc gtc aga acc cat gcg g

US5p21-2R agc gga taa caa ttt cac aca ggc tcc agt ggt gtc tcg gtg ac

P21/31-3 cag cga gca gct gag

Masses

Allele	Product Termination: ddC	SEQ #	Length	Mass
p21/31-3	cagcgagcagctgag	12	15	4627
P21/31-3 Ser (wt)	cagcgagcagctgagc	13	16	4900.2
P21/31-3 Arg	cagcgagcagctgagac	14	17	5213.4

Biotinylated US5 primer is used in the PCR amplification.

Each of the Caucasian subject DNA samples was individually analyzed by MALDI-TOF mass spectrometry to determine the identity of the nucleotide at the polymorphic sites. The genotypic results of each assay can be entered into the database. The results were then sorted according to age and/or sex to determine the distribution of allelic frequencies by age and/or sex. As depicted in the Figures showing

histograms of the results, in each case, there was a differential distribution of the allelic frequencies of the genetic markers for the p21, p53 and lipoprotein lipase gene polymorphisms.

Figure 8 shows the results of the p21 genetic marker assays reveals a statistically significant decrease (from 13.3% to 9.2%) in the frequency of the heterozygous genotype (S31R) in Caucasians with age (18-49 years of age compared to 50-79 years of age). The frequencies of the homozygous (S31 and R31) genotypes for the two age groups are also shown, as are the overall frequencies of the S31 and R31 alleles in the two age groups (designated as *S31 and *R31, respectively in the Figure).

Figures 7A-C shows the results of the p53 genetic marker assays and reveals a statistically significant decrease (from 6.7% to 3.7%) in the frequency of the homozygous polymorphic genotype (P72) in Caucasians with age (18-59 years of age compared to 60-79 years of age). The frequencies of the homozygous "wild-type" genotype (R72) and the heterozygous genotype (R72P) for the two age groups are also shown, as are the overall frequencies of the R72 and P72 alleles in the two age groups (designated as *R72 and *P72, respectively in the Figure). These results are consistent with the observation that allele is not benign, as p53 regulates expression of a second protein, p21, which inhibits cyclin-dependent kinases (CDKs) needed to drive cells through the cell-cycle (a mutation in either gene can disrupt the cell cycle leading to increased cell division).

Figure 2C shows the results of the lipoprotein lipase gene genetic marker assays reveals a statistically significant decrease (from 1.97% to 0.54%) in the frequency of the polymorphic allele (S291) in Caucasian males with age (see also Reymer *et al.* (1995) *Nature Genetics* 10:28-34).

The frequencies of this allele in Caucasian females of different age groups are also shown.

EXAMPLE 2

This example describes the use of MALDI-TOF mass spectrometry to analyze DNA samples of a number of subjects as individual samples and as pooled samples of multiple subjects to assess the presence or absence of a polymorphic allele (the 353Q allele) of the Factor VII gene and determine the frequency of the allele in the group of subjects. The results of this study show that essentially the same allelic frequency can be obtained by analyzing pooled DNA samples as by analyzing each sample separately and thereby demonstrate the quantitative nature of MALDI-TOF mass spectrometry in the analysis of nucleic acids.

Factor VII

Factor VII is a serine protease involved in the extrinsic blood coagulation cascade. This factor is activated by thrombin and works with tissue factor (Factor III) in the processing of Factor X to Factor Xa. There is evidence that supports an association between polymorphisms in the Factor VII gene and increased Factor VII activity which can result in an elevated risk of ischemic cardiovascular disease, including myocardial infarction. The polymorphism investigated in this study is R353Q (i.e., a substitution of a glutamic acid residue for an arginine residue at codon 353 of the Factor VII gene) (see Table 5).

Analysis of DNA samples for the presence or absence of the 353Q allele of the Factor VII gene

Genomic DNA was isolated from separate blood samples obtained from a large number of subjects divided into multiple groups of 92 subjects per group. Each sample of genomic DNA was analyzed using the BiomassPROBE™ assay as described in Example 1 to determine the presence or absence of the 353Q polymorphism of the Factor VII gene.

First, DNA from each sample was amplified in a polymerase chain reaction using primers F7-353FUS4 (SEQ ID NO: 24) and F7-353RUS5 (SEQ ID NO: 26) as shown below and using standard conditions, for example, as described in Example 1. One of the primers was biotinylated to permit immobilization of the amplification product to a solid support. The purified amplification products were immobilized via a biotin-avidin linkage to streptavidin-coated beads and the double-stranded DNA was denatured. A detection primer was then annealed to the immobilized DNA using conditions such as, for example, described in Example 1. The detection primer is shown as F7-353-P (SEQ ID NO: 27) below. The PROBE extension reaction was carried out using conditions, for example, such as those described in Example 1. The reaction was performed using ddG.

The DNA was denatured to release the extended primers from the immobilized template. Each of the resulting extension products was separately analyzed by MALDI-TOF mass spectrometry. A matrix such as 3-hydroxypicolinic acid (3-HPA) and a UV laser could be used in the MALDI-TOF mass spectrometric analysis. The products resulting from the reaction conducted on a "wild-type" allele template (wherein codon 353 encodes an arginine) and from the reaction conducted on a polymorphic 353Q allele template (wherein codon 353 encodes a glutamic acid) are shown below and designated as 353 CGG and 353 CAG, respectively. The masses for each product as can be measured by MALDI-TOF mass spectrometry are also provided (i.e., 5646.8 Da for the wild-type product and 5960 Da for the polymorphic product).

The MALDI-TOF mass spectrometric analyses of the PROBE reactions of each DNA sample were first conducted separately on each sample (250 nanograms total concentration of DNA per analysis). The allelic frequency of the 353Q polymorphism in the group of 92 subjects

was calculated based on the number of individual subjects in which it was detected.

Next, the samples from 92 subjects were pooled (250 nanograms total concentration of DNA in which the concentration of any individual DNA is 2.7 nanograms) and the pool of DNA was subjected to MALDI-TOF mass spectrometric analysis. The area under the signal corresponding to the mass of the 353Q polymorphism PROBE extension product in the resulting spectrum was integrated in order to quantitate the amount of DNA present. The ratio of this amount to total DNA was used to determine the allelic frequency of the 353Q polymorphism in the group of subjects. This type of individual sample vs. pooled sample analysis was repeated for numerous different groups of 92 different samples.

The frequencies calculated based on individual MALDI-TOF mass spectrometric analysis of the 92 separate samples of each group of 92 are compared to those calculated based on MALDI-TOF mass spectrometric analysis of pools of DNA from 92 samples in Figure 9. These comparisons are shown as "pairs" of bar graphs in the Figure, each pair being labeled as a separate "pool" number, e.g., P1, P16, P2, etc. Thus, for example, for P1, the allelic frequency of the polymorphism calculated by separate analysis of each of the 92 samples was 11.41% and the frequency calculated by analysis of a pool of all of the 92 DNA samples was 12.09%.

The similarity in frequencies calculated by analyzing separate DNA samples individually and by pooling the DNA samples demonstrates that it is possible, through the quantitative nature of MALDI-TOF mass spectrometry, to analyze pooled samples and obtain accurate frequency determinations. The ability to analyze pooled DNA samples significantly reduces the time and costs involved in the use of the non-selected, healthy databases as described herein. It has also been shown that it is

possible to decrease the DNA concentration of the individual samples in a pooled mixture from 2.7 nanograms to 0.27 nanograms without any change in the quality of the spectrum or the ability to quantitate the amount of sample detected.

Factor VII R353Q PROBE Assay

PROBE Assay for cod353 CGG>CAG (Arg>Gln), Exon 9 G>A.

PCR fragment: 134 bp (incl. US tags; SEQ ID Nos. 22 and 23)

Frequency of A allele: Europeans about 0.1, Japanese/Chinese about 0.03-0.05 (Thromb. Haemost. 1995, 73:617-22; Diabetologia 1998, 41:760-6):

```
                    F7-353FUS4>
1201 GTGCCGGCTA CTCGGATGGC AGCAAGGACT CCTGCAAGGG GGACAGTGGA
GGCCCACATG
     F7-353-P>      A            <F7-353RUS5
1261 CCACCCACTA CCGGGGCACG TGGTACCTGA CGGGCATCGT CAGCTGGGGC
CAGGGCTGCG
```

Primers (SEQ ID NOs: 24-26)		Tm^{gs}
F7-353FUS4	**CCC AGT CAC GAC GTT GTA AAA CGA** TGG CAG CAA GGA CTC CTG	64°C
F7-353-P	CAC ATG CCA CCC ACT ACC	
F7-353RUS5	**AGC GGA TAA CAA TTT CAC ACA GGT** GAC GAT GCC CGT CAG GTA C	64°C

Masses

Allele	Product Termination: ddG	SEQ #	Length	Mass
F7-353-P	atgccacccactacc	27	18	5333.6
353 CGG	cacatgccacccactaccg	28	19	5646.8
353 CAG	cacatgccacccactaccag	29	20	5960
US5-bio bio-	agcggataacaatttcacacagg	30	23	7648.6

Conclusion

The above examples demonstrate an effect of altered frequency of disease causing genetic factors within the general population. Interpretation of those results allows prediction of the medical relevance of polymorphic genetic alterations. In addition, conclusions can be drawn with regard to their penetrance, diagnostic specificity, positive predictive value, onset of disease, most appropriate onset of preventive strategies,

and the general applicability of genetic alterations identified in isolated populations to panmixed populations. Therefore, an age- and sex-stratified population-based sample bank that is ethnically homogenous is a suitable tool for rapid identification and validation of genetic factors regarding their potential medical utility.

EXAMPLE 3

MORBIDITY AND MORTALITY MARKERS

Sample Band and Initial Screening

Healthy samples were obtained through the blood bank of San Bernardino, CA. Donors signed prior to the blood collection a consent form and agreed that their blood will be used in genetic studies with regard to human aging. All samples were anomymized. Tracking back of samples is not possible.

Isolation of DNA from blood samples of a healthy donor population

Blood is obtained from a donor by venous puncture and preserved with 1mM EDTA pH 8.0. Ten milliliters of whole blood from each donor was centrifuged at 2000x g. One milliliter of the buffy coat was added to 9 milliliters of 155mM NH_4Cl, 10mM $KHCO_3$, and 0.1mM Na_2EDTA, incubated 10 minutes at room temperature and centrifuged for 10 minutes at 2000x g. The supernatant was removed, and the white cell pellet was washed in 155mM NH_4Cl, 10mM $KHCO_3$, and 0.1mM Na_2EDTA and resuspended in 4.5 milliliters of 50mM Tris, 5mM EDTA, and 1% SDS. Proteins were precipitated from the cell lysate by 6M Ammonium Acetate, pH 7.3, and separated from the nucleic acid by centrifugation 3000x g. The nucleic acid was recovered from the supernatant by the addition of an equal volume of 100% isopropanol and centrifugation at 2000x g. The dried nucleic acid pellet was hydrated in lOmM Tris pH 7.6 and 1mM Na2EDTA and stored at 4C.

In this study, samples were pooled as shown in Table 1. Both parents of the blood donors were of Caucasian origin.

Table 1

Pool ID	Sex	Age-range	# individuals
SP1	Female	18-39 years	276
SP2	Males	18-39 years	276
SP3	Females	60-69 years	184
SP4	Males	60-79 years	368

More than 400 SNPs were tested using all four pools. After one test run 34 assays were selected to be re-assayed at least once. Finally, 10 assays showed repeatedly differences in allele frequencies of several percent and, therefore, fulfilled the criteria to be tested using the individual samples. Average allele frequency and standard deviation is tabulated in Table 2.

Table 2

Assay ID	SP1	SP1-STD	SP2	SP2-STD	SP3	SP3-STD	SP4	SP4-STD
47861	0.457	0.028	0.433	0.042	0.384	0.034	0.380	0.015
47751	0.276	0.007	0.403	0.006	0.428	0.052	0.400	0.097
48319	0.676	0.013	0.627	0.018	0.755	0.009	0.686	0.034
48070	0.581	0.034	0.617	0.045	0.561	n.a.	0.539	0.032
49807	0.504	0.034	0.422	0.020	0.477	0.030	0.556	0.005
49534	0.537	0.017	0.503	n.a.	0.623	0.023	0.535	0.009
49733	0.560	0.006	0.527	0.059	0.546	0.032	0.436	0.016
49947	0.754	0.008	0.763	0.047	0.736	0.052	0.689	0.025
50128	0.401	0.022	0.363	0.001	0.294	0.059	0.345	0.013

63306	**0.697**	0.012	0.674	0.013	**0.712**	0.017	**0.719**	0.005

So far, 7 out of the 10 potential morbidity markers were fully analyzed. Additional information about genes in which these SNPs are located was gathered through publicly databases like Genbank.

AKAPS

Candidate morbidity and mortality markers include housekeeping genes, such as genes involved in signal transduction. Among such genes are the A-kinase anchoring proteins (AKAPs) genes, which participate in signal transduction pathways involving protein phosphorylation. Protein phosphorylation is an important mechanism for enzyme regulation and the transduction of extracellular signals across the cell membrane in eukaryotic cells. A wide variety of cellular substrates, including enzymes, membrane receptors, ion channels and transcription factors, can be phosphorylated in response to extracellular signals that interact with cells. A key enzyme in the phosphorylation of cellular proteins in response to hormones and neurotransmitters is cyclic AMP (cAMP)-dependent protein kinase (PKA). Upon activation by cAMP, PKA thus mediates a variety of cellular responses to such extracellular signals. An array of PKA isozymes are expressed in mammalian cells. The PKAs usually exist as inactive tetramers containing a regulatory (R) subunit dimer and two catalytic (C) subunits. Genes encoding three C subunits (Cα, Cβ and Cγ) and four R subunits (RIα, RIβ, RIIα and RIIβ) have been identified [see Takio *et al.* (1982) *Proc. Natl. Acad. Sci. U.S. A. 79*:2544-2548; Lee *et al.* (1983) *Proc. Natl. Acad. Sci. U.S. A. 80*:3608-3612; Jahnsen *et al.* (1996) *J. Biol. Chem. 261*:12352-12361; Clegg *et al.* (1988) *Proc. Natl. Acad. Sci. U.S. A. 85*:3703-3707; and Scott (1991) *Pharmacol. Ther. 50*:123-145]. The type I (RI) α and type II (RII) α subunits are distributed ubiquitously, whereas RIβ and RIIβ are present mainly in brain [see. *e.g.*, Miki and Eddy

(1999) *J. Biol. Chem. 274*:29057-29062]. The type I PKA holoenzyme (RIα and RIβ) is predominantly cytoplasmic, whereas the majority of type II PKA (RIIα and RIIβ) associates with cellular structures and organelles [Scott (1991) *Pharmacol. Ther. 50*:123-145]. Many hormones and other signals act through receptors to generate cAMP which binds to the R subunits of PKA and releases and activates the C subunits to phosphorylate proteins. Because protein kinases and their substrates are widely distributed throughout cells, there are mechanisms in place in cells to localize protein kinase-mediated responses to different signals. One such mechanism involves subcellular targeting of PKAs through association with anchoring proteins, referred to as A-kinase anchoring proteins (AKAPs), that place PKAs in close proximity to specific organelles or cytoskeletal components and particular substrates thereby providing for more specific PKA interactions and localized responses [see, *e.g.*, Scott *et al.* (1990) *J. Biol. Chem. 265*:21561-21566; Bregman *et al.* (1991) *J. Biol. Chem. 266*:7207-7213; and Miki and Eddy (1999) *J. Biol. Chem. 274*:29057-29062]. Anchoring not only places the kinase close to preferred substrates, but also positions the PKA holoenzyme at sites where it can optimally respond to fluctuations in the second messenger cAMP [Mochly-Rosen (1995) *Science 268*:247-251; Faux and Scott (1996) *Trends Biochem. Sci. 21*:312-315; Hubbard and Cohen (1993) *Trends Biochem. Sci. 18*:172-177].

Up to 75% of type II PKA is localized to various intracellular sites through association of the regulatory subunit (RII) with AKAPs [see, *e.g.*, Hausken *et al.* (1996) *J. Biol. Chem. 271*:29016-29022]. RII subunits of PKA bind to AKAPs with nanomolar affinity [Carr *et al.* (1992) *J. Biol. Chem. 267*:13376-13382], and many AKAP-RII complexes have been isolated from cell extracts. RI subunits of PKA bind to AKAPs with only micromolar affinity [Burton *et al.* (1997) *Proc. Natl. Acad. Sci. U.S.A.*

94:11067-11072]. Evidence of binding of a PKA RI subunit to an AKAP has been reported [Miki and Eddy (1998) *J. Biol. Chem 273*:34384-34390] in which RI*α*-specific and RI*α*/RII*α* dual specificity PKA anchoring domains were identified on FSC1/AKAP82. Additional dual specific AKAPs, referred to as D-AKAP1 and D-AKAP2, which interact with the type I and type II regulatory subunits of PKA have also been reported [Huang *et al.* (1997) *J. Biol. Chem. 272*:8057-8064; Huang *et al.* (1997) *Proc. Natl. Acad. Sci. U.S.A. 94*:11184-11189].

More than 20 AKAPs have been reported in different tissues and species. Complementary DNAs (cDNAs) encoding AKAPs have been isolated from diverse species, ranging from *Caenorhabditis elegans* and *Drosophilia* to human [see, *e.g.*, Colledge and Scott (1999) *Trends Cell Biol. 9*:216-221]. Regions within AKAPs that mediate association with RII subunits of PKA have been identified. These regions of approximately 10-18 amino acid residues vary substantially in primary sequence, but secondary structure predictions indicate that they are likely to form an amphipathic helix with hydrophobic residues aligned along one face of the helix and charged residues along the other [Carr *et al.* (1991) *J. Biol. Chem. 266*:14188-14192; Carr *et al.* (1992) *J. Biol. Chem. 267*:13376-13382]. Hydrophobic amino acids with a long aliphatic side chain, e.g., valine, leucine or isoleucine, may participate in binding to RII subunits [Glantz *et al.* (1993) *J. Biol. Chem. 268*:12796-12804].

Many AKAPs also have the ability to bind to multiple proteins, including other signaling enzymes. For example, AKAP79 binds to PKA, protein kinase C (PKC) and the protein phosphatase calcineurin (PP2B) [Coghlan *et al.* (1995) *Science 267*:108-112 and Klauck *et al.* (1996) *Science 271*:1589-1592]. Therefore, the targeting of AKAP79 to neuronal postsynaptic membranes brings together enzymes with opposite catalytic activities in a single complex.

AKAPs thus serve as potential regulatory mechanisms that increase the selectivity and intensity of a cAMP-mediated response. There is a need, therefore, to identify and elucidate the structural and functional properties of AKAPs in order to gain a complete understanding of the important role these proteins play in the basic functioning of cells.

AKAP10

The sequence of a human AKAP10 cDNA (also referred to as D-AKAP2) is available in the GenBank database, at accession numbers AF037439 (SEQ ID NO: 31) and NM 007202. The AKAP10 gene is located on chromosome 17.

The sequence of a mouse D-AKAP2 cDNA is also available in the GenBank database (see accession number AF021833). The mouse D-AKAP2 protein contains an RGS domain near the amino terminus that is characteristic of proteins that interact with Gα subunits and possess GTPase activating protein-like activity [Huang *et al.* (1997) *Proc. Natl. Acad. Sci. U.S.A. 94*:11184-11189]. The human AKAP10 protein also has sequences homologous to RGS domains. The carboxy-terminal 40 residues of the mouse D-AKAP2 protein are responsible for the interaction with the regulatory subunits of PKA. This sequence is fairly well conserved between the mouse D-AKAP2 and human AKAP10 proteins.

Polymorphisms of the human AKAP10 gene and polymorphic AKAP10 proteins

Polymorphisms of AKAP genes that alter gene expression, regulation, protein structure and/or protein function are more likely to have a significant effect on the regulation of enzyme (particularly PKA) activity, cellular transduction of signals and responses thereto and on the basic functioning of cells than polymorphisms that do not alter gene and/or protein function. Included in the polymorphic AKAPs provided herein are human AKAP10 proteins containing differing amino acid residues at position number 646.

Amino acid 646 of the human AKAP10 protein is located in the carboxy-terminal region of the protein within a segment that participates in the binding of R-subunits of PKAs. This segment includes the carboxy-terminal 40 amino acids.

The amino acid residue reported for position 646 of the human AKAP10 protein is an isoleucine. Polymorphic human AKAP10 proteins provided herein have the amino acid sequence but contain residues other than isoleucine at amino acid position 646 of the protein. In particular embodiments of the polymorphic human AKAP10 proteins provided herein, the amino acid at position 646 is a valine, leucine or phenylalanine residue.

An A to G transition at nucleotide 2073 of the human AKAP10 coding sequence

As described herein, an allele of the human AKAP10 gene that contains a specific polymorphism at position 2073 of the coding sequence and thereby encodes a valine at position 646 has been detected in varying frequencies in DNA samples from younger and older segments of the human population. In this allele, the A at position 2073 of the AKAP10 gene coding sequence is changed from an A to a G, giving rise to an altered sequence in which the codon for amino acid 646 changes from ATT, coding for isoleucine, to GTT, coding for valine.

Morbidity marker 1: human protein kinase A anchoring protein (AKAP10-1)

PCR Amplification and BiomassPROBE assay detection of AKAP10-1 in a healthy donor population

PCR Amplification of donor population for AKAP 10

PCR primers were synthesized by OPERON using phosphoramidite chemistry. Amplification of the AKAP10 target sequence was carried out in single 50μl PCR reaction with 100ng-1ug of pooled human genomic DNAs in a 50μl PCR reaction. Individual DNA concentrations within the

pooled samples were present in equal concentration with the final concentration ranging from 1-25ng. Each reaction containing IX PCR buffer (Qiagen, Valencia, CA), 200uM dNTPs, 1U Hotstar Taq polymerase (Qiagen, Valencia, CA), 4mM $MgCl_2$, and 25pmol of the forward primer containing the universal primer sequence and the target specific sequence 5'-TCTCAATCATGTGCATTGAGG-3'(SEQ ID NO: 45), 2pmol of the reverse primer 5'-AGCGGATAACAATTTCACACAGGGATCACACAGCCATCAGCAG-3' (SEQ ID NO: 46), and l0pmol of a biotinylated universal primer complementary to the 5' end of the PCR amplicon 5'-AGCGGATAACAATTTCACACAGG-3'(SEQ ID NO: 47). After an initial round of amplification with the target with the specific forward and reverse primer, the 5' biotinylated universal primer then hybridized and acted as a reverse primer thereby introducing a 3' biotin capture moiety into the molecule. The amplification protocol results in a 5'-biotinylated double stranded DNA amplicon and dramatically reduces the cost of high throughput genotyping by eliminating the need to 5' biotin label each forward primer used in a genotyping. Thermal cycling was performed in 0.2mL tubes or 96 well plate using an MJ Research Thermal Cycler (calculated temperature) with the following cycling parameters: 94° C for 5 min; 45 cycles: 94° C for 20 sec, 56° C for 30 sec, 72° C for 60 sec; 72° C 3min.

Immobilization of DNA

The 50μl PCR reaction was added to 25ul of streptavidin coated magnetic bead (Dynal) prewashed three times and resuspended in 1M NH_4Cl, 0.06M NH_4OH. The PCR amplicons were allowed to bind to the beads for 15 minutes at room temperature. The beads were then collected with a magnet and the supernatant containing unbound DNA was removed. The unbound strand was release from the double stranded amplicons by

incubation in 100mM NaOH and washing of the beads three times with 10mM Tris pH 8.0.

BiomassPROBE assay analysis of donor population for AKAP10-1 (clone 48319)

Genotyping using the BiomassPROBE assay methods was carried out by resuspending the DNA coated magnetic beads in 26mM Tris-HCl pH 9.5, 6.5 mM $MgCl_2$ and 50mM each of dTTP and 50mM each of ddCTP, ddATP, ddGTP, 2.5U of a thermostable DNA polymerase (Ambersham) and 20pmol of a template specific oligonucleotide PROBE primer 5'-CTGGCGCCCACGTGGTCAA-3' (SEQ ID NO: 48) (Operon). Primer extension occurs with three cycles of oligonucleotide primer hybridization and extension. The extension products were analyzed after denaturation from the template with 50mM NH_4Cl and transfer of 150nL each sample to a silicon chip preloaded with 150nL of H3PA matrix material. The sample material was allowed to crystallize and was analyzed by MALDI-TOF (Bruker, PerSeptive). The SNP that is present in AKAP10-1 is a T to C transversion at nucleotide number 156277 of the sequence of a genomic clone of the AKAP10 gene (GenBank Accession No. AC005730) (SEQ ID NO: 36). SEQ ID NO: 35: represents the nucleotide sequence of human chromosome 17, which contains the genomic nucleotide sequence of the human AKAP10 gene, and SEQ ID NO: represents the nucleotide sequence of human chromosome 17, which contains the genomic nucleotide sequence of the human AKAP10-1 allele. The mass of the primer used in the BioMass probe reaction was 5500.6 daltons. In the presence of the SNP, the primer is extended by the addition of ddC, which has a mass of 5773.8. The wildtype gene results in the addition of dT and ddG to the primer to produce an extension product having a mass of 6101 daltons.

The frequency of the SNP was measured in a population of age selected healthy individuals. Five hundred fifty-two (552) individuals between the ages of 18-39 years (276 females, 276 males) and 552 individuals between the ages of 60-79 (184 females between the ages of 60-69, 368 males between the age of 60-79) were tested for the presence of the polymorphism localized in the non-translated 3'region of AKAP 10. Differences in the frequency of this polymorphism with increasing age groups were observed among healthy individuals. Statistical analysis showed that the significance level for differences in the allelic frequency for alleles between the "younger" and the "older" populations was $p = 0.0009$ and for genotypes was $p = 0.003$. Differences between age groups are significant. For the total population allele significance is $p = 0.0009$, and genotype significance is $p = 0.003$.

This marker led to the best significant result with regard to allele and genotype frequencies in the age-stratified population. Figure 19 shows the allele and genotype frequency in both genders as well as in the entire population. For latter the significance for alleles was $p = 0.0009$ and for genotypes was $p = 0.003$. The young and old populations were in Hardy-Weinberg equilibrium. A preferential change of one particular genotype was not seen.

The polymorphism is localized in the non-translated 3'-region of the gene encoding the human protein kinase A anchoring protein (AKAP10). The gene is located on chromosome 17. Its structure includes 15 exons and 14 intervening sequences (introns). The encoded protein is responsible for the sub-cellular localization of the cAMP-dependent protein kinase and, therefore, plays a key role in the G-protein mediated receptor-signaling pathway (Huang et al. PNAS (1007) 94:11184-11189). Since its localization is outside the coding region, this polymorphism is most likely in linkage disequilibrium (LD) with other non-synonymous

polymorphisms that could cause amino acid substitutions and subsequently alter the function of the protein. Sequence comparison of different Genbank database entries concerning this gene revealed further six potential polymorphisms of which two are supposed to change the respective amino acid (see Table 3).

Table 3

Exon	Codon	Nucleotides	Amino acid
3	100	GCT > GCC	Ala > Ala
4	177	AGT > GTG	Met > Val
8	424	GGG > GGC	Gly > Gly
10	524	CCG > CTG	Pro > Leu
12	591	GTG > GTC	Val > Val
12	599	CGC > CGA	Arg > Arg

Morbitity marker 2: human protein kinase A anchoring protein (AKAP10-5)

Discovery of AKAP10-5 Allele (SEQ ID NO: 33)

Genomic DNA was isolated from blood (as described above) of seventeen (17) individuals with a genotype CC at the AKAP10-1 gene locus and a single heterozygous individual (CT) (as described). A target sequence in the AKAP10-1 gene which encodes the C-terminal PKA binding domain was amplified using the polymerase chain reaction. PCR primers were synthesized by OPERON using phosphoramidite chemistry. Amplification of the AKAP10-1 target sequence was carried out in individual 50μl PCR reaction with 25ng of human genomic DNA templates. Each reaction containing I X PCR buffer (Qiagen, Valencia, CA), 200μM dNTPs, IU Hotstar Taq polymerase (Qiagen, Valencia, CA), 4mM $MgCl_2$, 25pmol of the forward primer (Ex13F) containing the universal primer sequence and the target specific sequence 5'-TCC CAA AGT GCT GGA ATT AC-3' (SEQ ID NO: 53), and 2pmol of the reverse

primer (Ex14R) 5'-GTC CAA TAT ATG CAA ACA GTT G-3' (SEQ ID NO: 54). Thermal cycling was performed in 0.2mL tubes or 96 well plate using an MJ Research Thermal Cycler (MJ Research, Waltham, MA) (calculated temperature) with the following cycling parameters: 94° C for 5 min; 45 cycles; 94° C for 20 sec, 56° C for 30 sec, 72° C for 60 sec; 72° C 3min. After amplification the amplicons were purified using a chromatography (Mo Bio Laboratories (Solana Beach, CA)).

The sequence of the 18 amplicons, representing the target region, was determined using a standard Sanger cycle sequencing method with 25nmol of the PCR amplicon, 3.2uM DNA sequencing primer 5'-CCC ACA GCA GTT AAT CCT TC-3'(SEQ ID NO: 55), and chain terminating dRhodamine labeled 2', 3' dideoxynucleotides (PE Biosystems, Foster City, CA) using the following cycling parameters: 96° C for 15 seconds; 25 cycles: 55° C for 15 seconds, 60° C for 4 minutes. The sequencing products precipitated by 0.3M NaOAc and ethanol. The precipitate was centrifuged and dried. The pellets were resuspended in deionized formamide and separated on a 5% polyacrylimide gel. The sequence was determined using the "Sequencher" software (Gene Codes, Ann Arbor, MI).

The sequence of all 17 of the amplicons, which are homozygous for the AKAP10-1 SNP of the amplicons, revealed a polymorphism at nucleotide position 152171 (numbering for GenBank Accession No. AC005730 for AKAP10 genomic clone (SEQ ID NO: 35)) with A replaced by G. This SNP can also be designated as located at nucleotide 2073 of a cDNA clone of the wildtype AKAP10 (GenBank Accession No. AF037439) (SEQ ID NO: 31). The amino acid sequence of the human AKAP10 protein is provided as SEQ ID NO: 32. This single nucleotide polymorphism was designated as AKAP10-5 (SEQ ID NO: 33) and resulted in a substitution of a valine for an isoleucine residue at amino

acid position 646 of the amino acid sequence of human AKAP10 (SEQ ID NO: 32).

PCR Amplification and BiomassPROBE assay detection of AKAP10-5 in a healthy donor population

The healthy population stratified by age is a very efficient and a universal screening tool for morbidity associated genes by allowing for the detection of changes of allelic frequencies in the young compared to the old population. Individual samples of this healthy population base can be pooled to further increase the throughput.

Healthy samples were obtained through the blood bank of San Bernardino, CA. Both parents of the blood donors were of Caucasian origin. Practically a healthy subject, when human, is defined as human donor who passes blood bank criteria to donate blood for eventual use in the general population. These criteria are as follows: free of detectable viral, bacterial, mycoplasma, and parasitic infections; not anemic; and then further selected based upon a questionnaire regarding history (see Figure 3). Thus, a healthy population represents an unbiased population of sufficient health to donate blood according to blood bank criteria, and not further selected for any disease state. Typically such individuals are not taking any medications.

PCR primers were synthesized by OPERON using phosphoramidite chemistry. Amplification of the AKAP10 target sequence was carried out in a single 50μl PCR reaction with 100ng- 1μg of pooled human genomic DNAs in a 50μl PCR reaction. Individual DNA concentrations within the pooled samples were present in equal concentration with the final concentration ranging from 1-25ng. Each reaction contained 1X PCR buffer (Qiagen, Valencia, CA), 200μM dNTPs, 1U Hotstar Taq polymerase (Qiagen, Valencia, CA), 4mM $MgCl_2$, and 25pmol of the forward primer containing the universal primer sequence and the target specific sequence 5'-AGCGGATAACAATTTCACACAGGGAGCTAGCTTGGAAGAT

TGC-3' (SEQ ID NO: 41), 2pmol of the reverse primer 5'-GTCCAATATATGCAAACAGTTG-3' (SEQ ID NO: 54), and 10pmol of a biotinylated universal primer complementary to the 5' end of the PCR amplicon BIO:5'-AGCGGATAACAATTTCACACAGG-3' (SEQ ID NO: 43). After an initial round of amplification with the target with the specific forward and reverse primer, the 5' biotinylated universal primer can then be hybridized and acted as a forward primer thereby introducing a 5' biotin capture moiety into the molecule. The amplification protocol resulted in a 5'-biotinylated double stranded DNA amplicon and dramatically reduced the cost of high throughput genotyping by eliminating the need to 5' biotin label every forward primer used in a genotyping.

Themal cycling was performed in 0.2mL tubes or 96 well plate using an MJ Research Thermal Cycler (calculated temperature) with the following cycling parameters: 94° C for 5 min; 45 cycles: 94° C for 20 sec, 56° C for 30 sec; 72° C for 60 sec; 72° C 3min.

Immobilization of DNA

The 50 μl PCR reaction was added to 25μL of streptavidin coated magnetic beads (Dynal, Oslo, Norway), which were prewashed three times and resuspended in 1M NH_4Cl, 0.06M NH_4OH. The 5' end of one strand of the double stranded PCR amplicons were allowed to bind to the beads for 15 minutes at room temperature. The beads were then collected with a magnet and the supernatant containing unbound DNA was removed. The hybridized but unbound strand was released from the double stranded amplicons by incubation in 100mM NaOH and washing of the beads three times with 10mM Tris pH 8.0.

Detection of AKAP10-5 using BiomassPROBE™ Assay

BiomassPROBE™ assay of primer extension analysis (see, U.S. Patent No. 6,043,031) of donor population for AKAP 10-5 (SEQ ID NO:

33) was performed. Genotyping using these methods was carried out by resuspending the DNA coated magnetic beads in 26mM Tris-HCL pH 9.5, 6.5 mM $MgCl_2$, 50mM dTTP, 50mM each of ddCTP, ddATP, ddGTP, 2.5U of a thermostable DNA polymerase (Ambersham), and 20pmol of a template specific oligonucleotide PROBE primer 5'-ACTGAGCCTGCTGCATAA-3' (SEQ ID NO: 44) (Operon). Primer extension occurs with three cycles of oligonucleotide primer with hybridization and extension. The extension products were analyzed after denaturation from the template with 50 mM NH_4Cl and transfer of 150 nL of each sample to a silicon chip preloaded with 150 nl of H3PA matrix material. The sample material was allowed to crystallize and analyzed by MALDI-TOF (Bruker, PerSeptive). The primer has a mass of 5483.6 daltons. The SNP results in the additional of a ddC to the primer, giving a mass of 5756.8 daltons for the extended product. The wild type results in the addition a T and ddG to the primer giving a mass of 6101 daltons.

The frequency of the SNP was measured in a population of age selected healthy individuals. Seven hundred thirteen (713) individuals under 40 years of age (360 females, 353 males) and 703 individuals over 60 years of age (322 females, 381 males) were tested for the presence of the SNP, AKAP10-5 (SEQ ID NO: 33). Results are presented below in Table 1.

TABLE 1
AKAP10-5 (2073V) frequency comparison in 2 age groups

			<40	>60	delta G allele
Female	Alleles	*G	38.6	34.6	4.0
		*A	61.4	65.4	
	Genotypes	G	13.9	11.8	2.1
		GA	49.4	45.7	
		A	36.7	42.5	

Male	Alleles	*G	41.4	37.0	4.4
		*A	58.6	63.0	
	Genotypes	G	18.4	10.8	7.7
		GA	45.9	52.5	
		A	35.7	36.7	
Total	Alleles	*G	40.0	35.9	4.1
		*A	60.0	64.1	
	Genotypes	G	16.1	11.2	4.9
		GA	47.7	49.4	
		A	36.2	39.4	

Figure 20 graphically shows these results of allele and genotype distribution in the age and sex stratified Caucasian population.

Morbidity marker 3: human methionine sulfoxide reductase A (msrA)

The age-related allele and genotype frequency of this marker in both genders and the entire population is shown in Figure 21. The decrease of the homozygous CC genotype in the older male population is highly significant.

Methionine sulfoxide reductase A (#63306)

PCR Amplification and BiomassPROBE assay detection of the human methioine sulfoxid reductase A (h-msr-A) in a healthy donor population

PCR Amplification of donor population for h-msr-A

PCR primers were synthesized by OPERON using phosphoramidite chemistry. Amplification of the AKAP10 target sequence was carried out in single 50μl PCR reaction with 100ng-1ug of pooled human genomic DNA templates in a 50μl PCR reaction. Individual DNA concentrations within the pooled samples were present in an equal concentration with

the final concentration ranging from 1-25ng. Each reaction containing I X PCR buffer (Qiagen, Valencia, CA), 200μM dNTPs, 1U Hotstar Taq polymerase (Qiagen, Valencia, CA), 4mM $MgCl_2$, 25pmol of the forward primer containing the universal primer sequence and the target specific sequence 5'-TTTCTCTGCACAGAGAGGC-3' (SEQ ID NO: 49), 2pmol of the reverse primer 5'-AGCGGATAACAATTTCACACAGGGCTGAAATCCTTCGCTTTACC-3' (SEQ ID NO: 50), and 10pmol of a biotinylated universal primer complementary to the 5' end of the PCR amplicon 5'-AGCGGATAACAATTTCACACAGG-3' (SEQ ID NO: 51). After an initial round of amplification of the target with the specific forward and reverse primers, the 5' biotinylated universal primer was then hybridized and acted as a reverse primer thereby introducing a 3' biotin capture moiety into the molecule. The amplification protocol results in a 5'-biotinylated double stranded DNA amplicon and and dramatically reduces the cost of high throughput genotyping by eliminating the need to 5' biotin label each forward primer used in a genotyping. Thermal cycling was performed in 0.2mL tubes or 96 well plate using an MJ Research Thermal Cycler (calculated temperature) with the following cycling parameters: 94° C for 5 min; 45 cycles: 94° C for 20 sec, 56° C for 30 sec, 72° C for 60 sec; 72° C 3min.

Immobilization of DNA

The 50μl PCR reaction was added to 25ul of streptavidin coated magnetic bead (Dynal) prewashed three times and resuspended in 1M NH_4Cl, 0.06M NH_4OH. The PCR amplicons were allowed to bind to the beads for 15 minutes at room temperature. The beads were then collected with a magnet and the supernatant containing unbound DNA was removed. The unbound strand was release from the double stranded

amplicons by incubation in 100mM NaOH and washing of the beads three times with 10mM Tris pH 8.0.

BiomassPROBE assay analysis of donor population for h-msr A

Genotyping using the BiomassPROBE assay methods was carried out by resuspending the he DNA coated magnetic beads in 26mM Tris-HCl pH 9.5, 6.5 mM $MgCl_2$, 50mM of dTTPs and 50mM each of ddCTP, ddATP, ddGTP, 2.5U of a thermostable DNA polymerase (Ambersham), and 20pmol of a template specific oligonucleotide PROBE primer 5'-CTGAAAAGGGAGAGAAAG-3' (Operon) (SEQ ID NO: 52). Primer extension occurs with three cycles of oligonucleotide primer with hybridization and extension. The extension products were analyzed after denaturation from the template with 50mM NH_4Cl and transfer of 150nl each sample to a silicon chip preloaded with 150nl of H3PA matrix material. The sample material was allowed to crystallize and analyzed by MALDI-TOF (Bruker, PerSeptive). The SNP is represented as a T to C tranversion in the sequence of two ESTs. The wild type is represented by having a T at position 128 of GenBank Accession No. AW 195104, which represents the nucleotide sequence of an EST which is a portion of the wild type human msrA gene (SEQ ID NO: 39). The SNP is presented as a C at position 129 of GenBank Accession No. AW 874187, which represents the nucleotide sequence of an EST which is a portion of an allele of the human msrA gene (SEQ ID NO: 40).

In a genomic sequence the SNP is represented as an A to G transversion. The primer utilized in the BioMass probe reaction had a mass of 5654.8 daltons. In the presence of the SNP the primer is extended by the incorporation of a ddC and has a mass of 5928. In the presence of the wildtype the primer is extended by adding a dT and a DDC to produce a mass of 6232.1 daltons.

The frequency of the SNP was measured in a population of age selected healthy individuals. Five hundred fifty-two (552) individuals between the ages of 18-39 years (276 females, 276 males and 552 individuals between the age of 60-79 (184 females between the ages of 60-69, 368 males between the age of 60-79) were tested for the presence of the polymorphism localized in the nontranslated 3'region of h-msr-A.

Genotype difference between male age group among healthy individuals is significant. For the male population allele significance is $p = 0.0009$ and genotype significance is $p = 0.003$. The age-related allele and genotype frequency of this marker in both genders and the entire population is shown in Figure 21. The decrease of the homozygous CC genotype in the older male population is highly significant.

The polymorphism is localized in the non-translated 3'-region of the gene encoding the human methionine sulfoxide reductase (h-msrA). The exact localization is 451 base pairs downstream the stop codon (TAA). It is very likely that this SNP is in linkage disequilibrium (LD) with another polymorphism more upstream in the coding or promoter region; thus, it is not directly cause morbidity. The enzyme methionine sulfoxide reductase has been proposed to exhibit multiple biological functions. It may serve to repair oxidative protein damage but also play an important role in the regulation of proteins by activation or inactivation of their biological functions (Moskovitz et al. (1990) PNAS 95:14071-14075). It has also been shown that its activity is significantly reduced in brain tissues of Alzheimer patients (Gabbita et al., (1999) J. Neurochem 73:1660-1666). It is scientifically conceivable that proteins involved in the metabolism of reactive oxygen species are associated to disease.

CONCLUSION

The use of the healthy population provides for the identification of morbidity markers. The identification of proteins involved in the G-protein coupled signaling transduction pathway or in the detoxification of oxidative stress can be considered as convincing results. Further confirmation and validation of other potential polymorphisms already identified in *silico* in the gene encoding the human protein kinase A anchoring protein could even provide stronger association to morbidity and demonstrate that this gene product is a suitable pharmaceutical or diagnostic target.

EXAMPLE 4

MALDI-TOF Mass Spectrometry Analysis

All of the products of the enzyme assays listed below were analyzed by MALDI-TOF mass spectrometry. A diluted matrix solution (0.15μL) containing of 10:1 3-hydroxypicolinic acid:ammonium citrate in 1:1 water:acetonitrile diluted 2.5-fold with water was pipetted onto a SpectroChip (Sequenom, Inc.) and was allowed to crystallize. Then, 0.15μL of sample was added. A linear PerSeptive Voyager DE mass spectrometer or Bruker Biflex MALDI-TOF mass spectrometer, operating in positive ion mode, was used for the measurements. The sample plates were kept at 18.2 kV for 400 nm after each UV laser shot (approximate 250 laser shots total), and then the target voltage was raised to 20 kV. The original spectra were digitized at 500 MHz.

EXAMPLE 5

Sample Conditioning

Where indicated in the examples below, the products of the enzymatic digestions were purified with ZipTips (Millipore, Bedford, MA). The ZipTips were pre-wetted with 10 μL 50% acetonitrile and equilibrated 4 times with 10 μl 0.1 M TEAAc. The oligonucleotide fragments were

bound to the C18 in the ZipTip material by continuous aspiration and dispension of each sample into the ZipTip. Each digested oligonucleotide was conditioned by washing with 10 μL 0.1 M TEAAc, followed by 4 washing steps with 10 μL H_2O. DNA fragments were eluted from the Ziptip with 7 μL 50% acetonitrile.

Any method for condition the samples may be employed. Methods for conditioning, which generally is used to increase peak resolution, are well known (see, *e.g.*, International PCT application No. WO 98/20019).

EXAMPLE 6

DNA Glycosylase-Mediated Sequence Analysis

DNA Glycosylases modifies DNA at each position that a specific nucleobase resides in the DNA, thereby producing abasic sites. In a subsequent reaction with another enzyme, a chemical, or heat, the phosphate backbone at each abasic site can be cleaved.

The glycosylase utilized in the following procedures was uracil-DNA glycosylase (UDG). Uracil bases were incorporated into DNA fragments in each position that a thymine base would normally occupy by amplifying a DNA target sequence in the presence of uracil. Each uracil substituted DNA amplicon was incubated with UDG, which cleaved each uracil base in the amplicon, and was then subjected to conditions that effected backbone cleavage at each abasic site, which produced DNA fragments. DNA fragments were subjected to MALDI-TOF mass spectrometry analysis. Genetic variability in the target DNA was then assessed by analyzing mass spectra.

Glycosylases specific for nucleotide analogs or modified nucleotides, as described herein, can be substituted for UDG in the following procedures. The glycosylase methods described hereafter, in conjunction with phosphate backbone cleavage and MALDI, can be used to analyze DNA fragments for the purposes of SNP scanning, bacteria

typing, methylation analysis, microsatellite analysis, genotyping, and nucleotide sequencing and re-sequencing.

A. Genotyping

A glycosylase procedure was used to genotype the DNA sequence encoding UCP-2 (Uncoupling Protein 2). The sequence for UCP-2 is deposited in GenBank under accession number AF096289. The sequence variation genotyped in the following procedure was a cytosine (C-allele) to thymine (T-allele) variation at nucleotide position 4790, which results in a alanine to valine mutation at position 55 in the UCP-2 polypeptide.

DNA was amplified using a PCR procedure with a 50 μL reaction volume containing of 5 pmol biotinylated primer having the sequence 5'-TGCTTATCCCTGTAGCTACCCTGTCTTGGCCTTGCAGATCCAA-3' (SEQ ID NO: 91), 15 pmol non-biotinylated primer having the sequence 5'-AGCGGATAACAATTTCACACAGGCCATCACACCGCGGTACTG-3' (SEQ ID NO: 92), 200 μM dATP, 200 μM dCTP, 200 μM dGTP, 600 μM dUTP (to fully replace dTTP), 1.5 mM to 3 mM $MgCl_2$, 1 U of HotStarTaq polymerase, and 25 ng of CEPH DNA. Amplification was effected with 45 cycles at an annealing temperature of 56°C.

The amplification product was then immobilized onto a solid support by incubating 50 μL of the amplification reaction with 5 μL of prewashed Dynabeads for 20 minutes at room temperature. The supernatant was removed, and the beads were incubated with 50 μL of 0.1 M NaOH for 5 minutes at room temperature to denature the double-stranded PCR product in such a fashion that single-stranded DNA was linked to the beads. The beads were then neutralized by three washes with 50 μL 10 mM TrisHCl (pH 8). The beads were resuspended in 10 μL of a 60mM TrisHCl/1mM EDTA (pH 7.9) solution, and 1 U uracil DNA glycosylase was added to the solution for 45 minutes at 37°C to remove uracil nucleotides present in the single-stranded DNA linked to the beads.

The beads were then washed two times with 25 μL of 10 mM TrisHCl (pH 8) and once with 10 μL of water. The biotinylated strands were then eluted from the beads with 12 μL of 2 M NH_4OH at 60°C for 10 minutes. The backbone of the DNA was cleaved by incubating the samples for 10 min at 95°C (with a closed lid), and ammonia was evaporated from the samples by incubating the samples for 11 min at 80°C.

The cleavage fragments were then analyzed by MALDI-TOF mass spectrometry as described in Example 4. The T-allele generated a unique fragment of 3254 Daltons. The C-allele generated a unique fragment of 4788 Daltons. These fragements were distinguishable in mass spectra. Thus, the above-identified procedure was successfully utilized to genotype individuals heterozygous for the C-allele and T-allele in UCP-2.

B. Glycosylase Analysis Utilizing Pooled DNA Samples

The glycosylase assay was conducted using pooled samples to detect genetic variability at the UCP-2 locus. DNA of known genotype was pooled from eleven individuals and was diluted to a fixed concentration of 5 ng/μL. The procedure provided in Example 3A was followed using 2 pmol of forward primer having a sequence of 5'-CCCAGTCACGACGTTGTAAAACGTCTTGGCCTTGCAGATCCAAG- 3' (SEQ ID NO: 93) and 15 pmol of reverse primer having the sequence 5'-AGCGGATAACAATTTCACACAGGCCATCACACCGCGGTACTG-3' (SEQ ID NO: 94). In addition, 5 pmol of biotinylated primer having the sequence 5'bioCCCAGTCACGACGTTGTAAAACG 3' (SEQ ID NO: 97) may be introduced to the PCR reaction after about two cycles. The fragments were analyzed via MALDI-TOF mass spectroscopy (Example 4). As determined in Example 3A, the T-allele, which generated a unique fragment of 3254 Daltons, could be distinguished in mass spectra from the C-allele, which generated a unique fragment of 4788 Daltons. Allelic frequency in the pooled samples was quantified by integrating the area

under each signal corresponding to an allelic fragment. Integration was accomplished by hand calculations using equations well known to those skilled in the art. In the pool of eleven samples, this procedure suggested that 40.9% of the individuals harbored the T allele and 59.09% of the individuals harbored the C allele.

C. Glycosylase-Mediated Microsatellite Analysis

A glycosylase procedure was utilized to identify microsatellites of the Bradykinin Receptor 2 (BKR-2) sequence. The sequence for BKR-2 is deposited in GenBank under accession number X86173. BKR-2 includes a SNP in the promoter region, which is a C to T variation, as well as a SNP in a repeated unit, which is a G to T variation. The procedure provided in Example 3A was utilized to identify the SNP in the promotor region, the SNP in the microsattelite repeat region, and the number of repeated units in the microsattelite region of BKR-2. Specifically, a forward PCR primer having the sequence 5'-CTCCAGCTGGGCAGGAGTGC-3' (SEQ ID NO: 95) and a reverse primer having the sequence 5'-CACTTCAGTCGCTCCCT-3' (SEQ ID NO: 96) were utilized to amplify BKR-2 DNA in the presence of uracil. The amplicon was fragmented by UDG followed by backbone cleavage. The cleavage fragments were analyzed by MALDI-TOF mass spectrometry as described in Example 4.

With regard to the SNP in the BKR-2 promotor region having a C to T variation, the C-allele generated a unique fragment having a mass of 7342.4 Daltons and the T-allele generated a unique fragment having a mass of 7053.2 Daltons. These fragments were distinguishable in mass spectra. Thus, the above-identified procedure was successfully utilized to genotype individuals heterozygous for the C-allele and T-allele in the promotor region of BKR-2.

With regard to the SNP in the BKR-2 repeat region having a G to T variation, the T-allele generated a unique fragment having a mass of 1784 Daltons, which was readily detected in a mass spectrum. Hence, the presence of the T-allele was indicative of the G to T sequence variation in the repeat region of BKR-2.

In addition, the number of repeat regions was distinguished between individuals having two repeat sequences and individuals having three repeat sequences in BKR-2. The DNA of these individuals did not harbor the G to T sequence variation in the repeat sequence as each repeat sequence contained a G at the SNP locus. The number of repeat regions was determined in individual samples by calculating the area under a signal corresponding to a unique DNA fragment having a mass of 2771.6 Daltons. This signal in spectra generated from individuals having two repeat regions had an area that was thirty-three percent less than the area under the same signal in spectra generated from individuals having three repeat regions. Thus, the procedures discussed above can be utilized to genotype individuals for the number of repeat sequences present in BKR-2.

D. Bisulfite Treatment Coupled with Glycosylase Digestion

Bisulfite treatment of genomic DNA can be utilized to analyze positions of methylated cytosine residues within the DNA. Treating nucleic acids with bisulfite deaminates cytosine residues to uracil residues, while methylated cytosine remains unmodified. Thus, by comparing the sequence of a PCR product generated from genomic DNA that is not treated with bisulfite with the sequence of a PCR product generated from genomic DNA that is treated with bisulfite, the degree of methylation in a nucleic acid as well as the positions where cytosine is methylated can be deduced.

Genomic DNA (2 μg) was digested by incubation with 1 μL of a restriction enzyme at 37°C for 2 hours. An aliquot of 3 M NaOH was added to yield a final concentration of 0.3M NaOH in the digestion solution. The reaction was incubated at 37°C for 15 minutes followed by treatment with 5.35M urea, 4.44M bisulfite, and 10mM hydroquinone, where the final concentration of hydroquinone is 0.5 mM.

The sample that was treated with bisulfite (sample A) was compared to the same digestion sample that had not undergone bisulfite treatment (sample B). After sample A was treated with bisulfite as described above, sample A and sample B were amplified by a standard PCR procedure. The PCR procedure included the step of overlaying each sample with mineral oil and then subjecting the sample to thermocycling (20 cycles of 15 minutes at 55°C followed by 30 seconds at 95°C). The PCR reaction contained four nucleotide bases, C, A, G, and U. The mineral oil was removed from each sample, and the PCR products were purified with glassmilk. Sodium iodide (3 volumes) and glassmilk (5 μL) were added to samples A and B. The samples were then placed on ice for 8 minutes, washed with 420 μL cold buffer, centrifuged for 10 seconds, and the supernatant fractions were removed. This process was repeated twice and then 25 μL of water was added. Samples were incubated for 5 minutes at 37 °C, were centrifuged for 20 seconds, and the supernatant fraction was collected, and then this incubation/centrifugation/supernatant fraction collection procedure was repeated. 50 μL 0.1 M NaOH was then added to the samples to denature the DNA. The samples were incubated at room temperature for 5 minutes, washed three times with 50 μL of 10 mM TrisHCl (pH 8), and resuspended in 10 μL 60mM TrisHCl/1mM EDTA, pH 7.9.

The sequence of PCR products from sample A and sample B were then treated with 2U of UDG (MBI Fermentas) and then subjected to

backbone cleavage, as described herein. The resulting fragments from each of sample A and sample B were analyzed by MALDI-TOF mass spectroscopy as described in Example 4. Sample A gave rise to a greater number of fragments than the number of fragments arising from sample B, indicative that the nucleic acid harbored at least one methylated cytosine moiety.

EXAMPLE 7

Fen-Ligase-Mediated Haplotyping

Haplotyping procedures permit the selection of a fragment from one of an individual's two homologous chromosomes and to genotype linked SNPs on that fragment. The direct resolution of haplotypes can yield increased information content, improving the diagnosis of any linked disease genes or identifying linkages associated with those diseases. In previous studies, haplotypes were typically reconstructed indirectly through pedigree analysis (in cases where pedigrees were available) through laborious and unreliable allele-specific PCR or through single-molecule dilution methods well known in the art.

A haplotyping procedure was used to determine the presence of two SNPs, referred to as SNP1 and SNP2, located on one strand in a DNA sample. The haplotyping procedure used in this assay utilized Fen-1, a site-specific "flap" endonuclease that cleaves DNA "flaps" created by the overlap of two oligonucleotides hybridized to a target DNA strand. The two overlapping oligonucleotides in this example were short arm and long arm allele-specific adaptors. The target DNA was an amplified nucleic acid that had been denatured and contained SNP1 and SNP2.

The short arm adaptor included a unique sequence not found in the target DNA. The 3′ distal nucleotide of the short arm adaptor was identical to one of the SNP1 alleles. Moreover, the long arm adaptor included two regions: a 3′ region complementary to the short arm and a

5'gene-specific region complementary to the fragment of interest adjacent to the SNP. If there was a match between the adaptor and one of the homologues, the Fen enzyme recognized and cleaved the overlapping flap. The short arm of the adaptor was then ligated to the remainder of the target fragment (minus the SNP site). This ligated fragment was used as the forward primer for a second PCR reaction in which only the ligated homologue was amplified. The second PCR product (PCR2) was then analyzed by mass spectrometry. If there was no match between the adaptors and the target DNA, there was no overlap, no cleavage by Fen-1, and thus no PCR2 product of interest.

If there was more than one SNP in the sequence of interest, the second SNP (SNP2) was found by using an adaptor that was specific for SNP2 and hybridizing the adaptor to the PCR2 product containing the first SNP. The Fen-ligase and amplification procedures were repeated for the PCR2 product containing the first SNP. If the amplified product yielded a second SNP, then SNP1 and SNP2 were on the same fragment.

If the SNP is unknown, then four allele-specific adaptors (e.g. C, G, A, and T) can be used to hybridize with the target DNA. The substrates are then treated with the Fen-ligase protocol, including amplification. The PCR2 products may be analyzed by PROBE, as described herein, to determine which adaptors were hybridized to the DNA target and thus identify the SNPs in the sequence.

A Fen-ligase assay was used to detect two SNPs present in Factor VII. These SNPs are located 814 base pairs apart from each other. SNP1 was located at position 8401 (C to T), and SNP2 was located at 9215 (G to A) (SEQ ID #).

A. First Amplification Step

A PCR product (PCR1) was generated for a known heterozygous individual at SNP1, a short distance from the 5' end of the SNP.

Specifically, a 10 μL PCR reaction was performed by mixing 1.5 mM $MgCl_2$, 200 μM of each dNTP, 0.5 U HotStar polymerase, 0.1μM of a forward primer having the sequence 5'-GCG CTC CTG TCG GTG CCA (SEQ ID NO: 56), 0.1μM of a reverse primer having the sequence 5'-GCC TGA CTG GTG GGG CCC (SEQ ID NO: 57), and 1 ng of genomic DNA. The annealing temperature was 58°C, and the amplification process yielded fragments that were 861 bp in length.

The PCR1 reaction mixture was divided in half and was treated with an exonuclease 1/SAP mixture (0.22 μL mixture/5 μL PCR1 reaction) which contained 1.0μL SAP and 0.1 μL exon1. The exonuclease treatment was done for 30 minutes at 37°C and then 20 minutes at 85°C to denature the DNA.

B. Adaptor Oligonucleotides

A solution of allele-specific adaptors (C and T), containing of one long and one short oligonucleotide per adaptor, was prepared. The long arm and short arm oligonucleotides of each adaptor (10μM) were mixed in a 1:1 ratio and heated for 30 seconds at 95°C. The temperature was reduced in 2°C increments to 37°C for annealing. The C-adaptor had a short arm sequence of 5'-CAT GCA TGC ACG GTC (SEQ ID NO: 58) and a long arm sequence of 5'-CAG AGA GTA CCC CTC GAC CGT GCA TGC ATG (SEQ ID NO: 59). Hence, the long arm of the adaptor was 30 bp (15 bp gene-specific), and the short arm was 15bp. The T-adaptor had a short arm sequence of 5'-CAT GCA TGC ACG GTT (SEQ ID NO: 60) and a long arm sequence of 5'-GTA CGT ACG TGC CAA CTC CCC ATG AGA GAC (SEQ ID NO: 61). The adaptor could also have a hairpin structure in which the short and long arm are separated by a loop containing of 3 to 10 nucleotides (SEQ ID NO: 118).

C. FEN-ligase reaction

In two tubes (one tube for each allele-specific adaptor per sample) was placed a solution (Solution A) containing of 3.5 μl 10 mM 16%PEG/50 mM MOPS, 1.2 μl 25 mM $MgCl_2$, 1.5 μl 10X Ampligase Buffer, and 2.5 μl PCR1. Each tube containing Solution A was incubated at 95°C for 5 minutes to denature the PCR1 product. A second solution (Solution B) containing of 1.65 μl Ampligase (Thermostable ligase, Epicentre Technologies), 1.65 μl 200ng/μl MFEN (from *Methanocuccus jannaschii*), and 3.0 μl of an allele specific adaptor (C or T) was prepared. Thus, different variations of Solution B, each variation containing of different allele-specific adaptors, were made. Solution B was added to Solution A at 95°C and incubated at 55°C for 3 hours. The total reaction volume was 15.0 μl per adaptor-specific reaction. For a bi-allelic system, 2 x 15.0 μl reactions were required.

The Fen-ligase reaction in each tube was then deactivated by adding 8.0 μl 10 mM EDTA. Then, 1.0 μl exoIII/Buffer (70%/30%) solution was added to each sample and incubated 30 minutes at 37°C, 20 minutes at 70°C (to deactivate exoIII), and 5 minutes at 95°C (to denature the sample and dissociate unused adaptor from template). The samples were cooled in an ice slurry and purified on UltraClean PCR Clean-up (MoBio) spin columns which removed all fragments less than 100 base pairs in length. The fragments were eluted with 50 μl H_2O.

D. Second Amplification Step

A second amplification reaction (PCR2) was conducted in each sample tube using the short arm adaptor (C or T) sequence as the forward primer (minus the SNP1 site). Only the ligated homologue was amplified. A standard PCR reaction was conducted with a total volume of 10.0 μl containing of 1X Buffer (final concentration), 1.5 mM final concentration $MgCl_2$, 200 μM final concentration dNTPs, 0.5 U HotStar polymerase, 0.1 μM final concentration forward primer 5'-CAT GCA TGC ACG GT (SEQ ID

NO: 62), 0.1μM final concentration reverse primer 5'-GCC TGA CTG GTG GGG CCC (SEQ ID NO: 63), and 1.0 μl of the purified FEN-ligase reaction solution. The annealing temperature was 58°C. The PCR2 product was analyzed by MALDI TOF mass spectroscopy as described in Example 4. The mass spectrum of Fen SNP1 showed a mass of 6084.08 Daltons, representing the C allele.

E. Genotyping Additional SNPs

The second SNP (SNP2) can be found by using an adaptor that is specific for SNP2 and hybridizing that adaptor to the PCR2 product containing the first SNP. The Fen-ligase and amplification procedures are repeated for the PCR2 product containing the first SNP. If the amplified product yields a second SNP, then SN1 and SN2 are on the same fragment. The mass spectrum of SNP2, representing the T allele, showed a mass of 6359.88 Daltons.

This assay can also be performed upon pooled DNA to yield haplotype frequencies as described herein. The Fen-ligase assay can be used to analyze multiplexes as described herein.

EXAMPLE 8

Nickase-Mediated Sequence Analysis

A DNA nickase, or DNase, was used to recognize and cleave one strand of a DNA duplex. Two nickases usd were NY2A nickase and NYS1 nickase (Megabase) which cleave DNA at the following sites:

NY2A: 5'...R AG...3'

3'...Y↓TC...5' where R = A or G and Y = C or T

NYS1: 5'...↓CC[A/G/T]...3'

3'... GG[T/C/A]...5'.

A. Nickase Digestion

Tris-HCl (10 mM), KCl (10 mM, pH 8.3), magnesium acetate (25 mM), BSA (1 mg/mL), and 6 U of Cvi NY2A or Cvi NYS1 Nickase (Megabase Research) were added to 25 pmol of double-stranded oligonucleotide template having a sequence of 5'-CGC AGG GTT TCC TCG TCG CAC TGG GCA TGT G-3' (SEQ ID NO: 90, Operon, Alameda, CA) synthesized using standard phosphoramidite chemistry . With a total volume of 20μL, the reaction mixture was incubated at 37°C for 5 hours, and the digestion products were purified using ZipTips (Millipore, Bedford, MA) as described in Example 5. The samples were analyzed by MALTY-TOM mass spectroscopy as described in Example 1. The nickase Cvi NY2A yielded three fragments with masses 4049.76 Daltons, 5473.14 Daltons, and 9540.71 Daltons. The Cvi NYS1 nickase yielded fragments with masses 2063.18 Daltons, 3056.48 Daltons, 6492.81 Daltons, and 7450.14 Daltons.

B. Nickase Digestion of Pooled Samples

DQA (HLA ClassII-DQ Alpha, expected fragment size = 225bp) was amplified from the genomic DNA of 100 healthy individuals. DQA was amplified using standard PCR chemistry in a reaction having a total volume of 50 μL containing of 10 mM Tris-HCl, 10 mM KCl (pH 8.3), 2.5 mM $MgCl_2$, 200 μM of each dNTP, 10 pmol of a forward primer having the sequence 5'-GTG CTG CAG GTG TAA ACT TGT ACC AG-3'(SEQ ID NO: 64), 10 pmol of a reverse primer having the sequence 5'-CAC GGA TCC GGT AGC AGC GGT AGA GTT G-3'(SEQ ID NO: 65), 1 U DNA polymerase (Stoffel fragment, Perkin Elme r), and 200ng human genomic DNA (2ng DNA/individual). The template was denatured at 94°C for 5 minutes. Thermal cycling was continued with a touch-down program that included 45 cycles of 20 seconds at 94°C, 30 seconds at 56°C, 1

minute at 72°C, and a final extension of 3 minutes at 72°C. The crude PCR product was used in the subsequent nickase reaction.

The unpurified PCR product was subjected to nickase digestion. Tris-HCl (10 mM), KCl (10 mM, pH 8.3), magnesium acetate (25mM), BSA (1 mg/mL), and 5 U of Cvi NY2A or Cvi NYS1 Nickase (Megabase Research) were added to 25 pmol of the amplified template with a total reaction volume of 20μL. The mixture was then incubated at 37°C for 5 hours. The digestion products were purified with either ZipTips (Millipore, Bedford, MA) as described in Example 5. The samples were analyzed by MALDI-TOF mass spectroscopy as described in Example 4. This assay can also be used to do multiplexing and standardless genotyping as described herein.

To simplify the nickase mass spectrum, the two complementary strands can be separated after digestion by using a single-stranded undigested PCR product as a capture probe. This probe (preparation shown below in Example 8C) can be hybridized to the nickase fragments in hybridization buffer containing 200 mM sodium citrate and 1% blocking reagent (Boehringer Mannheim). The reaction is heated to 95°C for 5 minutes and cooled to room temperature over 30 minutes by using a thermal cycler (PTC-200 DNA engine, MJ Research, Waltham, MA). The capture probe-nickase fragment is immobilized on 140 μg of streptavidin-coated magnetic beads. The beads are subsequently washed three times with 70 mM ammonium citrate. The captured single-stranded nickase fragments are eluted by heating to 80°C for 5 minutes in 5 μL of 50 mM ammonium hydroxide.

C. Preparation of Capture Probe

The capture probe is prepared by amplifying the human β-globin gene (3' end of intron 1 to 5' end of exon 2) via PCR methods in a total volume of 50 μL containing of GeneAmp 1XPCR Buffer II, 10 mM Tris-

HCl, pH 8.3, 50 mM KCl, 2 mM $MgCl_2$, 0.2 mM dNTP mix, 10pmol of each primer (forward primer 5'-ACTGGGCATGTGGAGACAG-3'(SEQ ID NO: 66) and biotinylated reverse primer bio5'-GCACTTTCTTGCCATGAG-3'(SEQ ID: 67), 2 U of AmpliTaq Gold, and 200 ng of human genomic DNA. The template is denatured at 94°C for 8 minutes. Thermal cycling is continued with a touch-down program that included 11 cycles of 20 seconds at 94°C, 30 seconds at 64°C, 1 minute at 72°C; and a final extension of 5 minutes at 72°C. The amplicon is purified using UltraClean™ PCR clean-up kit (MO Bio Laboratories, Solano Beach, CA).

EXAMPLE 9

Multiplex Type IIS SNP Assay

A Type IIS assay was used to identify human gene sequences with known SNPs. The Type IIS enzyme used in this assay was Fok I which effected double-stranded cleavage of the target DNA. The assay involved the steps of amplification and Fok I treatment of the amplicon. In the amplification step, the primers were designed so that each PCR product of a designated gene target was less than 100 bases such that a Fok I recognition sequence was incorporated at the 5' and 3' end of the amplicon. Therefore, the fragments that were cleaved by Fok I included a center fragment containing the SNP of interest.

Ten human gene targets with known SNPs were analyzed by this assay. Sequences of the ten gene targets, as well as the primers used to amplify the target regions, are found in Table 5. The ten targets were lipoprotein lipase, prothrombin, factor V, cholesterol ester transfer protein (CETP), factor VII, factor XIII, HLA-H exon 2, HLA-H exon 4, methylenetetrahydrofolate reductase (MTHR), and P53 exon 4 codon 72.

Amplification of the ten human gene sequences were carried out in a single 50 μL volume PCR reaction with 20 ng of human genomic DNA

template in 5 PCR reaction tubes. Each reaction vial contained 1X PCR buffer (Qiagen), 200μM dNTPs, 1U Hotstar Taq polymerase (Qiagen), 4 mM $MgCl_2$, and 10pmol of each primer. US8, having sequence of 5'TCAGTCACGACGTT3'(SEQ ID NO: 68), and US9, having sequence of 5'CGGATAACAATTTC3'(SEQ ID NO: 69), were used for the forward and reverse primers respectively. Moreover, the primers were designed such that a Fok I recognition site was incorporated at the 5' and 3' ends of the amplicon. Thermal cycling was performed in 0.2 mL tubes or a 96 well plate using a MJ Research Thermal Cycler (calculated temperature) with the following cycling parameters: 94°C for 5 minutes; 45 cycles: 94°C for 20 seconds, 56°C for 20 seconds, 72°C for 60 seconds; and 72°C for 3 minutes.

Following PCR, the sample was treated with 0.2 U Exonuclease I (Amersham Pharmacia) and S Alkaline Phosphotase (Amersham Pharmacia) to remove the unincorporated primers and dNTPs. Typically, 0.2 U of exonuclease I and SAP were added to 5 μL of the PCR sample. The sample was then incubated at 37°C for 15 minutes. Exonuclease I and SAP were then inactivated by heating the sample up to 85°C for 15 minutes. Fok I digestion was performed by adding 2 U of Fok I (New England Biolab) to the 5 uL PCR sample and incubating at 37°C for 30 minutes. Since the Fok I restriction sites are located on both sides of the amplicon, the 5' and 3' cutoff fragments have higher masses than the center fragment containing the SNP. The sample was then purified by anion exchange and analyzed by MALDI-TOF mass spectrometry as described in Example 4. The masses of the gene fragments from this multiplexing experiment are listed in Table 6. These gene fragments were resolved in mass spectra thereby allowing multiplex analysis of sequence variability in these genes.

Table 5
Genes for Multiplex Type IIS Assay

Gene	Sequence	Seq. ID No.	Primers	Seq. ID No.
Lipoprotein Lipase (Asn291Ser)	cctttgagaa agggctctgc ttgagttgta gaaagaaccg ctgcaacaat ctgggctatg agatca[a▸g]taa agtcagagcc aaaagaagca gcaaaatgta	98-99	5′ caatttcatcgctggatgcaatct gggctatgagatc 3′ 5′ caatttcacacagcggatgcttct tttggctctgact 3′	70 71
Prothrombin	26731 gaattatttt tgtgtttcta aaactatggt tcccaataaa agtgactctc 26781 agc[g▸a]agcctc aatgctccca gtgctattca tgggcagctc tctgggctca	100-101	5′ tcagtcacgacgttggatgccaa taaaagtgactctcagc 3′ 5′ cggataacaatttcggatgcact gggagcattgaggc 3′	72 73
Factor V (Arg506Gln)	taataggact acttctaatc tgtaagagca gatccctgga caggc[g▸a]agga atacaggtat tttgtccttg aagtaacctt tcag	102-103	5′ tcagtcacgacgttggatgagca gatccctggacaggc 3′ 5′ cggataacaatttcggatggaca aaatacctgtattcc 3′	74 75
Cholesterol ester transfer protein (CETP) (I405V)	1261 ctcaccatgg gcatttgatt gcagagcage tccgagtcc[g▸a] tccagagctt 1311 cctgcagtca atgatcaccg ctgtgggcat ccctgaggtc atgtctcgta	104-105	5′ tcagtcacgacgttggatgcaga gcagctccgagtc 3′ 5′ cagcggtgatcattggatgcagg aagctctgg 3′	76 77
Factor VII (R353Q)	1221 agcaaggact cctgcaaggg ggacagtgga ggccccacatg ccacccacta 1271 cc[a▸g]gggcacg tggtacctga cgggcatcgt cagctggggc cagggctgcg	106-107	5′ tcagtcacgacgttggatgccca catgccacccactac 3′ 5′ cggataacaatttcggatgcccg tcaggtaccacg 3′	78 79
Factor XIII (V34L)	111 caataactct aatgcagcgg aagatgacct gcccacagtg gagcttcagg 161 gc[g▸t]tggtgcc ccggggcgtc aacctgcaag gtatgagcat accccccttc	108-109	5′ tcagtcacgacgttggatgccca cagtggagcttcag 3′ 5′ gctcataccttgcaggatgacg 3′	80 81
HLA-H exon 2 (His63Asp)	361 ttgaagcttt gggctacgtg gatgaccagc tgttcgtgtt ctatgat[c▸g]at 411 gagagtcgcc gtgtggagcc ccgaactcca tgggtttcca gtagaatttc	110-111	5′ tcagtcacgacgttggatgacca gctgttcgtgttc 3′ 5′ tacatggagttcggggatgcaca cggcgactctc 3′	82 83
HLA-H exon 4 (Cys282Tyr)	1021 ggataacctt ggctgtaccc cctggggaag agcagagata tacgt[g▸a]ccag 1071 gtggagcacc caggcctgga tcagcccctc attgtgatct gggagccctc	112-113	5′ tcagtcacgacgttggatgggga agagcagagatatacgt 3′ 5′ gaggggctgatccaggatgggt gctccac 3′	84 85

Gene	Sequence	Seq. ID No.	Primers	Seq. ID No.
Methylentetrahydrofolateredctase (MTHR) (Ala222Val)	761 tgaagcactt gaagga gaag gtgtctgcgg gag[c▸t]cgattt catcatcacg 811 cagcttttct ttgaggctga cacattcttc	114-115	5′ tcagtcacgacgttggatgggga agagcagagatatacgt 3′ 5′ gaggggctgatccaggatgggt gctccac 3′	86 87
P53 Exon4 Codon 72 (Arg72Pro)	12101 tccagatgaa gctcccagaa tgccagaggc tgctcccc[g▸c]c gtggcccctg 12151 caccagcagc tcctacaccg gcggcccctg	116-117	5′ gatgaagctcccaggatgccag aggc 3′ 5′ gccgccggtgtaggatgctgctg gtgc 3′	88 89

Table 6
The mass of Center Fragments for Ten Different SNP Typing by IIS Assay

Gene	LPL(^{Asn}291^{Ser})		Prothrombin		FV(^{Arg}506^{Gln})		CETP('405^{V})		FVII(^{R}353^{Q})		FXIII(^{V}34)	
Genotype	A	G	G	A	G	A	G	A	G	A	G	T
+ strand mass (Da)	6213	6229	5845	5829	5677	5661	3388	3372	6128	6112	5058	5033
- strand mass (Da)	6129	6114	5949	5964	5472	5487	3437	3452	6174	6189	4916	4940

Gene	Hlah2		Hlah4		MTHR(^{Ala}222^{Val})		P53exon4(^{Arg}72^{Pro})	
Genotype	C	G	G	A	C	T	G	C
+ strand mass (Da)	5889	5929	4392	4376	4400	4415	4586	4546
- strand mass (Da)	5836	5796	4319	4334	4368	4352	4724	4764

EXAMPLE 10

Exemplary use of parental medical history parameter for stratification of healthy datebase

A healthy database can be used to associate a disease state with a specific allele (SNP) that has been found to show a strong association between age and the allele, in particular the homozygous genotype. The method involves using the same healthy database used to identify the age dependent association, however stratification is by information given by the donors about common disorders from which their parents suffered (the donor's familial history of disease). There are three possible answers a donor could give about the health status of their parents: neither were affected, one was affected or both were affected. Only donors above a certain minimum age, depending on the disease, are utilized, as the donors parents must be old enough to to have exhibited clinical disease phenotypes. The genotype frequency in each of these groups is determined and compared with each other. If there is an association of the marker in the donor to a disease the frequency of the heterozyous genotype will be increased. The frequency of the homozygous genotype should not increase, as it should be significantly underrepresented in the healthy population.

EXAMPLE 11

Method and Device for Identifying a Biological Sample

Description

In accordance with the present invention, a method and device for identifying a biological sample is provided. Referring now to FIG. 24, an apparatus 10 for identifying a biological sample is disclosed. The apparatus 10 for identifying a biological sample generally comprises a mass spectrometer 15 communicating with a computing device 20. In a preferred embodiment, the mass spectrometer may be a MALDI-TOF mass spectrometer manufactured by Bruker-Franzen Analytik GmbH; however, it will be appreciated that other mass spectrometers can be substituted. The computing device 20 is preferably a general purpose computing device. However, it will be appreciated that the computing device could be alternatively configured, for example, it may be integrated with the mass spectrometer or could be part of a computer in a larger network system.

The apparatus 10 for identifying a biological sample may operate as an automated identification system having a robot 25 with a robotic arm 27 configured to deliver a sample plate 29 into a receiving area 31 of the mass spectrometer 15. In such a manner, the sample to be identified may be placed on the plate 29 and automatically received into the mass spectrometer 15. The biological sample is then processed in the mass spectrometer to generate data indicative of the mass of DNA fragments in the biological sample. This data may be sent directly to computing device 20, or may have some preprocessing or filtering performed within the mass spectrometer. In a preferred embodiment, the mass spectrometer 15 transmits unprocessed and unfiltered mass spectrometry data to the computing device 20. However, it will be appreciated that the analysis in the computing device may be adjusted to accommodate preprocessing or filtering performed within the mass spectrometer.

Referring now to FIG. 25, a general method 35 for identifying a biological sample is shown. In method 35, data is received into a computing device from a test instrument in block 40. Preferably the data is received in a raw, unprocessed and unfiltered form, but alternatively may have some form of

filtering or processing applied. The test instrument of a preferred embodiment is a mass spectrometer as described above. However, it will be appreciated that other test instruments could be substituted for the mass spectrometer.

The data generated by the test instrument, and in particular the mass spectrometer, includes information indicative of the identification of the biological sample. More specifically, the data is indicative of the DNA composition of the biological sample. Typically, mass spectrometry data gathered from DNA samples obtained from DNA amplification techniques are noisier than, for example, those from typical protein samples. This is due in part because protein samples are more readily prepared in more abundance, and protein samples are more easily ionizable as compared to DNA samples. Accordingly, conventional mass spectrometer data analysis techniques are generally ineffective for DNA analysis of a biological sample. To improve the analysis capability so that DNA composition data can be more readily discerned, a preferred embodiment uses wavelet technology for analyzing the DNA mass spectrometry data. Wavelets are an analytical tool for signal processing, numerical analysis, and mathematical modeling. Wavelet technology provides a basic expansion function which is applied to a data set. Using wavelet decomposition, the data set can be simultaneously analyzed in the time and frequency domains. Wavelet transformation is the technique of choice in the analysis of data that exhibit complicated time (mass) and frequency domain information, such as MALDI-TOF DNA data. Wavelet transforms as described herein have superior denoising properties as compared to conventional Fourier analysis techniques. Wavelet transformation has proven to be particularly effective in interpreting the inherently noisy MALDI-TOF spectra of DNA samples. In using wavelets, a "small wave" or "scaling function" is used to transform a data set into stages, with each stage representing a frequency component in the data set. Using wavelet transformation, mass spectrometry data can be processed, filtered, and analyzed with sufficient discrimination to be useful for identification of the DNA composition for a biological sample.

Referring again to FIG. 25, the data received in block 40 is denoised in block 45. The denoised data then has a baseline correction applied in block 50.

A baseline correction is generally necessary as data coming from the test instrument, in particular a mass spectrometer instrument, has data arranged in a generally exponentially decaying manner. This generally exponential decaying arrangement is not due to the composition of the biological sample, but is a result of the physical properties and characteristics of the test instrument, and other chemicals involved in DNA sample preparation. Accordingly, baseline correction substantially corrects the data to remove a component of the data attributable to the test system, and sample preparation characteristics.

After denoising in block 45 and the baseline correction in block 50, a signal remains which is generally indicative of the composition of the biological sample. However, due to the extraordinary discrimination required for analyzing the DNA composition of the biological sample, the composition is not readily apparent from the denoised and corrected signal. For example, although the signal may include peak areas, it is not yet clear whether these "putative" peaks actually represent a DNA composition, or whether the putative peaks are result of a systemic or chemical aberration. Further, any call of the composition of the biological sample would have a probability of error which would be unacceptable for clinical or therapeutic purposes. In such critical situations, there needs to be a high degree of certainty that any call or identification of the sample is accurate. Therefore, additional data processing and interpretation is necessary before the sample can be accurately and confidently identified.

Since the quantity of data resulting from each mass spectrometry test is typically thousands of data points, and an automated system may be set to perform hundreds or even thousands of tests per hour, the quantity of mass spectrometry data generated is enormous. To facilitate efficient transmission and storage of the mass spectrometry data, block 55 shows that the denoised and baseline corrected data is compressed.

In a preferred embodiment, the biological sample is selected and processed to have only a limited range of possible compositions. Accordingly, it is therefore known where peaks indicating composition should be located, if present. Taking advantage of knowing the location of these expected peaks, in block 60 the method 35 matches putative peaks in the processed signal to the

location of the expected peaks. In such a manner, the probability of each putative peak in the data being an actual peak indicative of the composition of the biological sample can be determined. Once the probability of each peak is determined in block 60, then in block 65 the method 35 statistically determines the composition of the biological sample, and determines if confidence is high enough to calling a genotype.

Referring again to block 40, data is received from the test instrument, which is preferably a mass spectrometer. In a specific illustration, FIG. 26 shows an example of data from a mass spectrometer. The mass spectrometer data 70 generally comprises data points distributed along an x-axis 71 and a y-axis 72. The x-axis 71 represents the mass of particles detected, while the y-axis 72 represents a numerical concentration of the particles. As can be seen in FIG. 26, the mass spectrometry data 70 is generally exponentially decaying with data at the left end of the x-axis 73 generally decaying in an exponential manner toward data at the heavier end 74 of the x-axis 71. However, the general exponential presentation of the data is not indicative of the composition of the biological sample, but is more reflective of systematic error and characteristics. Further, as described above and illustrated in FIG. 26, considerable noise exists in the mass spectrometry DNA data 70.

Referring again to block 45, where the raw data received in block 40 is denoised, the denoising process will be described in more detail. As illustrated in FIG. 25, the denoising process generally entails 1) performing a wavelet transformation on the raw data to decompose the raw data into wavelet stage coefficients; 2) generating a noise profile from the highest stage of wavelet coefficients; and 3) applying a scaled noise profile to other stages in the wavelet transformation. Each step of the denoising process is further described below.

Referring now to FIG. 27, the wavelet transformation of the raw mass spectrometry data is generally diagramed. Using wavelet transformation techniques, the mass spectrometry data 70 is sequentially transformed into stages. In each stage the data is represented in a high stage and a low stage, with the low stage acting as the input to the next sequential stage. For example, the mass spectrometry data 70 is transformed into stage 0 high data

82 and stage 0 low data 83. The stage 0 low data 83 is then used as an input to the next level transformation to generate stage 1 high data 84 and stage 1 low data 85. In a similar manner, the stage 1 low data 85 is used as an input to be transformed into stage 2 high data 86 and stage 2 low data 87. The transformation is continued until no more useful information can be derived by further wavelet transformation. For example, in the preferred embodiment a 24-point wavelet is used. More particularly a wavelet commonly referred to as the Daubechies 24 is used to decompose the raw data. However, it will be appreciated that other wavelets can be used for the wavelet transformation. Since each stage in a wavelet transformation has one-half the data points of the previous stage, the wavelet transformation can be continued until the stage n low data 89 has around 50 points. Accordingly, the stage n high 88 would contain about 100 data points. Since the preferred wavelet is 24 points long, little data or information can be derived by continuing the wavelet transformation on a data set of around 50 points.

FIG. 28 shows an example of stage 0 high data 95. Since stage 0 high data 95 is generally indicative of the highest frequencies in the mass spectrometry data, stage 0 high data 95 will closely relate to the quantity of high frequency noise in the mass spectrometry data. In FIG. 29, an exponential fitting formula has been applied to the stage 0 high data 95 to generate a stage 0 noise profile 97. In particular, the exponential fitting formula is in the format $A_0 + A_1 \text{EXP}(-A_2 m)$. It will be appreciated that other expediential fitting formulas or other types of curve fits may be used.

Referring now to FIG. 30, noise profiles for the other high stages are determined. Since the later data points in each stage will likely be representative of the level of noise in each stage, only the later data points in each stage are used to generate a standard deviation figure that is representative of the noise content in that particular stage. More particularly, in generating the noise profile for each remaining stage, only the last five percent of the data points in each stage are analyzed to determined a standard deviation number. It will be appreciated that other numbers of points, or alternative methods could be used to generate such a standard deviation figure.

The standard deviation number for each stage is used with the stage 0 noise profile (the exponential curve) 97 to generate a scaled noise profile for each stage. For example, FIG. 30 shows that stage 1 high data 98 has stage 1 high data 103 with the last five percent of the data points represented by area 99. The points in area 99 are evaluated to determine a standard deviation number indicative of the noise content in stage 1 high data 103. The standard deviation number is then used with the stage 0 noise profile 97 to generate a stage 1 noise profile.

In a similar manner, stage 2 high 100 has stage 2 high data 104 with the last five percent of points represented by area 101. The data points in area 101 are then used to calculate a standard deviation number which is then used to scale the stage 0 noise profile 97 to generate a noise profile for stage 2 data. This same process is continued for each of the stage high data as shown by the stage n high 105. For stage n high 105, stage n high data 108 has the last five percent of data points indicated in area 106. The data points in area 106 are used to determine a standard deviation number for stage n. The stage n standard deviation number is then used with the stage 0 noise profile 97 to generate a noise profile for stage n. Accordingly, each of the high data stages has a noise profile.

FIG. 31 shows how the noise profile is applied to the data in each stage. Generally, the noise profile is used to generate a threshold which is applied to the data in each stage. Since the noise profile is already scaled to adjust for the noise content of each stage, calculating a threshold permits further adjustment to tune the quantity of noise removed. Wavelet coefficients below the threshold are ignored while those above the threshold are retained. Accordingly, the remaining data has a substantial portion of the noise content removed.

Due to the characteristics of wavelet transformation, the lower stages, such as stage 0 and 1, will have more noise content than the later stages such as stage 2 or stage n. Indeed, stage n low data is likely to have little noise at all. Therefore, in a preferred embodiment the noise profiles are applied more aggressively in the lower stages and less aggressively in the later stages. For example, FIG. 31 shows that stage 0 high threshold is determined by multiplying

the stage 0 noise profile by a factor of four. In such a manner, significant numbers of data points in stage 0 high data 95 will be below the threshold and therefore eliminated. Stage 1 high threshold 112 is set at two times the noise profile for the stage 1 high data, and stage 2 high threshold 114 is set equal to the noise profile for stage 2 high. Following this geometric progression, stage n high threshold 116 is therefore determined by scaling the noise profile for each respective stage n high by a factor equal to $(1/2^{n-2})$. It will be appreciated that other factors may be applied to scale the noise profile for each stage. For example, the noise profile may be scaled more or less aggressively to accommodate specific systemic characteristics or sample compositions. As indicated above, stage n low data does not have a noise profile applied as stage n low data 118 is assumed to have little or no noise content. After the scaled noise profiles have been applied to each high data stage, the mass spectrometry data 70 has been denoised and is ready for further processing. A wavelet transformation of the denoised signal results in the sparse data set 120 as shown in FIG. 31.

Referring again to FIG. 25, the mass spectrometry data received in block 40 has been denoised in block 45 and is now passed to block 50 for baseline correction. Before performing baseline correction, the artifacts introduced by the wavelet transformation procedure are preferably removed. Wavelet transformation results vary slightly depending upon which point of the wavelet is used as a starting point. For example, the preferred embodiment uses the 24-point Daubechies-24 wavelet. By starting the transformation at the 0 point of the wavelet, a slightly different result will be obtained than if starting at points 1 or 2 of the wavelet. Therefore, the denoised data is transformed using every available possible starting point, with the results averaged to determine a final denoised and shifted signal. For example, FIG. 33 shows that the wavelet coefficient is applied 24 different times and then the results averaged to generate the final data set. It will be appreciated that other techniques may be used to accommodate the slight error introduced due to wavelet shifting.

The formula 125 is generally indicated in FIG. 33. Once the signal has been denoised and shifted, a denoised and shifted signal 130 is generated as

shown in FIG. 58. FIG. 34 shows an example of the wavelet coefficient 135 data set from the denoised and shifted signal 130.

FIG. 36 shows that putative peak areas 145, 147, and 149 are located in the denoised and shifted signal 150. The putative peak areas are systematically identified by taking a moving average along the signal 150 and identifying sections of the signal 150 which exceed a threshold related to the moving average. It will be appreciated that other methods can be used to identify putative peak areas in the signal 150.

Putative peak areas 145, 147 and 149 are removed from the signal 150 to create a peak-free signal 155 as shown in FIG. 37. The peak-free signal 155 is further analyzed to identify remaining minimum values 157, and the remaining minimum values 157 are connected to generate the peak-free signal 155.

FIG. 38 shows a process of using the peak-free signal 155 to generate a baseline 170 as shown in FIG. 39. As shown in block 162, a wavelet transformation is performed on the peak-free signal 155. All the stages from the wavelet transformation are eliminated in block 164 except for the n low stage. The n low stage will generally indicate the lowest frequency component of the peak-free signal 155 and therefore will generally indicate the system exponential characteristics. Block 166 shows that a signal is reconstructed from the n low coefficients and the baseline signal 170 is generated in block 168.

FIG. 39 shows a denoised and shifted data signal 172 positioned adjacent a correction baseline 170. The baseline correction 170 is subtracted from the denoised and shifted signal 172 to generate a signal 175 having a baseline correction applied as shown in FIG. 40. Although such a denoised, shifted, and corrected signal is sufficient for most identification purposes, the putative peaks in signal 175 are not identifiable with sufficient accuracy or confidence to call the DNA composition of a biological sample.

Referring again to FIG. 25, the data from the baseline correction 50 is now compressed in block 55, the compression technique used in a preferred embodiment is detailed in FIG. 41. In FIG. 41 the data in the baseline corrected data is presented in an array format 182 with x-axis points 183 having an associated data value 184. The x-axis is indexed by the non-zero wavelet

coefficients, and the associated value is the value of the wavelet coefficient. In the illustrated data example in table 182, the maximum value 184 is indicated to be 1000. Although a particularly advantageous compression technique for mass spectrometry data is shown, it will be appreciated that other compression techniques can be used. Although not preferred, the data may also be stored without compression.

In compressing the data according to a preferred embodiment, an intermediate format 186 is generated. The intermediate format 186 generally comprises a real number having a whole number portion 188 and a decimal portion 190. The whole number portion is the x-axis point 183 while the decimal portion is the value data 184 divided by the maximum data value. For example, in the data 182 a data value "25" is indicated at x-axis point "100". The intermediate value for this data point would be "100.025".

From the intermediate compressed data 186 the final compressed data 195 is generated. The first point of the intermediate data file becomes the starting point for the compressed data. Thereafter each data point in the compressed data 195 is calculated as follows: the whole number portion (left of the decimal) is replaced by the difference between the current and the last whole number. The remainder (right of the decimal) remains intact. For example, the starting point of the compressed data 195 is shown to be the same as the intermediate data point which is "100.025". The comparison between the first intermediate data point "100.025" and the second intermediate data point "150.220" is "50.220". Therefore, "50.220" becomes the second point of the compressed data 195. In a similar manner, the second intermediate point is "150.220" and the third intermediate data point is "500.0001". Therefore, the third compressed data becomes "350.000". The calculation for determining compressed data points is continued until the entire array of data points is converted to a single array of real numbers.

FIG. 42 generally describes the method of compressing mass spectrometry data, showing that the data file in block 201 is presented as an array of coefficients in block 202. The data starting point and maximum is determined as shown in block 203, and the intermediate real numbers are

calculated in block 204 as described above. With the intermediate data points generated, the compressed data is generated in block 205. The described compression method is highly advantageous and efficient for compressing data sets such as a processed data set from a mass spectrometry instrument. The method is particularly useful for data, such as mass spectrometry data, that uses large numbers and has been processed to have occasional lengthy gaps in x-axis data. Accordingly, an x-y data array for processed mass spectrometry data may be stored with an effective compression rate of 10x or more. Although the compression technique is applied to mass spectrometry data, it will be appreciated that the method may also advantageously be applied to other data sets.

Referring again to FIG. 25, peak heights are now determined in block 60. The first step in determining peak height is illustrated in FIG. 43 where the signal 210 is shifted left or right to correspond with the position of expected peaks. As the set of possible compositions in the biological sample is known before the mass spectrometry data is generated, the possible positioning of expected peaks is already known. These possible peaks are referred to as expected peaks, such as expected peaks 212, 214, and 216. Due to calibration or other errors in the test instrument data, the entire signal may be shifted left or right from its actual position, therefore, putative peaks located in the signal, such as putative peaks 218, 222, and 224 may be compared to the expected peaks 212, 214, and 216, respectively. The entire signal is then shifted such that the putative peaks align more closely with the expected peaks.

Once the putative peaks have been shifted to match expected peaks, the strongest putative peak is identified in FIG. 44. In a preferred embodiment, the strongest peak is calculated as a combination of analyzing the overall peak height and area beneath the peak. For example, a moderately high but wide peak would be stronger than a very high peak that is extremely narrow. With the strongest putative peak identified, such as putative peak 225, a Gaussian 228 curve is fit to the peak 225. Once the Gaussian is fit, the width (W) of the Gaussian is determined and will be used as the peak width for future calculations.

As generally addressed above, the denoised, shifted, and baseline-corrected signal is not sufficiently processed for confidently calling the DNA composition of the biological sample. For example, although the baseline has generally been removed, there are still residual baseline effects present. These residual baseline effects are therefore removed to increase the accuracy and confidence in making identifications.

To remove the residual baseline effects, FIG. 45 shows that the putative peaks 218, 222, and 224 are removed from the baseline corrected signal. The peaks are removed by identifying a center line 230, 232, and 234 of the putative peaks 218, 222, and 224, respectively and removing an area to the left and to the right of the identified center line. For each putative peak, an area equal to twice the width (W) of the Gaussian is removed from the left of the center line, while an area equivalent to 50 daltons is removed from the right of the center line. It has been found that the area representing 50 daltons is adequate to sufficiently remove the effect of salt adducts which may be associated with an actual peak. Such adducts appear to the right of an actual peak and are a natural effect from the chemistry involved in acquiring a mass spectrum. Although a 50 Dalton buffer has been selected, it will be appreciated that other ranges or methods can be used to reduce or eliminate adduct effects.

The peaks are removed and remaining minima 247 located as shown in FIG. 46 with the minima 247 connected to create signal 245. A quartic polynomial is applied to signal 245 to generate a residual baseline 250 as shown in FIG. 47. The residual baseline 250 is subtracted from the signal 225 to generate the final signal 255 as indicated in FIG. 48. Although the residual baseline is the result of a quartic fit to signal 245, it will be appreciated that other techniques can be used to smooth or fit the residual baseline.

To determine peak height, as shown in FIG. 49, a Gaussian such as Gaussian 266, 268, and 270 is fit to each of the peaks, such as peaks 260, 262, and 264, respectively. Accordingly, the height of the Gaussian is determined as height 272, 274, and 276. Once the height of each Gaussian peak is determined, then the method of identifying a biological compound 35 can move into the genotyping phase 65 as shown in FIG. 25.

An indication of the confidence that each putative peak is an actual peak can be discerned by calculating a signal-to-noise ratio for each putative peak. Accordingly, putative peaks with a strong signal-to-noise ratio are generally more likely to be an actual peak than a putative peak with a lower signal-to-noise ratio. As described above and shown in FIG. 50, the height of each peak, such as height 272, 274, and 276, is determined for each peak, with the height being an indicator of signal strength for each peak. The noise profile, such as noise profile 97, is extrapolated into noise profile 280 across the identified peaks. At the center line of each of the peaks, a noise value is determined, such as noise value 282, 283, and 284. With a signal values and a noise values generated, signal-to-noise ratios can be calculated for each peak. For example, the signal-to-noise ratio for the first peak in FIG. 50 would be calculated as signal value 272 divided by noise value 282, and in a similar manner the signal-to-noise ratio of the middle peak in FIG. 50 would be determined as signal 274 divided by noise value 283.

Although the signal-to-noise ratio is generally a useful indicator of the presence of an actual peak, further processing has been found to increase the confidence by which a sample can be identified. For example, the signal-to-noise ratio for each peak in the preferred embodiment is preferably adjusted by the goodness of fit between a Gaussian and each putative peak. It is a characteristic of a mass spectrometer that sample material is detected in a manner that generally complies with a normal distribution. Accordingly, greater confidence will be associated with a putative signal having a Gaussian shape than a signal that has a less normal distribution. The error resulting from having a non-Gaussian shape can be referred to as a "residual error".

Referring to FIG. 51, a residual error is calculated by taking a root mean square calculation between the Gaussian 293 and the putative peak 290 in the data signal. The calculation is performed on data within one width on either side of a center line of the Gaussian. The residual error is calculated as:

where G is the Gaussian signal value, R is the putative peak value, and N is the number of points from $-W$ to $+W$. The calculated residual error is used to generate an adjusted signal-to-noise ratio, as described below.

An adjusted signal noise ratio is calculated for each putative peak using the formula (S/N) * $EXP^{(-.1 * R)}$, where S/N is the signal-to-noise ratio, and R is the residual error determined above. Although the preferred embodiment calculates an adjusted signal-to-noise ratio using a residual error for each peak, it will be appreciated that other techniques can be used to account for the goodness of fit between the Gaussian and the actual signal.

Referring now to FIG. 52, a probability is determined that a putative peak is an actual peak. In making the determination of peak probability, a probability profile 300 is generated where the adjusted signal-to-noise ratio is the x-axis and the probability is the y-axis. Probability is necessarily in the range between a 0% probability and a 100% probability, which is indicated as 1. Generally, the higher the adjusted signal-to-noise ratio, the greater the confidence that a putative peak is an actual peak.

At some target value for the adjusted signal-to-noise, it has been found that the probability is 100% that the putative peak is an actual peak and can confidently be used to identify the DNA composition of a biological sample. However, the target value of adjusted signal-to-noise ratio where the probability is assumed to be 100% is a variable parameter which is to be set according to application specific criteria. For example, the target signal-to-noise ratio will be adjusted depending upon trial experience, sample characteristics, and the acceptable error tolerance in the overall system. More specifically, for situations requiring a conservative approach where error cannot be tolerated, the target adjusted signal-to-noise ratio can be set to, for example, 10 and higher. Accordingly, 100% probability will not be assigned to a peak unless the adjusted signal-to-noise ratio is 10 or over.

In other situations, a more aggressive approach may be taken as sample data is more pronounced or the risk of error may be reduced. In such a situation, the system may be set to assume a 100% probability with a 5 or greater target signal-to-noise ratio. Of course, an intermediate signal-to-noise ratio target figure can be selected, such as 7, when a moderate risk of error can be assumed. Once the target adjusted signal-to-noise ratio is set for the method,

then for any adjusted signal-to-noise ratio a probability can be determined that a putative peak is an actual peak.

Due to the chemistry involved in performing an identification test, especially a mass spectrometry test of a sample prepared by DNA amplifications, the allelic ratio between the signal strength of the highest peak and the signal strength of the second (or third and so on) highest peak should fall within an expected ratio. If the allelic ratio falls outside of normal guidelines, the preferred embodiment imposes an allelic ratio penalty to the probability. For example, FIG. 53 shows an allelic penalty 315 which has an x-axis 317 that is the ratio between the signal strength of the second highest peak divided by signal strength of the highest peak. The y-axis 319 assigns a penalty between 0 and 1 depending on the determined allelic ratio. In the preferred embodiment, it is assumed that allelic ratios over 30% are within the expected range and therefore no penalty is applied. Between a ratio of 10% and 30%, the penalty is linearly increased until at allelic ratios below 10% it is assumed the second-highest peak is not real. For allelic ratios between 10% and 30%, the allelic penalty chart 315 is used to determine a penalty 319, which is multiplied by the peak probability determined in FIG. 52 to determine a final peak probability. Although the preferred embodiment incorporates an allelic ratio penalty to account for a possible chemistry error, it will be appreciated that other techniques may be used. Similar treatment will be applied to the other peaks.

With the peak probability of each peak determined, the statistical probability for various composition components may be determined. As an example, in order to determine the probability of each of three possible combinations of two peaks, -- peak G, peak C and combinations GG, CC and GC. FIG. 54 shows an example where a most probable peak 325 is determined to have a final peak probability of 90%. Peak 325 is positioned such that it represents a G component in the biological sample. Accordingly, it can be maintained that there is a 90% probability that G exists in the biological sample. Also in the example shown in FIG. 54, the second highest probability is peak 330 which has a peak probability of 20%. Peak 330 is at a position associated

with a C composition. Accordingly, it can be maintained that there is a 20% probability that C exists in the biological sample.

With the probability of G existing (90%) and the probability of C existing (20%) as a starting point, the probability of combinations of G and C existing can be calculated. For example, FIG. 54 indicates that the probability of GG existing 329 is calculated as 72%. This is calculated as the probability of GG is equal to the probability of G existing (90%) multiplied by the probability of C not existing (100% -20%). So if the probability of G existing is 90% and the probability of C not existing is 80%, the probability of GG is 72%.

In a similar manner, the probability of CC existing is equivalent to the probability of C existing (20%) multiplied by the probability of G not existing (100% - 90%). As shown in FIG. 54, the probability of C existing is 20% while the probability of G not existing is 10%, so therefore the probability of CC is only 2%. Finally, the probability of GC existing is equal to the probability of G existing (90%) multiplied by the probability of C existing (20%). So if the probability of G existing is 90% and the probability of C existing is 20%, the probability of GC existing is 18%. In summary form, then, the probability of the composition of the biological sample is:

probability of GG: 72%;
probability of GC: 18%; and
probability of CC: 2%.

Once the probabilities of each of the possible combinations has been determined, FIG. 55 is used to decide whether or not sufficient confidence exists to call the genotype. FIG. 55 shows a call chart 335 which has an x-axis 337 which is the ratio of the highest combination probability to the second highest combination probability. The y-axis 339 simply indicates whether the ratio is sufficiently high to justify calling the genotype. The value of the ratio may be indicated by M 340. The value of M is set depending upon trial data, sample composition, and the ability to accept error. For example, the value M may be set relatively high, such as to a value 4 so that the highest probability must be at least four times greater than the second highest probability before confidence is established to call a genotype. However, if a certain level of error may be

acceptable, the value of M may be set to a more aggressive value, such as to 3, so that the ratio between the highest and second highest probabilities needs to be only a ratio of 3 or higher. Of course, moderate value may be selected for M when a moderate risk can be accepted. Using the example of FIG. 54, where the probability of GG was 72% and the probability of GC was 18%, the ratio between 72% and 18% is 4.0, therefore, whether M is set to 3, 3.5, or 4, the system would call the genotype as GG. Although the preferred embodiment uses a ratio between the two highest peak probabilities to determine if a genotype confidently can be called, it will be appreciated that other methods may be substituted. It will also be appreciated that the above techniques may be used for calculating probabilities and choosing genotypes (or more general DNA patterns) containing of combinations of more than two peaks.

Referring now to FIG. 56, a flow chart is shown generally defining the process of statistically calling genotype described above. In FIG. 56 block 402 shows that the height of each peak is determined and that in block 404 a noise profile is extrapolated for each peak. The signal is determined from the height of each peak in block 406 and the noise for each peak is determined using the noise profile in block 408. In block 410, the signal-to-noise ratio is calculated for each peak. To account for a non-Gaussian peak shape, a residual error is determined in block 412 and an adjusted signal-to-noise ratio is calculated in block 414. Block 416 shows that a probability profile is developed, with the probability of each peak existing found in block 418. An allelic penalty may be applied in block 420, with the allelic penalty applied to the adjusted peak probability in block 422. The probability of each combination of components is calculated in block 424 with the ratio between the two highest probabilities being determined in block 426. If the ratio of probabilities exceeds a threshold value then the genotype is called in block 428.

In another embodiment of the invention, the computing device 20 (Fig. 24) supports "standardless" genotyping by identifying data peaks that contain putative SNPs. Standardless genotyping is used, for example, where insufficient information is known about the samples to determine a distribution of expected

peak locations, against which an allelic penalty as described above can be reliably calculated. This permits the computing device to be used for identification of peaks that contain putative SNPs from data generated by any assay that fragments a targeted DNA molecule. For such standardless genotyping, peaks that are associated with an area under the data curve that deviates significantly from the typical area of other peaks in the data spectrum are identified and their corresponding mass (location along the x-axis) is determined.

More particularly, peaks that deviate significantly from the average area of other peaks in the data are identified, and the expected allelic ratio between data peaks is defined in terms of the ratio of the area under the data peaks. Theoretically, where each genetic loci has the same molar concentration of analyte, the area under each corresponding peak should be the same, thus producing a 1.0 ratio of the peak area between any two peaks. In accordance with the invention, peaks having a smaller ratio relative to the other peaks in the data will not be recognized as peaks. More particularly, peaks having an area ratio smaller than 30% relative to a nominal value for peak area will be assigned an allelic penalty. The mass of the remaining peaks (their location along the x-axis of the data) will be determined based on oligonucleotide standards.

Fig. 57 shows a flow diagram representation of the processing by the computing device 20 (Fig. 24) when performing standardless genotyping. In the first operation, represented by the flow diagram box numbered 502, the computing device receives data from the mass spectrometer. Next, the height of each putative peak in the data sample is determined, as indicated by the block 504. After the height of each peak in the mass spectrometer data is determined, a de-noise process 505 is performed, beginning with an extrapolation of the noise profile (block 506), followed by finding the noise of each peak (block 508) and calculating the signal to noise ratio for each data sample (block 510). Each of these operations may be performed in accordance with the description above for denoise operations 45 of Fig. 25. Other suitable denoise operations will occur to those skilled in the art.

The next operation is to find the residual error associated with each data point. This is represented by the block 512 in Figure 57. The next step, block 514, involves calculating an adjusted signal to noise ratio for each identified peak. A probability profile is developed next (block 516), followed by a determination of the peak probabilities at block 518. In the preferred embodiment, the denoise operations of Fig. 57, comprising block 502 to block 518, comprise the corresponding operations described above in conjunction with Fig. 56 for block 402 through block 418, respectively.

The next action for the standardless genotype processing is to determine an allelic penalty for each peak, indicated by the block 524. As noted above, the standardless genotype processing of Fig. 57 determines an allelic penalty by comparing area under the peaks. Therefore, rather than compare signal strength ratios to determine an allelic penalty, such as described above for Fig. 53, the standardless processing determines the area under each of the identified peaks and compares the ratio of those areas. Determining the area under each peak may be computed using conventional numerical analysis techniques for calculating the area under a curve for experimental data.

Thus, the allelic penalty is assigned in accordance with Fig. 58, which shows that no penalty is assigned to peaks having a peak area relative to an expected average area value that is greater than 0.30 (30%). The allelic penalty is applied to the peak probability value, which may be determined according to the process such as described in Fig. 52. It should be apparent from Fig. 58 that the allelic penalty imposed for peaks below a ratio of 30% is that such peaks will be removed from further measurement and processing. Other penalty schemes, however, may be imposed in accordance with knowledge about the data being processed, as determined by those skilled in the art.

After the allelic penalty has been determined and applied, the standardless genotype processing compares the location of the remaining putative peaks to oligonucleotide standards to determine corresponding masses in the processing for block 524. For standardless genotype data, the processing of the block 524 is performed to determine mass and genotype, rather than performing the operations corresponding to block 424, 426, and 428 of Fig. 33.

Techniques for performing such comparisons and determining mass will be known to those skilled in the art.

In another embodiment, the computing device 20 (Fig. 24) permits the detection and determination of the mass (location along the x-axis of the data) of the sense and antisense strand of fragments generated in the assay. If desired, the computing device may also detect and determine the quantity (area under each peak) of the respective sense and antisense strands, using a similar technique to that described above for standardless genotype processing. The data generated for each type of strand may then be combined to achieve a data redundancy and to thereby increase the confidence level of the determined genotype. This technique obviates primer peaks that are often observed in data from other diagnostic methods, thereby permitting a higher level of multiplexing. In addition, when quantitation is used in pooling experiments, the ratio of the measured peak areas is more reliably calculated than the peak identifying technique, due to data redundancy.

Fig. 23 is a flow diagram that illustrates the processing implemented by the computing device 20 to perform sense and antisense processing. In the first operation, represented by the flow diagram box numbered 602, the computing device receives data from the mass spectrometer. This data will include data for the sense strand and antisense strand of assay fragments. Next, the height of each putative peak in the data sample is determined, as indicated by the block 604. After the height of each peak in the mass spectrometer data is determined, a de-noise process 605 is performed, beginning with an operation that extrapolates the noise profile (block 606), followed by finding the noise of each peak (block 608) and calculating the signal to noise ratio for each data sample (block 610). Each of these operations may be performed in accordance with the description above for the denoise operations 45 of Fig. 25. Other suitable denoise operations will occur to those skilled in the art. The next operation is to find the residual error associated with each data point. This is represented by the block 612 in Figure 36.

After the residual error for the data of the sense strand and antisense strand has been performed, processing to identify the genotypes will be

performed for the sense strand and also for the antisense strand. Therefore, Fig. 23 shows that processing includes sense strand processing (block 630) and antisense strand processing (block 640). Each block 630, 640 includes processing that corresponds to adjusting the signal to noise ratio, developing a probability profile, determining an allelic penalty, adjusting the peak probability by the allelic penalty, calculating genotype probabilities, and testing genotype probability ratios, such as described above in conjunction with blocks 414 through 426 of Fig. 56. The processing of each block 630, 640 may, if desired, include standardless processing operations such as described above in conjunction with Fig. 57. The standardless processing may be included in place of or in addition to the processing operations of Fig. 56.

After the genotype probability processing is completed, the data from the sense strand and antisense strand processing is combined and compared to expected database values to obtain the benefits of data redundancy as between the sense strand and antisense strand. Those skilled in the art will understand techniques to take advantage of known data redundancies between a sense strand and antisense strand of assay fragments. This processing is represented by the block 650. After the data from the two strands is combined for processing, the genotype processing is performed (block 660) and the genotype is identified.

Since modifications will be apparent to those of skill in this art, it is intended that this invention be limited only by the scope of the appended claims.

WHAT IS CLAIMED IS:

1. A subcollection of samples from a target population, comprising:

a plurality of samples, wherein the samples are selected from the group consisting of blood, tissue, body fluid, cell, seed, microbe, pathogen and reproductive tissue samples; and

a symbology on the containers containing the samples, wherein the symbology is representative of the source and/or history of each sample, wherein:

the target population is a healthy population that has not been selected for any disease state;

the collection comprises samples from the healthy population; and

the subcollection is obtained by sorting the collection according to specified parameters.

2. The subcollection of claim 1, wherein the parameters are selected from the group consisting of ethnicity, age, gender, height, weight, alcohol intake, number of pregnancies, number of live births, vegetarians, type of physical activity, state of residence and/or length of residence in a particular state, educational level, age of parent at death, cause of parent death, former or current smoker, length of time as a smoker, frequency of smoking, occurrence of a disease in immediate family (parent, siblings, children), use of prescription drugs and/or reason therefor, length and/or number of hospital stays and exposure to environmental factors.

3. The subcollection of claim 1, wherein the symbology is a bar code.

4. A method of producing a database, comprising:

identifying healthy members of a population;

obtaining data comprising identifying information and obtaining historical information and data relating to the identified members of the population and their immediate family;

entering the data into a database for each member of the population and associating the member and the data with an indexer.

5. The method of claim 4, further comprising:

obtaining a body tissue or body fluid sample;

analyzing the body tissue or body fluid in the sample; and

entering the results of the analysis for each member into the database and associating each result with the indexer representative of each member.

6. A database produced by the method of claim 4.

7. A database produced by the method of claim 5.

8. A database, comprising:

datapoints representative of a plurality of healthy organisms from whom biological samples are obtained,

wherein each datapoint is associated with data representative of the organism type and other identifying information.

9. The database of claim 8, wherein the datapoints are answers to questions regarding one or more of a parameters selected from the group consisting of ethnicity, age, gender, height, weight, alcohol intake, number of pregnancies, number of live births, vegetarians, type of physical activity, state of residence and/or length of residence in a particular state, educational level, age of parent at death, cause of parent death, former or current smoker, length of time as a smoker, frequency of smoking, occurrence of a disease in immediate family (parent, siblings, children), use of prescription drugs and/or reason therefor, length and/or number of hospital stays and exposure to environmental factors.

10. The database of claim 9, wherein the organisms are mammals and the samples are body fluids or tissues.

11. The database of claim 9, wherein the samples are selected from blood, blood fractions, cells and subcellular organelles.

12 The database of claim 8, further comprising,

phenotypic data from an organism.

13. The database of claim 12, wherein the data includes one of physical characteristics, background data, medical data, and historical data.

14. The database of claim 8, further comprising,

genotypic data from nucleic acid obtained from an organism.

15. The database of claim 14, wherein genotypic data includes, genetic markers, non-coding regions, microsatellites, RFLPs, VNTRs, historical data of the organism, medical history, and phenotypic information.

16. The database of claim 8 that is a relational database.

17. The database of claim 16, wherein the data are related to an indexer datapoint representative of each organism from whom data is obtained.

18. A method of identifying polymorphisms that are candidate genetic markers, comprising:

identifying a polymorphism; and

identifying any pathway or gene linked to the locus of the polymorphism, wherein

the polymorphisms are identified in samples associated with a target population that comprises healthy subjects.

19. The method of claim 18, wherein the polymorphism is identified by detecting the presence of target nucleic acids in a sample by a method, comprising the steps of:

a) hybridizing a first oligonucleotide to the target nucleic acid;

b) hybridizing a second oligonucleotide to an adjacent region of the target nucleic acid;

c) ligating the hybridized oligonucleotides; and

c) detecting hybridized first oligonucleotide by mass spectrometry as an indication of the presence of the target nucleic acid.

20. The method of claim 18, wherein the polymorphism is identified by detecting target nucleic acids in a sample by a method, comprising the steps of:

a) hybridizing a first oligonucleotide to the target nucleic acid and hybridizing a second oligonucleotide to an adjacent region of the target nucleic acid;

b) contacting the hybridized first and second oligonucleotides with a cleavage enzyme to form a cleavage product; and

c) detecting the cleavage product by mass spectrometry as an indication of the presence of the target nucleic acid.

21. The method of claim 20 wherein the samples are from subjects in a healthy database.

22. The method of claim 18, wherein the polymorphism is identified by identifying target nucleic acids in a sample by primer oligo base extension (probe).

23. The method of 22, wherein primer oligo base extension, comprises:

a) obtaining a nucleic acid molecule that contains a target nucleotide;

b) optionally immobilizing the nucleic acid molecule onto a solid support, to produce an immobilized nucleic acid molecule;

c) hybridizing the nucleic acid molecule with a primer oligonucleotide that is complementary to the nucleic acid molecule at a site adjacent to the target nucleotide;

d) contacting the product of step c) with a composition comprising a dideoxynucleoside triphosphate or a 3'-deoxynucleoside triphosphates and a polymerase, so that only a dideoxynucleoside or 3'-deoxynucleoside triphosphate that is complementary to the target nucleotide is extended onto the primer; and

e) detecting the extended primer, thereby identifying the target nucleotide.

24. The method of claim 23, wherein detection of the extended primer is effected by mass spectrometry, comprising:

ionizing and volatizing the product of step d) ; and

detecting the extended primer by mass spectrometry, thereby identifying the target nucleotide.

25. The method of claim 24, wherein;

samples are presented to the mass spectrometer as arrays on chips; and

each sample occupies a volume that is about the size of the laser spot projected by the laser in a mass spectrometer used in matrix-assisted laser desorption/ionization (MALDI) spectrometry.

26. A combination, comprising:

a database containing parameters associated with a datapoint representative of a subject from whom samples are obtained, wherein the subjects are healthy; and

an indexed collection of the samples, wherein the index identifies the subject from whom the sample was obtained.

27 The combination of claim 26, wherein the parameter is selected from the group consisting of ethnicity, age, gender, height, weight, alcohol intake, number of pregnancies, number of live births, vegetarians, type of physical activity, state of residence and/or length of residence in a particular state, educational level, age of parent at death, cause of parent death, former or current smoker, length of time as a smoker, frequency of smoking, occurrence of disease in immediate family (parent, siblings, children), use of prescription drugs and/or reason therefor, length and/or number of hospital stays and ecposure to environmental factors.

28. The combination of claim 26, wherein the database further contains genotypic data for each subject.

29. The combination of claim 26, wherein the samples are blood.

30 A data storage medium, comprising the database of claim 8.

31. A computer system, comprising the database of claim 8.

32. A system for high throughput processing of biological samples, comprising:

a process line comprising a plurality of processing stations, each of which performs a procedure on a biological sample contained in a reaction vessel;

a robotic system that transports the reaction vessel from processing station to processing station;

a data analysis system that receives test results of the process line and automatically processes the test results to make a determination regarding the biological sample in the reaction vessel;

a control system that determines when the test at each processing station is complete and, in response, moves the reaction vessel to

the next test station, and continuously processes reaction vessels one after another until the control system receives a stop instruction; and

a database of claim 8, wherein the samples tested by the automated process line comprise samples from subjects in the database.

33. The system of claim 32, wherein one of the processing stations comprises a mass spectrometer.

34. The system of claim 32, wherein the data analysis system processes the test results by receiving test data from the mass spectrometer such that the test data for a biological sample contains one or more signals, whereupon the data analysis system determines the area under the curve of each signal and normalizes the results thereof and obtains a substantially quantitative result representative of the relative amounts of components in the tested sample.

35. A method for high throughput processing of biological samples, the method comprising:

transporting a reaction vessel along a system of claim 32, comprising a process line having a plurality of processing stations, each of which performs a procedure on one or more biological samples contained in the reaction vessel;

determining when the test procedure at each processing station is complete and, in response, moving the reaction vessel to the next processing station;

receiving test results of the process line and automatically processing the test results to make a data analysis determination regarding the biological samples in the reaction vessel; and

processing reaction vessels continuously one after another until receiving a stop instruction, wherein the samples tested by the automated process line comprise samples from subjects in the database.

36. The method of 35, wherein one of the processing stations comprises a mass spectrometer.

37. The method of claim 36, wherein the samples are analyzed by a method comprising primer oligo base extension (probe).

38. The method of claim 37, further comprising:

processing the test results by receiving test data from the mass spectrometer such that the test data for a biological sample contains one or more signals or numerical values representative of signals, whereupon the data analysis system determines the area under the curve of each signal and normalizes the results thereof and obtains a substantially quantitative result representative of the relative amounts of components in the tested sample.

39. The method of claim 37, wherein primer oligo base extension, comprises:

a) obtaining a nucleic acid molecule that contains a target nucleotide;

b) optionally immobilizing the nucleic acid molecule onto a solid support, to produce an immobilized nucleic acid molecule;

c) hybridizing the nucleic acid molecule with a primer oligonucleotide that is complementary to the nucleic acid molecule at a site adjacent to the target nucleotide;

d) contacting the product of step c) with composition comprising a dideoxynucleoside triphosphate or a 3'-deoxynucleoside triphosphates and a polymerase, so that only a dideoxynucleoside or 3'-deoxynucleoside triphosphate that is complementary to the target nucleotide is extended onto the primer; and

e) detecting the primer, thereby identifying the target nucleotide.

40. The method of 39, wherein detection of the extended primer is effected by mass spectrometry, comprising:

ionizing and volatizing the product of step d); and

detecting the extended primer by mass spectrometry, thereby identifying the target nucleotide.

41. The method of claim 36, wherein the target nucleic acids in the sample are detected and/or identified by a method, comprising the steps of:

a) hybridizing a first oligonucleotide to the target nucleic acid;

b) hybridizing a second oligonucleotide to an adjacent region of the target nucleic acid;

c) ligating then hybridized oligonucleotides; and

c) detecting hybridized first oligonucleotide by mass spectrometry as an indication of the presence of the target nucleic acid.

42. The method of claim 36, wherein the target nucleic acids in the sample are detected and/or identified by a method, comprising the steps of:

a) hybridizing a first oligonucleotide to the target nucleic acid and hybridizing a second oligonucleotide to an adjacent region of the target nucleic acid;

b) contacting the hybridized first and second oligonucleotides with a cleavage enzyme to form a cleavage product; and

c) detecting the cleavage product by mass spectrometry as an indication of the presence of the target nucleic acid.

43. A method of producing a database stored in a computer memory, comprising:

identifying healthy members of a population;

obtaining identifying and historical information and data relating to the identified members of the population;

entering the member-related data into the computer memory database for each identified member of the population and associating the member and the data with an indexer.

44. The method of claim 43, further comprising:

obtaining a body tissue or body fluid sample of an identified member;

analyzing the body tissue or body fluid in the sample; and

entering the results of the analysis for each member into the computer memory database and associating each result with the indexer representative of each member.

45. A database produced by the method of claim 43.

46. A database produced by the method of claim 44.

47. The database of claim 8, wherein:

the organims are selected from among animals, bacteria, fungi, protozoans and parasites and

each datapoint is associated with parameters representative of the organism type and identifying information.

48. The database of claim 43, further comprising, phenotypic data regarding each subject.

49. The database of claim 47 that is a relational database and the parameters are the answers to the questions in the questionnaire.

50. The database of claim 8, further comprising,

genotypic data of nucleic acid of the subject, wherein genotypic data includes, but is not limited to, genetic markers, non-coding regions, microsatellites, restriction fragment length polymorphisms (RFLPs), variable number tandem repeats (VNTRs), historical day of the organism, the medical history of the subject, phenotypic information, and other information.

51. A database, comprising data records stored in computer memory, wherein the data records contain information that identifies healthy members of a population, and also contain identifying and historical information and data relating to the identified members.

52. The database of claim 51, further comprising an index value for each identified member that associates each member of the population with the identifying and historical information and data.

53. A computer system, comprising the database of claim 51.

54. An automated process line, comprising the database of claim 51.

55. A method for determining a polymorphism that correlates with age, ethnicity or gender, comprising:

identifying a polymorphism; and

determining the frequency of the polymorphism with increasing age, with ethnicity or with gender in a healthy population.

56. A method for determining whether a polymorphism correlates with suceptibility to morbidity, early mortality, or morbidity and early mortality, comprising;

identifying a polymorphism; and

determining the frequency of the polymorphism with increasing age in a healthy population.

57. A high throughput method of determining frequencies of genetic variations, comprising:

selecting a healthy target population and a genetic variation to be assessed;

pooling a plurality of samples of biopolymers obtained from members of the population,

determining or detecting the biopolymer that comprises the variation by mass spectrometry;

obtaining a mass spectrum or a digital representation thereof; and

determining the frequency of the variation in the population.

58. The method of claim 57, wherein:

the variation is selected from the group consisting of an allelic variation, a post-translational modification, a nucleic modification, a label, a mass modification of a nucleic acid and methylation; and/or

the biopolymer is a nucleic acid, a protein, a polysaccharide, a lipid, a small organic metabolite or intermediate, wherein the concentration of biopolymer of interest is the same in each of the samples; and/or

the frequency is determined by assessing the method comprising determining the area under the peak in the mass spectrum or digital repesentation thereof corresponding to the mass of the biopolymer comprising the genomic variation.

59. The method of claim 58, wherein the method for determining the frequency is effected by determining the ratio of the signal or the digital representation thereof to the total area of the entire mass spectrum, which is corrected for background.

60. A method for discovery of a polymorphism in a population, comprising:

sorting the database of claim 8 according to a selected parameter to identify samples that match the selected parameter;

isolating a biopolymer from each identified sample;

optionally pooling each isolated biopolymer;

optionally amplifying the amount of biopolymer;

cleaving the pooled biopolymers to produce fragments thereof;

obtaining a mass spectrum of the resulting fragments and comparing the mass spectrum with a control mass spectrum to identify differences between the spectra and thereby identifing any polymorphisms; wherein:

the control mass spectrum is obtained from unsorted samples in the collection or samples sorted according to a different parameter.

61. The method of claim 60, wherein cleaving is effected by contacting the biopolymer with an enzyme.

62. The method of claim 61, wherein the enzyme is selected from the group consisting of nucleotide glycosylase, a nickase and a type IIS restriction enzyme.

63. The method of claim 60, wherein the biopolymer is a nucleic acid or a protein.

64. The method of claim 60, wherein the the mass spectrometric format is selected from among Matrix-Assisted Laser Desorption/Ionization, Time-of-Flight (MALDI-TOF), Electrospray (ES), IR-MALDI, Ion Cyclotron Resonance (ICR), Fourier Transform and combinations thereof.

65. A method for discovery of a polymorphism in a population, comprising:

obtaining samples of body tissue or fluid from a plurality of organisms;

isolating a biopolymer from each sample;

pooling each isolated biopolymer;

optionally amplifying the amount of biopolymer;

cleaving the pooled biopolymers to produce fragments thereof;

obtaining a mass spectrum of the resulting fragments;

comparing the frequency of each fragment to identify fragments present in amounts lower than the average frequency, thereby identifying any polymorphisms.

66. The method of claim 65, wherein cleaving is effected by contacting the biopolymer with an enzyme.

67. The method of claim 66, wherein the enzyme is selected from the group consisting of nucleotide glycosylase, a nickase and a type IIS restriction enzyme.

68. The method of claim 65, wherein the biopolymer is a nucleic acid or a protein.

69. The method of claim 65, wherein the the mass spectrometric format is selected from among Matrix-Assisted Laser Desorption/Ionization, Time-of-Flight (MALDI-TOF), Electrospray (ES), IR-MALDI, Ion Cyclotron Resonance (ICR), Fourier Transform and combinations thereof.

70. The method of claim 65, wherein the samples are obtained from healthy subjects.

71. A method of correlating a polymorphism with a parameter, comprising:

sorting the database of claim 8 according to a selected parameter to identify samples that match the selected parameter;

isolating a biopolymer from each identified sample;

pooling each isolated biopolymer;

optionally amplifying the amount of biopolymer;

determining the frequency of the polymorphism in the pooled biopolymers, wherein:

an alteration of the frequency of the polymorphism compared to a control, indicates a correlation of the polymorphism with the selected parameter; and

the control is the frequency of the polymorphism in pooled biopolymers obtained from samples identified from an unsorted database or from a database sorting according to a different parameter.

72. The method claim 71, wherein the parameter is selected from the group consisting of ethnicity, age, gender, height, weight, alcohol intake, number of pregnancies, number of live births, vegetarians, type of physical activity, state of residence and/or length of residence in a particular state, educational level, age of parent at death, cause of parent death, former or current smoker, length of time as a smoker, frequency of smoking, occurrence of a disease in immediate family (parent, siblings, children), use of prescription

drugs and/or reason therefor, length and/or number of hospital stays and exposure to environmental factors.

73. The method claim 72, wherein the parameter is occurrence of disease or a particular disease in an immediate family member, thereby correlating the polymorphism with the disease.

74. The method of claim 71, wherein the pooled biopolymers are pooled nucleic acid molecules.

75. The method of claim 74, wherein the polymorphism is detected by primer oligo base extension (PROBE).

76. The method of 75, wherein primer oligo base extension, comprises:

a) optionally immobilizing the nucleic acid molecules onto a solid support, to produce immobilized nucleic acid molecules;

b) hybridizing the nucleic acid molecules with a primer oligonucleotide that is complementary to the nucleic acid molecule at a site adjacent to the polymorphism;

c) contacting the product of step c) with composition comprising a dideoxynucleoside triphosphate or a 3'-deoxynucleoside triphosphates and a polymerase, so that only a dideoxynucleoside or 3'-deoxynucleoside triphosphate that is complementary to the polymorphism is extended onto the primer; and

d) detecting the extended primer, thereby detecting the polymorphism in nucleic acid molecules in the pooled nucleic acids.

77. The method of claim 76, wherein detecting is effected by mass spectrometry.

78. The method of claim 71, wherein the frequency is percentage of nucleic acid molecules in the pooled nucleic acids that contain the polymorphism.

79. The method of claim 78, wherein the ratio is determined by obtaining mass spectra of the pooled nucleic acids.

80. The method of claim 72, wherein the parameter is age, thereby correlating the polymorphism with suceptibility to morbidity, early mortality or morbidity and early mortality.

81. A method for haplotyping polymorphisms in a nucleic acid, comprising:

(a) sorting the database of claim 8 according to a selected parameter to identify samples that match the selected parameter;

(b) isolating nucleic acid from each identified sample;

(c) optionally pooling each isolated nucleic acid;

(d) amplifying the amount of nucleic acid;

(e) forming single-stranded nucleic acid and splitting each single-strand into a separate reaction vessel;

(f) contacting each single-stranded nucleic acid with an adaptor nucleic acid to form an adaptor complex;

(g) contacting the adaptor complex with a nuclease and a ligase;

(h) contacting the products of step (g) with a mixture that is capable of amplifying a ligated adaptor to produce an extended product;

(i) obtaining a mass spectrum of each nucleic acid resulting from step (h) and detecting a polymorphism by identifying a signal corresponding to the extended product;

(j) repeating steps (f) through (i) utilizing an adaptor nucleic acid able to hybridize with another adapter nucleic acid that hybridizes to a different sequence on the same strand; whereby

the polymorphisms are haplotyped by detecting more than one extended product.

82. The method of claim 1, wherein the nuclease is Fen-1.

83. A method for haplotyping polymorphisms in a population, comprising:

sorting the database of claim 8 according to a selected parameter to identify samples that match the selected parameter;

isolating a nucleic acid from each identified sample;

pooling each isolated nucleic acid;

optionally amplifying the amount of nucleic acid;

contacting the nucleic acid with at least one enzyme to produce fragments thereof;

obtaining a mass spectrum of the resulting fragments; whereby:

the polymorphisms are detected by detecting signals corresponding to the polymorphisms; and

the polymorphisms are haplotyped by determining from the mass spectrum that the polymorphisms are located on the same strand of the nucleic acid.

84. The method of claim 83, wherein the enzyme is a nickase.

85. The method of claim 84, wherein the nickase is selected from the group consisting of NY2A and NYS1.

86. A method for detecting methylated nucleotides within a nucleic acid sample, comprising:

splitting a nucleic acid sample into separate reaction vessels;

contacting nucleic acid in one reaction vessel with bisulfite;

amplifying the nucleic acid in each reaction vessel;

cleaving the nucleic acids in each reaction vessel to produce fragments thereof;

obtaining a mass spectrum of the resulting fragments from one reaction vessel and another mass spectrum of the resulting fragements from another reaction vessel; whereby:

cytosine methylation is detected by identifying a difference in signals between the mass spectra.

87. The method of claim 86, wherein:

the step of amplifying is carried out in the presence of uracil; and

the step of cleaving is effected by a uracil glycosylase.

88. A method for identifying a biological sample, comprising:

generating a data set indicative of the composition of the biological sample;

denoising the data set to generate denoised data;

deleting the baseline from the denoised data to generate an intermediate data set;

defining putative peaks for the biological sample;

using the putative peaks to generate a residual baseline;

removing the residual baseline from the intermediate data set to generate a corrected data set;

locating, responsive to removing the residual baseline, a probable peak in the corrected data set; and

identifying, using the located probable peak, the biological sample;

wherein the generated biological sample data set comprises data from sense strands and antisense strands of assay fragments.

89. The method according to claim 88, wherein identifying includes combining data from the sense strands and the antisense strands, and comparing the data against expected sense strand and antisense strand values, to identify the biological sample.

90. The method according to claim 88, wherein identifying includes deriving a peak probability for the probable peak, in accordance with whether the probable peak is from sense strand data or from antisense strand data.

91. The method according to claim 88, wherein identifying includes deriving a peak probability for the probable peak and applying an allelic penalty in response to a ratio between a calculated area under the probable peak and a calculated expected average area under all peaks in the data set.

92. A method for identifying a biological sample, comprising:

generating a data set indicative of the composition of the biological sample;

denoising the data set to generate denoised data;

deleting the baseline from the denoised data to generate an intermediate data set;

defining putative peaks for the biological sample; using the putative peaks to generate a residual baseline;

removing the residual baseline from the intermediate data set to generate a corrected data set;

locating, responsive to removing the residual baseline, a probable peak in the corrected data set; and

identifying, using the located probable peak, the biological sample;

wherein identifying includes deriving a peak probability for the probable peak and

applying an allelic penalty in response to a ratio between a calculated area under the probable peak and a calculated expected average area under all peaks in the data set.

93. The method according to claim 92, wherein identifying includes comparing data from probable peaks that did not receive an applied allelic penalty to determine their mass in accordance with oligonucleotide biological data.

94. The method according to claim 92, wherein the allelic penalty is not applied to probable peaks whose ratio of area under the peak to the expected area value is greater than 30%.

95. A method for detecting a polymorphism in a nucleic acid, comprising:

amplifying a region of the nucleic acid to produce an amplicon, wherein the resulting amplicon comprises one or more enzyme restriction sites;

contacting the amplicon with a restriction enzyme to produce fragments;

obtaining a mass spectrum of the resulting fragments and analyzing signals in the mass spectrum by the method of claim 88; whereby:

the polymorphism is detected from the pattern of the signals.

96. A subcollection of samples from a target population, comprising:

a plurality of samples, wherein the samples are selected from the group consisting of nucleic acids, fetal tissue, protein samples; and

a symbology on the containers containing the samples, wherein the symbology is representative of the source and/or history of each sample, wherein:

the target population is a healthy population that has not been selected for any disease state;

the collection comprises samples from the healthy population; and

the subcollection is obtained by sorting the collection according to specified parameters.

97. The combination of claim 26, wherein the samples are selected selected from the group consisting of nucleic acids, fetal tissue, protein, tissue, body fluid, cell, seed, microbe, pathogen and reproductive tissue samples.

98. A combination, comprising the database of claim 8 and a mass spectrometer.

99. The combination of claim 98 that is an automated process line for analyzing biological samples.

100. A system for high throughput processing of biological samples, comprising:

a database of claim 8, wherein the samples tested by the automated process line comprise samples from subjects in the database; and

a mass spectrometry for analysis of biopolymers in the samples.

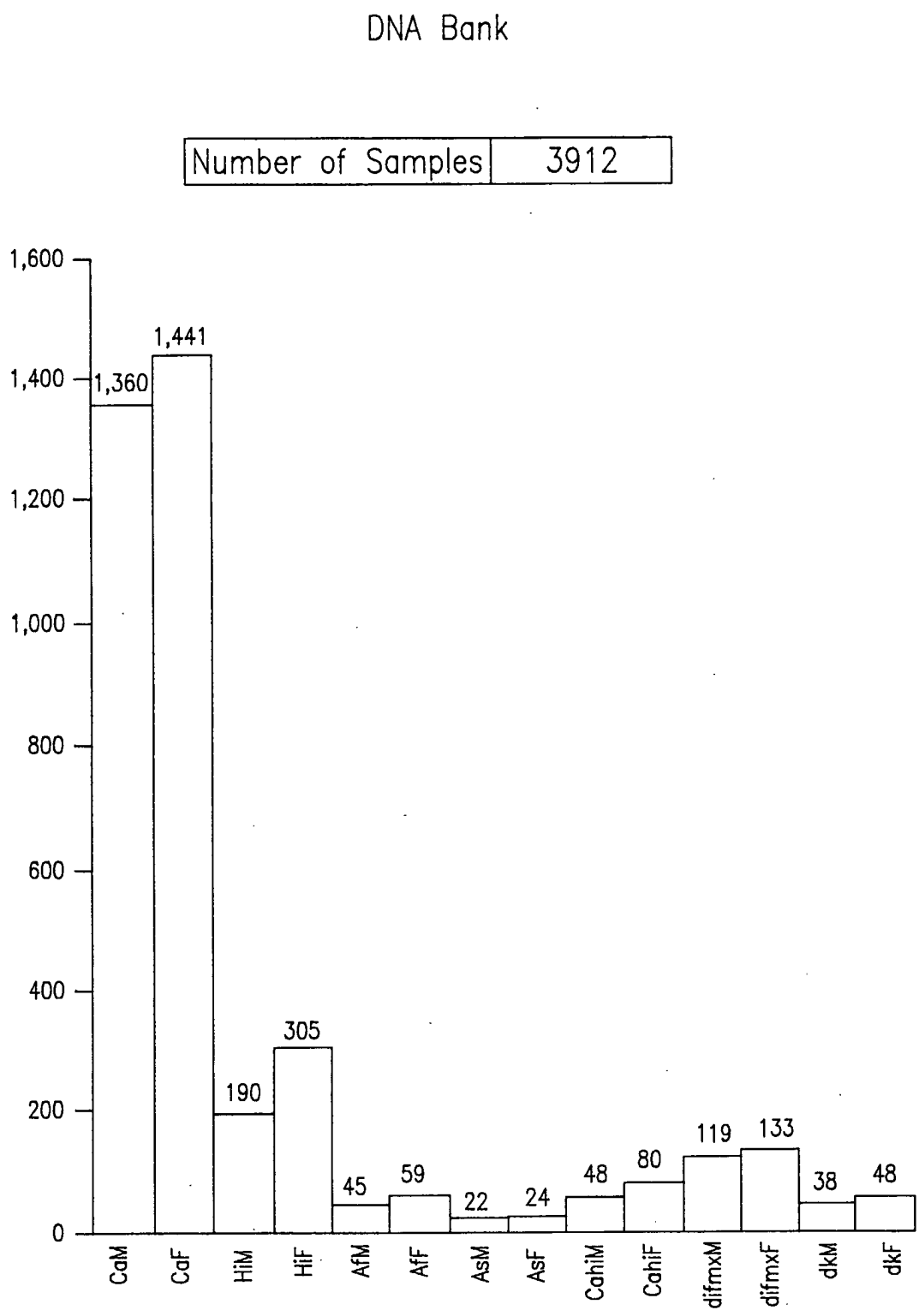

DNA Bank
Number of Samples 3912
1,600
1,400
1,200
1,000
800
600
400
200
0
1,360
1,441
190
305
45
59
22
24
48
80
119
133
38
48
CaM
CaF
HiM
HiF
AfM
AfF
AsM
AsF
CahiM
CahiF
difmxM
difmxF
dkM
dkF

FIG. IA

Caucasians

Number of Samples	2801

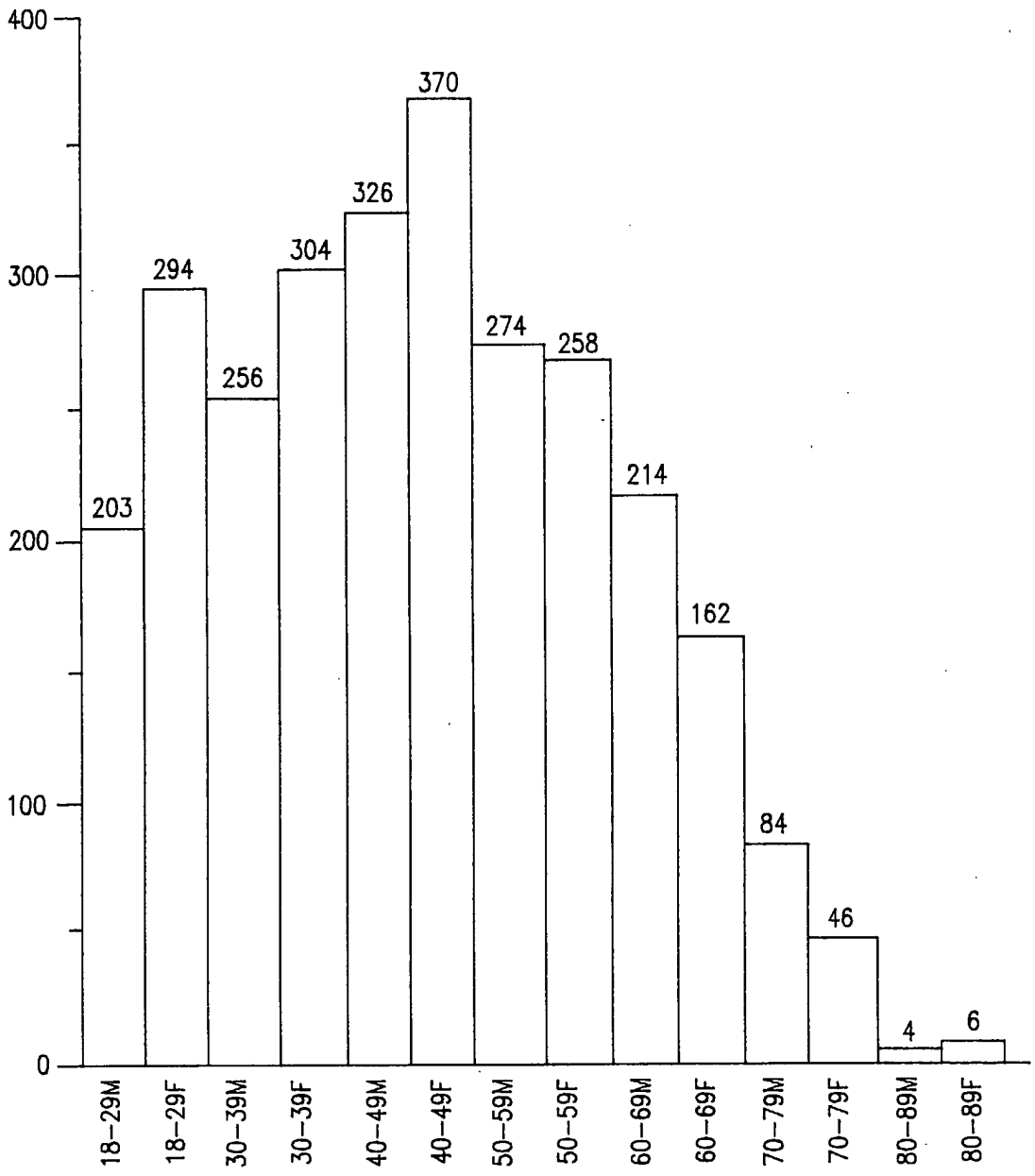


FIG. IB

Hispanics

Number of Samples	495

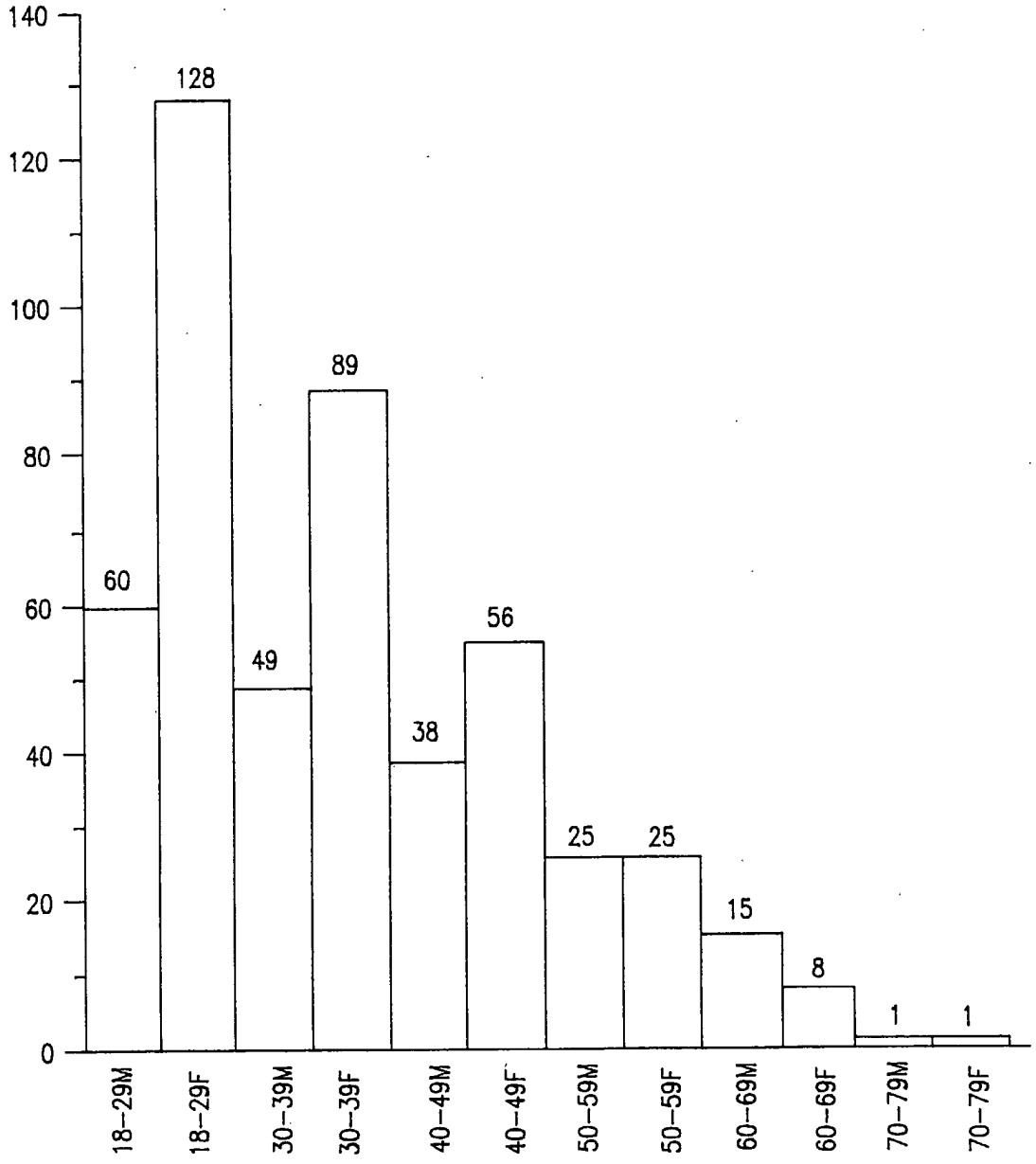
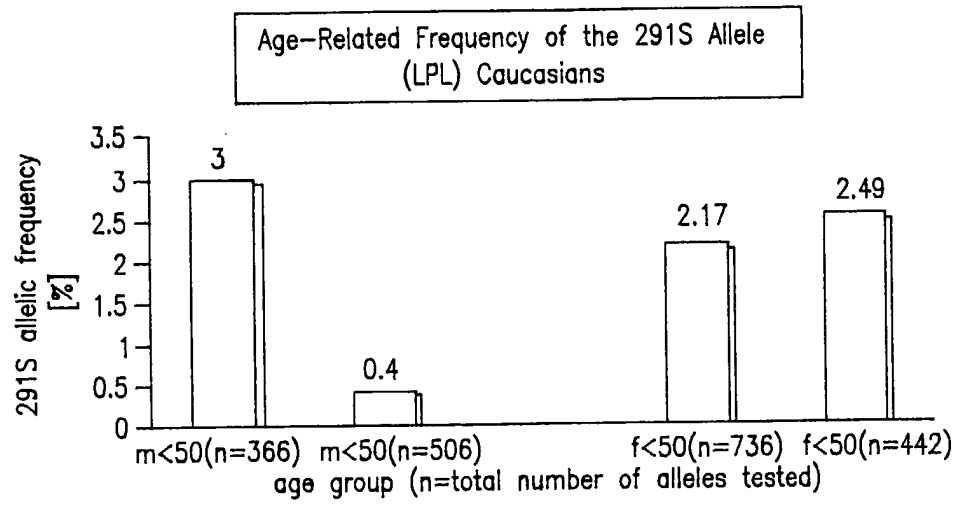
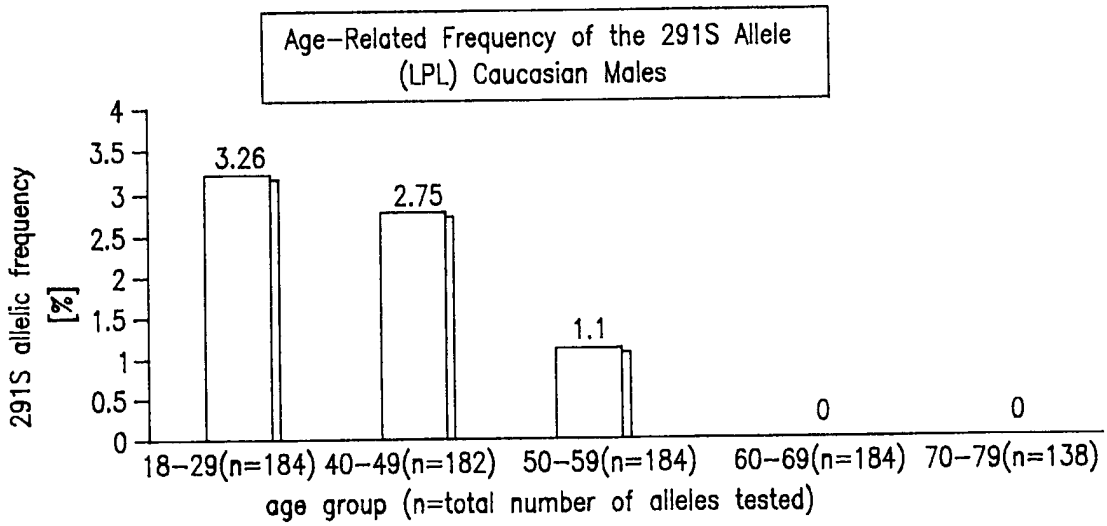


FIG. IC



age- and sex-distribution of the 291S allele of the lipoprotein lipase gene. A total of 436 males and 586 females were investigated.

FIG. 2A



Age- related distribution of the 291S allele of the lipoprotein lipase gene within the male Caucasian population. A total of 436 males were tested.

FIG. 2B

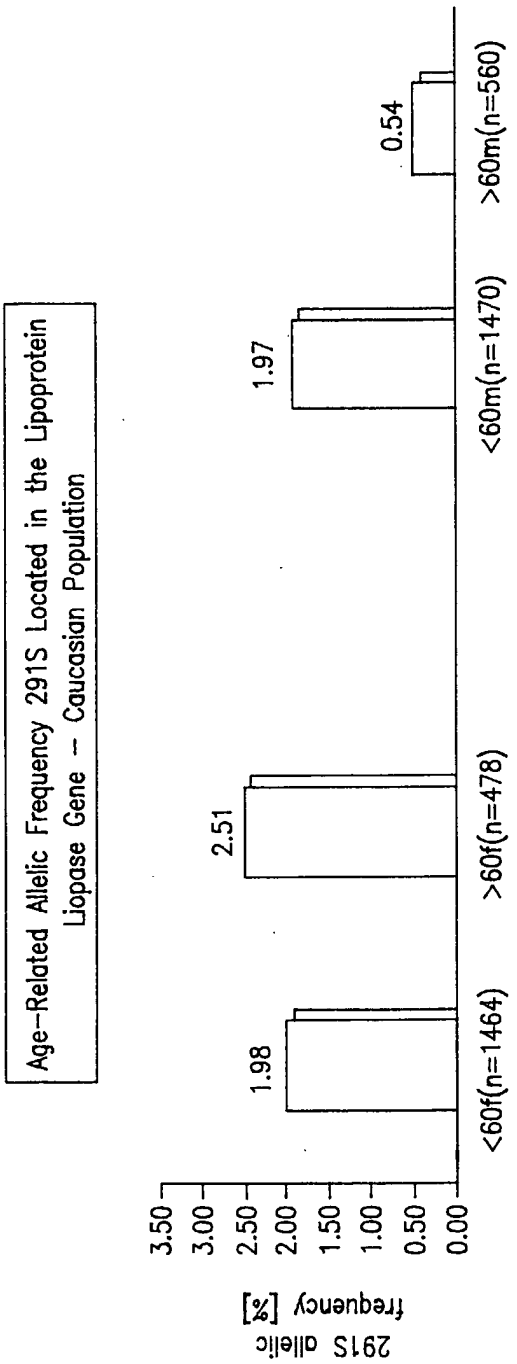

Age-Related Allelic Frequency 291S Located in the Lipoprotein Liopase Gene -- Caucasian Population
291S allelic frequency [%]
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
1.98
2.51
1.97
0.54
<60f(n=1464)
>60f(n=478)
<60m(n=1470)
>60m(n=560)
age groups (n=total number of alleles tested)
Significance: Allele frequency of Ser291 drops from 1.97% to 0.54% in males; p=0.009

FIG. 2C

Questionnaire for
Population–Based
Sample Banking

Data Collection Form

Collection Information

Affix Barcode Here

Consent Form Signed Yes No
Date of Collection (MM/DD/YY)__/__/98
Time of Sample Collection(nearest hour in 24 hour clock format)_____
Initials of Data Collector_____Collecting Agency_____
(DO NOT COMPLETE: (For Date Entry Only)Sample_____intact_____lost _____broken

Donor information

Sex: ☐ Male ☐ Female Date of Birth (MM/YY)__/__
In which state do you live? _____ How long have you lived there ? _____ Years
What is your highest grade you completed in school?

☐ less than 8th grade ☐ 8th,9th,10th or 11th grade ☐ high school graduate or equivalency
☐ some college 2 yr degree ☐ college graduate 4 yr degree ☐ post graduate education or degree

To the best of your knowledge what is the Ethnic Origin of your:

Father	Mother	
☐	☐	Caucasian (please check specific geographic area below if known)
☐	☐	Northern Europe (Austria,Denmark,Finland,France,Germany,Netherlands,Norway,Sweden,Switzerland,U.K.)
☐	☐	Southern Europe (Greece,Italy,Spain)
☐	☐	Eastern Europe (Czechoslovakia,Hungary,Poland,Russia,Yugoslavia)
☐	☐	Middle Eastern (Israel,Egypt,Iran,Iraq,Jordan,Syria, other Arab States)
☐	☐	African–American
☐	☐	Hispanic (please check specific geographic area below if known)
☐	☐	Mexico
☐	☐	Central America,South American
☐	☐	Cuba,Puerto Rico, other Caribbean
☐	☐	Asian (please check specific geographic area below if known)
☐	☐	Japanese
☐	☐	Chinese
☐	☐	Korean
☐	☐	Vietnamese
☐	☐	other Asian
☐	☐	Other _____
☐	☐	Don't know

Health information: Have you or has anyone in your immediate family(parents,brothers,sisters, or your children) had the following? Check all that apply

Disease:	You	Mother	Father	Sister	Brother	Child
Heart Disease Stroke or Arteriosclerosis						
Cancer (Specify type if known)						
Alzheimer's Disease or Dementia						
Chronic inflammatory or Autoimmune Disease						
Nervous System Disease like Multiple Sclerosis						
Other (please specify)						

Additional health information details you would like to provide:

_____

FIG. 3

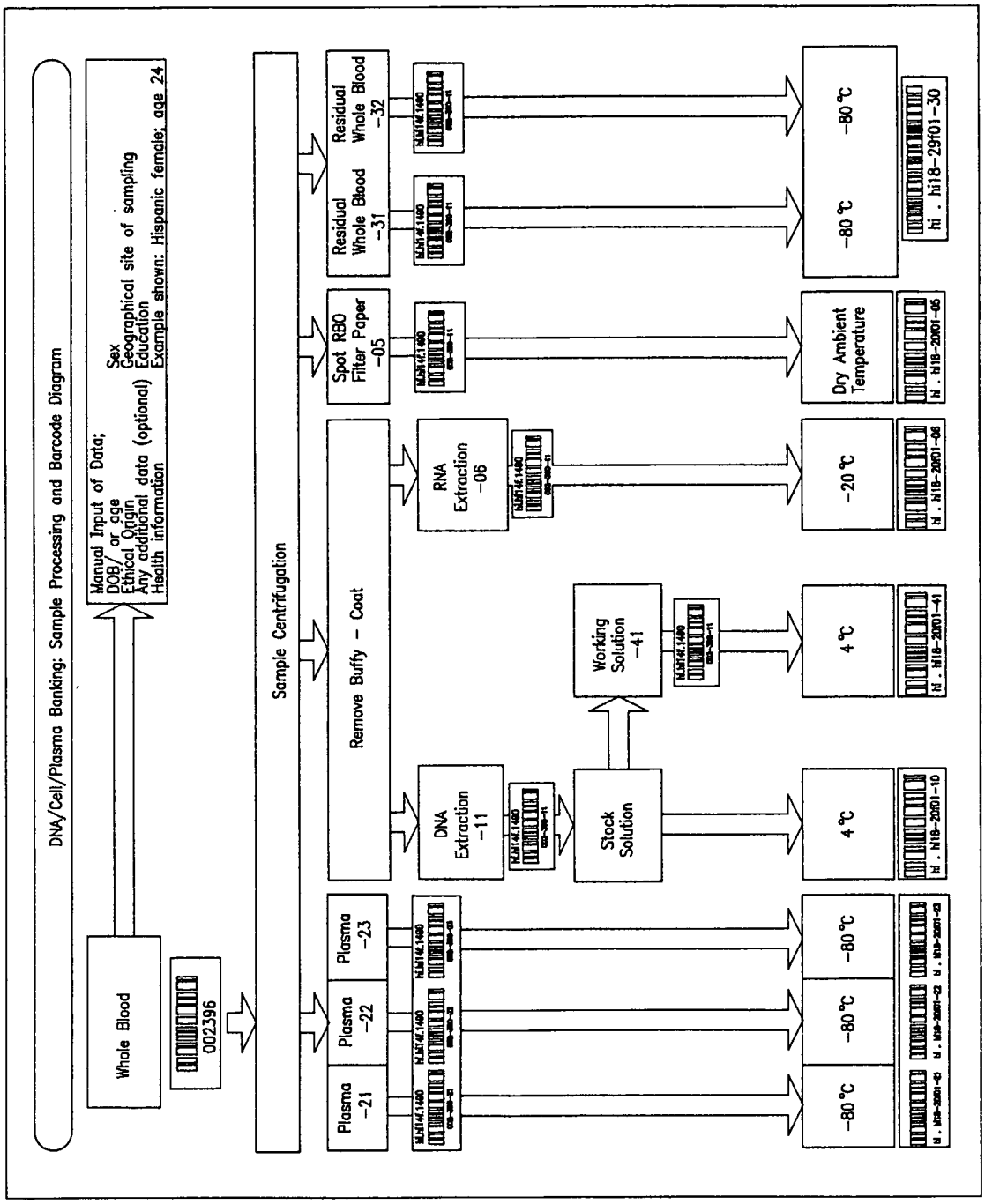

Sample Banks
DNA/Cell/Plasma Banking: Sample Processing and Barcode Diagram
Manual Input of Data;
DOB/ or age
Ethical Origin
Any additional data (optional)
Health information
Sex
Geographical site of sampling
Education
Example shown: Hispanic female; age 24
Whole Blood
002396
Sample Centrifugation
Plasma -21
Plasma -22
Plasma -23
Remove Buffy - Coat
DNA Extraction -11
RNA Extraction -06
Spot RBC Filter Paper -05
Residual Whole Blood -31
Residual Whole Blood -32
Stock Solution
Working Solution -41
-80 °C
4 °C
-20 °C
Dry Ambient Temperature
hi . hi18-29f01-30

FIG. 4

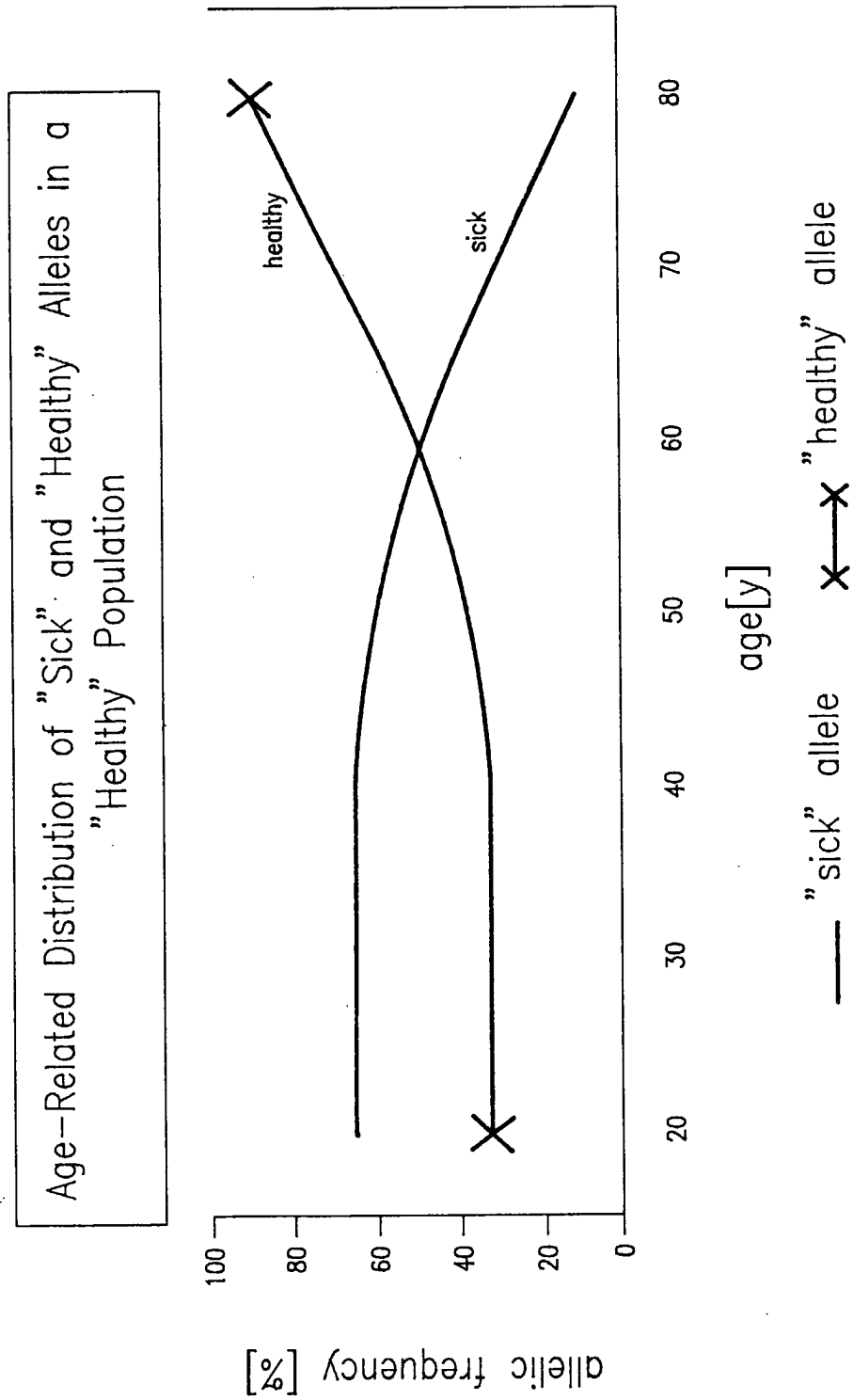

Age-Related Distribution of "Sick" and "Healthy" Alleles in a "Healthy" Population
healthy
sick
100
80
60
40
20
0
20
30
40
50
60
70
80
allelic frequency [%]
age[y]
"sick" allele
"healthy" allele

FIG. 5

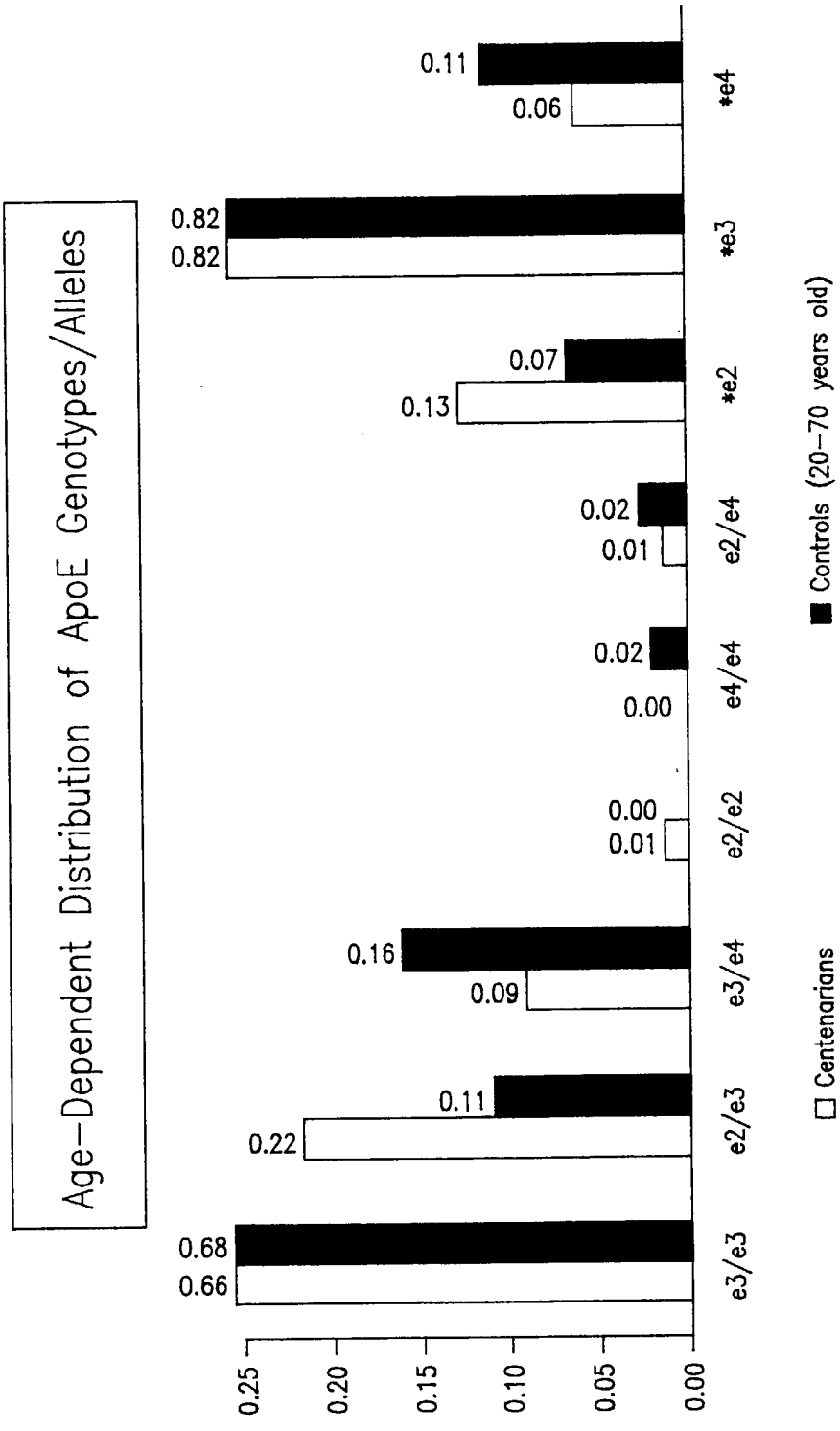

Age–Dependent Distribution of ApoE Genotypes/Alleles
0.11
0.06
*e4
0.82
0.82
*e3
0.07
0.13
*e2
0.02
0.01
e2/e4
0.02
0.00
e4/e4
0.00
0.01
e2/e2
0.16
0.09
e3/e4
0.11
0.22
e2/e3
0.68
0.66
e3/e3
0.25
0.20
0.15
0.10
0.05
0.00
Controls (20–70 years old)
Centenarians

FIG. 6

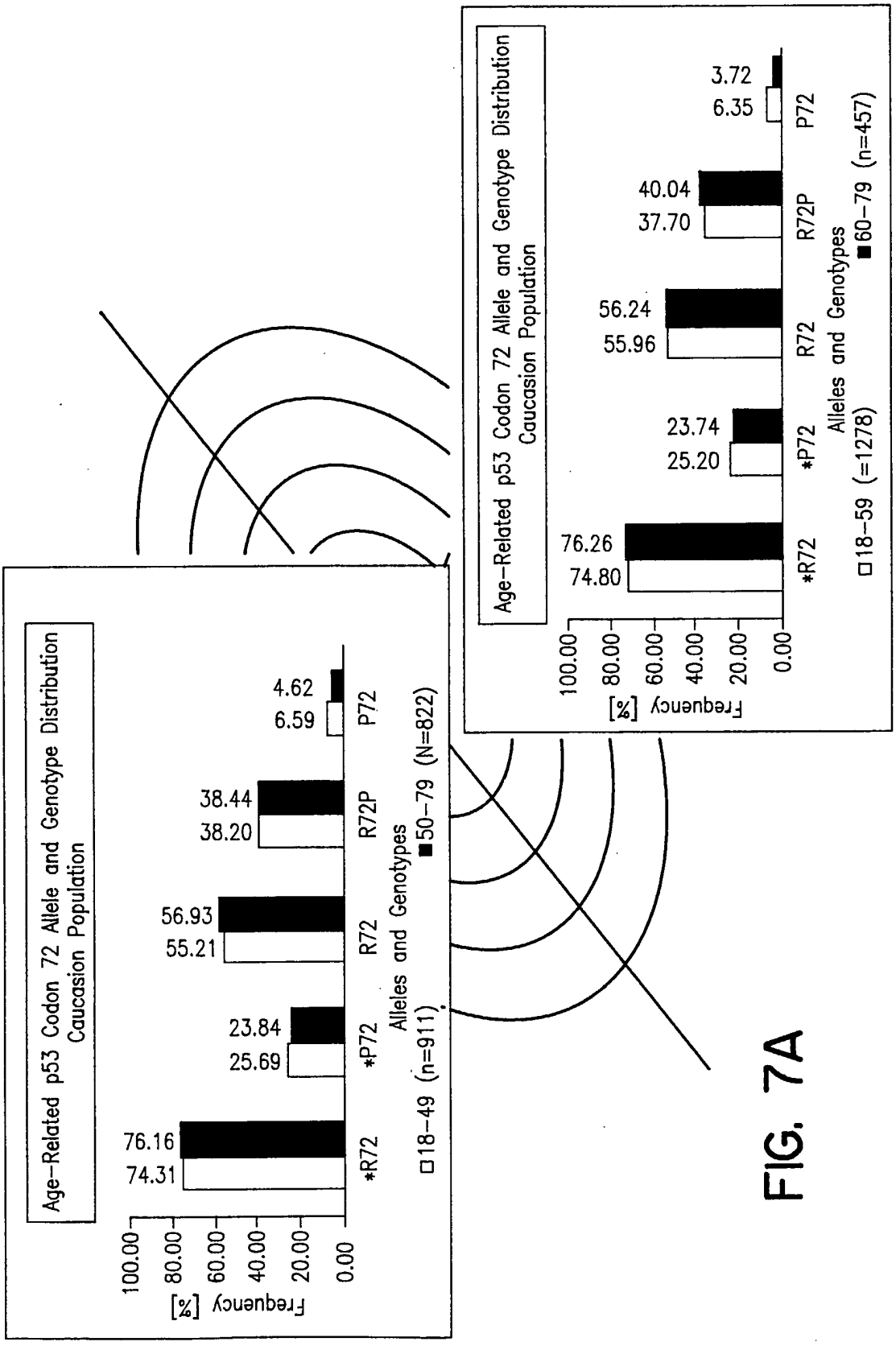

Age-Related p53 Codon 72 Allele and Genotype Distribution
Caucasion Population
Frequency [%]
100.00
80.00
60.00
40.00
20.00
0.00
76.16
74.31
23.84
25.69
56.93
55.21
38.44
38.20
4.62
6.59
*R72
*P72
R72
R72P
P72
Alleles and Genotypes
18-49 (n=911)
50-79 (N=822)
Age-Related p53 Codon 72 Allele and Genotype Distribution
Caucasion Population
Frequency [%]
100.00
80.00
60.00
40.00
20.00
0.00
76.26
74.80
23.74
25.20
56.24
55.96
40.04
37.70
3.72
6.35
*R72
*P72
R72
R72P
P72
Alleles and Genotypes
18-59 (=1278)
60-79 (n=457)

FIG. 7A

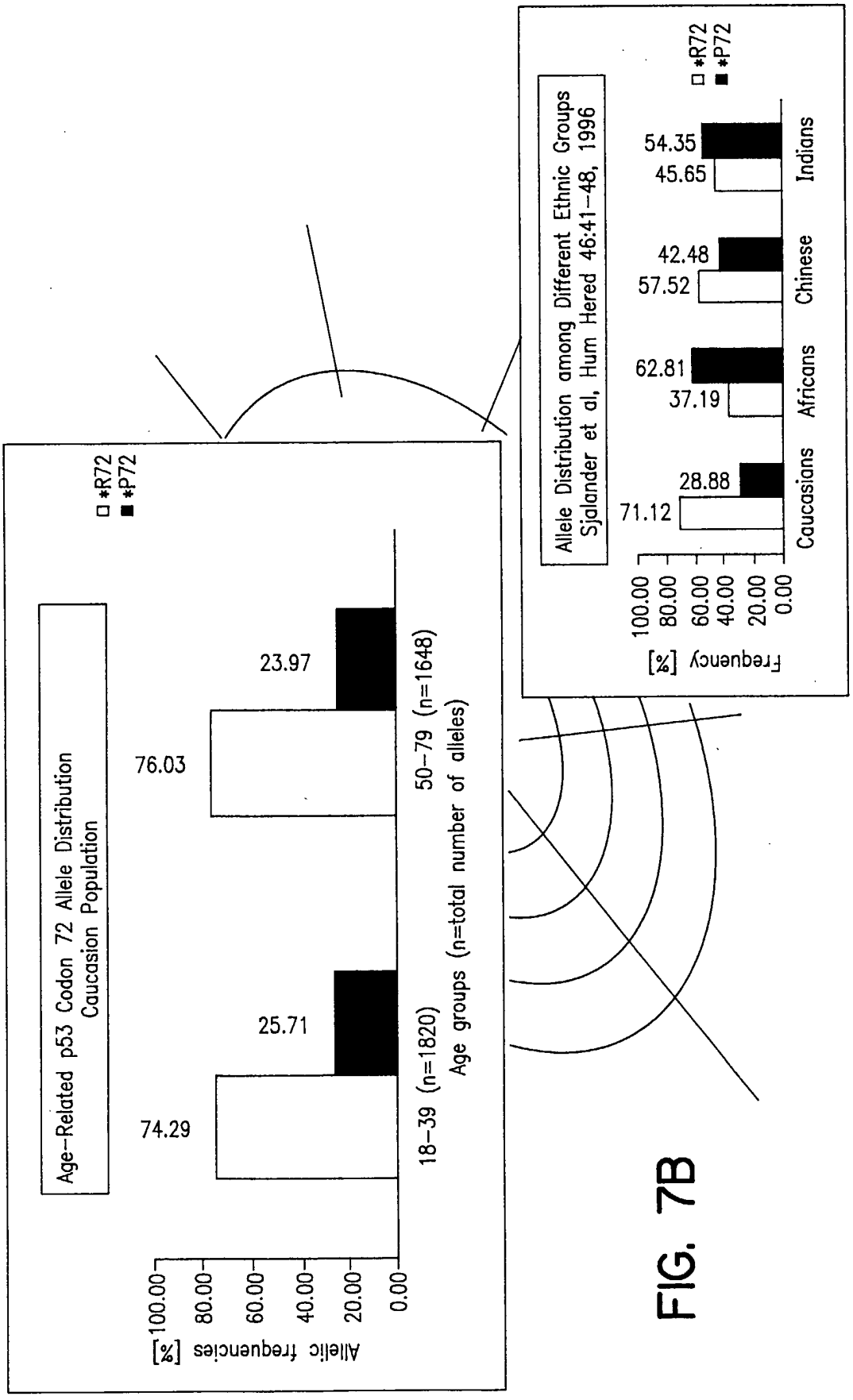
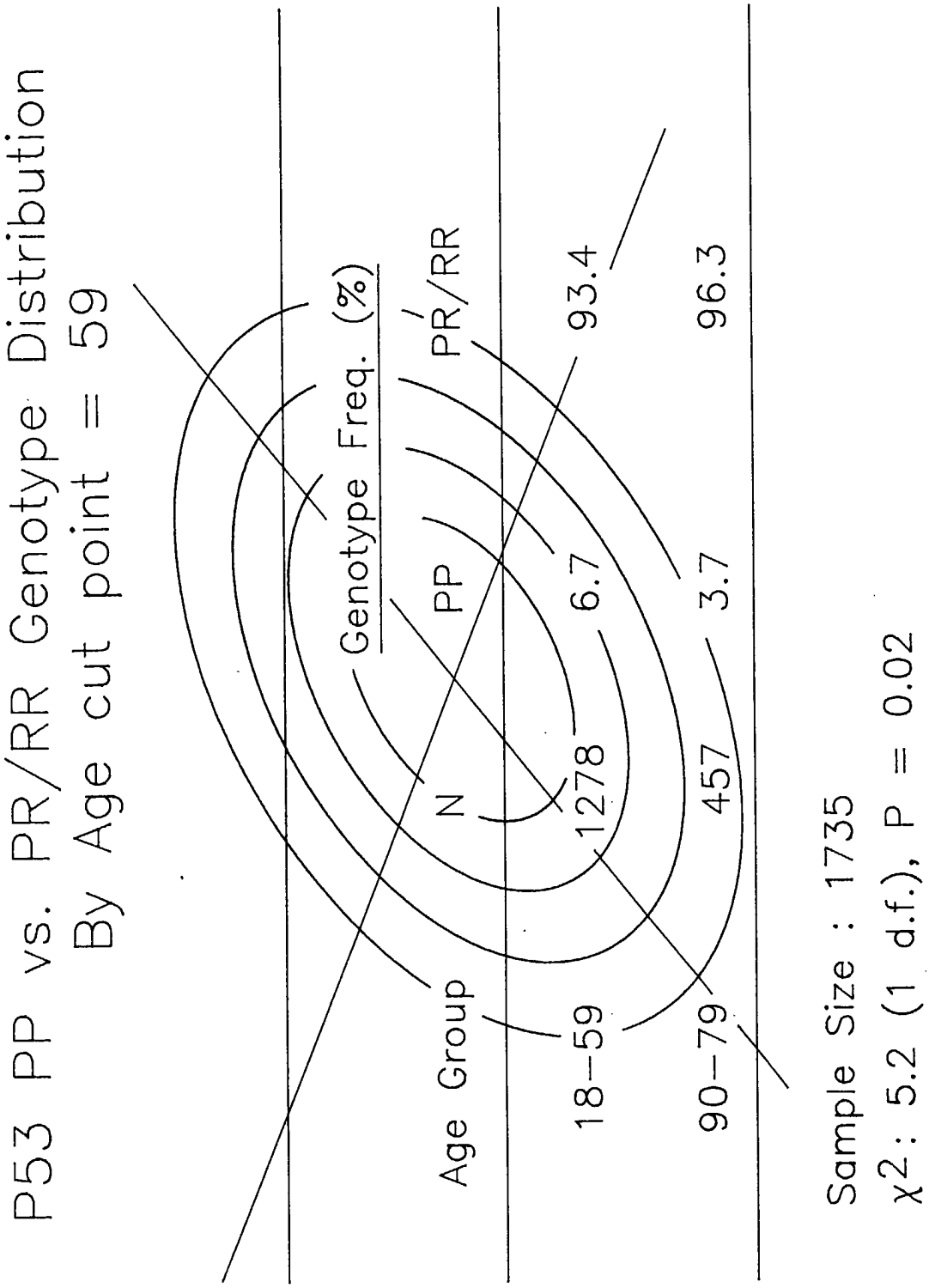

Age-Related p53 Codon 72 Allele Distribution
Caucasion Population
□ *R72
■ *P72
Allelic frequencies [%]
100.00
80.00
60.00
40.00
20.00
0.00
74.29
25.71
76.03
23.97
18-39 (n=1820)
50-79 (n=1648)
Age groups (n=total number of alleles)
Allele Distribution among Different Ethnic Groups
Sjalander et al, Hum Hered 46:41-48, 1996
□ *R72
■ *P72
Frequency [%]
71.12
28.88
37.19
62.81
57.52
42.48
45.65
54.35
Caucasians
Africans
Chinese
Indians

FIG. 7B

FIG. 7C


P53 PP vs. PR/RR Genotype Distribution
By Age cut point = 59
Genotype Freq. (%)
PP
PR/RR
N
1278
6.7
93.4
457
3.7
96.3
Age Group
18–59
90–79
Sample Size : 1735
χ2 : 5.2 (1 d.f.), P = 0.02

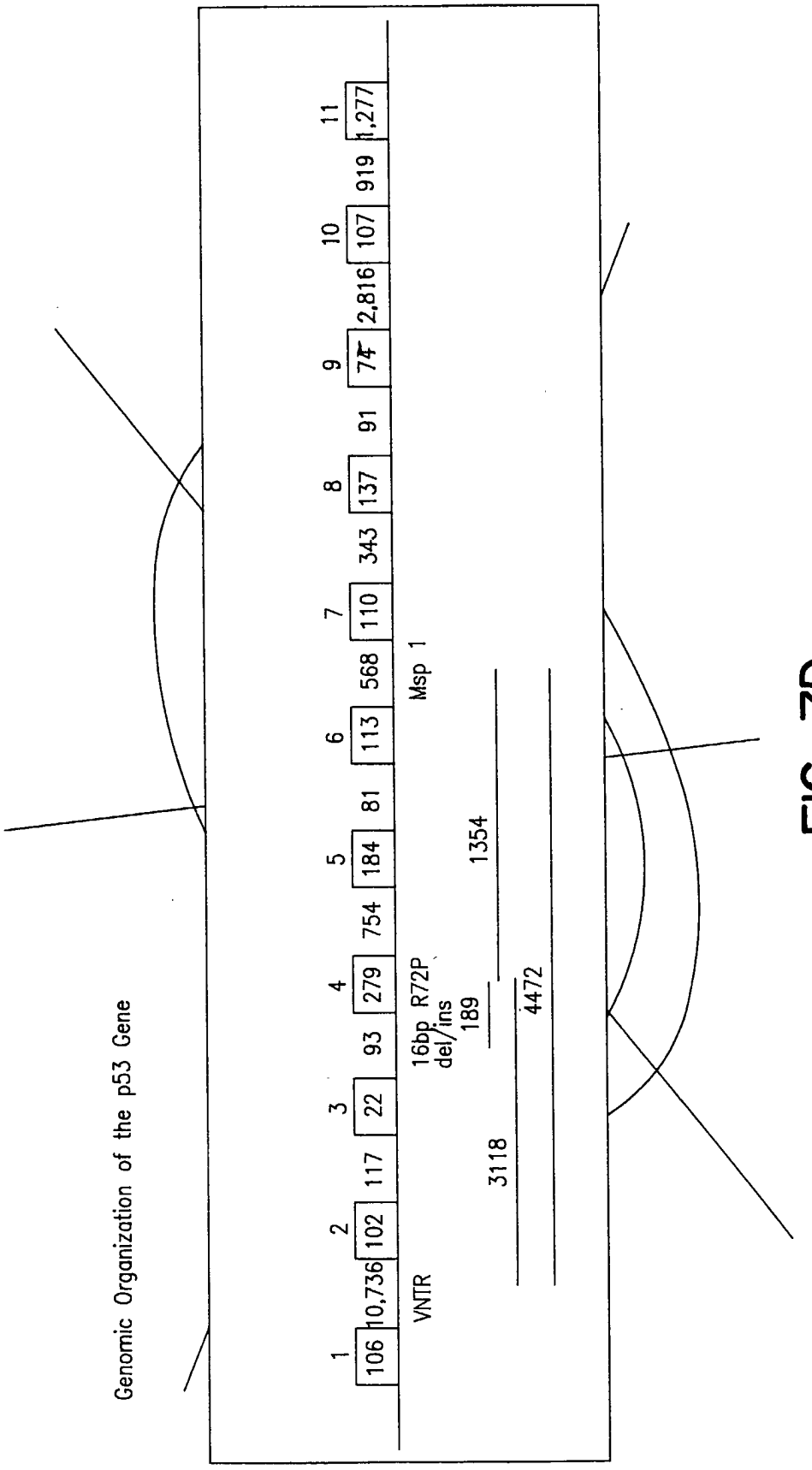
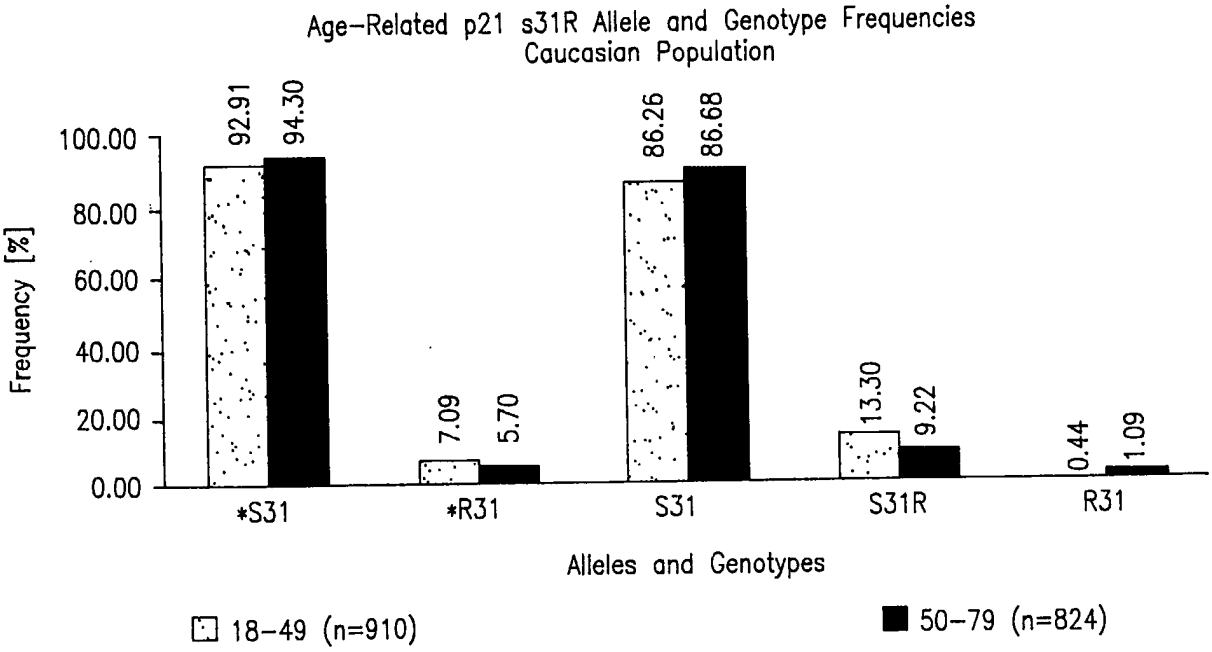

Genomic Organization of the p53 Gene
1
106
10,736
2
102
117
3
22
93
4
279
754
5
184
81
6
113
568
7
110
343
8
137
91
9
74
2,816
10
107
919
11
1,277
VNTR
16bp del/ins
R72P
Msp 1
189
1354
3118
4472

FIG. 7D



Significance: Genotype frequencyof SR heterozygous drops from 13.3% to 9.2%; p=0.009

FIG. 8

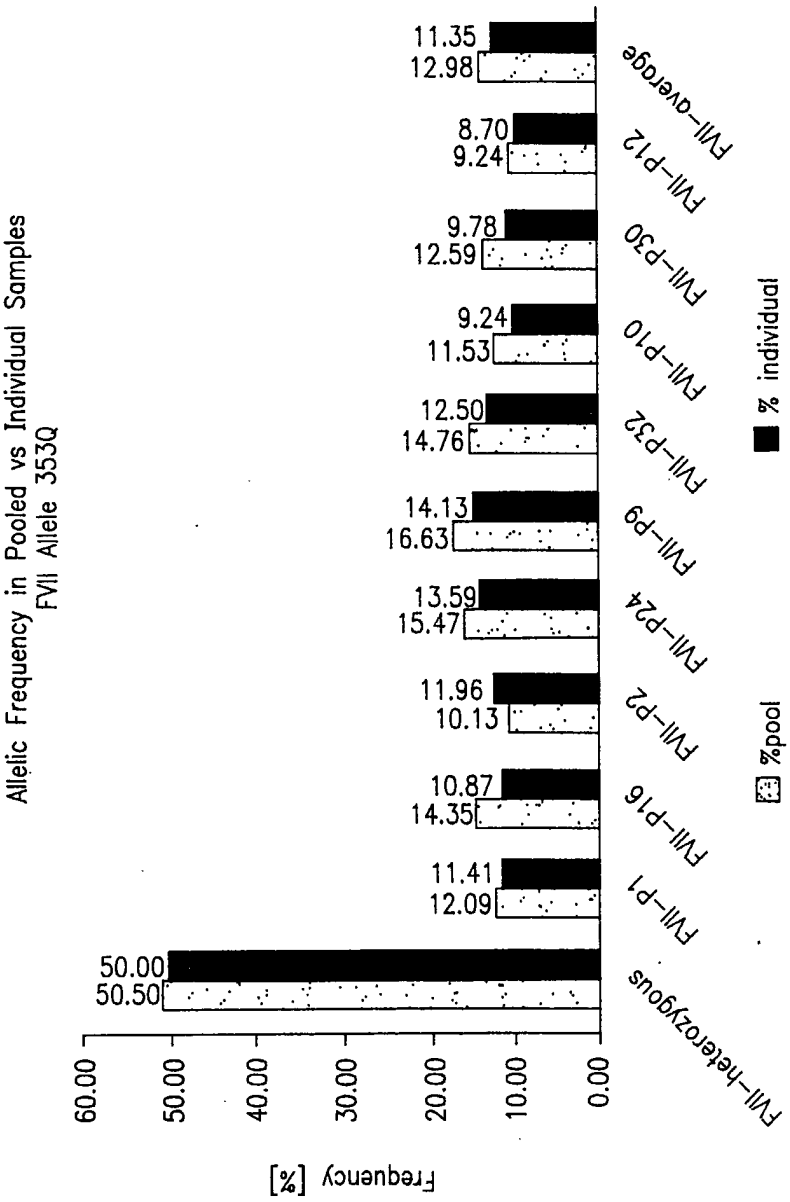

Allelic Frequency in Pooled vs Individual Samples
FVII Allele 353Q
11.35
12.98
FVII-average
8.70
9.24
FVII-P12
9.78
12.59
FVII-P30
9.24
11.53
FVII-P10
12.50
14.76
FVII-P32
14.13
16.63
FVII-P9
13.59
15.47
FVII-P24
11.96
10.13
FVII-P2
10.87
14.35
FVII-P16
11.41
12.09
FVII-P1
50.00
50.50
FVII-heterozygous
60.00
50.00
40.00
30.00
20.00
10.00
0.00
Frequency [%]
% individual
%pool

FIG. 9

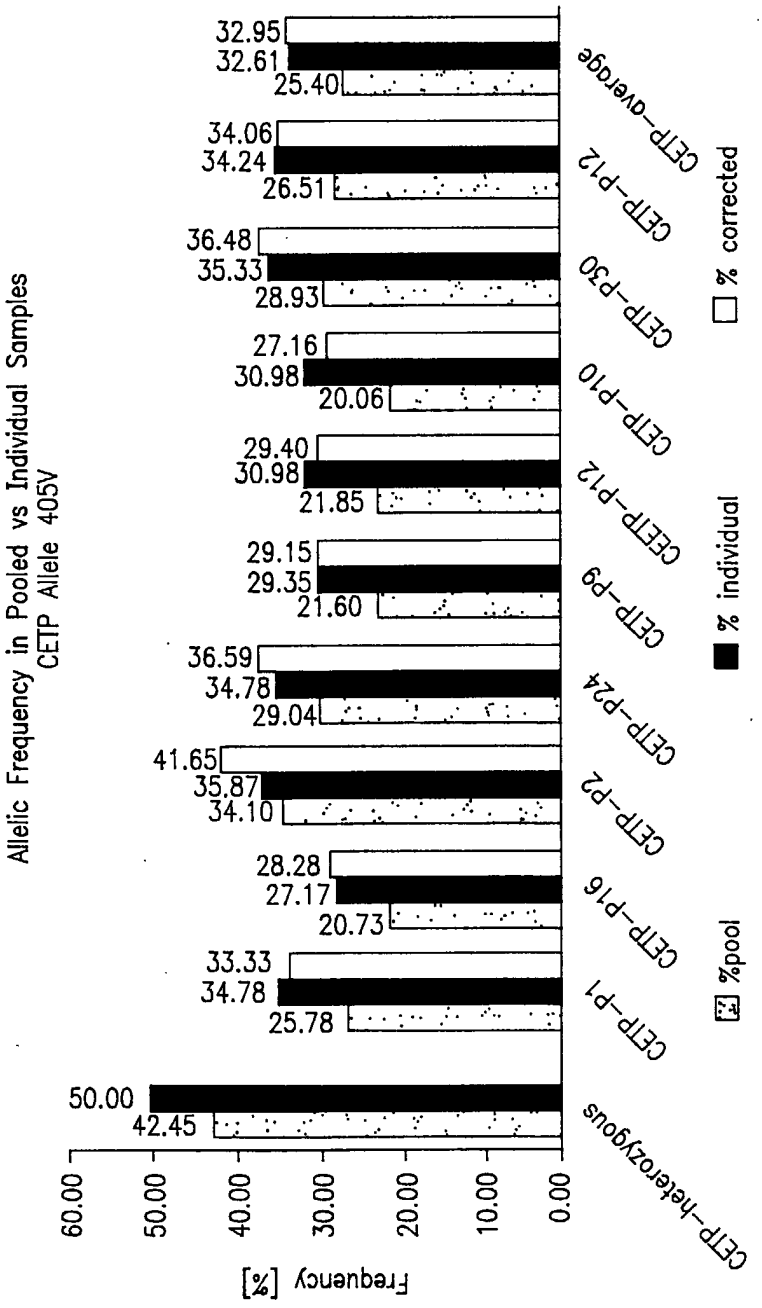

Allelic Frequency in Pooled vs Individual Samples
CETP Allele 405V
Frequency [%]
60.00
50.00
40.00
30.00
20.00
10.00
0.00
CETP-average
CETP-P12
CETP-P30
CETP-P10
CETP-P12
CETP-P9
CETP-P24
CETP-P2
CETP-P16
CETP-P1
CETP-heterozygous
32.95
32.61
25.40
34.06
34.24
26.51
36.48
35.33
28.93
27.16
30.98
20.06
29.40
30.98
21.85
29.15
29.35
21.60
36.59
34.78
29.04
41.65
35.87
34.10
28.28
27.17
20.73
33.33
34.78
25.78
50.00
42.45
% corrected
% individual
%pool

FIG. 10

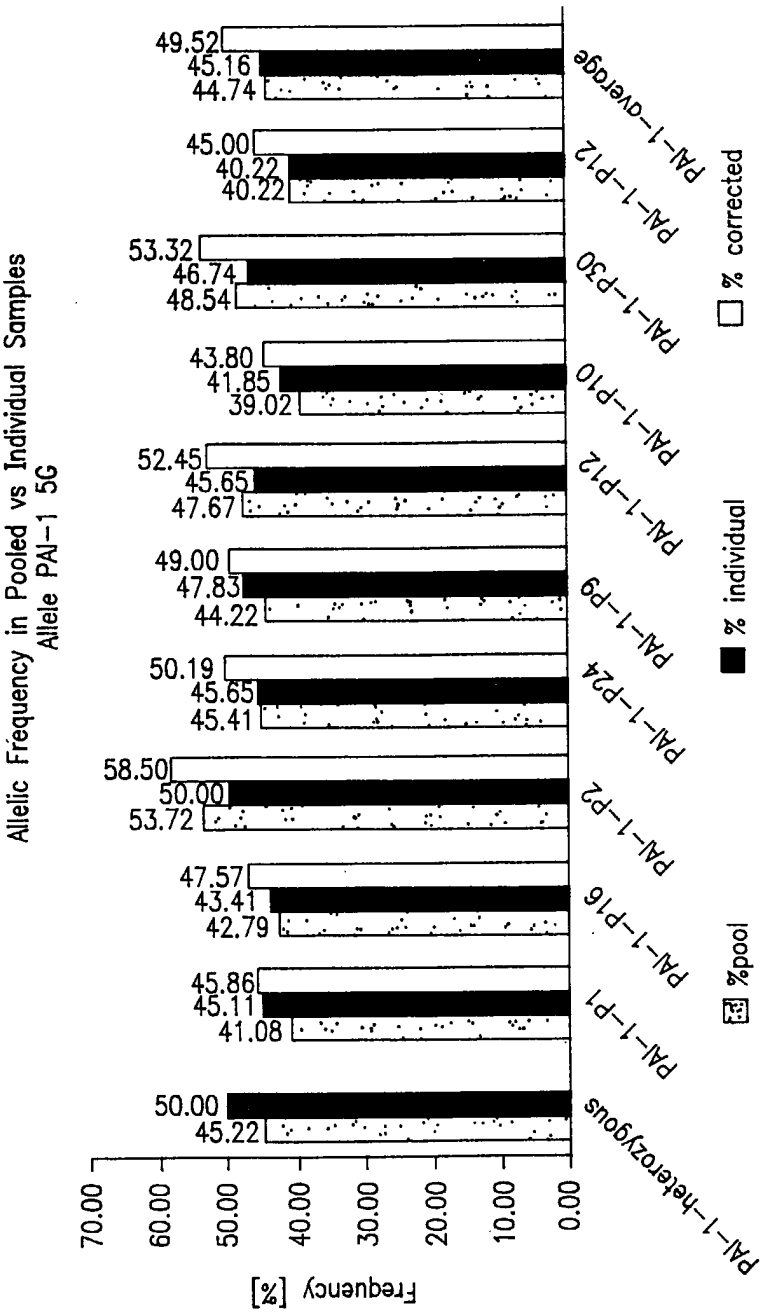
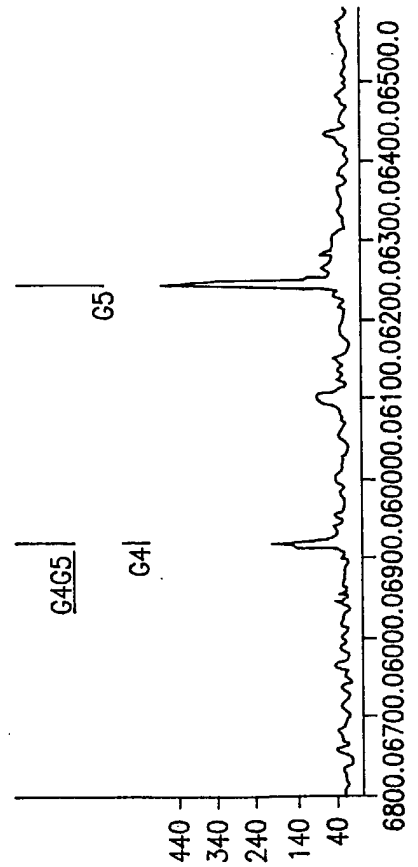
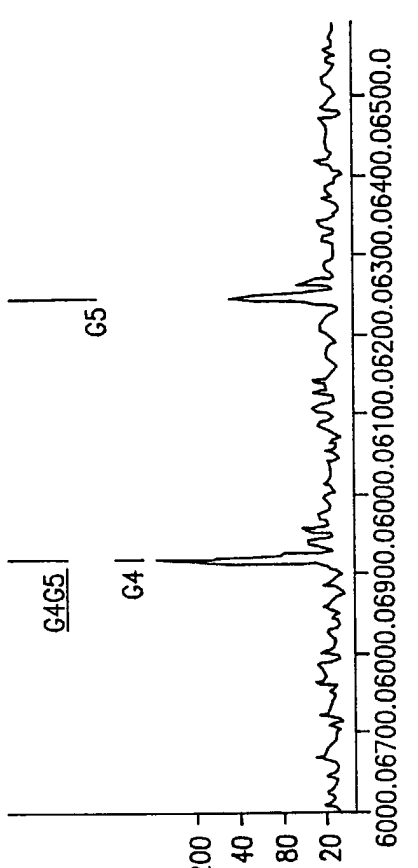

Allelic Frequency in Pooled vs Individual Samples
Allele PAI-1 5G
Frequency [%]
70.00
60.00
50.00
40.00
30.00
20.00
10.00
0.00
PAI-1-heterozygous
50.00
45.22
PAI-1-P1
45.86
45.11
41.08
PAI-1-P16
47.57
43.41
42.79
PAI-1-P2
58.50
50.00
53.72
PAI-1-P24
50.19
45.65
45.41
PAI-1-P9
49.00
47.83
44.22
PAI-1-P12
52.45
45.65
47.67
PAI-1-P10
43.80
41.85
39.02
PAI-1-P30
53.32
46.74
48.54
PAI-1-P12
45.00
40.22
40.22
PAI-1-average
49.52
45.16
44.74
%pool
% individual
% corrected

FIG. 11



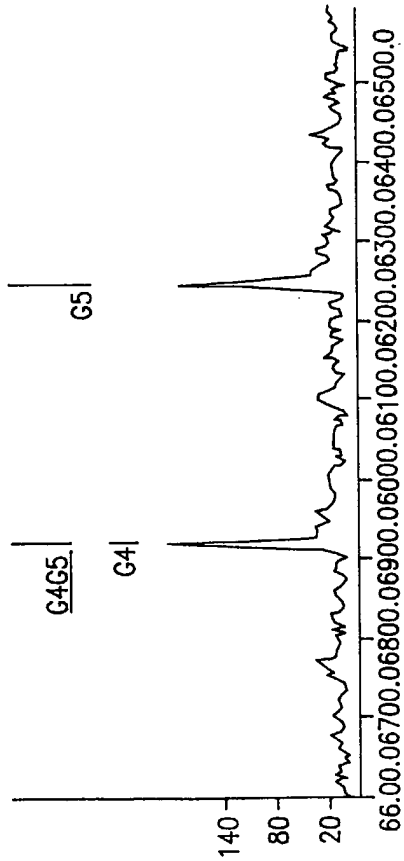
African 4G 28.2% 5G 71.2%

FIG. 12A



Asian 4G 65.8% 5G 34.2%

FIG. 12B



Hispanic 4G 26.7% 5G 73.3%

FIG. 12D

Caucasian 4G 53.5% 5G 46.5%

FIG. 12C

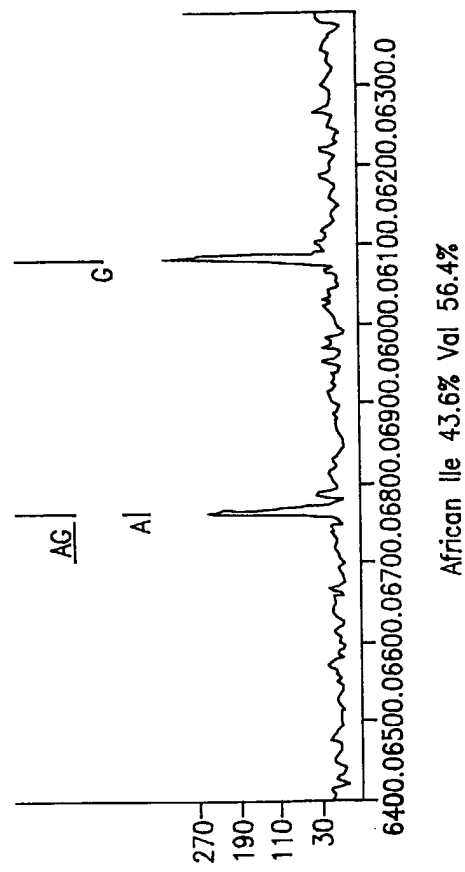


FIG. 13A

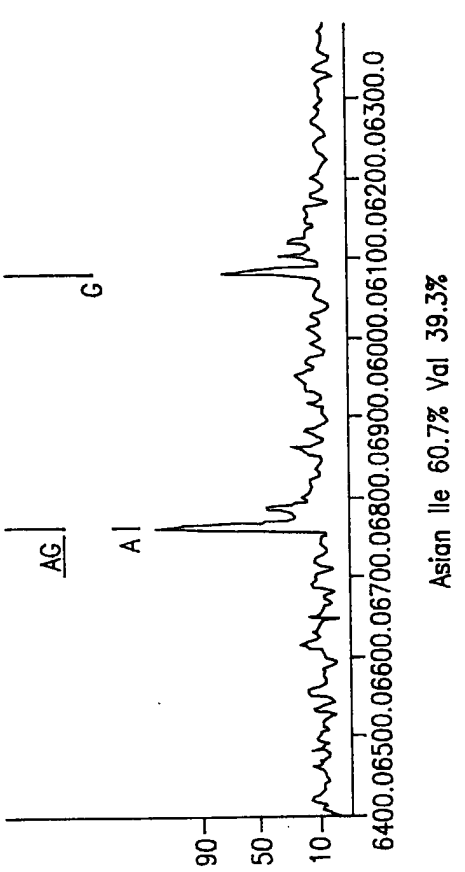


FIG. 13B

FIG. 13C

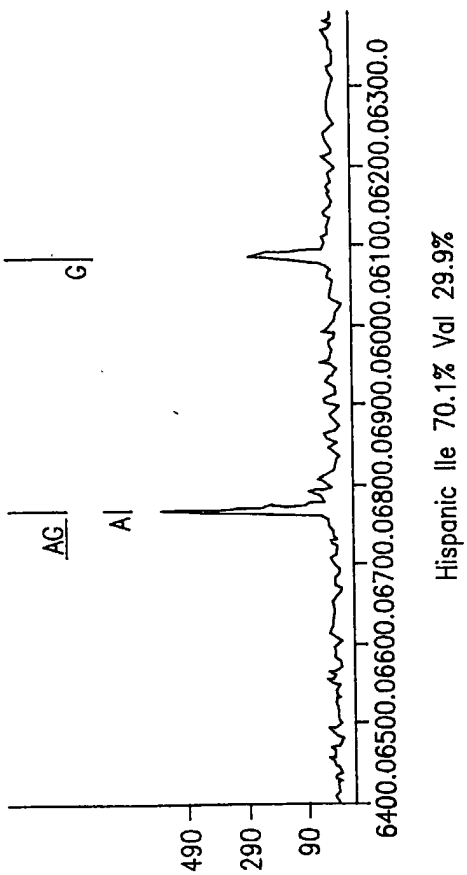


FIG. 13D

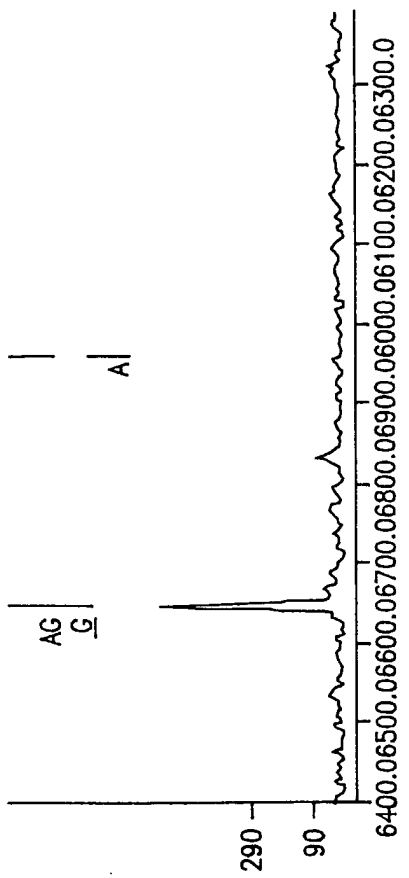


FIG. 14B

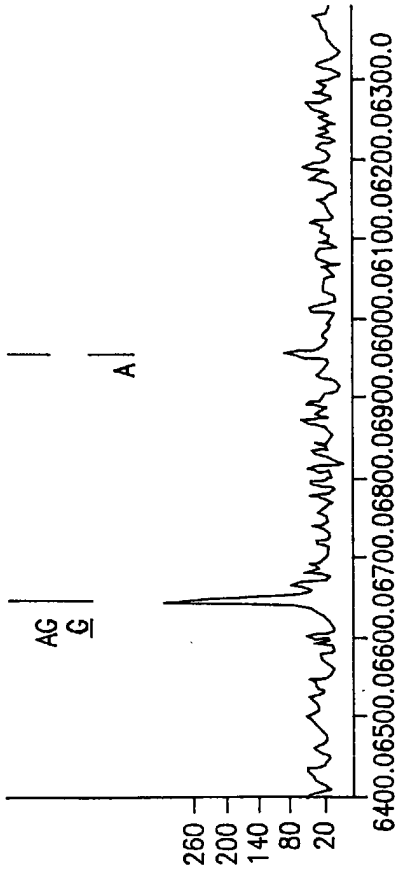


FIG. 14D

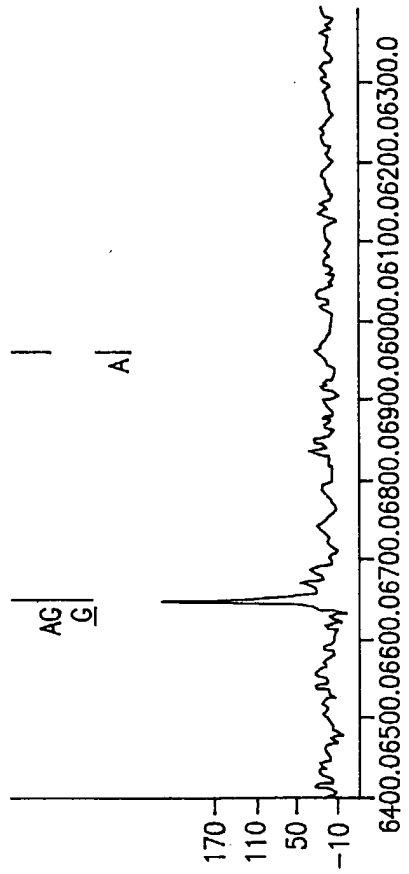


FIG. 14A

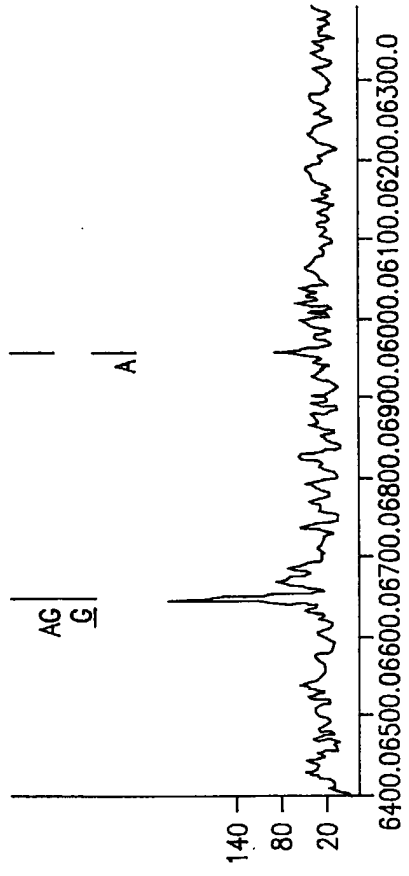


FIG. 14C

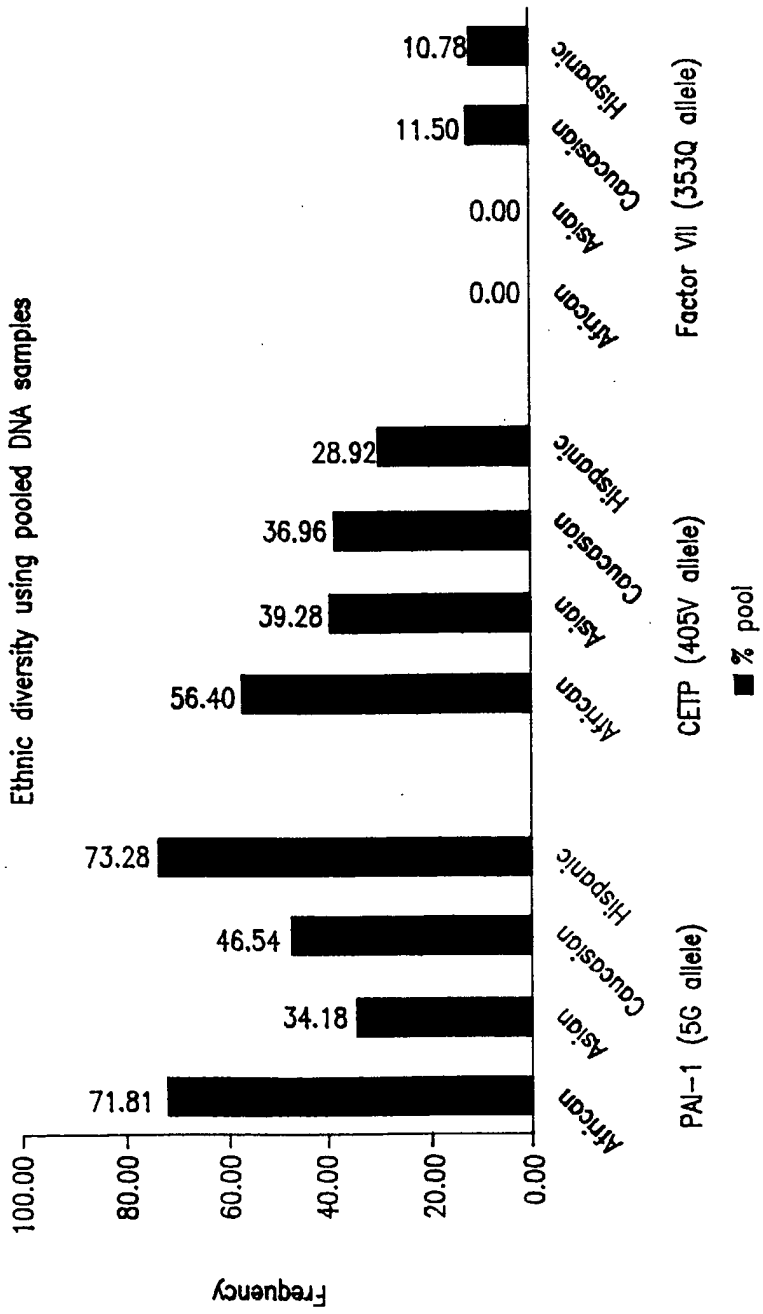

Ethnic diversity using pooled DNA samples
Frequency
100.00
80.00
60.00
40.00
20.00
0.00
71.81
34.18
46.54
73.28
56.40
39.28
36.96
28.92
0.00
0.00
11.50
10.78
African
Asian
Caucasian
Hispanic
PAI-1 (5G allele)
CETP (405V allele)
Factor VII (353Q allele)
% pool

FIG. 15

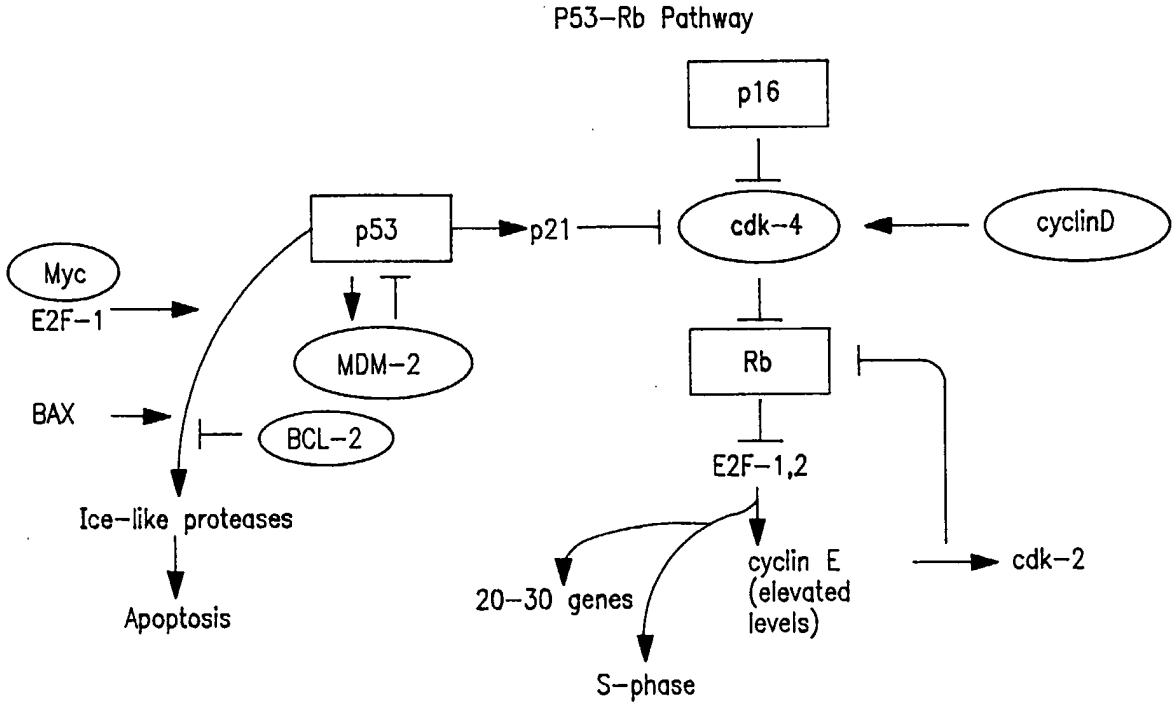

P53–Rb Pathway
p16
p53
p21
cdk–4
cyclinD
Myc
E2F–1
MDM–2
Rb
BAX
BCL–2
E2F–1,2
Ice–like proteases
Apoptosis
20–30 genes
cyclin E
(elevated
levels)
cdk–2
S–phase

FIG. 16

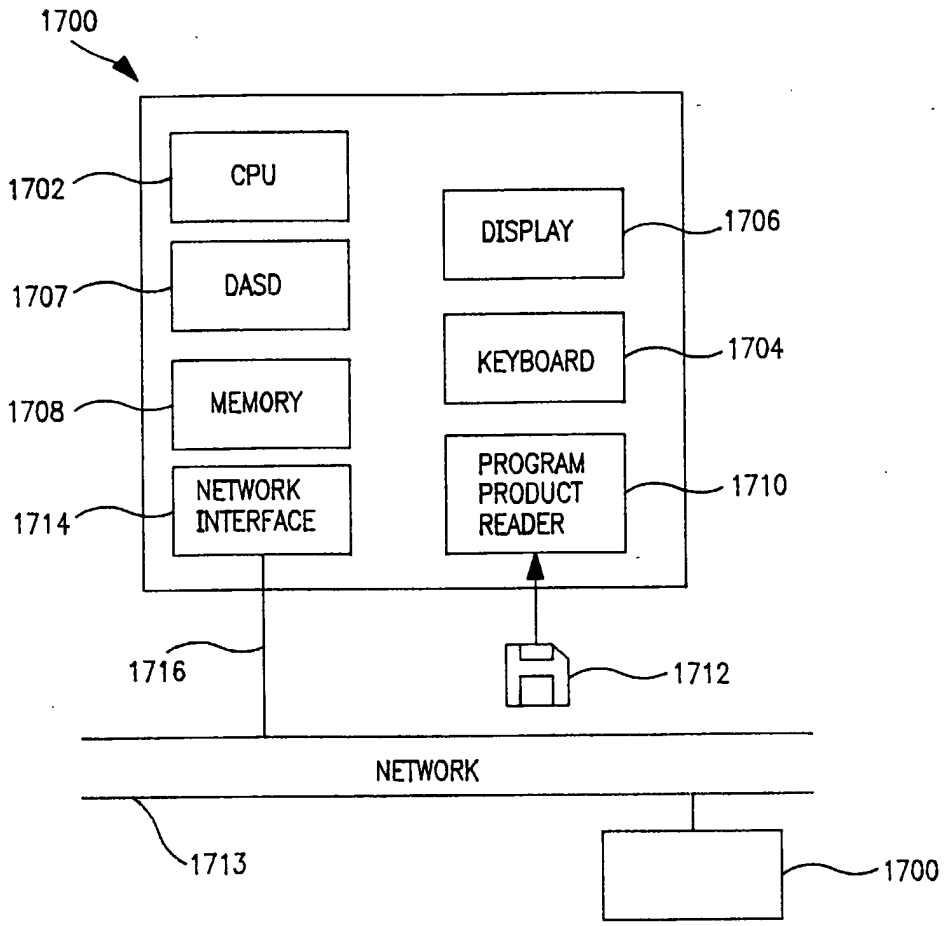

1700
CPU
1702
DASD
1707
MEMORY
1708
NETWORK INTERFACE
1714
DISPLAY
1706
KEYBOARD
1704
PROGRAM PRODUCT READER
1710
1716
1712
NETWORK
1713
1700

FIG. 17

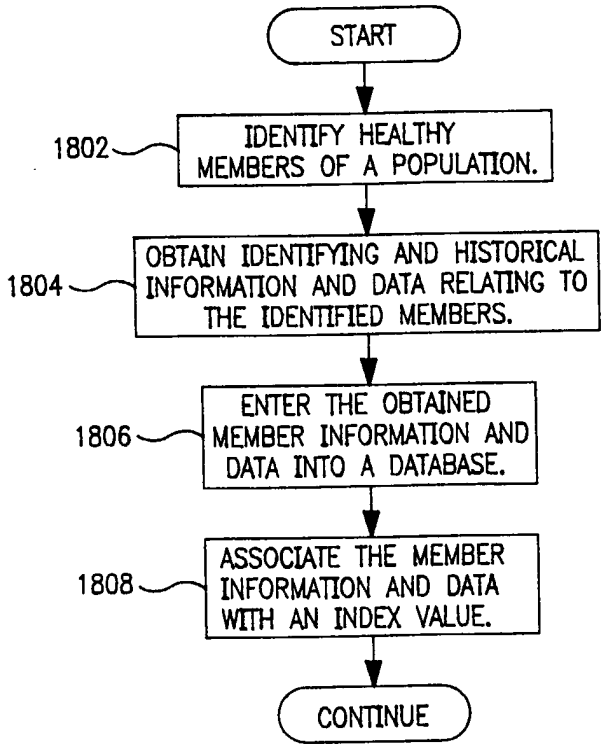

START
1802
IDENTIFY HEALTHY MEMBERS OF A POPULATION.
1804
OBTAIN IDENTIFYING AND HISTORICAL INFORMATION AND DATA RELATING TO THE IDENTIFIED MEMBERS.
1806
ENTER THE OBTAINED MEMBER INFORMATION AND DATA INTO A DATABASE.
1808
ASSOCIATE THE MEMBER INFORMATION AND DATA WITH AN INDEX VALUE.
CONTINUE

FIG. 18

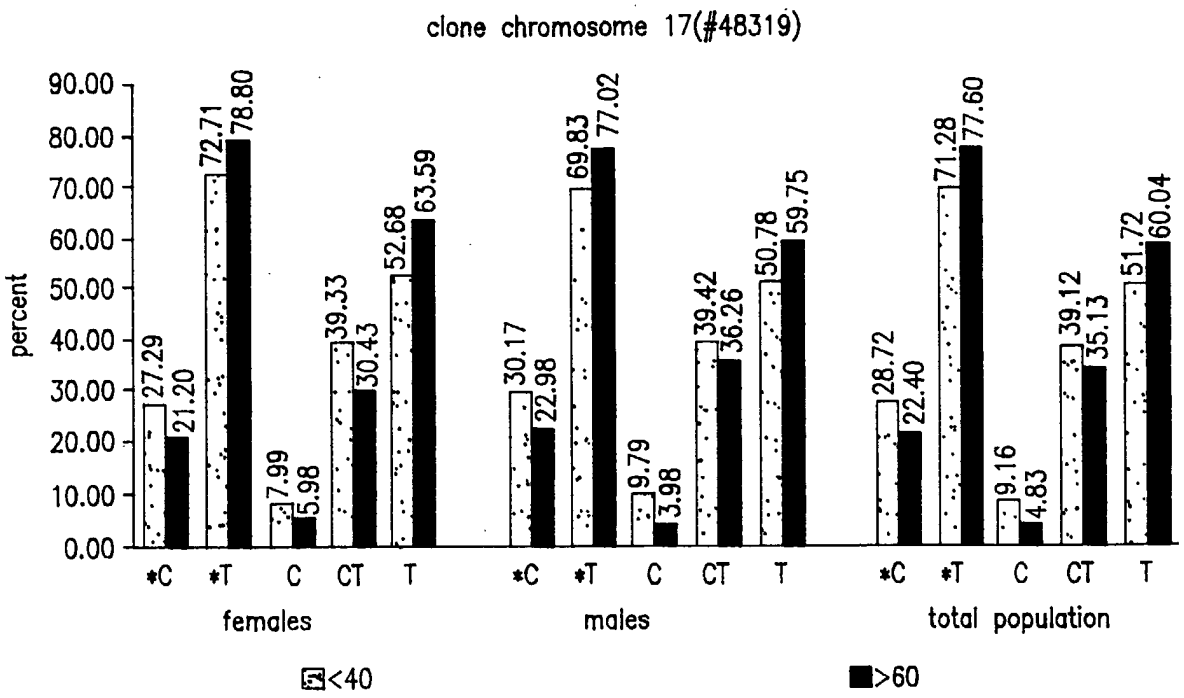

clone chromosome 17(#48319)
percent
90.00
80.00
70.00
60.00
50.00
40.00
30.00
20.00
10.00
0.00
27.29
21.20
72.71
78.80
7.99
5.98
39.33
30.43
52.68
63.59
30.17
22.98
69.83
77.02
9.79
3.98
39.42
36.26
50.78
59.75
28.72
22.40
71.28
77.60
9.16
4.83
39.12
35.13
51.72
60.04
*C
*T
C
CT
T
females
males
total population
<40
>60

FIG. 19

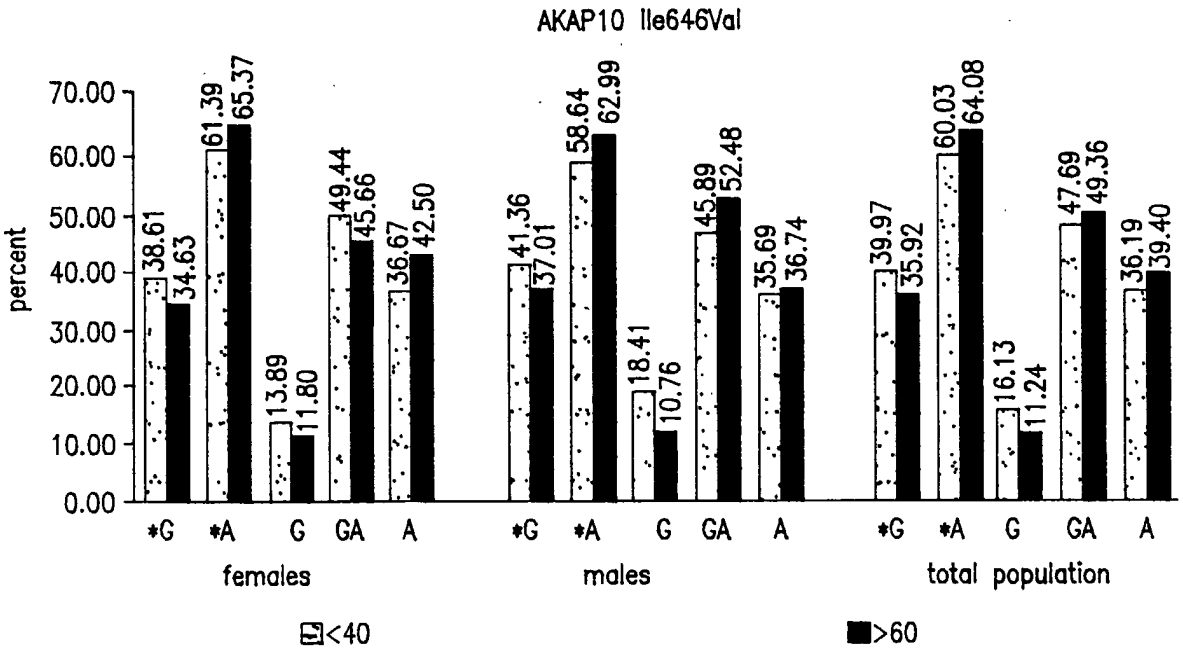

AKAP10 Ile646Val
percent
70.00
60.00
50.00
40.00
30.00
20.00
10.00
0.00
38.61
34.63
61.39
65.37
13.89
11.80
49.44
45.66
36.67
42.50
41.36
37.01
58.64
62.99
18.41
10.76
45.89
52.48
35.69
36.74
39.97
35.92
60.03
64.08
16.13
11.24
47.69
49.36
36.19
39.40
*G
*A
G
GA
A
females
males
total population
<40
>60

FIG. 20

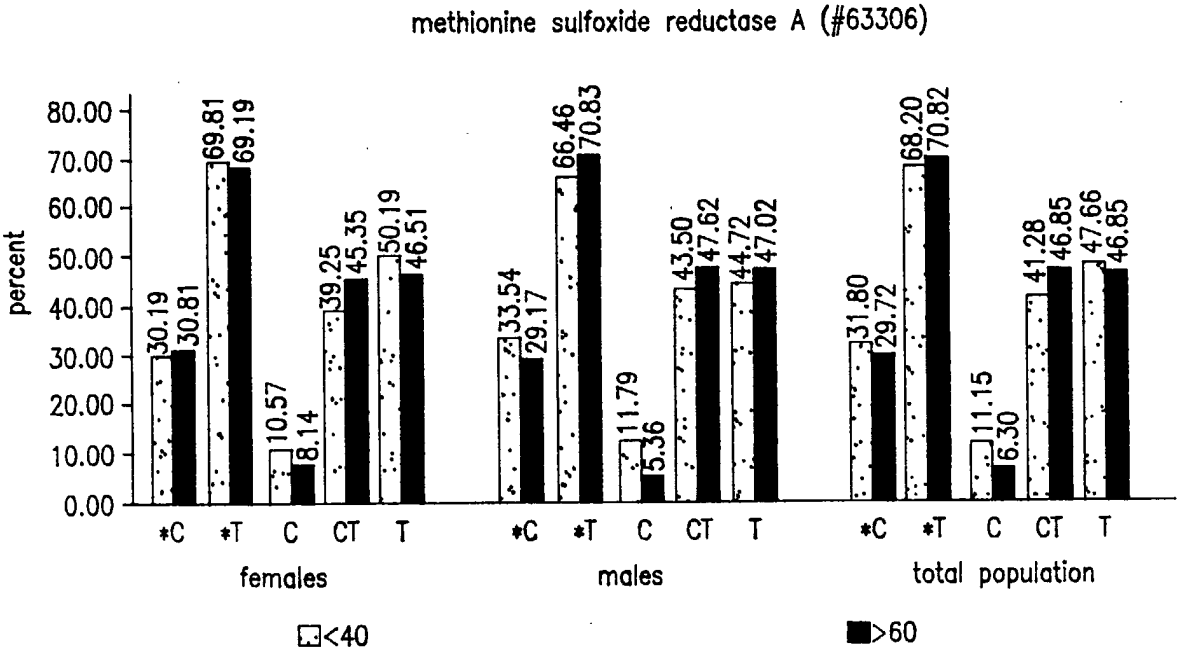

methionine sulfoxide reductase A (#63306)
percent
80.00
70.00
60.00
50.00
40.00
30.00
20.00
10.00
0.00
30.19
30.81
69.81
69.19
10.57
8.14
39.25
45.35
50.19
46.51
33.54
29.17
66.46
70.83
11.79
5.36
43.50
47.62
44.72
47.02
31.80
29.72
68.20
70.82
11.15
6.30
41.28
46.85
47.66
46.85
*C *T C CT T
females
males
total population
<40
>60

FIG. 21

Collection Information

Consent Form Signed
☐ Yes ☐ No

Date of Collectioon
Month | Day | Year 2 0 0
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC

Time of Sample Collection (nearest hour, in 24 hour clock format)

Initials

Initials of Data Collector _____

(DO NOT COMPLETE; for data entry only)
Sample;
☐ Intact
☐ Lost
☐ Broken
Volume (ml)

BAR CODE

Donor Information

Date of Birth
Month | Year 1 9
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC

Sex:
☐ Male
☐ Female

Height
Ft. | Inches

Weight (lb)

What Physical activity do you do on a regular basis?
☐ Running
☐ Swimming
☐ Biking
☐ Gymnastics
☐ Other
☐ None

Are you a vegetarian?
☐ Yes
☐ No

If Female:
How many times have you been pregnant? ≥
How many times did you give birth? ≥

To the best of your knowledge, what is the Ethnic Origin of your:

Father	Mother	
☐	☐	Caucasian (please mark specific geographic area below if known)
☐	☐	Northern Europe (Austria, Denmark, Finland, France, Germany, Netherlands, Norway, Sweden, Switzerland, UK)
☐	☐	Southern Europe (Greece, Italy, Spain, Turkey)
☐	☐	Eastern Europe (Czechoslovakia, Hungary, Poland, Russia, Yugoslavia)
☐	☐	Middle Eastern (Israel, Egypt, Iran, Iraq, Jordan, Syria, Other Arab States)
☐	☐	African-American
☐	☐	Hispanic (please mark specific geographic area below if known)
☐	☐	Mexico
☐	☐	Central America, South America
☐	☐	Cuba, Puerto Rico, other Caribbean
☐	☐	Asian (please mark specific geographic area below if known)
☐	☐	Japanese
☐	☐	Chinese
☐	☐	Korean
☐	☐	Vietnamese
☐	☐	Filipino
☐	☐	Native American
☐	☐	Other _____
☐	☐	Don't know

n which tate do ou live?

How long have you lived there? Years

What is your highest grade you completed in school?
☐ less then 8th grade
☐ 8th,9th,10th,or11th grade
☐ high school graduate or equivalency
☐ some college, 2yr degree
☐ college graduate,4yr degree
☐ post graduate education or degree

Mother Deceased? ☐ Yes ☐ No
If Yes at what age? ≤ 29 30-39 40-49 50-59 60-69 70-79 80-89 ≥ 90
Cause of Death Mother:
☐ Heart Disease ☐ Cancer ☐ Stroke ☐ Accident ☐ Suicide ☐ Other,____

Father Deceased? ☐ Yes ☐ No
If Yes at what age? ≤ 29 30-39 40-49 50-59 60-69 70-79 80-89 > 90
Cause of Death Father:
☐ Heart Disease ☐ Cancer ☐ Stroke ☐ Accident ☐ Suicide ☐ Other,____

FIG. 22A

Have you ever smoked? ☐ Yes ☐ No

If yes, for how long? ☐☐ Years

Have you been hospitalized in the past 5 years for more then 6 days at a time? ☐ Yes ☐ No

If yes, how many times? ☐☐

For each hospitalization (if not the same) how long did you stay and for what reason?

1) Weeks: ☐☐
☐ Acute disorder, including infection and thrombosis
☐ Chronic Disorder
☐ Accident
☐ Other:_____

2) Weeks: ☐☐
☐ Acute disorder, including infection and thrombosis
☐ Chronic Disorder
☐ Accident
☐ Other:_____

3) Weeks: ☐☐
☐ Acute disorder, including infection and thrombosis
☐ Chronic Disorder
☐ Accident
☐ Other:_____

Have you or has anyone in your immediate family (parents,brothers,sisters,or your children) had the following? Mark all that apply!

Disease	You	Mother	Father	Sister	Brother	Child
Heart Disease, including arteriosclerosis	☐	☐	☐	☐	☐	☐
Stroke	☐	☐	☐	☐	☐	☐
Hypertension	☐	☐	☐	☐	☐	☐
Blood clots	☐	☐	☐	☐	☐	☐
Diabetes, insulin dependent	☐	☐	☐	☐	☐	☐
Diabetes, not insulin-dependent (diet controlled)	☐	☐	☐	☐	☐	☐
Cancer:	☐	☐	☐	☐	☐	☐
Lung&Bronchus	☐	☐	☐	☐	☐	☐
Breasts	☐	☐	☐	☐	☐	☐
Prostate	☐	☐	☐	☐	☐	☐
Colon&Rectum	☐	☐	☐	☐	☐	☐
Skin	☐	☐	☐	☐	☐	☐
Lymphoma&Leukemia	☐	☐	☐	☐	☐	☐
Other, please specify below:	☐	☐	☐	☐	☐	☐
Alzheimer's Disease	☐	☐	☐	☐	☐	☐
Epilepsy	☐	☐	☐	☐	☐	☐
Schizophrenia	☐	☐	☐	☐	☐	☐
Bipolar disorder (manic depression)	☐	☐	☐	☐	☐	☐
Major depression	☐	☐	☐	☐	☐	☐
Chronic Inflammatory or Autoimmune Disease including Multiple Sclerosis and Rheumatoid Arthritis	☐	☐	☐	☐	☐	☐
Emphysema	☐	☐	☐	☐	☐	☐
Asthma	☐	☐	☐	☐	☐	☐
Other, please specify below:	☐	☐	☐	☐	☐	☐

Do you take prescription drugs on a regular basis?	☐ Yes ☐ No
If yes, please specify below:	

Have you ever donated blood before? ☐ Yes ☐ No

If yes, how many times: Number of Times ☐☐☐

Additional health information details you would like to provide:

_____

_____

_____

_____

FOR OFFICE USE ONLY

☐☐

Do you drink any kind of alcoholic beverage?

☐ Never ☐ Hardly ever
☐ Less than 3 times per week ☐ 3 or more times per week
☐ Daily

FIG. 22B

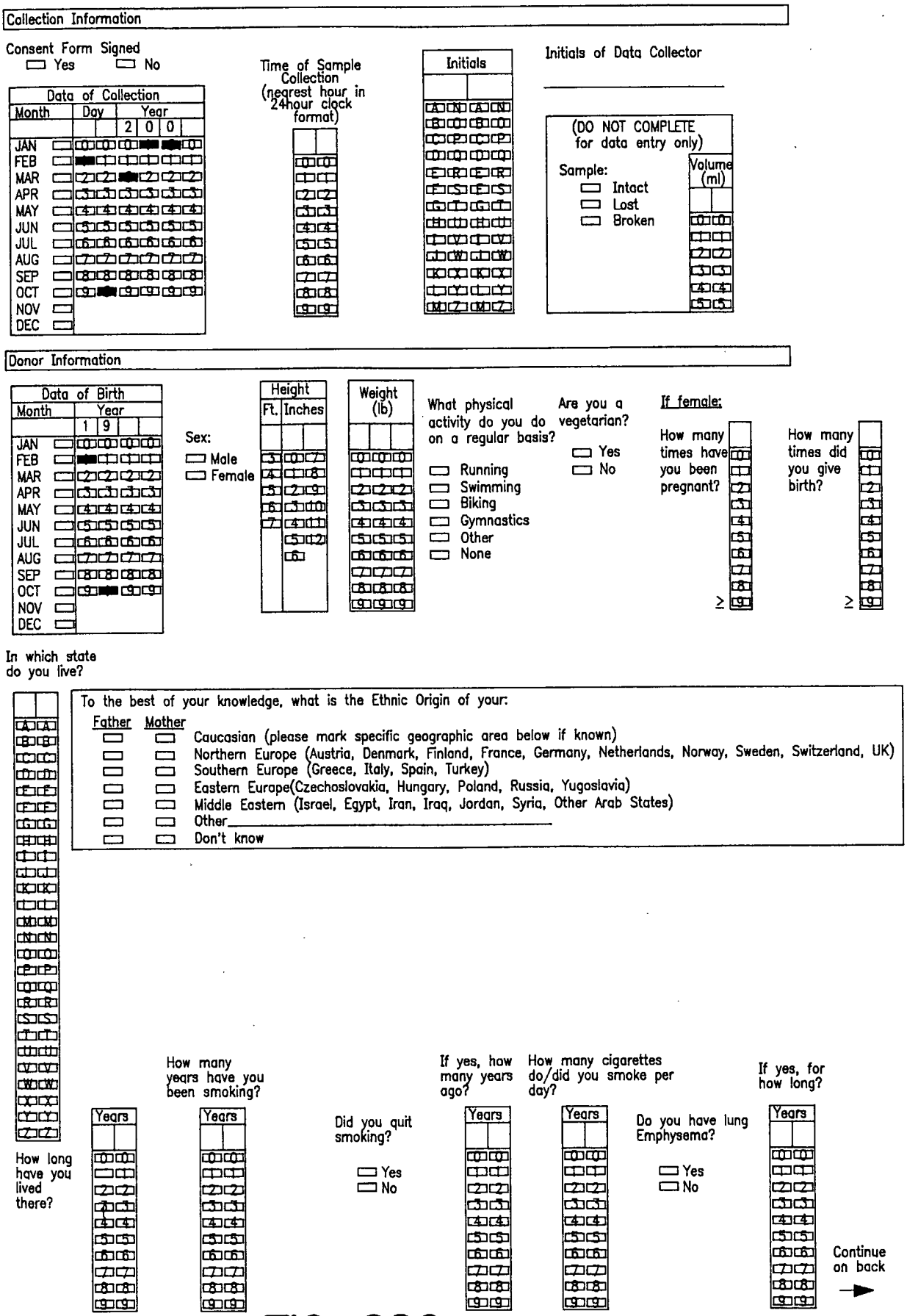

Collection Information
Consent Form Signed
Yes
No
Data of Collection
Month
Day
Year
2 0 0
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
OCT
NOV
DEC
Time of Sample Collection (nearest hour in 24hour clock format)
Initials
Initials of Data Collector
(DO NOT COMPLETE for data entry only)
Sample:
Intact
Lost
Broken
Volume (ml)
Donor Information
Data of Birth
Month
Year
1 9
Sex:
Male
Female
Height
Ft. Inches
Weight (lb)
What physical activity do you do on a regular basis?
Running
Swimming
Biking
Gymnastics
Other
None
Are you a vegetarian?
Yes
No
If female:
How many times have you been pregnant?
How many times did you give birth?
In which state do you live?
To the best of your knowledge, what is the Ethnic Origin of your:
Father
Mother
Caucasian (please mark specific geographic area below if known)
Northern Europe (Austria, Denmark, Finland, France, Germany, Netherlands, Norway, Sweden, Switzerland, UK)
Southern Europe (Greece, Italy, Spain, Turkey)
Eastern Europe(Czechoslovakia, Hungary, Poland, Russia, Yugoslavia)
Middle Eastern (Israel, Egypt, Iran, Iraq, Jordan, Syria, Other Arab States)
Other
Don't know
How long have you lived there?
Years
How many years have you been smoking?
Years
Did you quit smoking?
Yes
No
If yes, how many years ago?
Years
How many cigarettes do/did you smoke per day?
Years
Do you have lung Emphysema?
Yes
No
If yes, for how long?
Years
Continue on back

FIG. 22C

What is your highest grade you completed in school?
- ☐ less then 8th grade
- ☐ 8th,9th,10th,or11th grade
- ☐ high school graduate or equivalency
- ☐ some college, 2yr degree
- ☐ college graduate,4yr degree
- ☐ post graduate education or degree

Mother Deceased? ☐ Yes ☐ No
If Yes at what age? ☐ ≤ 29 ☐ 30–39 ☐ 40–49 ☐ 50–59 ☐ 60–69 ☐ 70–79 ☐ 80–89 ☐ ≥ 90

Cause of Death Mother:
- ☐ Heart Disease
- ☐ Cancer
- ☐ Stroke
- ☐ Accident
- ☐ Suicide
- ☐ Other, _____

Father Deceased? ☐ Yes ☐ No
If Yes at what age? ☐ ≤ 29 ☐ 30–39 ☐ 40–49 ☐ 50–59 ☐ 60–69 ☐ 70–79 ☐ 80–89 ☐ > 90

Cause of Death Father:
- ☐ Heart Disease
- ☐ Cancer
- ☐ Stroke
- ☐ Accident
- ☐ Suicide
- ☐ Other, _____

Health Information

Have you or has anyone in your immediate family (parents,brothers,sisters,or your children) had the following? Mark all that apply!

Disease	You	Mother	Father	Sister	Brother	Child
Heart Disease	☐	☐	☐	☐	☐	☐
Stroke	☐	☐	☐	☐	☐	☐
Hypertension	☐	☐	☐	☐	☐	☐
Blood clots	☐	☐	☐	☐	☐	☐
Diabetes, insulin dependent	☐	☐	☐	☐	☐	☐
Diabetes, not insulin-dependent	☐	☐	☐	☐	☐	☐
Cancer:	☐	☐	☐	☐	☐	☐
Lung&Bronchus	☐	☐	☐	☐	☐	☐
Breasts	☐	☐	☐	☐	☐	☐
Prostate	☐	☐	☐	☐	☐	☐
Colon&Rectum	☐	☐	☐	☐	☐	☐
Skin	☐	☐	☐	☐	☐	☐
Lymphoma&Leukemia	☐	☐	☐	☐	☐	☐
Other, please specify below:	☐	☐	☐	☐	☐	☐
Alzheimer's Disease	☐	☐	☐	☐	☐	☐
Epilepsy	☐	☐	☐	☐	☐	☐
Schizophrenia	☐	☐	☐	☐	☐	☐
Bipolar disorder (manic depression)	☐	☐	☐	☐	☐	☐
Major depression	☐	☐	☐	☐	☐	☐
Chronic Inflammatory or Autoimmune Disease including Multiple Sclerosis and Rheumatoid Arthritis	☐	☐	☐	☐	☐	☐
Emphysema	☐	☐	☐	☐	☐	☐
Asthma	☐	☐	☐	☐	☐	☐
Other, please specify below:	☐	☐	☐	☐	☐	☐

Do you take prescription drugs on a regular basis? ☐ Yes ☐ No

If yes, please specify below:

Have you ever donated blood before? ☐ Yes ☐ No

If yes, how many times:

Number of Times

0	0	0
1	1	1
2	2	2
3	3	3
4	4	4
5	5	5
6	6	6
7	7	7
8	8	8
9	9	9

Have you been hospitalized in the past 5 years for more then 6 days at a time? ☐ Yes ☐ No

If yes, how many times? ☐☐☐☐☐☐☐☐☐

For each hospitalization (if not the same) how long did you stay and for what reason?

1) Weeks: ☐☐☐☐☐☐
- ☐ Acute disorder, including infection and thrombosis
- ☐ Chronic Disorder
- ☐ Accident
- ☐ Other: _____

2) Weeks: ☐☐☐☐☐☐
- ☐ Acute disorder, including infection and thrombosis
- ☐ Chronic Disorder
- ☐ Accident
- ☐ Other: _____

3) Weeks: ☐☐☐☐☐☐
- ☐ Acute disorder, including infection and thrombosis
- ☐ Chronic Disorder
- ☐ Accident
- ☐ Other: _____

Do you drink any kind of alcoholic beverage?
- ☐ Never
- ☐ Less than 3 times per week
- ☐ Daily
- ☐ Hardly ever
- ☐ 3 or more times per week

Additional health information details you would like to provide:

_____

_____

FOR OFFICE USE ONLY

■	☐
☐	☐
☐	☐
☐	☐
☐	☐

FIG. 22D

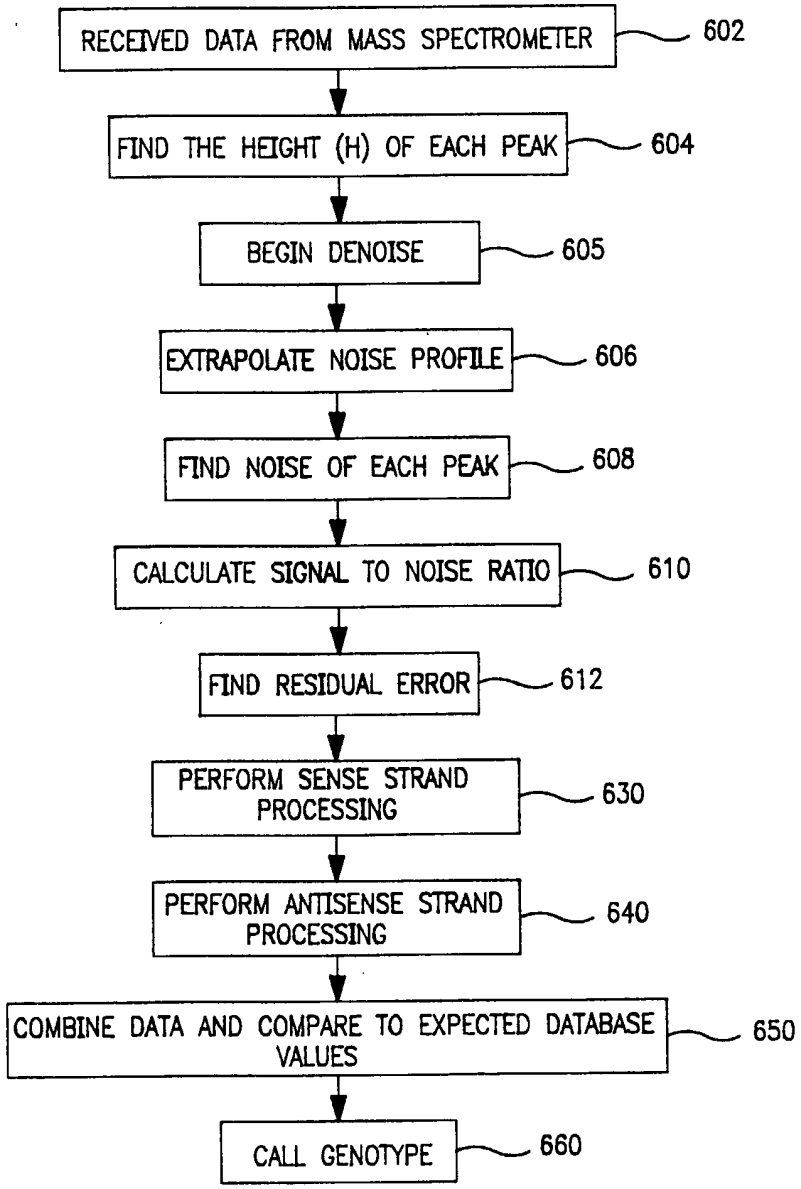

RECEIVED DATA FROM MASS SPECTROMETER
602
FIND THE HEIGHT (H) OF EACH PEAK
604
BEGIN DENOISE
605
EXTRAPOLATE NOISE PROFILE
606
FIND NOISE OF EACH PEAK
608
CALCULATE SIGNAL TO NOISE RATIO
610
FIND RESIDUAL ERROR
612
PERFORM SENSE STRAND PROCESSING
630
PERFORM ANTISENSE STRAND PROCESSING
640
COMBINE DATA AND COMPARE TO EXPECTED DATABASE VALUES
650
CALL GENOTYPE
660

FIG. 23

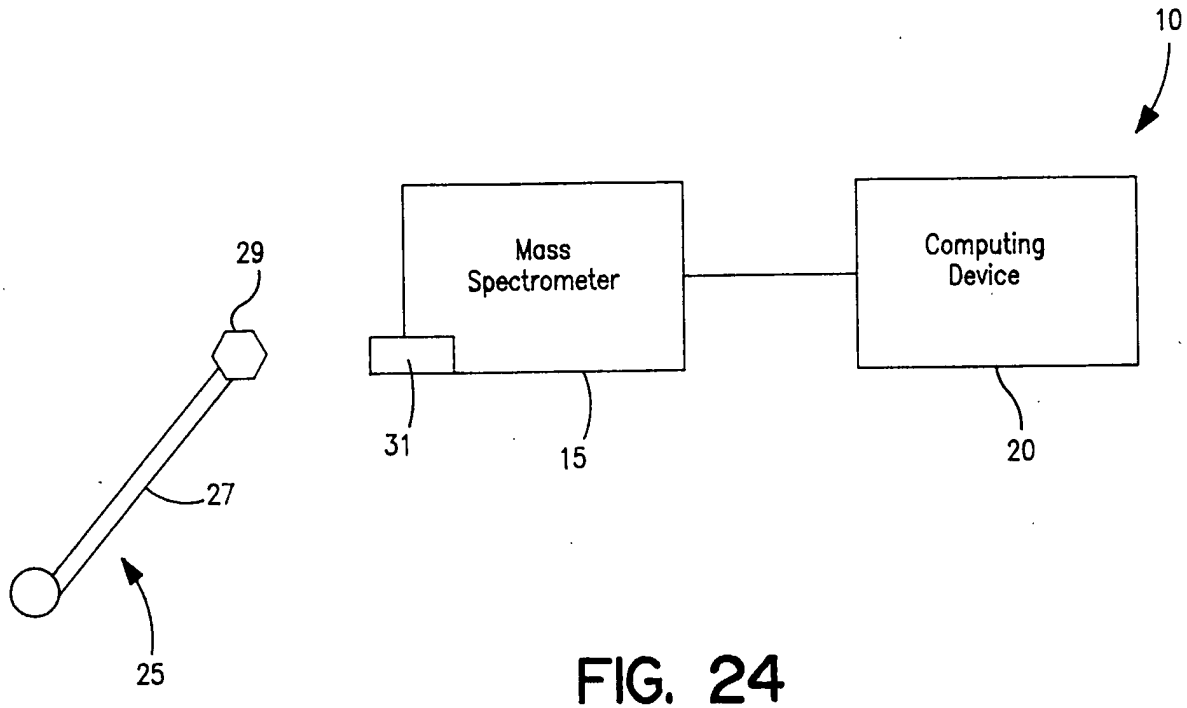


FIG. 24

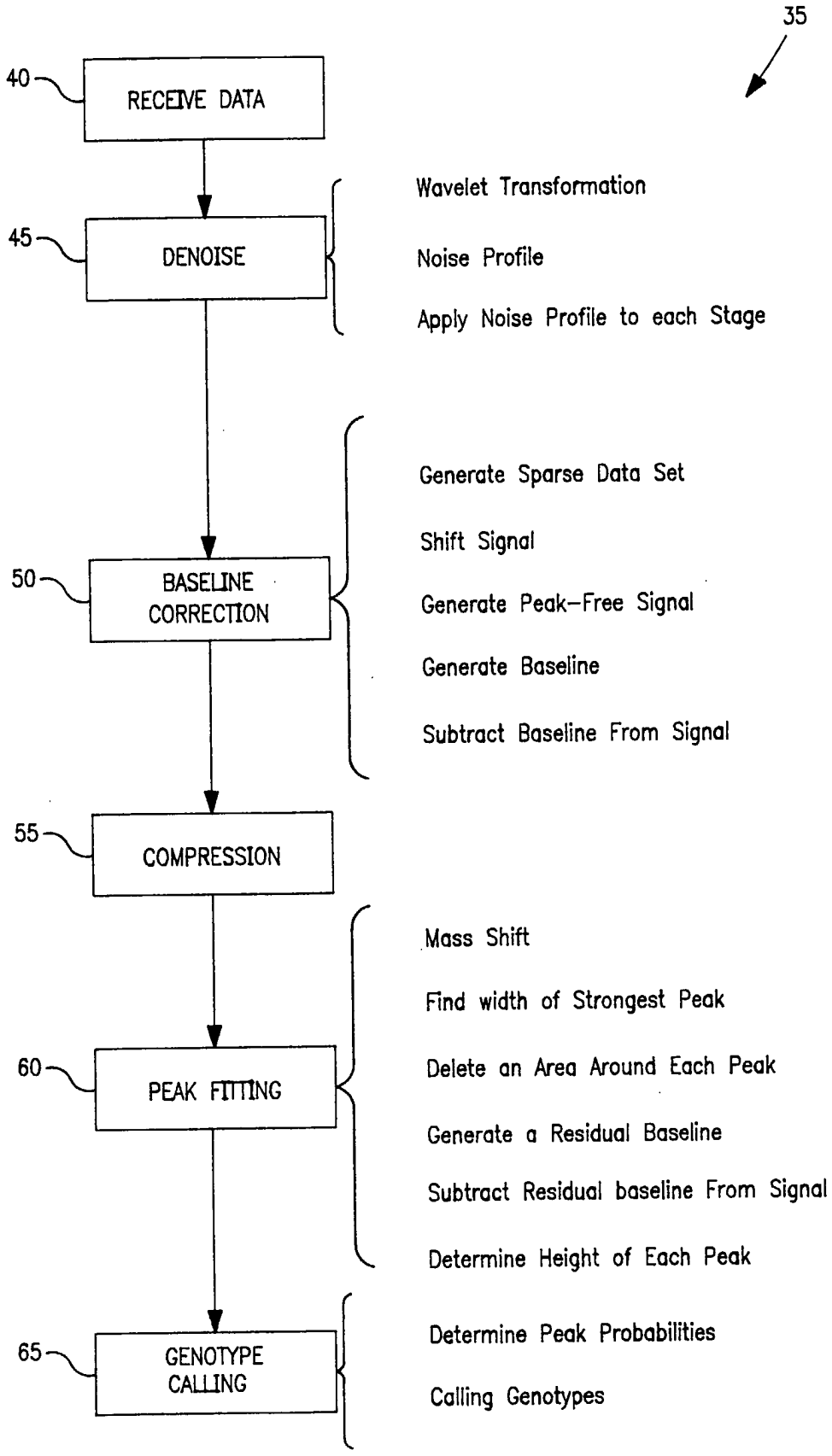

35
40
RECEIVE DATA
45
DENOISE
Wavelet Transformation
Noise Profile
Apply Noise Profile to each Stage
50
BASELINE CORRECTION
Generate Sparse Data Set
Shift Signal
Generate Peak–Free Signal
Generate Baseline
Subtract Baseline From Signal
55
COMPRESSION
60
PEAK FITTING
Mass Shift
Find width of Strongest Peak
Delete an Area Around Each Peak
Generate a Residual Baseline
Subtract Residual baseline From Signal
Determine Height of Each Peak
65
GENOTYPE CALLING
Determine Peak Probabilities
Calling Genotypes

FIG. 25

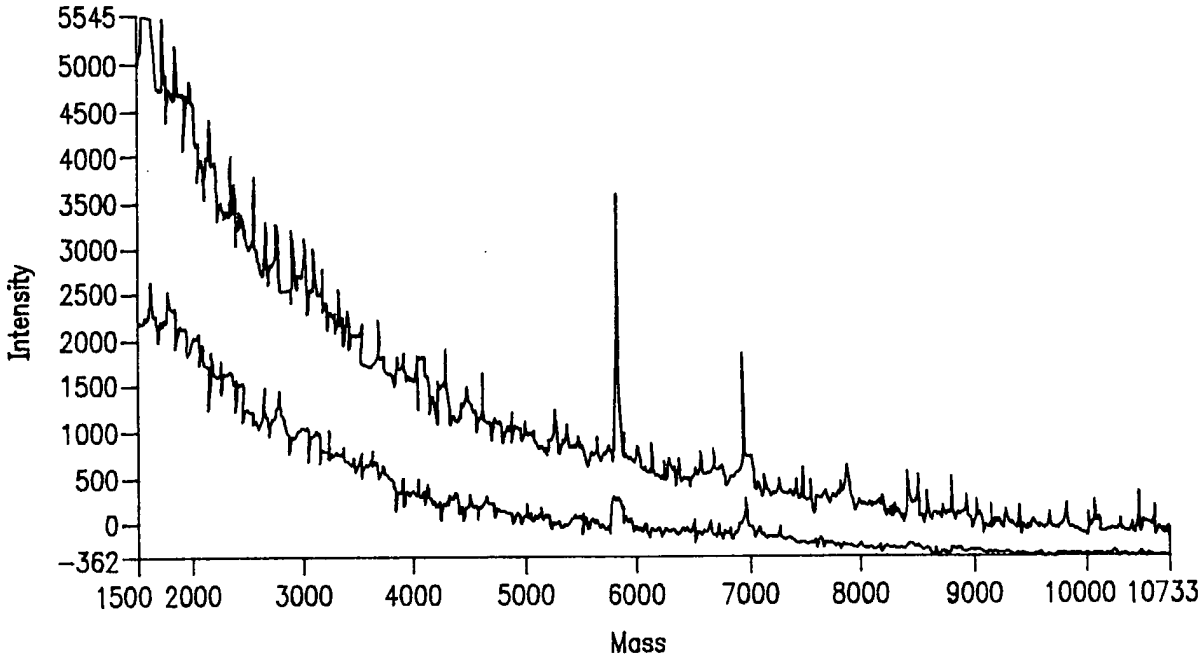

5545
5000
4500
4000
3500
3000
2500
2000
1500
1000
500
0
-362
Intensity
1500 2000 3000 4000 5000 6000 7000 8000 9000 10000 10733
Mass

FIG. 26

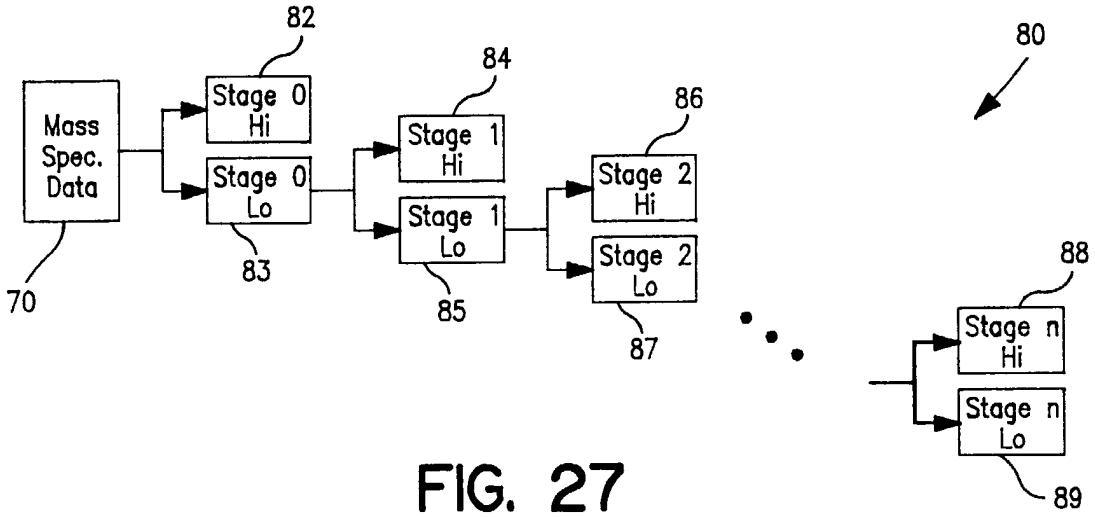

82
84
86
80
Mass Spec. Data
Stage 0 Hi
Stage 0 Lo
Stage 1 Hi
Stage 1 Lo
Stage 2 Hi
Stage 2 Lo
Stage n Hi
Stage n Lo
70
83
85
87
88
89

FIG. 27

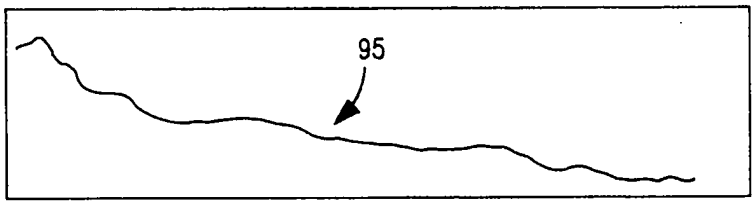
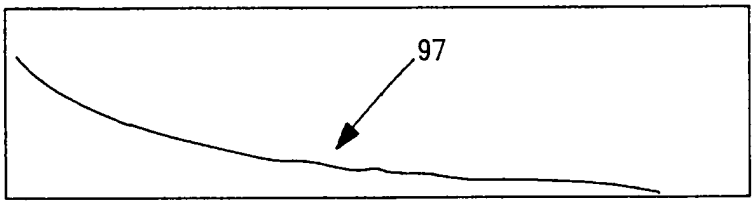


FIG. 28



Exp fitting
$a_0 + a_1 \exp^{-}(a_2 m)$

FIG. 29

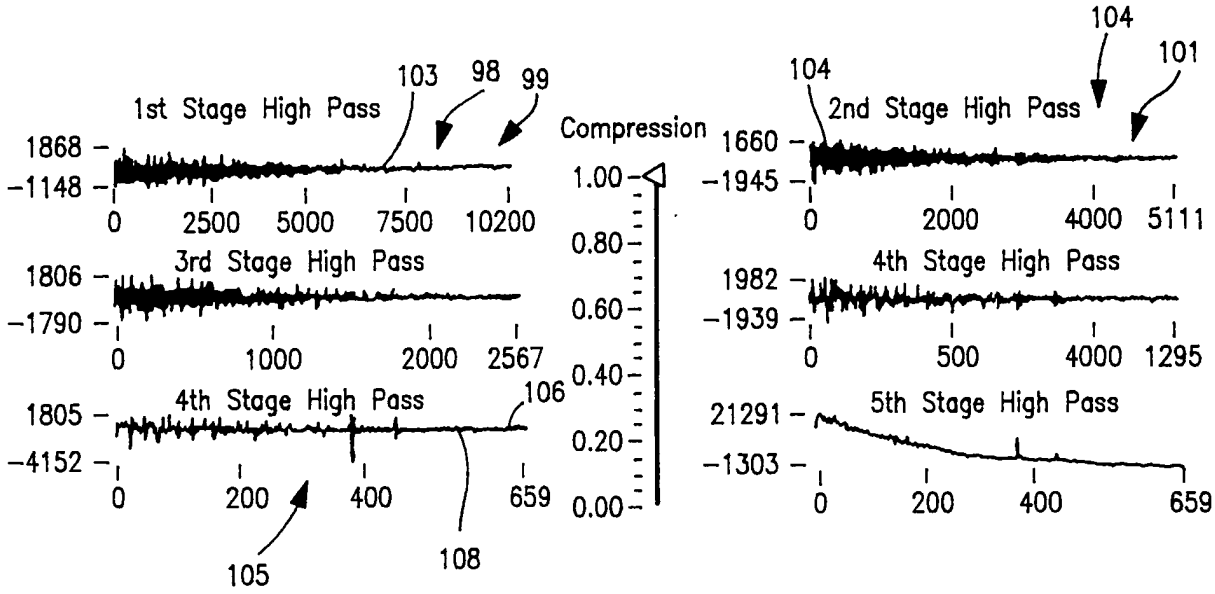


FIG. 30

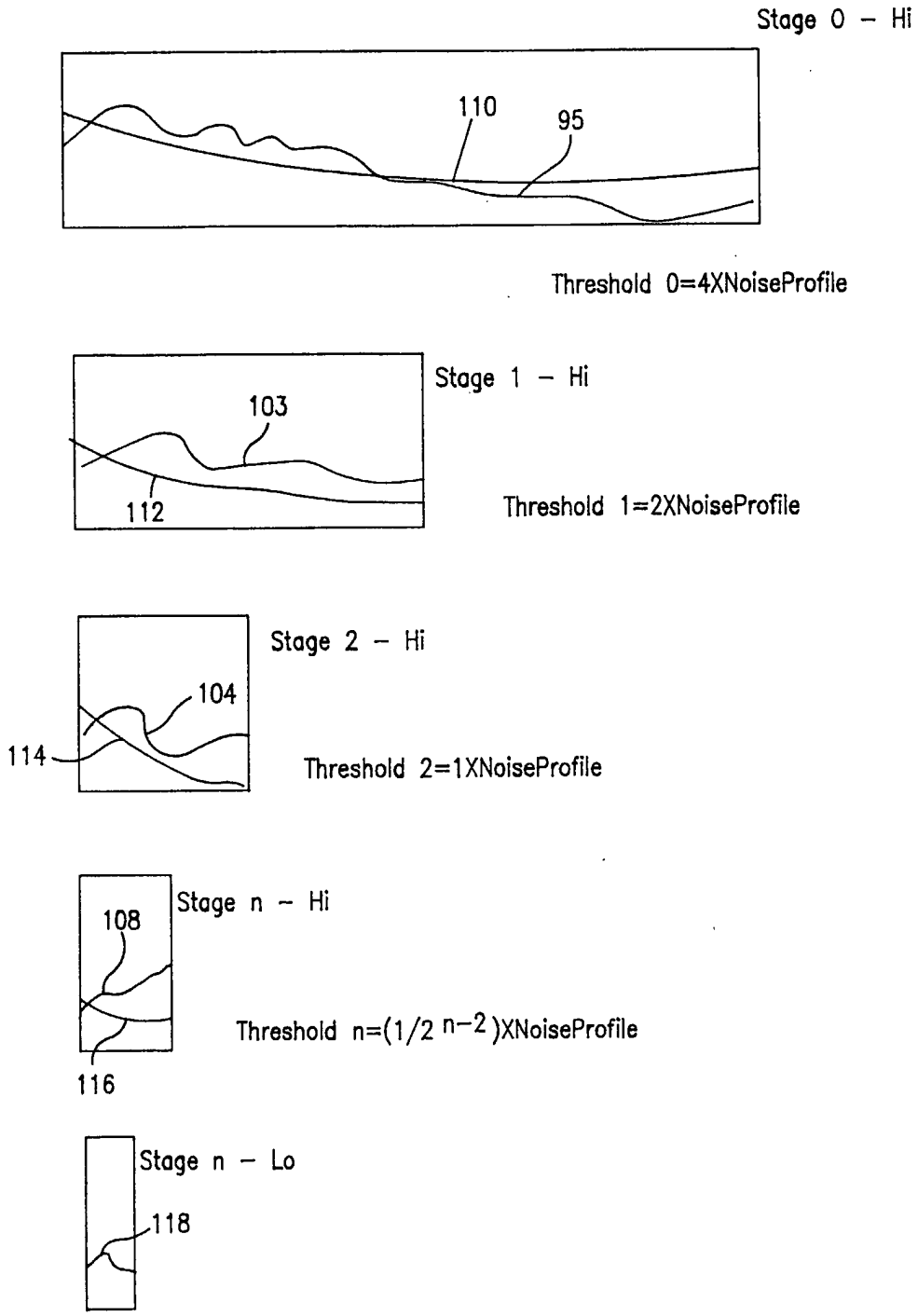

Stage 0 – Hi
110
95
Threshold 0=4XNoiseProfile
Stage 1 – Hi
103
112
Threshold 1=2XNoiseProfile
Stage 2 – Hi
104
114
Threshold 2=1XNoiseProfile
Stage n – Hi
108
Threshold n=(1/2 n−2)XNoiseProfile
116
Stage n – Lo
118

FIG. 31

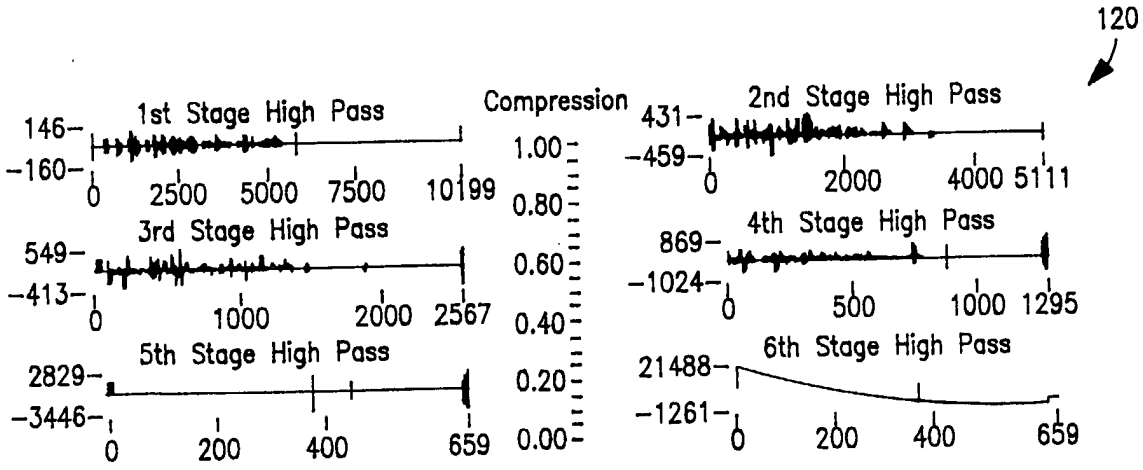


FIG. 32

$$\text{Signal (t)} = \frac{(\text{Start } 0(t) + \text{Start } 1(t) + \text{Start } 2(t) \ldots + \text{Start } 23\ (t))}{24}$$

SHIFT SIGNAL TO ACCOUNT FOR VARIATIONS DUE TO STARTING POINT

FIG. 33

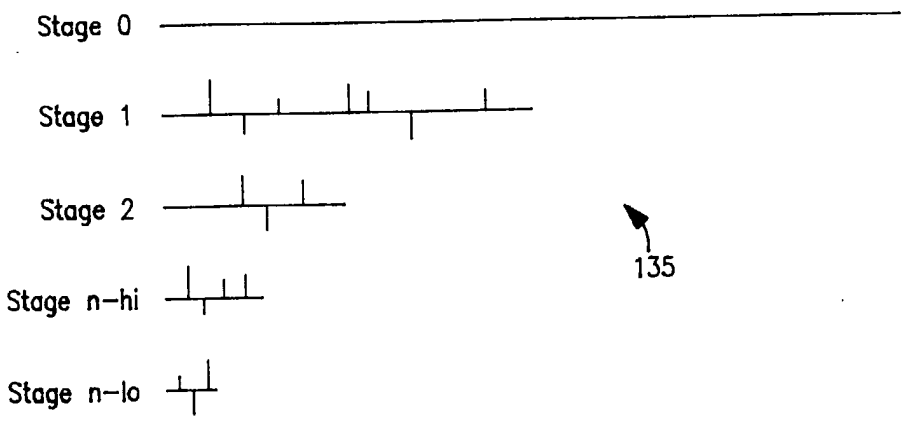


FIG. 34

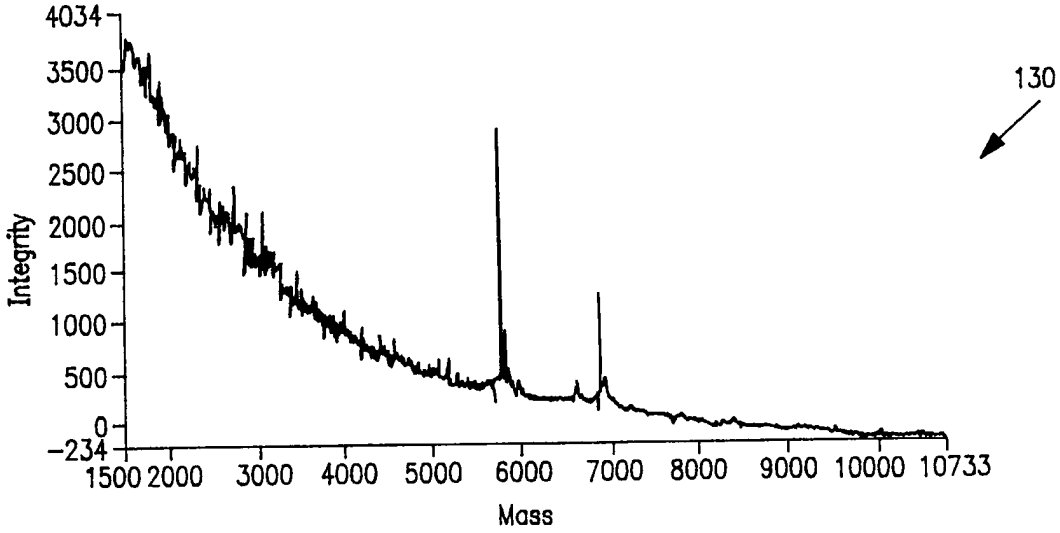


FIG. 35

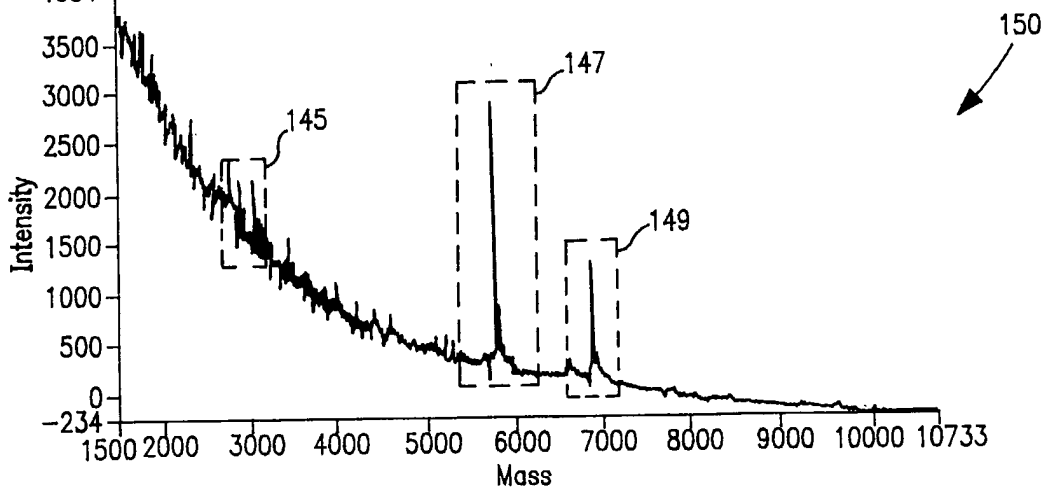


FIG. 13–TAKE A MOVING AVERAGE, REMOVE SECTIONS EXCEEDING A THRESHOLD

FIG. 36

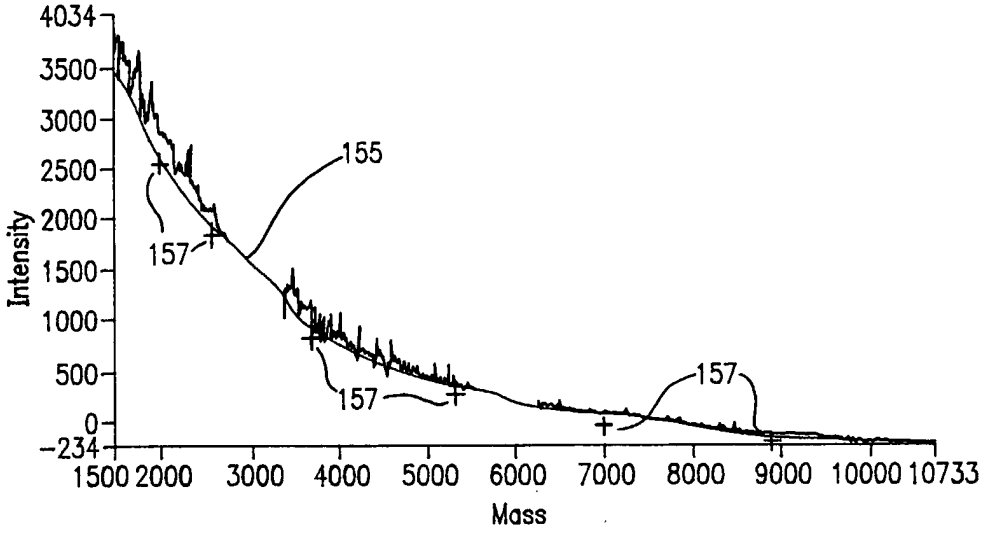


FIG. 37

FIND MINIMA IN REMAINING SIGNALS AND CONNECT TO FORM A PEAK FREE SIGNAL

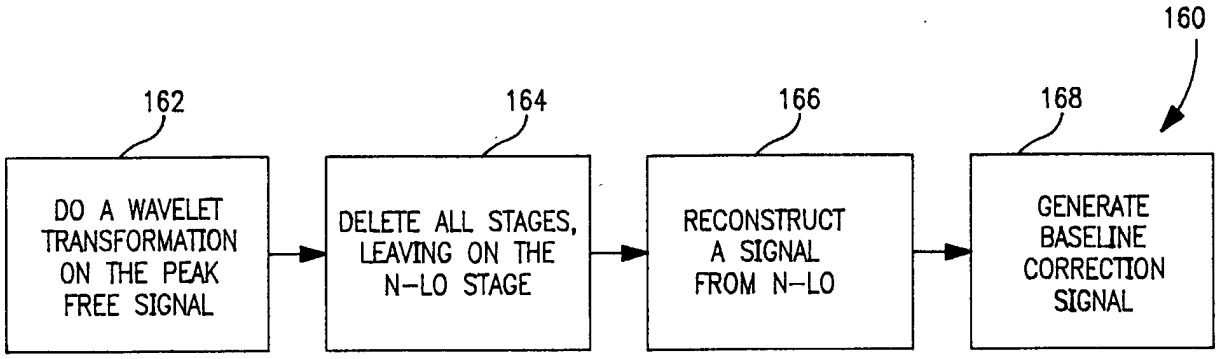


FIG. 38

GENRATE BASLELINE CORRECTION

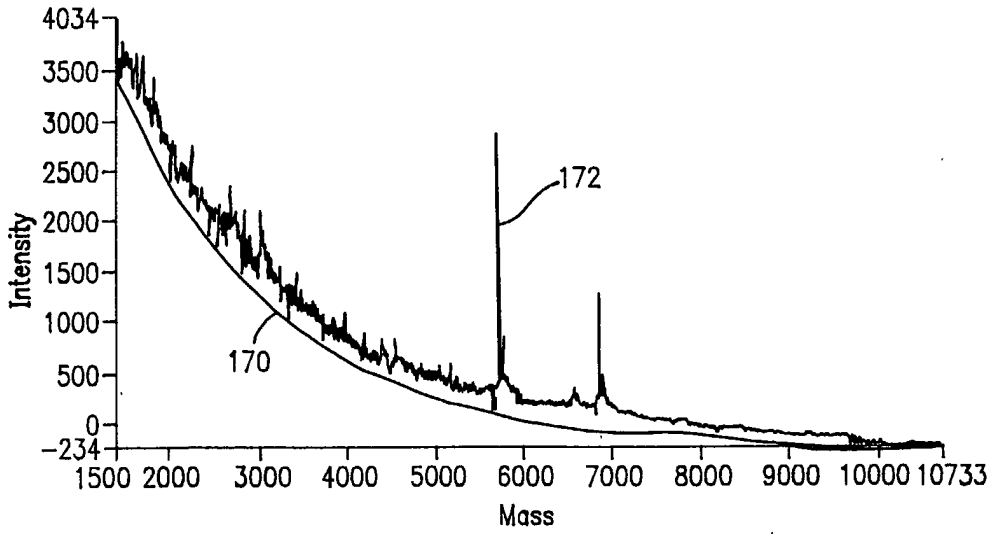


FIG. 39

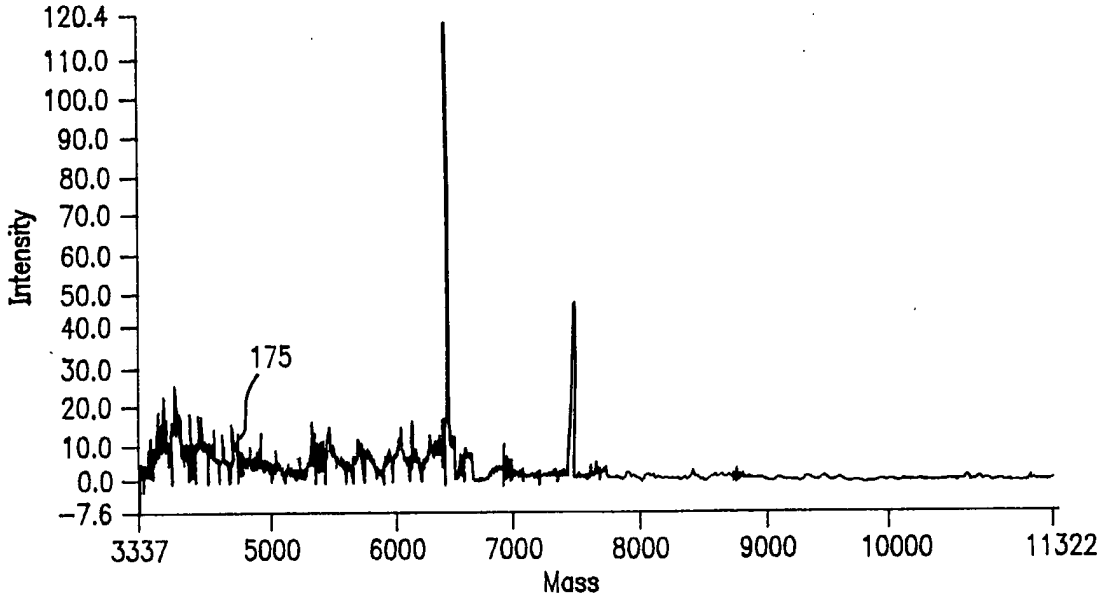

120.4
110.0
100.0
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
-7.6
Intensity
175
3337
5000
6000
7000
8000
9000
10000
11322
Mass

FIG. 40

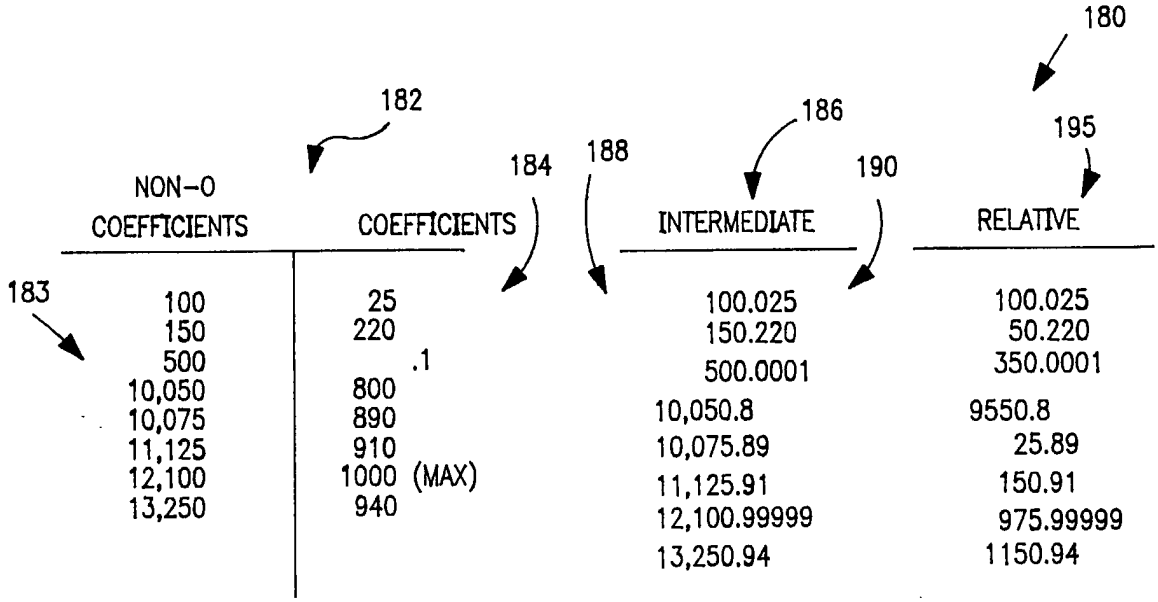

180
182
186
195
184
188
190
183
NON-0 COEFFICIENTS
COEFFICIENTS
INTERMEDIATE
RELATIVE
100
150
500
10,050
10,075
11,125
12,100
13,250
25
220
.1
800
890
910
1000 (MAX)
940
100.025
150.220
500.0001
10,050.8
10,075.89
11,125.91
12,100.99999
13,250.94
100.025
50.220
350.0001
9550.8
25.89
150.91
975.99999
1150.94

FIG. 41

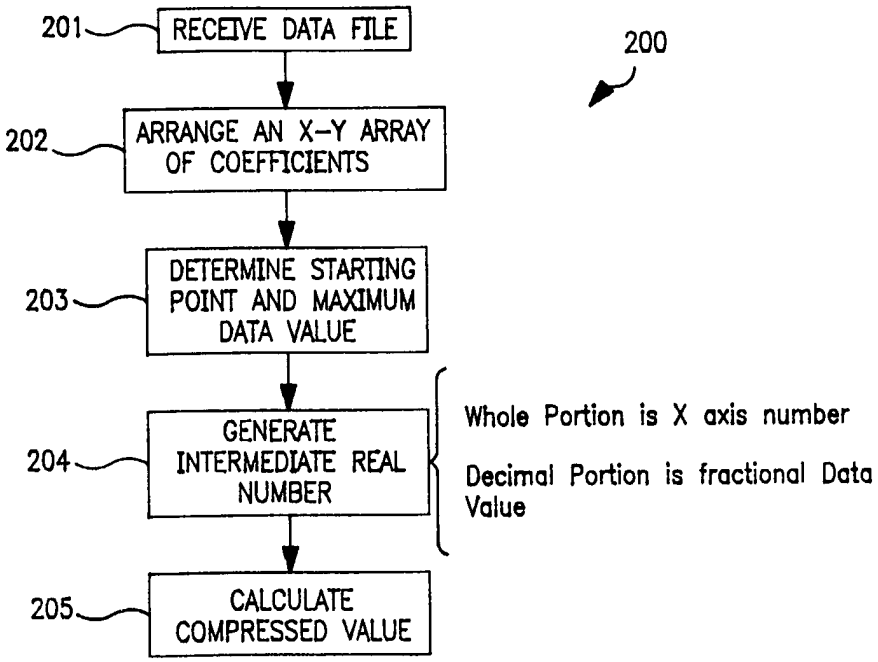

201
RECEIVE DATA FILE
200
202
ARRANGE AN X-Y ARRAY OF COEFFICIENTS
203
DETERMINE STARTING POINT AND MAXIMUM DATA VALUE
204
GENERATE INTERMEDIATE REAL NUMBER
Whole Portion is X axis number
Decimal Portion is fractional Data Value
205
CALCULATE COMPRESSED VALUE

FIG. 42

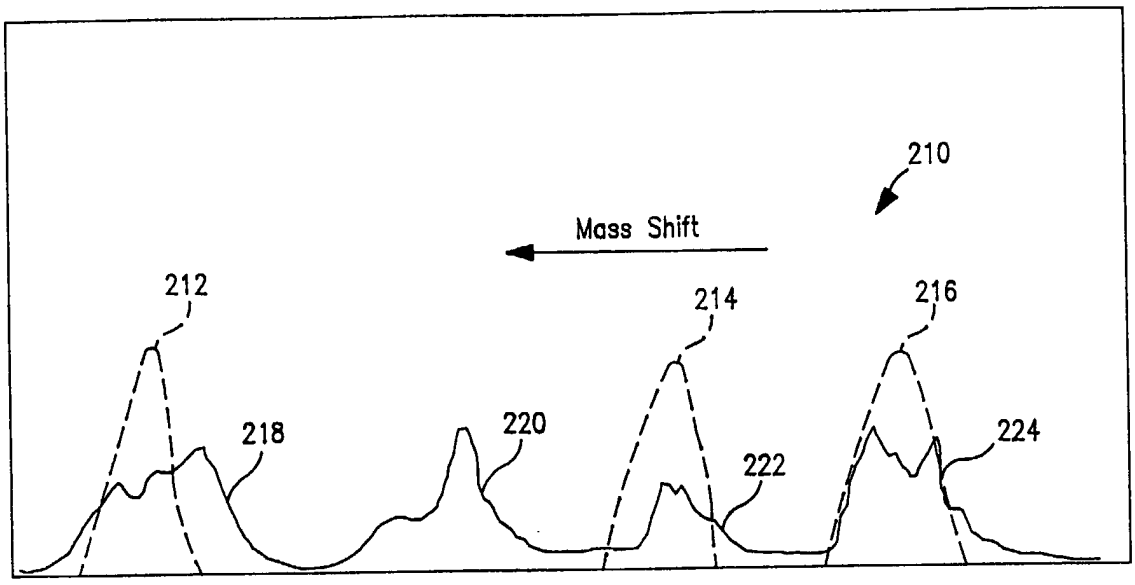


FIG. 43

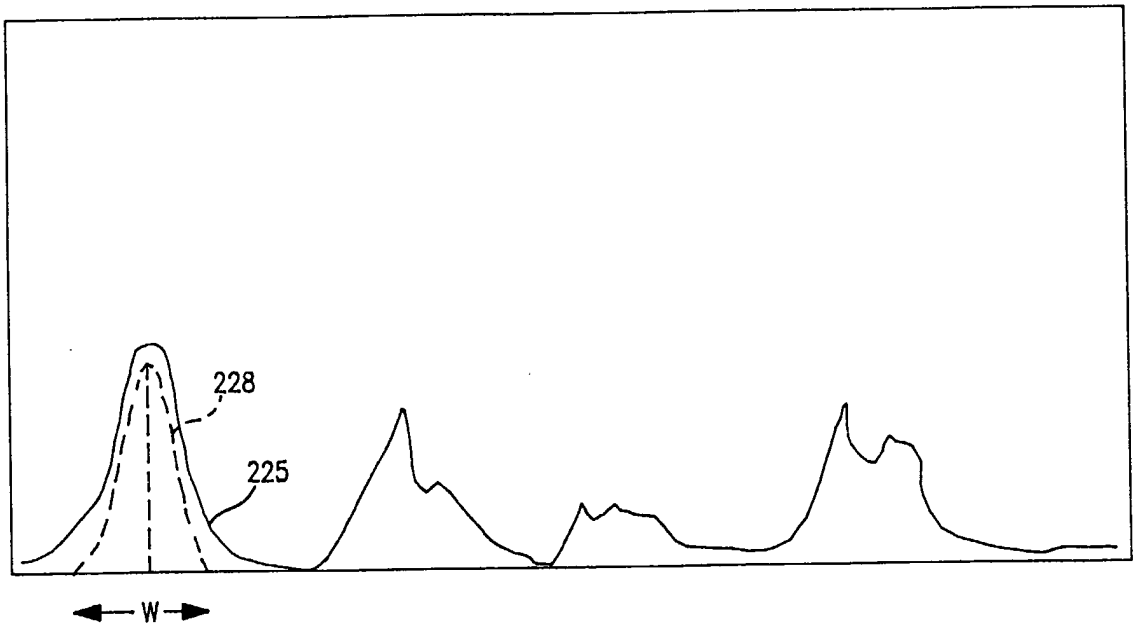


FIG. 44

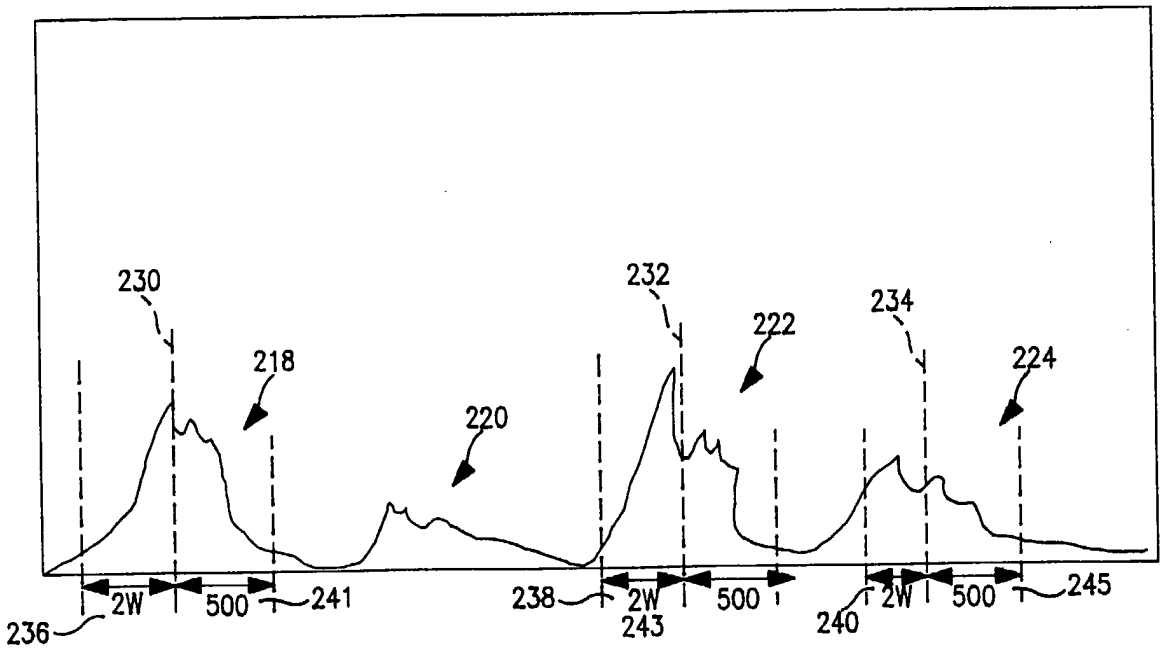


FIG. 45

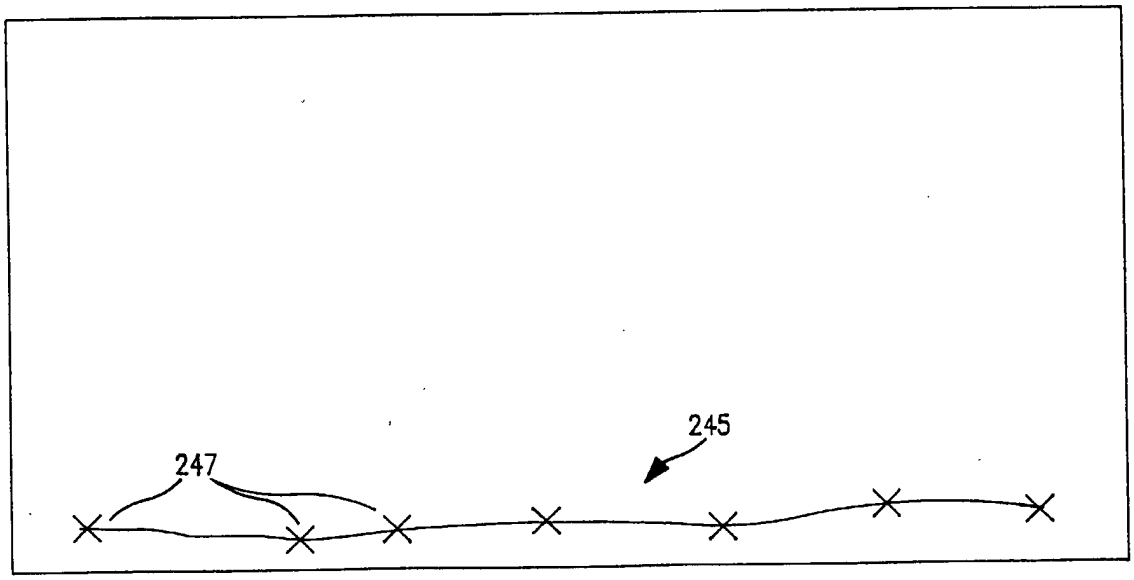


FIG. 46

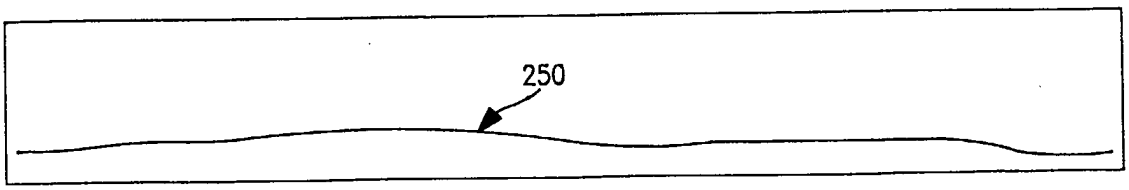


FIG. 47

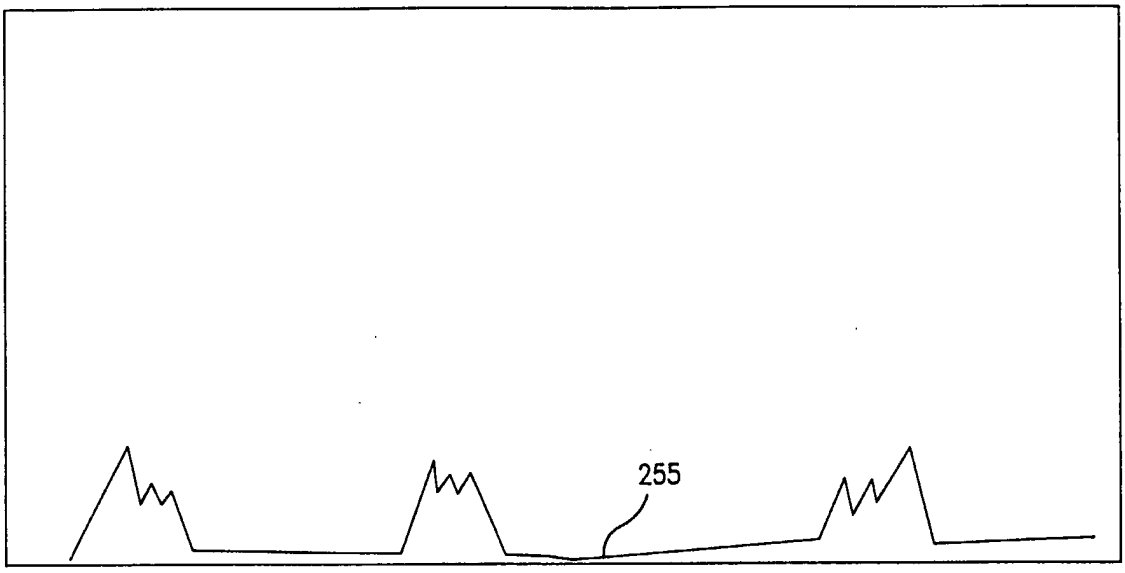


FIG. 48

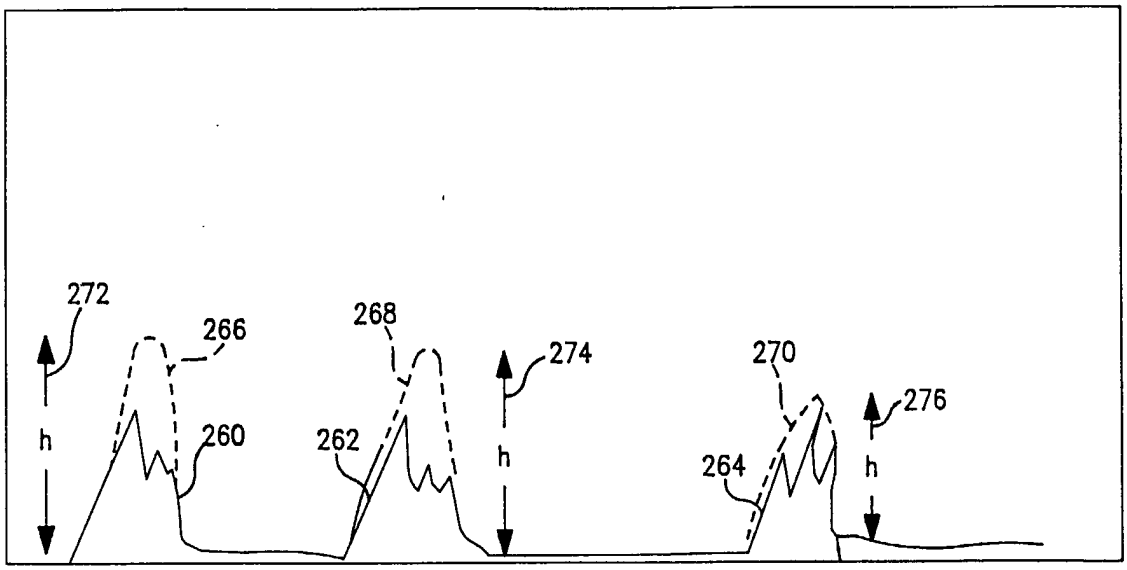


FIG. 49

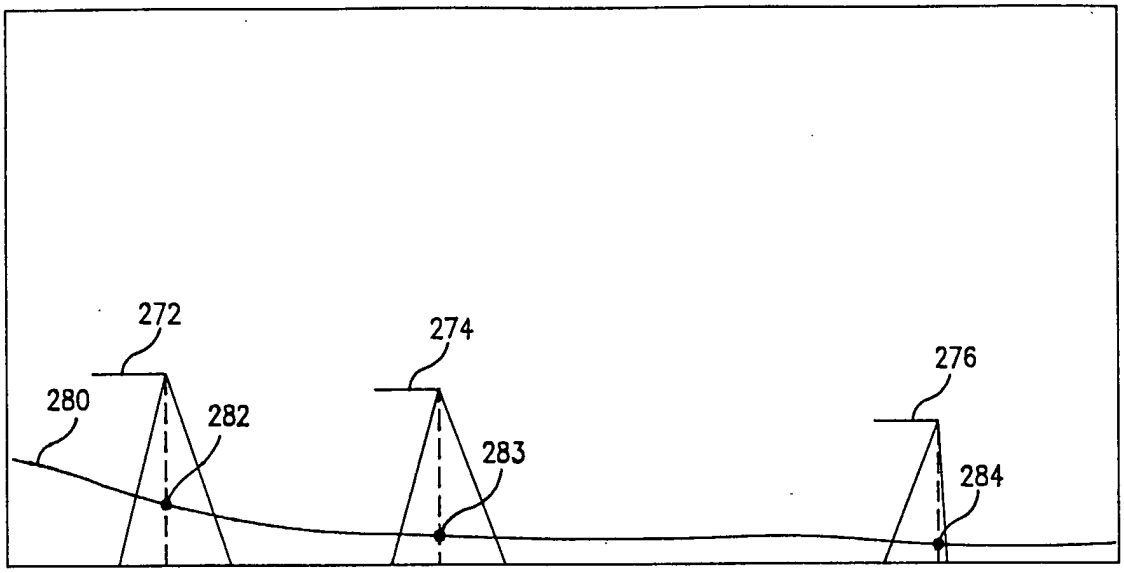


FIG. 50

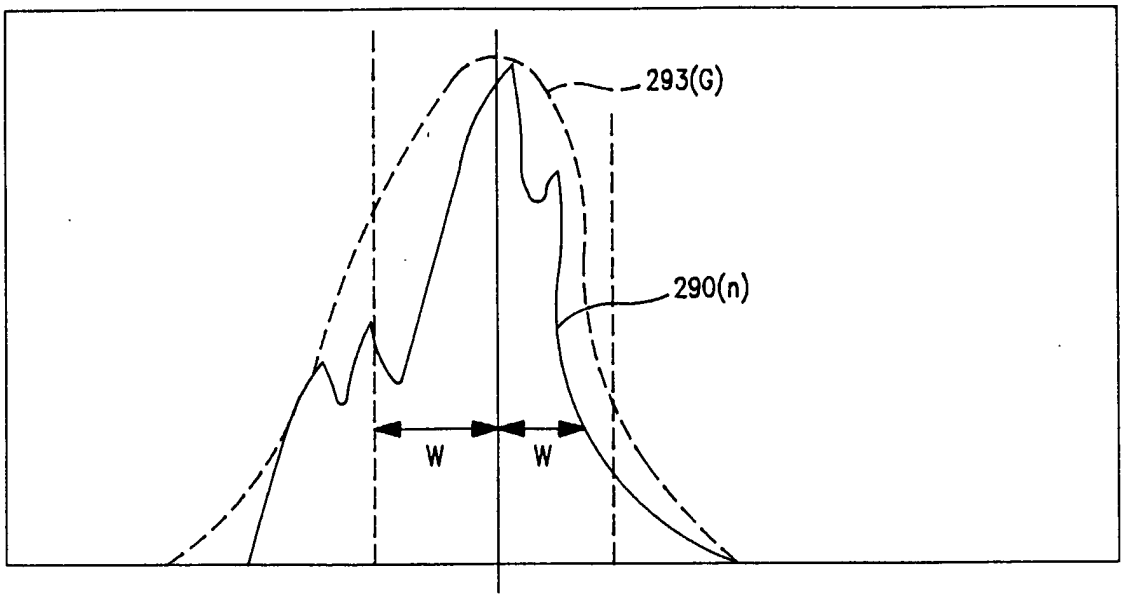


FIG. 51

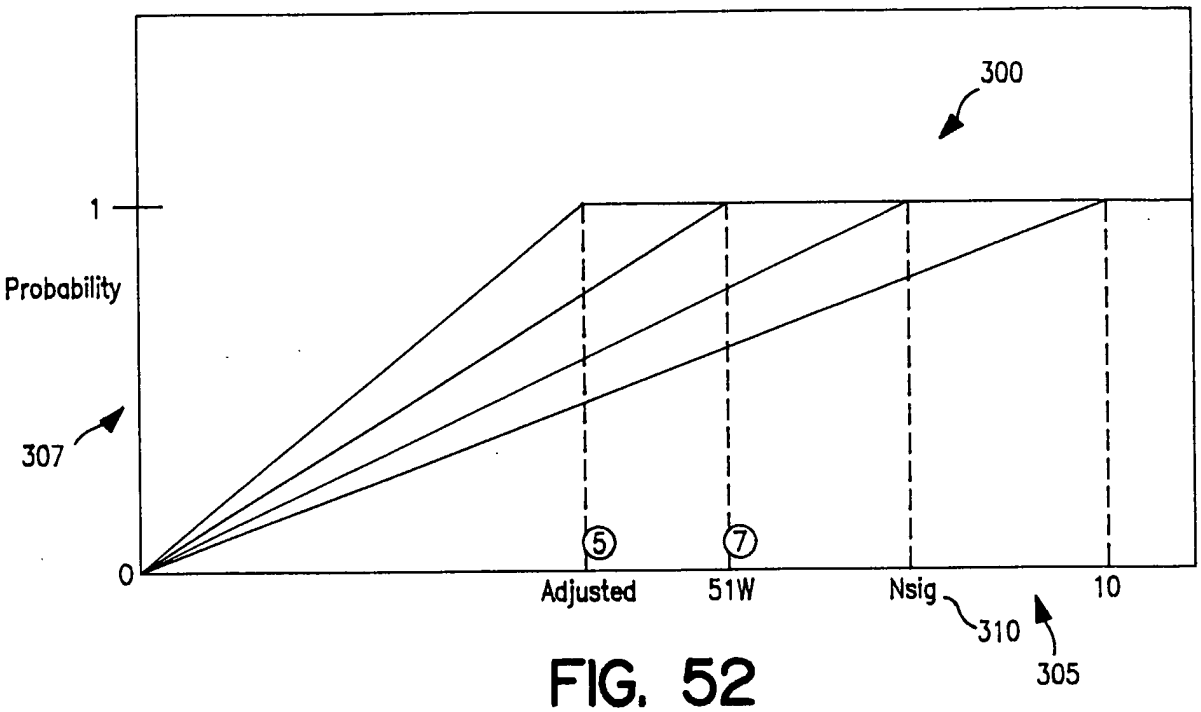

300
1
Probability
307
0
5
7
Adjusted
51W
Nsig
10
310
305

FIG. 52

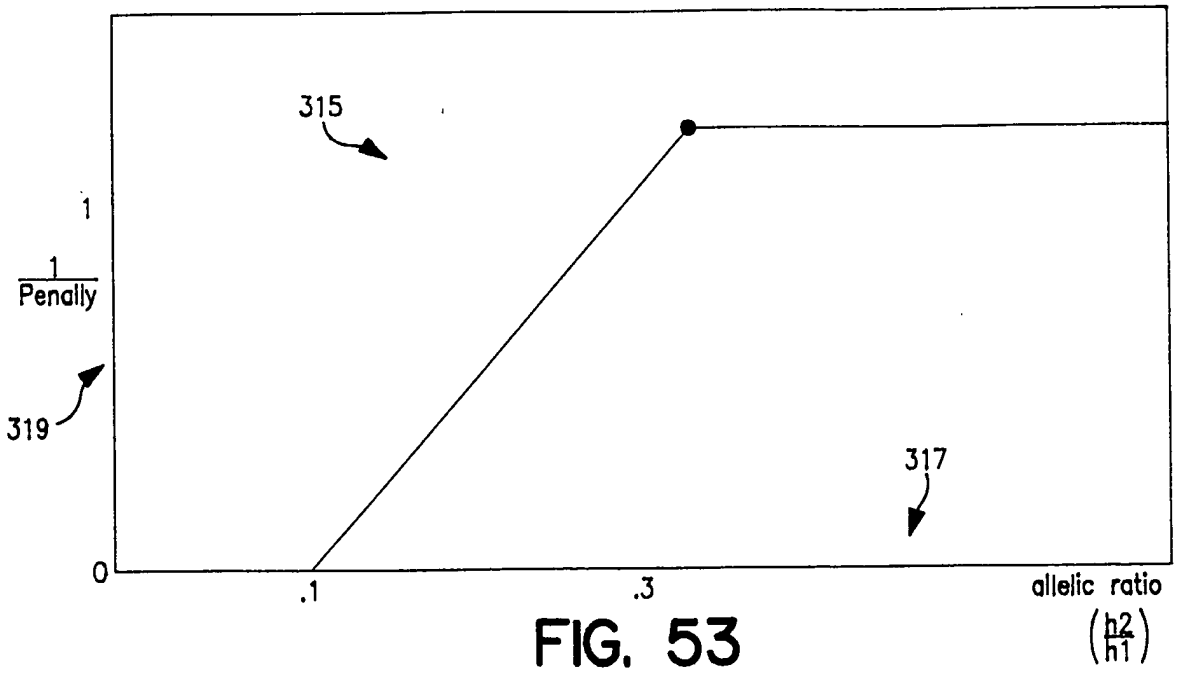

315
1
1/Penalty
319
0
317
.1
.3
allelic ratio
(h2/h1)

FIG. 53

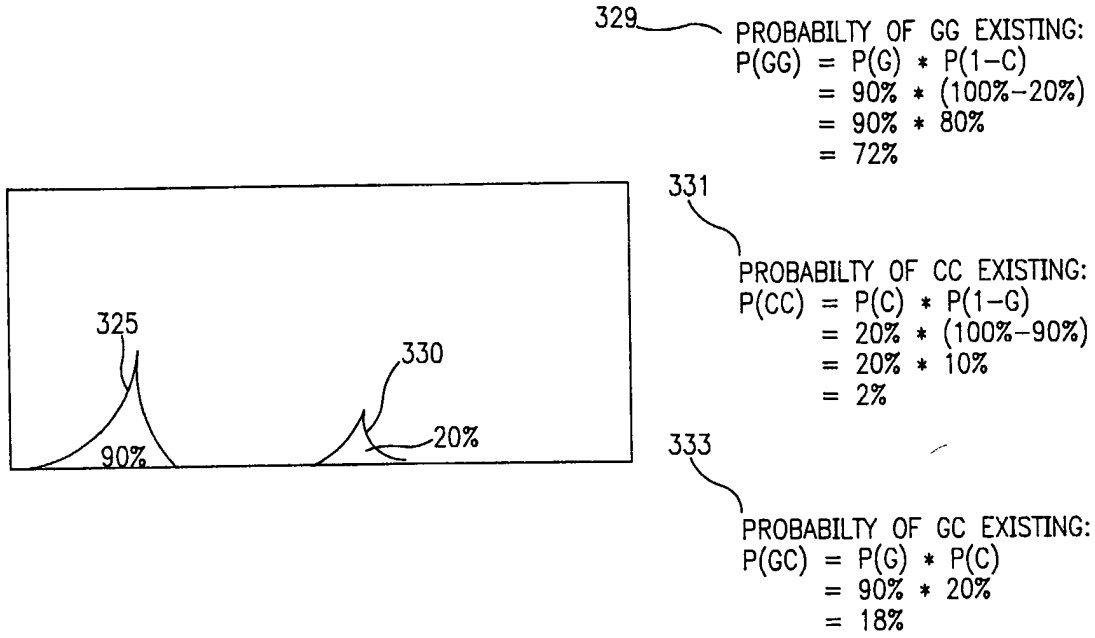

329
PROBABILTY OF GG EXISTING:
P(GG) = P(G) * P(1-C)
= 90% * (100%-20%)
= 90% * 80%
= 72%
331
PROBABILTY OF CC EXISTING:
P(CC) = P(C) * P(1-G)
= 20% * (100%-90%)
= 20% * 10%
= 2%
333
PROBABILTY OF GC EXISTING:
P(GC) = P(G) * P(C)
= 90% * 20%
= 18%
325
330
90%
20%

FIG. 54

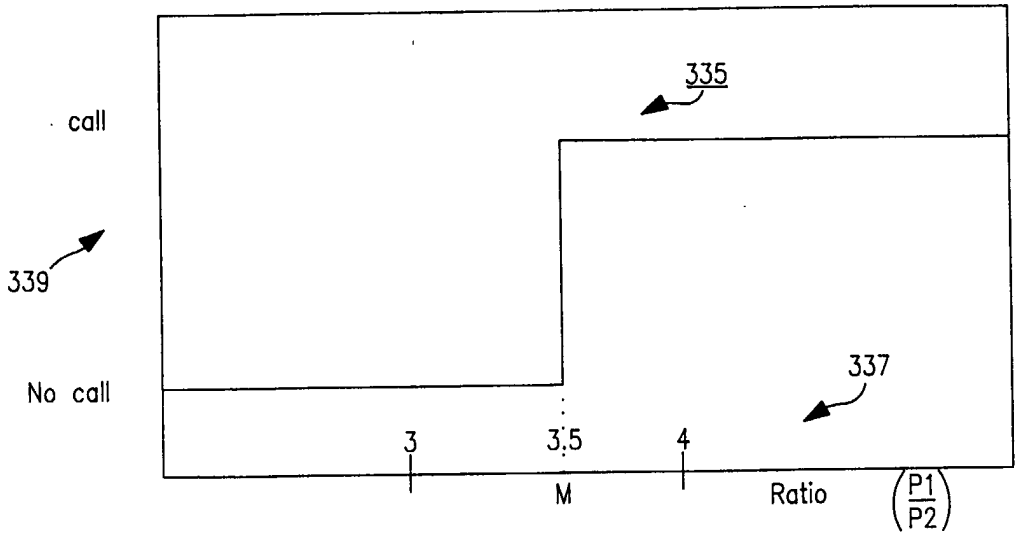

335
call
339
No call
337
3
3.5
4
M
Ratio
P1
P2

FIG. 55

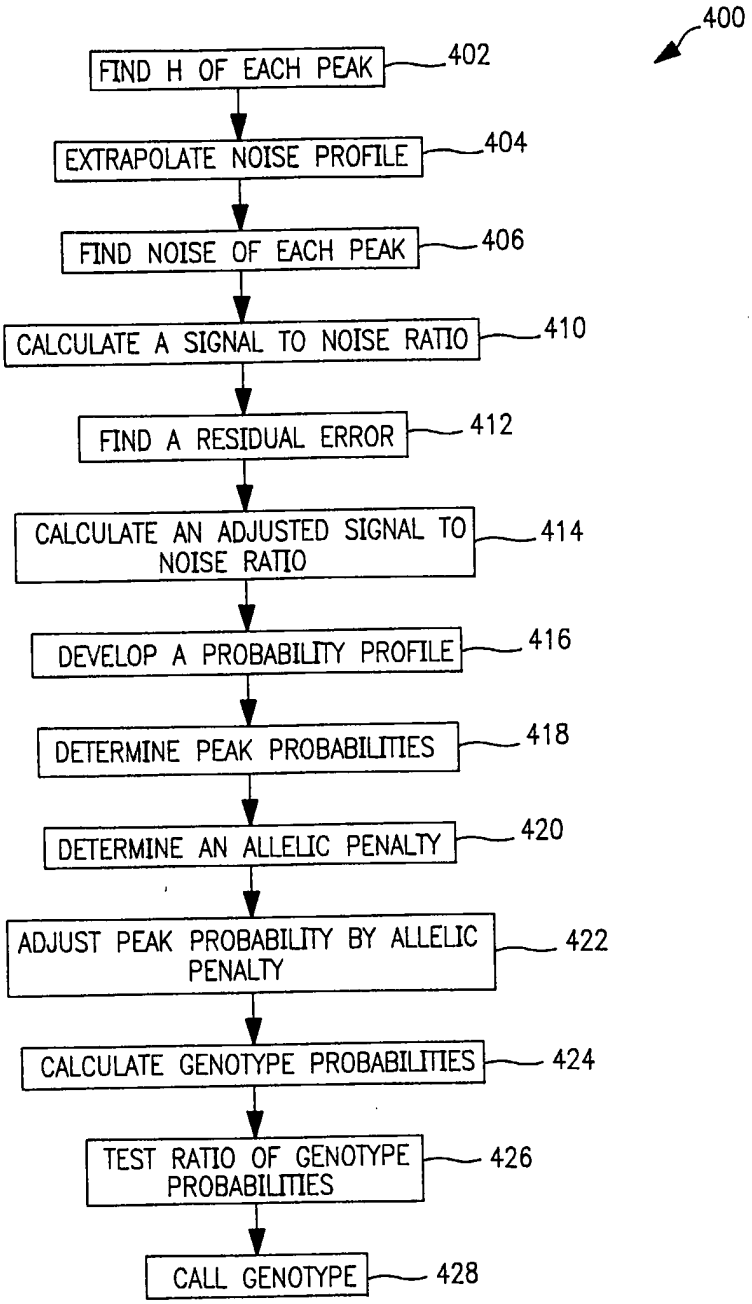

400
FIND H OF EACH PEAK
402
EXTRAPOLATE NOISE PROFILE
404
FIND NOISE OF EACH PEAK
406
CALCULATE A SIGNAL TO NOISE RATIO
410
FIND A RESIDUAL ERROR
412
CALCULATE AN ADJUSTED SIGNAL TO NOISE RATIO
414
DEVELOP A PROBABILITY PROFILE
416
DETERMINE PEAK PROBABILITIES
418
DETERMINE AN ALLELIC PENALTY
420
ADJUST PEAK PROBABILITY BY ALLELIC PENALTY
422
CALCULATE GENOTYPE PROBABILITIES
424
TEST RATIO OF GENOTYPE PROBABILITIES
426
CALL GENOTYPE
428

FIG. 56

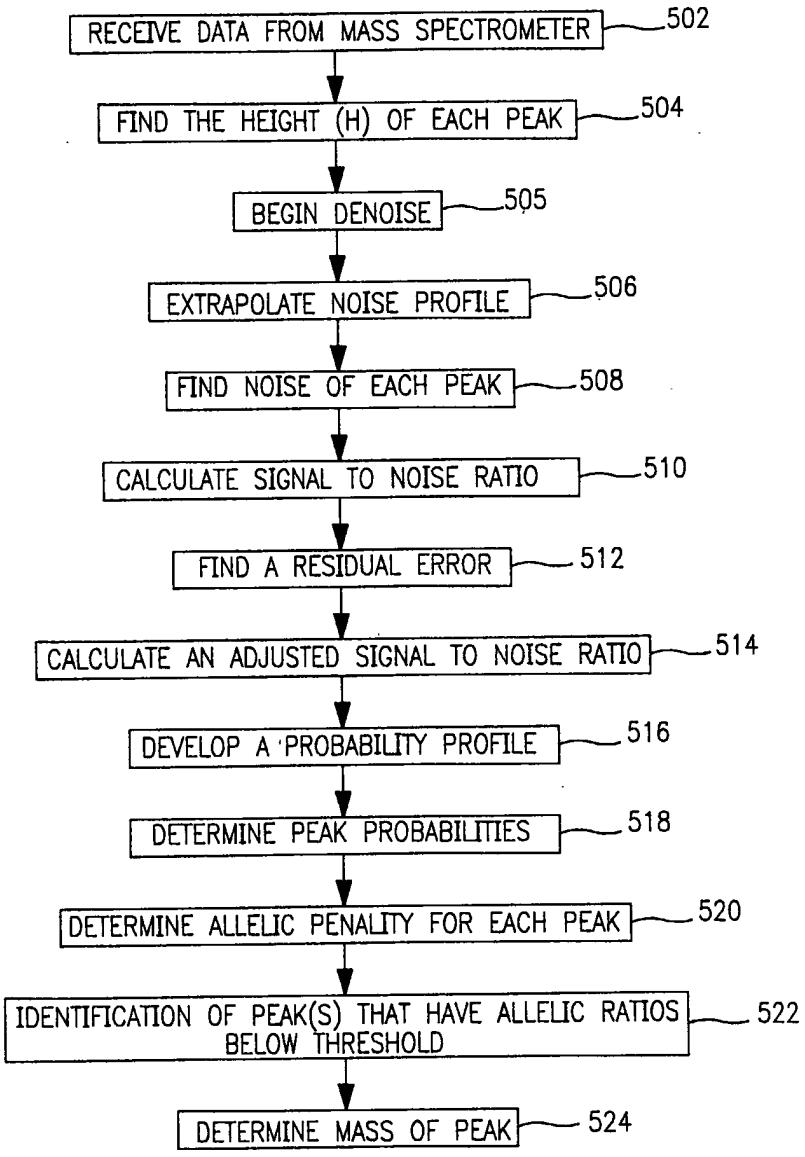

RECEIVE DATA FROM MASS SPECTROMETER
502
FIND THE HEIGHT (H) OF EACH PEAK
504
BEGIN DENOISE
505
EXTRAPOLATE NOISE PROFILE
506
FIND NOISE OF EACH PEAK
508
CALCULATE SIGNAL TO NOISE RATIO
510
FIND A RESIDUAL ERROR
512
CALCULATE AN ADJUSTED SIGNAL TO NOISE RATIO
514
DEVELOP A PROBABILITY PROFILE
516
DETERMINE PEAK PROBABILITIES
518
DETERMINE ALLELIC PENALITY FOR EACH PEAK
520
IDENTIFICATION OF PEAK(S) THAT HAVE ALLELIC RATIOS BELOW THRESHOLD
522
DETERMINE MASS OF PEAK
524

FIG. 57

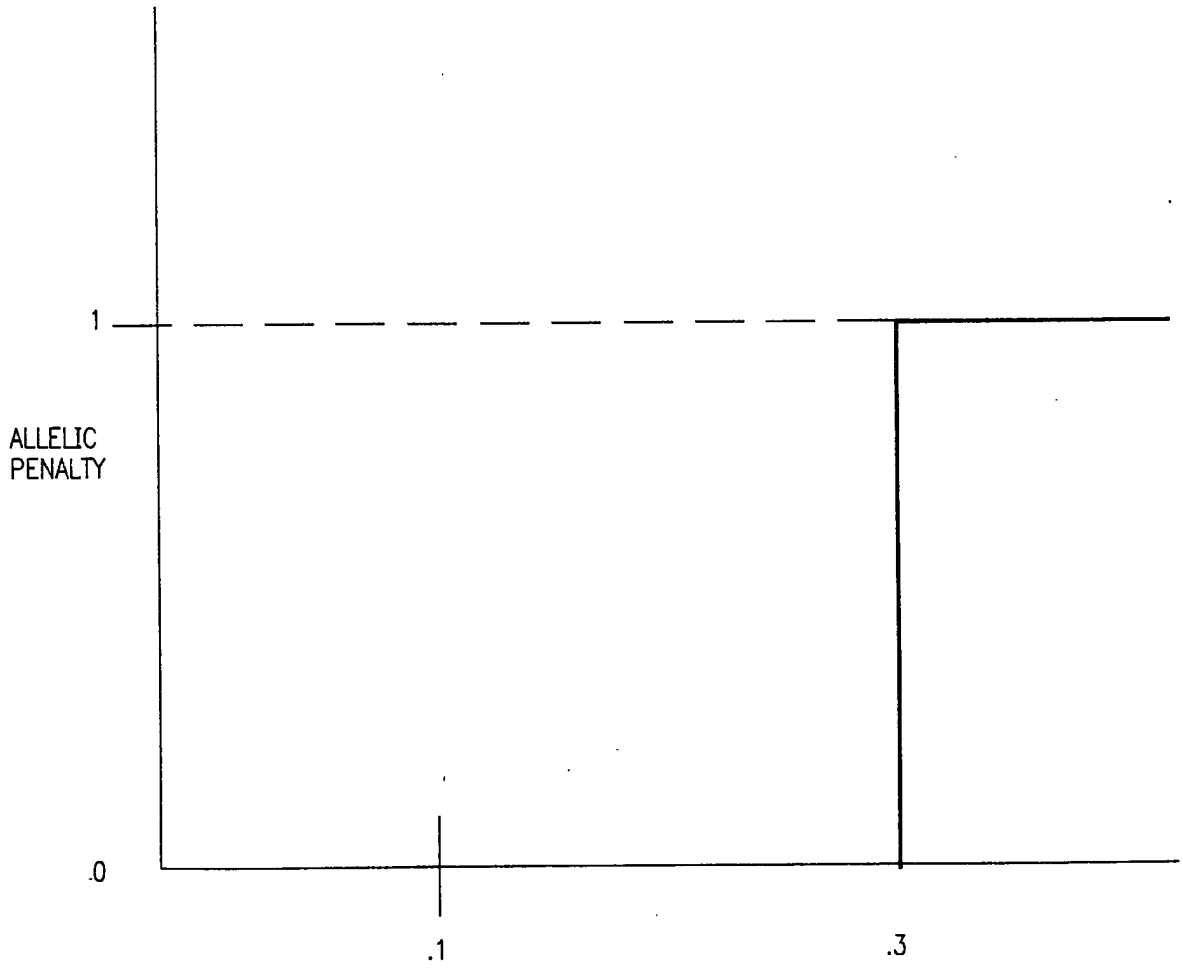


FIG. 58

SEQUENCE LISTING

<110> SEQUENOM
Braun *et al.*

<120> METHODS FOR GENERATING DATABASES AND DATABASES FOR IDENTIFYING POLYMORPHIC GENETIC MARKERS

<130> 24736-2033PC

<140> Not Yet Assigned
<141> 2000-10-13

<150> 60/217,658
<151> 2000-07-10

<150> 60/159,176
<151> 1999-10-13

<150> 60/217,251
<151> 2000-07-10

<150> 09/663,968
<151> 2000-09-19

<160> 118

<170> FastSEQ for Windows Version 4.0

<210> 1
<211> 361
<212> DNA
<213> Homo Sapien

<400> 1
ctgaggacct ggtcctctga ctgctctttt cacccatcta cagtcccccc tgccgtccca 60
agcaatggat gatttgatgc tgtccccgga cgatattgaa caatggttca ctgaagaccc 120
aggtccagat gaagctccca gaatgccaga ggctgctccc cgcgtggccc ctgcaccagc 180
agctcctaca ccggcggccc ctgcaccagc cccctcctgg cccctgtcat cttctgtccc 240
ttcccagaaa acctaccagg gcagctacgg tttccgtctg ggcttcttgc attctgggac 300
agccaagtct gtgacttgca cggtcagttg ccctgagggg ctggcttcca tgagacttca 360
a 361

<210> 2
<211> 44
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide Primer

<400> 2
cccagtcacg acgttgtaaa acgctgagga cctggtcctc tgac 44

<210> 3
<211> 42
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide Primer

<400> 3
agcggataac aatttcacac aggttgaagt ctcatggaag cc 42

<210> 4
<211> 17
<212> DNA

<213> Artificial Sequence

<220>
<223> Probe

<400> 4
gccagaggct gctcccc 17

<210> 5
<211> 17
<212> DNA
<213> Artificial Sequence

<220>
<223> Probe

<400> 5
gccagaggct gctcccc 17

<210> 6
<211> 19
<212> DNA
<213> Artificial Sequence

<220>
<223> Probe

<400> 6
gccagaggct gctccccgc 19

<210> 7
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Probe

<400> 7
gccagaggct gctccccc 18

<210> 8
<211> 161
<212> DNA
<213> Homo Sapien

<400> 8
gtccgtcaga acccatgcgg cagcaaggcc tgccgccgcc tcttcggccc agtggacagc 60
gagcagctga gccgcgactg tgatgcgcta atggcgggct gcatccagga ggcccgtgag 120
cgatggaact tcgactttgt caccgagaca ccactggagg g 161

<210> 9
<211> 43
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide Primer

<400> 9

cccagtcacg acgttgtaaa acggtccgtc agaacccatg cgg 43

<210> 10
<211> 44
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide Primer

<400> 10
agcggataac aatttcacac aggctccagt ggtgtctcgg tgac 44

<210> 11
<211> 15
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide Primer

<400> 11
cagcgagcag ctgag 15

<210> 12
<211> 15
<212> DNA
<213> Artificial Sequence

<220>
<223> Probe

<400> 12
cagcgagcag ctgag 15

<210> 13
<211> 16
<212> DNA
<213> Artificial Sequence

<220>
<223> Probe

<400> 13
cagcgagcag ctgagc 16

<210> 14
<211> 17
<212> DNA
<213> Artificial Sequence

<220>
<223> Probe

<400> 14
cagcgagcag ctgagac 17

<210> 15
<211> 205
<212> DNA

<213> Homo Sapien

<400> 15
gcgctccatt catctcttca tcgactctct gttgaatgaa gaaaatccaa gtaaggccta 60
caggtgcagt tccaaggaag cctttgagaa agggctctgc ttgagttgta gaaagaaccg 120
ctgcaacaat ctgggctatg agatcaataa agtcagagcc aaaagaagca gcaaaatgta 180
cctgaagact cgttctcaga tgccc 205

<210> 16
<211> 42
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide Primers

<400> 16
cccagtcacg acgttgtaaa acggcgctcc attcatctct tc 42

<210> 17
<211> 42
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide Primer

<400> 17
agcggataac aatttcacac aggggcatc tgagaacgag tc 42

<210> 18
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide Primer

<400> 18
caatctgggc tatgagatca 20

<210> 19
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Probe

<400> 19
caatctgggc tatgagatca 20

<210> 20
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
<223> Probe

<400> 20
caatctgggc tatgagatca a 21

<210> 21
<211> 22
<212> DNA
<213> Artificial Sequence

<220>
<223> Probe

<400> 21
caatctgggc tatgagatca gt 20

<210> 22
<211> 60
<212> DNA
<213> Homo Sapien

<220>
<223> Probe

<400> 22
gtgccggcta ctcggatggc agcaaggact cctgcaaggg ggacagtgga ggcccacatg 60

<210> 23
<211> 60
<212> DNA
<213> Homo sapien

<400> 23
ccacccacta ccggggcacg tggtacctga cgggcatcgt cagctggggc cagggctgcg 60

<210> 24
<211> 42
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide primer

<400> 24
cccagtcacg acgttgtaaa acgatggcag caaggactcc tg 42

<210> 25
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide primer

<400> 25
cacatgccac ccactacc 18

<210> 26
<211> 43
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide primer

<400> 26
agcggataac aatttcacac aggtgacgat gcccgtcagg tac 43

<210> 27
<211> 15
<212> DNA
<213> Artificial Sequence

<220>
<223> Probe

<400> 27
atgccaccca ctacc 15

<210> 28
<211> 19
<212> DNA
<213> Artificial Sequence

<220>
<223> Probe

<400> 28
cacatgccac ccactaccg 19

<210> 29
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Probe

<400> 29
cacatgccac ccactaccag 20

<210> 30
<211> 23
<212> DNA
<213> Artificial Sequence

<220>
<223> Probe

<400> 30
agcggataac aatttcacac agg 23

<210> 31
<211> 2363
<212> DNA
<213> Homo Sapien

<220>
<221> CDS
<222> (138)...(2126)
<223> AKAP-10

<300>
<308> GenBank AF037439
<309> 1997-12-21

<400> 31

```
gcggcttgtt gataatatgg cggctggagc tgcctgggca tcccgaggag gcggtggggc     60
ccactcccgg aagaagggtc ccttttcgcg ctagtgcagc ggcccctctg gacccggaag    120
tccgggccgg ttgctga atg agg gga gcc ggg ccc tcc ccg cgc cag tcc        170
                    Met Arg Gly Ala Gly Pro Ser Pro Arg Gln Ser
                     1               5                  10

ccc cgc acc ctc cgt ccc gac ccg ggc ccc gcc atg tcc ttc ttc cgg      218
Pro Arg Thr Leu Arg Pro Asp Pro Gly Pro Ala Met Ser Phe Phe Arg
             15                  20                  25

cgg aaa gtg aaa ggc aaa gaa caa gag aag acc tca gat gtg aag tcc      266
Arg Lys Val Lys Gly Lys Glu Gln Glu Lys Thr Ser Asp Val Lys Ser
         30                  35                  40

att aaa gct tca ata tcc gta cat tcc cca caa aaa agc act aaa aat      314
Ile Lys Ala Ser Ile Ser Val His Ser Pro Gln Lys Ser Thr Lys Asn
     45                  50                  55

cat gcc ttg ctg gag gct gca gga cca agt cat gtt gca atc aat gcc      362
His Ala Leu Leu Glu Ala Ala Gly Pro Ser His Val Ala Ile Asn Ala
 60                  65                  70                  75

att tct gcc aac atg gac tcc ttt tca agt agc agg aca gcc aca ctt      410
Ile Ser Ala Asn Met Asp Ser Phe Ser Ser Ser Arg Thr Ala Thr Leu
                 80                  85                  90

aag aag cag cca agc cac atg gag gct gct cat ttt ggt gac ctg ggc      458
Lys Lys Gln Pro Ser His Met Glu Ala Ala His Phe Gly Asp Leu Gly
             95                 100                 105

aga tct tgt ctg gac tac cag act caa gag acc aaa tca agc ctt tct      506
Arg Ser Cys Leu Asp Tyr Gln Thr Gln Glu Thr Lys Ser Ser Leu Ser
        110                 115                 120

aag acc ctt gaa caa gtc ttg cac gac act att gtc ctc cct tac ttc      554
Lys Thr Leu Glu Gln Val Leu His Asp Thr Ile Val Leu Pro Tyr Phe
    125                 130                 135

att caa ttc atg gaa ctt cgg cga atg gag cat ttg gtg aaa ttt tgg      602
Ile Gln Phe Met Glu Leu Arg Arg Met Glu His Leu Val Lys Phe Trp
140                 145                 150                 155

tta gag gct gaa agt ttt cat tca aca act tgg tcg cga ata aga gca      650
Leu Glu Ala Glu Ser Phe His Ser Thr Thr Trp Ser Arg Ile Arg Ala
                160                 165                 170

cac agt cta aac aca atg aag cag agc tca ctg gct gag cct gtc tct      698
His Ser Leu Asn Thr Met Lys Gln Ser Ser Leu Ala Glu Pro Val Ser
            175                 180                 185

cca tct aaa aag cat gaa act aca gcg tct ttt tta act gat tct ctt      746
Pro Ser Lys Lys His Glu Thr Thr Ala Ser Phe Leu Thr Asp Ser Leu
        190                 195                 200

gat aag aga ttg gag gat tct ggc tca gca cag ttg ttt atg act cat      794
```

```
Asp Lys Arg Leu Glu Asp Ser Gly Ser Ala Gln Leu Phe Met Thr His
    205                 210                 215

tca gaa gga att gac ctg aat aat aga act aac agc act cag aat cac      842
Ser Glu Gly Ile Asp Leu Asn Asn Arg Thr Asn Ser Thr Gln Asn His
220                 225                 230                 235

ttg ctg ctt tcc cag gaa tgt gac agt gcc cat tct ctc cgt ctt gaa      890
Leu Leu Leu Ser Gln Glu Cys Asp Ser Ala His Ser Leu Arg Leu Glu
                240                 245                 250

atg gcc aga gca gga act cac caa gtt tcc atg gaa acc caa gaa tct      938
Met Ala Arg Ala Gly Thr His Gln Val Ser Met Glu Thr Gln Glu Ser
            255                 260                 265

tcc tct aca ctt aca gta gcc agt aga aat agt ccc gct tct cca cta      986
Ser Ser Thr Leu Thr Val Ala Ser Arg Asn Ser Pro Ala Ser Pro Leu
        270                 275                 280

aaa gaa ttg tca gga aaa cta atg aaa agt ata gaa caa gat gca gtg     1034
Lys Glu Leu Ser Gly Lys Leu Met Lys Ser Ile Glu Gln Asp Ala Val
    285                 290                 295

aat act ttt acc aaa tat ata tct cca gat gct gct aaa cca ata cca     1082
Asn Thr Phe Thr Lys Tyr Ile Ser Pro Asp Ala Ala Lys Pro Ile Pro
300                 305                 310                 315

att aca gaa gca atg aga aat gac atc ata gca agg att tgt gga gaa     1130
Ile Thr Glu Ala Met Arg Asn Asp Ile Ile Ala Arg Ile Cys Gly Glu
                320                 325                 330

gat gga cag gtg gat ccc aac tgt ttc gtt ttg gca cag tcc ata gtc     1178
Asp Gly Gln Val Asp Pro Asn Cys Phe Val Leu Ala Gln Ser Ile Val
            335                 340                 345

ttt agt gca atg gag caa gag cac ttt agt gag ttt ctg cga agt cac     1226
Phe Ser Ala Met Glu Gln Glu His Phe Ser Glu Phe Leu Arg Ser His
        350                 355                 360

cat ttc tgt aaa tac cag att gaa gtg ctg acc agt gga act gtt tac     1274
His Phe Cys Lys Tyr Gln Ile Glu Val Leu Thr Ser Gly Thr Val Tyr
    365                 370                 375

ctg gct gac att ctc ttc tgt gag tca gcc ctc ttt tat ttc tct gag     1322
Leu Ala Asp Ile Leu Phe Cys Glu Ser Ala Leu Phe Tyr Phe Ser Glu
380                 385                 390                 395

tac atg gaa aaa gag gat gca gtg aat atc tta caa ttc tgg ttg gca     1370
Tyr Met Glu Lys Glu Asp Ala Val Asn Ile Leu Gln Phe Trp Leu Ala
                400                 405                 410

gca gat aac ttc cag tct cag ctt gct gcc aaa aag ggg caa tat gat     1418
Ala Asp Asn Phe Gln Ser Gln Leu Ala Ala Lys Lys Gly Gln Tyr Asp
            415                 420                 425

gga cag gag gca cag aat gat gcc atg att tta tat gac aag tac ttc     1466
Gly Gln Glu Ala Gln Asn Asp Ala Met Ile Leu Tyr Asp Lys Tyr Phe
        430                 435                 440

tcc ctc caa gcc aca cat cct ctt gga ttt gat gat gtt gta cga tta     1514
```

```
Ser Leu Gln Ala Thr His Pro Leu Gly Phe Asp Asp Val Val Arg Leu
    445                 450                 455

gaa att gaa tcc aat atc tgc agg gaa ggt ggg cca ctc ccc aac tgt     1562
Glu Ile Glu Ser Asn Ile Cys Arg Glu Gly Gly Pro Leu Pro Asn Cys
460                 465                 470                 475

ttc aca act cca tta cgt cag gcc tgg aca acc atg gag aag gtc ttt     1610
Phe Thr Thr Pro Leu Arg Gln Ala Trp Thr Thr Met Glu Lys Val Phe
                480                 485                 490

ttg cct ggc ttt ctg tcc agc aat ctt tat tat aaa tat ttg aat gat     1658
Leu Pro Gly Phe Leu Ser Ser Asn Leu Tyr Tyr Lys Tyr Leu Asn Asp
            495                 500                 505

ctc atc cat tcg gtt cga gga gat gaa ttt ctg ggc ggg aac gtg tcg     1706
Leu Ile His Ser Val Arg Gly Asp Glu Phe Leu Gly Gly Asn Val Ser
        510                 515                 520

ccg act gct cct ggc tct gtt ggc cct cct gat gag tct cac cca ggg     1754
Pro Thr Ala Pro Gly Ser Val Gly Pro Pro Asp Glu Ser His Pro Gly
    525                 530                 535

agt tct gac agc tct gcg tct cag tcc agt gtg aaa aaa gcc agt att     1802
Ser Ser Asp Ser Ser Ala Ser Gln Ser Ser Val Lys Lys Ala Ser Ile
540                 545                 550                 555

aaa ata ctg aaa aat ttt gat gaa gcg ata att gtg gat gcg gca agt     1850
Lys Ile Leu Lys Asn Phe Asp Glu Ala Ile Ile Val Asp Ala Ala Ser
                560                 565                 570

ctg gat cca gaa tct tta tat caa cgg aca tat gcc ggg aag atg aca     1898
Leu Asp Pro Glu Ser Leu Tyr Gln Arg Thr Tyr Ala Gly Lys Met Thr
            575                 580                 585

ttt gga aga gtg agt gac ttg ggg caa ttc atc cgg gaa tct gag cct     1946
Phe Gly Arg Val Ser Asp Leu Gly Gln Phe Ile Arg Glu Ser Glu Pro
        590                 595                 600

gaa cct gat gta agg aaa tca aaa gga tcc atg ttc tca caa gct atg     1994
Glu Pro Asp Val Arg Lys Ser Lys Gly Ser Met Phe Ser Gln Ala Met
    605                 610                 615

aag aaa tgg gtg caa gga aat act gat gag gcc cag gaa gag cta gct     2042
Lys Lys Trp Val Gln Gly Asn Thr Asp Glu Ala Gln Glu Glu Leu Ala
620                 625                 630                 635

tgg aag att gct aaa atg ata gtc agt gac att atg cag cag gct cag     2090
Trp Lys Ile Ala Lys Met Ile Val Ser Asp Ile Met Gln Gln Ala Gln
                640                 645                 650

tat gat caa ccg tta gag aaa tct aca aag tta tga ctcaaaactt          2136
Tyr Asp Gln Pro Leu Glu Lys Ser Thr Lys Leu  *
            655                 660

gagataaagg aaatctgctt gtgaaaaata agagaacttt tttcccttgg ttggattctt   2196
caacacagcc aatgaaaaca gcactatatt tctgatctgt cactgttgtt tccagggaga   2256
gaatggggag acaatcctag gacttccacc ctaatgcagt tacctgtagg gcataattgg   2316
atggcacatg atgtttcaca cagtgaggag tctttaaagg ttaccaa                 2363
```

<210> 32
<211> 662
<212> PRT
<213> Homo Sapien

<400> 32
Met Arg Gly Ala Gly Pro Ser Pro Arg Gln Ser Pro Arg Thr Leu Arg
1 5 10 15
Pro Asp Pro Gly Pro Ala Met Ser Phe Phe Arg Arg Lys Val Lys Gly
20 25 30
Lys Glu Gln Glu Lys Thr Ser Asp Val Lys Ser Ile Lys Ala Ser Ile
35 40 45
Ser Val His Ser Pro Gln Lys Ser Thr Lys Asn His Ala Leu Leu Glu
50 55 60
Ala Ala Gly Pro Ser His Val Ala Ile Asn Ala Ile Ser Ala Asn Met
65 70 75 80
Asp Ser Phe Ser Ser Ser Arg Thr Ala Thr Leu Lys Lys Gln Pro Ser
85 90 95
His Met Glu Ala Ala His Phe Gly Asp Leu Gly Arg Ser Cys Leu Asp
100 105 110
Tyr Gln Thr Gln Glu Thr Lys Ser Ser Leu Ser Lys Thr Leu Glu Gln
115 120 125
Val Leu His Asp Thr Ile Val Leu Pro Tyr Phe Ile Gln Phe Met Glu
130 135 140
Leu Arg Arg Met Glu His Leu Val Lys Phe Trp Leu Glu Ala Glu Ser
145 150 155 160
Phe His Ser Thr Thr Trp Ser Arg Ile Arg Ala His Ser Leu Asn Thr
165 170 175
Met Lys Gln Ser Ser Leu Ala Glu Pro Val Ser Pro Ser Lys Lys His
180 185 190
Glu Thr Thr Ala Ser Phe Leu Thr Asp Ser Leu Asp Lys Arg Leu Glu
195 200 205
Asp Ser Gly Ser Ala Gln Leu Phe Met Thr His Ser Glu Gly Ile Asp
210 215 220
Leu Asn Asn Arg Thr Asn Ser Thr Gln Asn His Leu Leu Leu Ser Gln
225 230 235 240
Glu Cys Asp Ser Ala His Ser Leu Arg Leu Glu Met Ala Arg Ala Gly
245 250 255
Thr His Gln Val Ser Met Glu Thr Gln Glu Ser Ser Ser Thr Leu Thr
260 265 270
Val Ala Ser Arg Asn Ser Pro Ala Ser Pro Leu Lys Glu Leu Ser Gly
275 280 285
Lys Leu Met Lys Ser Ile Glu Gln Asp Ala Val Asn Thr Phe Thr Lys
290 295 300
Tyr Ile Ser Pro Asp Ala Ala Lys Pro Ile Pro Ile Thr Glu Ala Met
305 310 315 320
Arg Asn Asp Ile Ile Ala Arg Ile Cys Gly Glu Asp Gly Gln Val Asp
325 330 335
Pro Asn Cys Phe Val Leu Ala Gln Ser Ile Val Phe Ser Ala Met Glu
340 345 350
Gln Glu His Phe Ser Glu Phe Leu Arg Ser His His Phe Cys Lys Tyr
355 360 365
Gln Ile Glu Val Leu Thr Ser Gly Thr Val Tyr Leu Ala Asp Ile Leu
370 375 380
Phe Cys Glu Ser Ala Leu Phe Tyr Phe Ser Glu Tyr Met Glu Lys Glu
385 390 395 400
Asp Ala Val Asn Ile Leu Gln Phe Trp Leu Ala Ala Asp Asn Phe Gln
405 410 415
Ser Gln Leu Ala Ala Lys Lys Gly Gln Tyr Asp Gly Gln Glu Ala Gln
420 425 430

```
Asn Asp Ala Met Ile Leu Tyr Asp Lys Tyr Phe Ser Leu Gln Ala Thr
        435                 440                 445
His Pro Leu Gly Phe Asp Asp Val Val Arg Leu Glu Ile Glu Ser Asn
    450                 455                 460
Ile Cys Arg Glu Gly Gly Pro Leu Pro Asn Cys Phe Thr Thr Pro Leu
465                 470                 475                 480
Arg Gln Ala Trp Thr Thr Met Glu Lys Val Phe Leu Pro Gly Phe Leu
                485                 490                 495
Ser Ser Asn Leu Tyr Tyr Lys Tyr Leu Asn Asp Leu Ile His Ser Val
            500                 505                 510
Arg Gly Asp Glu Phe Leu Gly Gly Asn Val Ser Pro Thr Ala Pro Gly
        515                 520                 525
Ser Val Gly Pro Pro Asp Glu Ser His Pro Gly Ser Ser Asp Ser Ser
    530                 535                 540
Ala Ser Gln Ser Ser Val Lys Lys Ala Ser Ile Lys Ile Leu Lys Asn
545                 550                 555                 560
Phe Asp Glu Ala Ile Ile Val Asp Ala Ala Ser Leu Asp Pro Glu Ser
                565                 570                 575
Leu Tyr Gln Arg Thr Tyr Ala Gly Lys Met Thr Phe Gly Arg Val Ser
            580                 585                 590
Asp Leu Gly Gln Phe Ile Arg Glu Ser Glu Pro Glu Pro Asp Val Arg
        595                 600                 605
Lys Ser Lys Gly Ser Met Phe Ser Gln Ala Met Lys Lys Trp Val Gln
    610                 615                 620
Gly Asn Thr Asp Glu Ala Gln Glu Glu Leu Ala Trp Lys Ile Ala Lys
625                 630                 635                 640
Met Ile Val Ser Asp Ile Met Gln Gln Ala Gln Tyr Asp Gln Pro Leu
                645                 650                 655
Glu Lys Ser Thr Lys Leu
            660
```

<210> 33
<211> 2363
<212> DNA
<213> Homo Sapien

<220>
<221> CDS
<222> (138)...(2126)
<223> AKAP-10-5

<221> allele
<222> 2073
<223> Single Nucleotide Polymorphism: A to G

<400> 33

```
gcggcttgtt gataatatgg cggctggagc tgcctgggca tcccgaggag gcggtggggc      60
ccactcccgg aagaagggtc ccttttcgcg ctagtgcagc ggcccctctg gacccggaag     120
tccgggccgg ttgctga atg agg gga gcc ggg ccc tcc ccg cgc cag tcc         170
                  Met Arg Gly Ala Gly Pro Ser Pro Arg Gln Ser
                   1               5                   10

ccc cgc acc ctc cgt ccc gac ccg ggc ccc gcc atg tcc ttc ttc cgg       218
Pro Arg Thr Leu Arg Pro Asp Pro Gly Pro Ala Met Ser Phe Phe Arg
             15                  20                  25

cgg aaa gtg aaa ggc aaa gaa caa gag aag acc tca gat gtg aag tcc       266
Arg Lys Val Lys Gly Lys Glu Gln Glu Lys Thr Ser Asp Val Lys Ser
         30                  35                  40
```

```
att aaa gct tca ata tcc gta cat tcc cca caa aaa agc act aaa aat      314
Ile Lys Ala Ser Ile Ser Val His Ser Pro Gln Lys Ser Thr Lys Asn
     45                  50                  55

cat gcc ttg ctg gag gct gca gga cca agt cat gtt gca atc aat gcc      362
His Ala Leu Leu Glu Ala Ala Gly Pro Ser His Val Ala Ile Asn Ala
 60                  65                  70                  75

att tct gcc aac atg gac tcc ttt tca agt agc agg aca gcc aca ctt      410
Ile Ser Ala Asn Met Asp Ser Phe Ser Ser Ser Arg Thr Ala Thr Leu
                 80                  85                  90

aag aag cag cca agc cac atg gag gct gct cat ttt ggt gac ctg ggc      458
Lys Lys Gln Pro Ser His Met Glu Ala Ala His Phe Gly Asp Leu Gly
             95                 100                 105

aga tct tgt ctg gac tac cag act caa gag acc aaa tca agc ctt tct      506
Arg Ser Cys Leu Asp Tyr Gln Thr Gln Glu Thr Lys Ser Ser Leu Ser
        110                 115                 120

aag acc ctt gaa caa gtc ttg cac gac act att gtc ctc cct tac ttc      554
Lys Thr Leu Glu Gln Val Leu His Asp Thr Ile Val Leu Pro Tyr Phe
    125                 130                 135

att caa ttc atg gaa ctt cgg cga atg gag cat ttg gtg aaa ttt tgg      602
Ile Gln Phe Met Glu Leu Arg Arg Met Glu His Leu Val Lys Phe Trp
140                 145                 150                 155

tta gag gct gaa agt ttt cat tca aca act tgg tcg cga ata aga gca      650
Leu Glu Ala Glu Ser Phe His Ser Thr Thr Trp Ser Arg Ile Arg Ala
                160                 165                 170

cac agt cta aac aca atg aag cag agc tca ctg gct gag cct gtc tct      698
His Ser Leu Asn Thr Met Lys Gln Ser Ser Leu Ala Glu Pro Val Ser
            175                 180                 185

cca tct aaa aag cat gaa act aca gcg tct ttt tta act gat tct ctt      746
Pro Ser Lys Lys His Glu Thr Thr Ala Ser Phe Leu Thr Asp Ser Leu
        190                 195                 200

gat aag aga ttg gag gat tct ggc tca gca cag ttg ttt atg act cat      794
Asp Lys Arg Leu Glu Asp Ser Gly Ser Ala Gln Leu Phe Met Thr His
    205                 210                 215

tca gaa gga att gac ctg aat aat aga act aac agc act cag aat cac      842
Ser Glu Gly Ile Asp Leu Asn Asn Arg Thr Asn Ser Thr Gln Asn His
220                 225                 230                 235

ttg ctg ctt tcc cag gaa tgt gac agt gcc cat tct ctc cgt ctt gaa      890
Leu Leu Leu Ser Gln Glu Cys Asp Ser Ala His Ser Leu Arg Leu Glu
                240                 245                 250

atg gcc aga gca gga act cac caa gtt tcc atg gaa acc caa gaa tct      938
Met Ala Arg Ala Gly Thr His Gln Val Ser Met Glu Thr Gln Glu Ser
            255                 260                 265

tcc tct aca ctt aca gta gcc agt aga aat agt ccc gct tct cca cta      986
Ser Ser Thr Leu Thr Val Ala Ser Arg Asn Ser Pro Ala Ser Pro Leu
        270                 275                 280
```

```
aaa gaa ttg tca gga aaa cta atg aaa agt ata gaa caa gat gca gtg     1034
Lys Glu Leu Ser Gly Lys Leu Met Lys Ser Ile Glu Gln Asp Ala Val
    285                 290                 295

aat act ttt acc aaa tat ata tct cca gat gct gct aaa cca ata cca     1082
Asn Thr Phe Thr Lys Tyr Ile Ser Pro Asp Ala Ala Lys Pro Ile Pro
300                 305                 310                 315

att aca gaa gca atg aga aat gac atc ata gca agg att tgt gga gaa     1130
Ile Thr Glu Ala Met Arg Asn Asp Ile Ile Ala Arg Ile Cys Gly Glu
                320                 325                 330

gat gga cag gtg gat ccc aac tgt ttc gtt ttg gca cag tcc ata gtc     1178
Asp Gly Gln Val Asp Pro Asn Cys Phe Val Leu Ala Gln Ser Ile Val
            335                 340                 345

ttt agt gca atg gag caa gag cac ttt agt gag ttt ctg cga agt cac     1226
Phe Ser Ala Met Glu Gln Glu His Phe Ser Glu Phe Leu Arg Ser His
        350                 355                 360

cat ttc tgt aaa tac cag att gaa gtg ctg acc agt gga act gtt tac     1274
His Phe Cys Lys Tyr Gln Ile Glu Val Leu Thr Ser Gly Thr Val Tyr
    365                 370                 375

ctg gct gac att ctc ttc tgt gag tca gcc ctc ttt tat ttc tct gag     1322
Leu Ala Asp Ile Leu Phe Cys Glu Ser Ala Leu Phe Tyr Phe Ser Glu
380                 385                 390                 395

tac atg gaa aaa gag gat gca gtg aat atc tta caa ttc tgg ttg gca     1370
Tyr Met Glu Lys Glu Asp Ala Val Asn Ile Leu Gln Phe Trp Leu Ala
                400                 405                 410

gca gat aac ttc cag tct cag ctt gct gcc aaa aag ggg caa tat gat     1418
Ala Asp Asn Phe Gln Ser Gln Leu Ala Ala Lys Lys Gly Gln Tyr Asp
            415                 420                 425

gga cag gag gca cag aat gat gcc atg att tta tat gac aag tac ttc     1466
Gly Gln Glu Ala Gln Asn Asp Ala Met Ile Leu Tyr Asp Lys Tyr Phe
        430                 435                 440

tcc ctc caa gcc aca cat cct ctt gga ttt gat gat gtt gta cga tta     1514
Ser Leu Gln Ala Thr His Pro Leu Gly Phe Asp Asp Val Val Arg Leu
    445                 450                 455

gaa att gaa tcc aat atc tgc agg gaa ggt ggg cca ctc ccc aac tgt     1562
Glu Ile Glu Ser Asn Ile Cys Arg Glu Gly Gly Pro Leu Pro Asn Cys
460                 465                 470                 475

ttc aca act cca tta cgt cag gcc tgg aca acc atg gag aag gtc ttt     1610
Phe Thr Thr Pro Leu Arg Gln Ala Trp Thr Thr Met Glu Lys Val Phe
                480                 485                 490

ttg cct ggc ttt ctg tcc agc aat ctt tat tat aaa tat ttg aat gat     1658
Leu Pro Gly Phe Leu Ser Ser Asn Leu Tyr Tyr Lys Tyr Leu Asn Asp
            495                 500                 505

ctc atc cat tcg gtt cga gga gat gaa ttt ctg ggc ggg aac gtg tcg     1706
Leu Ile His Ser Val Arg Gly Asp Glu Phe Leu Gly Gly Asn Val Ser
        510                 515                 520
```

```
ccg act gct cct ggc tct gtt ggc cct cct gat gag tct cac cca ggg     1754
Pro Thr Ala Pro Gly Ser Val Gly Pro Pro Asp Glu Ser His Pro Gly
    525                 530                 535

agt tct gac agc tct gcg tct cag tcc agt gtg aaa aaa gcc agt att     1802
Ser Ser Asp Ser Ser Ala Ser Gln Ser Ser Val Lys Lys Ala Ser Ile
540                 545                 550                 555

aaa ata ctg aaa aat ttt gat gaa gcg ata att gtg gat gcg gca agt     1850
Lys Ile Leu Lys Asn Phe Asp Glu Ala Ile Ile Val Asp Ala Ala Ser
                560                 565                 570

ctg gat cca gaa tct tta tat caa cgg aca tat gcc ggg aag atg aca     1898
Leu Asp Pro Glu Ser Leu Tyr Gln Arg Thr Tyr Ala Gly Lys Met Thr
            575                 580                 585

ttt gga aga gtg agt gac ttg ggg caa ttc atc cgg gaa tct gag cct     1946
Phe Gly Arg Val Ser Asp Leu Gly Gln Phe Ile Arg Glu Ser Glu Pro
        590                 595                 600

gaa cct gat gta agg aaa tca aaa gga tcc atg ttc tca caa gct atg     1994
Glu Pro Asp Val Arg Lys Ser Lys Gly Ser Met Phe Ser Gln Ala Met
    605                 610                 615

aag aaa tgg gtg caa gga aat act gat gag gcc cag gaa gag cta gct     2042
Lys Lys Trp Val Gln Gly Asn Thr Asp Glu Ala Gln Glu Glu Leu Ala
620                 625                 630                 635

tgg aag att gct aaa atg ata gtc agt gac gtt atg cag cag gct cag     2090
Trp Lys Ile Ala Lys Met Ile Val Ser Asp Val Met Gln Gln Ala Gln
                640                 645                 650

tat gat caa ccg tta gag aaa tct aca aag tta tga ctcaaaactt          2136
Tyr Asp Gln Pro Leu Glu Lys Ser Thr Lys Leu  *
            655                 660

gagataaagg aaatctgctt gtgaaaaata agagaacttt tttcccttgg ttggattctt   2196
caacacagcc aatgaaaaca gcactatatt tctgatctgt cactgttgtt tccagggaga   2256
gaatggggag acaatcctag gacttccacc ctaatgcagt tacctgtagg gcataattgg   2316
atggcacatg atgtttcaca cagtgaggag tctttaaagg ttaccaa                 2363

<210> 34
<211> 662
<212> PRT
<213> Homo Sapien

<400> 34
Met Arg Gly Ala Gly Pro Ser Pro Arg Gln Ser Pro Arg Thr Leu Arg
 1               5                  10                  15
Pro Asp Pro Gly Pro Ala Met Ser Phe Phe Arg Arg Lys Val Lys Gly
            20                  25                  30
Lys Glu Gln Glu Lys Thr Ser Asp Val Lys Ser Ile Lys Ala Ser Ile
        35                  40                  45
Ser Val His Ser Pro Gln Lys Ser Thr Lys Asn His Ala Leu Leu Glu
    50                  55                  60
Ala Ala Gly Pro Ser His Val Ala Ile Asn Ala Ile Ser Ala Asn Met
65                  70                  75                  80
Asp Ser Phe Ser Ser Ser Arg Thr Ala Thr Leu Lys Lys Gln Pro Ser
                85                  90                  95
His Met Glu Ala Ala His Phe Gly Asp Leu Gly Arg Ser Cys Leu Asp
```

```
                100                 105                 110
Tyr Gln Thr Gln Glu Thr Lys Ser Ser Leu Ser Lys Thr Leu Glu Gln
        115                 120                 125
Val Leu His Asp Thr Ile Val Leu Pro Tyr Phe Ile Gln Phe Met Glu
    130                 135                 140
Leu Arg Arg Met Glu His Leu Val Lys Phe Trp Leu Glu Ala Glu Ser
145                 150                 155                 160
Phe His Ser Thr Thr Trp Ser Arg Ile Arg Ala His Ser Leu Asn Thr
                165                 170                 175
Met Lys Gln Ser Ser Leu Ala Glu Pro Val Ser Pro Ser Lys Lys His
            180                 185                 190
Glu Thr Thr Ala Ser Phe Leu Thr Asp Ser Leu Asp Lys Arg Leu Glu
        195                 200                 205
Asp Ser Gly Ser Ala Gln Leu Phe Met Thr His Ser Glu Gly Ile Asp
    210                 215                 220
Leu Asn Asn Arg Thr Asn Ser Thr Gln Asn His Leu Leu Leu Ser Gln
225                 230                 235                 240
Glu Cys Asp Ser Ala His Ser Leu Arg Leu Glu Met Ala Arg Ala Gly
                245                 250                 255
Thr His Gln Val Ser Met Glu Thr Gln Glu Ser Ser Ser Thr Leu Thr
            260                 265                 270
Val Ala Ser Arg Asn Ser Pro Ala Ser Pro Leu Lys Glu Leu Ser Gly
        275                 280                 285
Lys Leu Met Lys Ser Ile Glu Gln Asp Ala Val Asn Thr Phe Thr Lys
    290                 295                 300
Tyr Ile Ser Pro Asp Ala Ala Lys Pro Ile Pro Ile Thr Glu Ala Met
305                 310                 315                 320
Arg Asn Asp Ile Ile Ala Arg Ile Cys Gly Glu Asp Gly Gln Val Asp
                325                 330                 335
Pro Asn Cys Phe Val Leu Ala Gln Ser Ile Val Phe Ser Ala Met Glu
            340                 345                 350
Gln Glu His Phe Ser Glu Phe Leu Arg Ser His His Phe Cys Lys Tyr
        355                 360                 365
Gln Ile Glu Val Leu Thr Ser Gly Thr Val Tyr Leu Ala Asp Ile Leu
    370                 375                 380
Phe Cys Glu Ser Ala Leu Phe Tyr Phe Ser Glu Tyr Met Glu Lys Glu
385                 390                 395                 400
Asp Ala Val Asn Ile Leu Gln Phe Trp Leu Ala Ala Asp Asn Phe Gln
                405                 410                 415
Ser Gln Leu Ala Ala Lys Lys Gly Gln Tyr Asp Gly Gln Glu Ala Gln
            420                 425                 430
Asn Asp Ala Met Ile Leu Tyr Asp Lys Tyr Phe Ser Leu Gln Ala Thr
        435                 440                 445
His Pro Leu Gly Phe Asp Asp Val Val Arg Leu Glu Ile Glu Ser Asn
    450                 455                 460
Ile Cys Arg Glu Gly Gly Pro Leu Pro Asn Cys Phe Thr Thr Pro Leu
465                 470                 475                 480
Arg Gln Ala Trp Thr Thr Met Glu Lys Val Phe Leu Pro Gly Phe Leu
                485                 490                 495
Ser Ser Asn Leu Tyr Tyr Lys Tyr Leu Asn Asp Leu Ile His Ser Val
            500                 505                 510
Arg Gly Asp Glu Phe Leu Gly Gly Asn Val Ser Pro Thr Ala Pro Gly
        515                 520                 525
Ser Val Gly Pro Pro Asp Glu Ser His Pro Gly Ser Ser Asp Ser Ser
    530                 535                 540
Ala Ser Gln Ser Ser Val Lys Lys Ala Ser Ile Lys Ile Leu Lys Asn
545                 550                 555                 560
Phe Asp Glu Ala Ile Ile Val Asp Ala Ala Ser Leu Asp Pro Glu Ser
                565                 570                 575
Leu Tyr Gln Arg Thr Tyr Ala Gly Lys Met Thr Phe Gly Arg Val Ser
```

```
            580                 585                 590
Asp Leu Gly Gln Phe Ile Arg Glu Ser Glu Pro Glu Pro Asp Val Arg
        595                 600                 605
Lys Ser Lys Gly Ser Met Phe Ser Gln Ala Met Lys Lys Trp Val Gln
    610                 615                 620
Gly Asn Thr Asp Glu Ala Gln Glu Glu Leu Ala Trp Lys Ile Ala Lys
625                 630                 635                 640
Met Ile Val Ser Asp Val Met Gln Gln Ala Gln Tyr Asp Gln Pro Leu
                645                 650                 655
Glu Lys Ser Thr Lys Leu
            660
```

<210> 35
<211> 162025
<212> DNA
<213> Homo Sapien

<300>
<308> GenBank AC005730
<309> 1998-10-22

<400> 35

```
gaattcctat ttcaaaagaa acaaatgggc caagtatggt ggctcatacc tgtaatccca      60
gcactttggg aggccgaggt gagtgggtca cttgaggtca ggagttccag gccagtctgg     120
ccaacatggt gaaacactgt ctctactaaa aatacaaaaa ttagccgggc gtggtggcgg     180
gcacctgtaa tcccagctac tcaggaggct gaggcaggag aattgcttga acctgggaga     240
tggaggttgc agtgagccga gatcgcgcca ctgctctcca gcctgggtgg cagagtgaga     300
ctctgtctca aaaagaaaca aagaaataaa tgaaacaatt ttgttcacat atatttcaca     360
aatttgaaat gttaaaggta ttatggtcac tgatatcctg tttcattctt tatataatca     420
ttaagtttga aatgtatact tgcactacta acacagtagt taatcttagt cctacaagtt     480
actgctttta cacaatatat tttcgtaata tgtatgcact ggtgtttatg tacgtgttta     540
tgtttatatc tgttaaaatt agcagtttcc atctttttct attttgtacc atcacatcag     600
ttcagaagga ttgacagagc aaaatgattt gatgaagtat aaaagtcaca tggtgagtgg     660
cataaataca actctgaaca attaggaggc tcactattga ctggaactaa actgcaagcc     720
agaaagacac atatcctata tgtcaagaga tgtaccaccc aggcagttaa agaagggaag     780
tacacataga aagcacaatg gtgaataatt aaaaaattgg aatttatcag acactggatt     840
catttgctcc taaagtcaga gtcctctatt gtttttttgt ttttgtgggt ttctttttaa     900
attttttttat tttttgtaga gtcggagtct cactgtgtta cccgggctgg tctagaactc     960
ctggcctcaa acaaacctcc tgcctcagct tcccaaagca ttgggattac agacatgagc    1020
cactgagccc agcccagacg ctttagcatt tatgaagctt ctgaaatagt tgtagaaacc    1080
gcataagctt tccatgtcac tttcaaagtt tgatggtctc tttagtaaac caaccaagtt    1140
attcctcaag ggcaaaataa catttctcag tgcaaaactg atgcacttca ttaccaaaag    1200
gaaaagacca caactataga ggcgtcattg aaagctgcac tcttcagagg ccaaaaaaaa    1260
aggtacaaac acatactaat ggaacattct ttagaagagc cccaaagtta atgataaaca    1320
ttttcatcaa agagaaaaga gaacaaggtg ttagcaaatt cctctatcaa ataacactaa    1380
acatcaagga acatcaatgg catgccatgt ggaagaggaa gtgctagctc atgtacaaac    1440
cagtagataa tttcaacttg ctgccgaatg aaacctcttt gcaaggtatg aatcagcact    1500
tctcatgttt gttttgcttt gttttgtttt gtttttagag acaggccctt gctctgtcac    1560
acaggctgga gtgcagtggc acgatcagag ctcactgcaa cctgaaactc ctgggctcaa    1620
gggatcctcc tgccttagcc tcccaagtag ctgggactac aggcccacca tgcccagcta    1680
atttttaaa ttttctatag agatgggatc tcactagcac ctttcatgtt tgatgttcat    1740
atacaacgac caaggtacaa tgtggaaaag ggtctcaggg atctaaagtg aaggaggacc    1800
agaaagaaaa ggggttgcta catagagtag aagaagttgc acttcatgcc agtctacaac    1860
actgctgttt tcctcagagc agagttgatg atctaaatca ggggtcccca acccccagtt    1920
catagcctgt taggaaccgg gccacacagc aggaggtgag caataggcaa gcgagcatta    1980
ccacctgggc ttcacctccc gtcagatcag tgatgtcatt agattctcat aggaccatga    2040
accctattgt gaactgagca tgcaagggat gtaggttttc cgctctttat gagactctaa    2100
tgccggaaga tctgtcactg tcttccatca ccctgagatg ggaacatcta gttgcaggaa    2160
aacaacctca gggctcccat tgattctata ttacagtgag ttgtatcatt atttcattct    2220
atattacaat gtaataataa tagaaataaa ggcacaatag gccaggcgtg gtggctcaca    2280
```

cctgtaatcc cagcacttcg ggaggccaag gcaggcggat cacgaggtca ggagatcgag 2340
accatcctgg ctaaaacggt gaaaccccgt ctactaaaaa ttcaaaaaaa aattagccgg 2400
gtgtggtggt gggcacctgt agtcccagct actcgagagg ctgaggcagg agaatggtgt 2460
gaacctggga ggcagagctt gaggtaagcc gagatcacgc cactgcactc cagcctgggc 2520
gacagagcga tactctgtct caaaaaaaaa aaaaaaaaaa aaagaaataa agtgaacaat 2580
aaatgtaatg tggctgaatc attccaaaac aatcccccca ccccagttca cggaaaaatt 2640
ctcccacaaa accagtccct ggtgccaaaa aggttgggga ccgctaatct aaataatcta 2700
atcttcattc aatgctaaaa aatgaataaa ctttttttta aatacacggt ctcactttgt 2760
tgcccaggct ggagtacggt ggcatgatca cagctcactg tagcctcaat cacccaggcc 2820
ccagcgatcc tcccacctaa acttcctgag tagctgggac tacaggcacg caccaccatg 2880
cccagctaat ttttaaattt tttatagaga tgggggtctc accatgttgc ccagactggt 2940
ctcaaaccct gggctcaagt gatcctccct caaactcctg gactcaagtg atcctccttc 3000
cttggcctcc caaagtgctg ggattacaag catgagccac tgtacccagc tggataaaca 3060
ttttaagtcg cactacagtc atggacaatc aggcttttca acatgcagta tggacagtga 3120
gtcccagggt ctgcttttcc atactgaaat acatgtgata ctaaggagaa aggtgctcgc 3180
aaggatattt aaaatgaaga atatttaaaa tgaggaaaaa actgtttctt catgactttg 3240
ataaggctga taaagaccat ttctgtgatc tcaggtgatt cactcaagta gtatatttca 3300
gtaatcatta tctggaacag cctgaatctt aaccaaaata ccatgatttt ttaatgctgt 3360
tatgatacct tgatgatatg accaaactgc aatgtaggca gctaaatctc cacgagtttg 3420
acttccccga gagttgacag ttttcttcac aaattaaaga aatatatttt ttgatacatg 3480
attggcatat ttaaaaacta cactgaaatg ctgcaaaatg atataaagaa acattttcca 3540
gaatcaaatg caatcaaaga gtggattagg aatctactca ccattatcaa ctaaatagaa 3600
acacttggac tgggtgtggt ggctcacatc tgtaatctca gcactttggg aggccaaggc 3660
aggtggattg cttgaggcca ggagctcaag accagcctga gcaacatagc aaaactctgt 3720
ctctacaaaa aaaaaaaaaa attaaccagg catggtggca gatgcttgta atcccagcta 3780
ctctggaagc tgaagtagga ggactgcttg agcccaggag atcaagactg cagtgagccg 3840
tggtcatgct gcgccacagc ctgagtgaca gagagagacc ctgtctcaaa aacaaaaaca 3900
aacaaaaaac acttaacctt cctgtttttt gctgttgttg ttgttgtttg tttgttttga 3960
gatggagtct cactctgttg cccaggctgg agtgcagtgg cgtgatcttg gctcactgca 4020
agctctgcct cccgggttca cgccattctc ctgcctcagc ctcccgagta gctgggacta 4080
taggcgcccg ccaccacgcc cggctacttt tttgcatttt tagtagagat ggggtttcac 4140
cgtgttagcc aggatggtct tgatctcctg acctcgtgat ccacctgcct cggcctccca 4200
aagtgctggg attacaggca tgagccaccg cacccggcca acctttctgt tttttagttt 4260
gatatgcttg ttaactcagc agctgaaaga atgctgaaag tggccttcag taaaaaaatt 4320
tcactagaat ctctacatcc atatttaatc tgaatgcata tccagattga tcagttagag 4380
caaaaacact catcatcatt cctgatgacc tctaattctg gtttcggctt tctatttcaa 4440
tggaaacaga ataaggaaag aaatggaagg gctctggaaa tttgtcctgg gctatagata 4500
ctatcaaaga tcaccaacaa taagatctct cctataaata taaaacaagt ataattaatt 4560
ttttaattat ttttttctct tcagaggatt ttatttcaag ataaaacata acttctaccc 4620
atactattga ttccaaaggt tagaaaaagt gtttttcctc atcttatcct tcaaagaggt 4680
cacagcaatg caaacatcta taaaatgcct ctgcataatt gtcagaagct atagtccaga 4740
aatcattgaa aatgcttttc cattttaagc ttaggtgagg tgtcttagga aacctctatg 4800
acaacttact ctatttattg ggaggtaaac tcccagactc tcccagggtc tcctgtattg 4860
atctcatttt ttaggcttcc taatcccttg aagcacaatc gaaaaagccc tggatctctt 4920
ttctgcacat atcatcgcgg aattcattcg gcttccagca agctgacact ccatgataca 4980
agcggcctcg cccttctccg gacgccagtc cttgctgcgg ttagctagga tgaggggttt 5040
gctgggcttc agtgcaggct tctgcgggtt cccaagccgc accaggtggc ctcacaggct 5100
ggatgtcacc attgcacact gagctcctgg caggctgtac caatttttta attatttaat 5160
atttatttt aaaattatgg tgaatatttt ggtattctgc tctaaaatag gcccataaat 5220
gcacagcaga tatctcttgg aacccacagc tttccactgg aagaactaag tatttttctt 5280
ttaaagatgc tactaagtct ctgaaaagtc cagatcctct acctctttcc atcccaaact 5340
aagacttgga atttatgaga gatctagcta acagaaatcc cagacacatc attggttctt 5400
cccagagtgc agtcctccta aagaggctca gccctaagca ggcccctgca ccaggagggt 5460
gggtctgaga cccacatagc acttcccaag gtgcatgctc cagagaggca ctgaaacagc 5520
tgagcacaag cctgcaagcc tggagaactc tcacagtcag aacggagggg gcccagtggg 5580
actaacataa agagaaaagg gaacacagag aaatggatgg caccaacaac cagcaaagcc 5640
ttcatggcca atgaaagcat cagtgacggg gccagaaccc tcatccccaa agactcttca 5700
ctgcctttag tgaaaaacaa tggctagaga gtgaagttat gatcatgtat agagaggtaa 5760
agttacattt ttatattctg actctgctaa tgtgaaattc cctatctgct agactaaaag 5820
tttcagacac cctgttcaaa tatcccatta gttgctagag acttaaaatg aacagaacgc 5880

acattgtcag gatgactatt accaaaaaat caaaagacag caagtattgg tgaggatgta 5940
gagaaactgg aacttttgtg cactgtttat gagaatgtaa aatggagcag ctgctgtgga 6000
aaagagtatg caggttcctc aaagagtaaa accaagatgt ggaaacaact aaatgcccat 6060
cagtggatga aggggtagac aatatgtggt atatacatac catggagtac tattcagcct 6120
ctaaaaaaaa aaaaggaaat tctataacat gcaacagcat ggatgaatct tgaggacatt 6180
ttgctaatga aataaggcag tcatagaaag acaaatactg cacgactcca cttatatgag 6240
ataccaaaaa tagacaaatt catagaatca aagagtacaa tggaggttac ctggagctgc 6300
agggcgggaa acgaggagtt actaatcaac gaacataacg ttgcagttaa gtaagatgaa 6360
taagctctca agatcagctg tacaacactg tacctagagt caacaataat gtattgtaca 6420
cttaaaaatt tgttaagggt agattaacaa atgtagtaga tccacaaatg tggttaagtg 6480
ttcttaccac agtaaaataa aaaaagaata tcaagcccag gagttcgaga ctagcctggg 6540
taacatggtg aaaccctgtc tctacagaaa atacaaaaat tagccagctg tggaggtgca 6600
ctcctaggga ggctgaggtg ggaggcttgc ttgagcccag gaggtcaagg ctgcagtgag 6660
ccatgattgc accactgtac tccagcccag atgacagagc aagacaccac ccccccaaaa 6720
aaaagaaaaa gaatatcaaa cattttaaaa gatcagatac gcaagaacaa caacaaaaaa 6780
gagatgaaca gagcatcgac cctcatctag tgggattctt ggtctaactg aaaaacagac 6840
attgagagac aaacaatgac agtgatgtga tcacagcaat tacacaggta tcccctgggg 6900
actgcagaag aaaggaggaa tgcctaactt tcagaaaata gagaaagcgt caaacagttg 6960
gtgaaagcct tccaaaacta gagagaactg cacacaccaa atcacagaaa gaagaaaagc 7020
cgtgggagat tctgggaccc accggctatt tttgatggct gaacaccctg ctgcaggaga 7080
gacaggagct ggaaagcatg gtgggatgaa acctcaaaca gctttgcctg cattgcttaa 7140
gatgactggg cttgattaac tctagtcaat ggggacaatt caatcaaaga agaaagatgc 7200
tcaaattcac attttagaat gatttttttat ggcagtatgg ggaatagatt aaaagagagt 7260
gaagctggag gcaagaaact tgttaagagg caactgaaac agtctagatg ataaataata 7320
aactgacaga gtgactagaa aaatcagaac aggctgaatc aacagatacc tagatgaaaa 7380
taacaggact tgatcaccag ttgtatcttg gagaggaagg agttgtttcc ttgctttccc 7440
tacgactggg aatacggaag gtttgccgtg tgtattggtt atatactggt gtgtagccaa 7500
tcactgacaa ccatttagca gcttaaaaca caaaggctta tctcccagtt tctgtgggcc 7560
aggaatctaa gataggctta gctggctggt tctggctcag agtttctcaa gaggttgcaa 7620
tcaagatgtc agctggggtt gcatcatctg aaggctcaac tggggccgga gggtccactt 7680
ccaaggagtt cactcacctg cctgacaagg cagtgctggt tgttggcagg agatctcaat 7740
tcattgccaa gtgagcctct ctatagcatt gctggaacat cctccccatc tggcagttgg 7800
cttctctcag catgagtgat ctgagagaga gagcaaggag gaagccacag tgttcttcct 7860
actcctactc ctaacactat ggacctactc ctaacactct cacttctgcc ttattccatt 7920
agttagaaag ggaactaagc tccacctctt gaaataagaa gtgtcaaaga atttgtggat 7980
atatttaaaa atcatcacac tgtggaagtg gataggggggt tcaattaatg ctgaacttga 8040
aatgcctgag acattcaaat gtccaacagg caatgaacat acccatagat ggtcatgact 8100
ttagcaagaa tagaggaaga tcacagaatt aaggaggaat tgaaaggtaa aagaagtgga 8160
gtcagattcc ccctgaaaag tgagccatga aaggaacttt aactattgag ttagaggtca 8220
gagtaggaaa tttcggtgga attcttttttt aaagaaagga accatataag catgttttga 8280
ggtagaggga gaataaatca gtagacaggg agaggtaaaa aacataaatg ataggggata 8340
gttgacaaag gtcttggcag aatcccttac ccattgactt ggggccaaga gagggacact 8400
tctttgtttg agggataagg aaaataagaa agaatgggtg ctatttagtg tggtcctgtc 8460
tctagggcaa acgcataggt aacaaactgt gtgtgttagg aatatagatg tgacctcaca 8520
ttgagattct cacctcaaat ccatttttgtt gttacctgta ccttcctacc ttctcttttt 8580
gctacatgca gactgctgtt ttgtcttcct ggcctgttcc aggtttcagc attctggcat 8640
atctgctacc ctgttcccaa acctctctag agtccatgct ccttccttgg atagtgtttg 8700
attgggccac gtatctaaga agtgatgcct tcagttaggc ctgagaacct cctctatgga 8760
aatctccatc agtgaccctg acagacttgg tatcttggag atgtcactgc tcccagcctg 8820
tggtctagga gaatctcagc ctgggcctct agtagtatgg ataaggcgtt aaggtatctt 8880
tgaaccagag tctgtcatat tcctcaatgt gggacagata aaacagtggt agtgctggtg 8940
tttctgagct agaactctgg tttttggtct agattctttg atgtatgacc tttcagaggt 9000
attaaaattt gttctaatac aatgttcaat acaaatgtag ttccttttct gttaggacct 9060
caacaaaaca tgaccaactg tagatgaaca ttaaactatg acaattcatg gaaatgaata 9120
cagtaatacc tgcggttccc ccattttagc agtcactatg gtgacatttg gcacaaatgg 9180
ctatttaagg gtgcttttgt taaaacctac catcttacta ggcacatgat attgaaacta 9240
atgaaataat ggagaaactt cttaaaaact tttaatgaat aaagtgatga agtgataata 9300
ttttagctgc tatttataaa gtgactatta caggtcaaac attcttctag ggtttttttg 9360
ttgaagttgt cacatttaat ccttaataac ccactatgag tcaggtattc ttctctcccc 9420
tttggacagt tggggaaatg ggggtcagag aggttaggta atttgctcag ggccacacaa 9480

cctgcatgta gaaaatctga gatttgtaca ggaacgtatc aaactctgaa gtccatgctt 9540
ctattttccc atgctgcctt tctaataaaa ggtaactaat gctactggat gctgccccca 9600
aagtgagtca ctttcacccc accctacttg attttctcca taaaactaat cacatcctga 9660
caacttattt attgctgatc tcccccacta gattataaac tcaataaaag caagatcctt 9720
gtctgctgaa tatcagtacc taaaacgctg tctagcacag agcaagtaat taatatttgt 9780
tgaatgaaca aataaaggaa aaaaattcaa aggaagaaaa agccctaaaa cagatgttta 9840
cctaaacata cattttaaaa gaaagcatat aacaaattca ggacagaatt taaatttgat 9900
tttttaaaga aataaccaag tgctagctgg gcacagtggc tcacacctgt aatcctagca 9960
ctctgggagg ccgaggcagg cagatcactt gaggtcaaga gttcaagacc agcctggcca 10020
acatggtgaa acctgtctct actaaaaata cagaaattat ccaggcatgg tggcaggtcc 10080
ctgtaacccc agctactcag gaggctgagt caggagaatt gcttgaaccc aggaggcaga 10140
ggttgcagtg ggccaagatt gcaccactgc actccagcct gagtaacaaa gcaagactct 10200
gtctgaagga gaaggaaaga aagaaggaaa gaaggaaaga aggaaagaag gaaagaagga 10260
aagaaagaaa gaaagaaaga aagaaagaaa gaaagaaaga aagaaagaaa gaaagaaaga 10320
aagaaagaaa aagaaagaaa gaaagaaaga accaagtgct tatttgggac ctactatgct 10380
atgtttttcc atgcacgcta ttttcagtaa agcagttagc aaacttgcaa gatcataaca 10440
acaaatatat gcttctataa ctctaaaatt gtgctttaag aagttcctct ttaccagctc 10500
atgtatgcat tagttttcta agagttacta gtaacttttt ccctggagaa tatccacagc 10560
cagtttattt aaccaaagga ggatgcttac taacatgaag ttatcaaatg tgagcctaag 10620
ttgggccagt tcatgttaat atactccaga acaaaaacca tcctactgtc ctctgacaat 10680
tttacctgaa aattcatttt ccacattacc aaggagccag ggtaggagaa tatagaaaga 10740
ccacccaaga atccttactt ctttcagcaa aatcaattca aagtaggtaa ctaaacacat 10800
gccctaacaa tgaatagcag attgtgctca gaagaatgat ctacaacatc ttactgtgaa 10860
ggaactactg aaatattcca ataagacttc tctccaaaat gattttattg aatttgcatt 10920
ttaaaaaata ttttaagcct aaattttaaa aggtttgata ttggtacatg aatagacaaa 10980
cagacatgga ctagaccaag aattaggttc aaacatatac aggaatttaa tatacgataa 11040
atctagtatt ccaaaggaac caacaaatgg tgttcagaca gcaggatagg catcaggaaa 11100
aacacagttg ggcaccctac cttactccta acaccaggag taactgaagg agcaccaaat 11160
atttatttat tttaattata gttttaagtt ctagggtacg tgtgcacaac atgcaggttt 11220
attacatagg tatacatgtg ccatgttggt gaggagcacc aaatatttaa aagaaaaaaa 11280
ttggccaggg gcggtggctc acacctgtaa tcccagcact ttgggaggcc aaggtgggca 11340
gatcacctga ggtcgggagt tcgagaccag cctgagcaac atggagaaac cccatctcta 11400
ctaaaaatac aaaattagcc aggcatggtg gcacatgcct gtaatcccag ctacttggga 11460
ggctgaggca ggagaatagc tttaatctgg gaggcacagg ttgcggtgag ctgagatatt 11520
gcactccagc ctgggcaaca agagcaaaac ttcaactcaa aaaaattaat aaataaataa 11580
aaataaagaa agaaaagaaa aaaatgaaaa tagtataatt agcagaagaa aacaccgtag 11640
aatcctcgga ctcttaggat ggggaatgcc tataatataa aaaccctgaa gttataaaag 11700
agaaaatcac ctacatacaa accaaatctt tctacatgcc taaaacatag cacaaacaca 11760
gctaaataat catagctgaa tgaactggga aaacaaaact tgactcatat ccagacagag 11820
ttaattttcc tacacataaa gagtacctat ataaacccaa caaaaaaacc accactaacc 11880
caaaataaaa atgtgacagg taatgaacag gtagttcaca gagaatacaa atggctcttc 11940
ggcacataag atgctcagac tgacttttac ttatttattt tttgagagac agggtctcac 12000
gatgttgccc aggttaggct caaactcctg ggctcaaatg atagtaccag gactacaggt 12060
gtgccccacc gcacctggct cctcaaccac ctgtattaac aggaaatgca aaataaaact 12120
ttcaaatcta ttttacctat tagaatggca aaaatttgaa aaacttcaaa catcatcatg 12180
ttggtgagaa tgtgaggaga ctggcactct catttttttgc tgatagcata tatatactga 12240
tggcttctat ggaaagcaat ctggcagcgt ctatcaaatg tacaagtgca tatatccttt 12300
gacaaagcaa ttccactcta ggaatgtgtt ctatatggtt gtgcttcctg gggctgggaa 12360
ctgggagcta agggacaggg gcagaagata atcttctttt ccctccttcc ccgttaaaca 12420
tgttgaattt tatatactgt aatatattat ttttcacaaa agataatttt taagcgatat 12480
gtctgggaat ttttttttt cttttctgag acagggtctc actctgtcat ccaggctgga 12540
atgccatggt atgatctcag ctgactgcag cctcgacctc ctgggttcaa gcaatcctcc 12600
cacctcagcc tcctgagtag ctgggactac aggcacgtgc catcatgcta atttttgtat 12660
atacagggtc tcactatgtt gcccaggcta atgtcaaact cctaggctca agcaatccac 12720
ccacctcagg ctccaaagtg ctgggattac aggcgtgagc caccgcgcct ggccctggga 12780
attcttacaa aagaaaaaat atctactctc cccttctatt aaagtcaaaa cagagaagga 12840
aattcaacct ataatgaaag tagagaaggg cctcaaccct gagcaacaaa cacaaaggct 12900
atttctgaga caggaatttg ctgaacaaaa tcgagggaag atgacaagaa tcaagactca 12960
cttctcggct gggcgcagtg gctcacacct gtaatcccag cactttggga ggccgaggcg 13020
gacagatcac gaggtcagga gattgagacc atactggcta acacagtgaa acccagtctc 13080

tactaaaaat acaaaaaatt agccgggcgt ggtggcaggt gcctgtagtc ccagctactt 13140
gggaagctga ggcaggagaa tggcgtgaac ccaggaagcg gagcttgcag tgagccgaga 13200
tcacgccact gcactccagc ctgggtgaca gagcaagact ctgtctcaaa aaaaaaaaaa 13260
aagactcatt tctctagatc ttgagccgta ttcaaattta tctcagctta gtgagaggtt 13320
aaagcaagga atatccttcc ctgtgggccc tgctccttac tgaaggaagg taacggatga 13380
gtcaaggaca ccaatggaga aaagcactaa caccattatc tgatgaacat tacgtgaaga 13440
agggtaagaa gtgaagtgga attgctgaag aagtcagtga aagcggacat tcatttgggg 13500
aaatggaata taggaaatcc ataaaagtga ttaaaaagat gttagaggct gaggcggggg 13560
gaccacaggg tcaggagatc gagaccatcc tggctaacac ggtgaaaccc catctctact 13620
aaaaatacaa aaaattagcc aggcgtggtg gcaggcacct gtagtcccaa ctactcggga 13680
gactgaggca ggagaatggc atgaacctgg gagacggagc ttgcagtgag ccgagatcac 13740
gccactgcac tccagcctgg gtgacagagt gagactccat ctcaaaaaaa aaagttagat 13800
acgagagata aagatccaac agacacacaa ctgctaattc tgaacagaac aaaacaaatg 13860
gcacaggaaa agaaaattta agatataaca ccggaaaact ttcctgaaat tgagtaactg 13920
aatctatagc ttgaaagggt ttagcatatg ccaagaaaaa tcagtagagt ccaaccagca 13980
caagacacat ctagcaaggc tggtgattct accaacacag agaaagaagt gggtgaccca 14040
taatgcggaa aaaggcagac catctgcagt cttctccaga acactggagt ctgaagacaa 14100
aagaatgctg cctactgagc cagaagggag agaaagtgac ccaacacatc tttaccaagt 14160
tagaatgtca cgcattattt aaaggctgca aaagccatga aagacatgaa agaacacaag 14220
catttacaac atgaaagaac acaagcattc tcatactcaa gaatccttaa gaaaaatgta 14280
gtcctaatcc agcccactga aagttaaatg tacttaatgt gctcattaat gggaacttca 14340
tagcttcaaa tcagtctggt cccatctacc aacatctctc gcccggcttt cctgcaatag 14400
tcagcacctt tccctcctcc cagtcttgtc ccctggagtc tgctctcagc atagcagagt 14460
gaccacatca acacccaagt cagagccctc cagtgcgcac tggtctacaa agcccttccc 14520
acccccccacc ccacgtgccc tccggatcct tgtgacgtgt ctcctgcata ccctagcagc 14580
cctggcctcc tcactgcccc tcctgtacat caggaaggcg actccttgag tcttggctct 14640
ggccgcctcc tccacctgca gtgagttaac tcccttacct actctaggtc attgctcaaa 14700
tgtcagcatc tcaatggggc cctccctgac taccctattt aaattctaca tactcccctt 14760
gaccccatgg acctcactca ccctattcca cttttattct tacaatttag cacttgttct 14820
cttctaacgt attctaagac ttactcattt attacattgt ttgccacccc ctctagtaca 14880
taaactccag aggggcaggg atttctgtct atttattcat ttctttatcc ctaggacata 14940
gaacagggca tagttcagag tattcaatgt tatcaatgaa tgaactagca gtagtaccag 15000
ttccagttag gcacagaatt aaatctaaat agaattaaat ctcatggtct gggttaacta 15060
tggatagaaa attagatata attttaagaa gcctagaaag aaaaaattaa taatgtaaaa 15120
ataatattaa tttgataata ataacaaaaa ctctgccagg cactgtggct caaatctgca 15180
atcccagcta ctcaggaggc tgaggtggaa ggatcacttg agaccagagt tcaagactca 15240
gcctaggcaa cacggcaaga aactgtctct aaaaaaatta aaacttaaat ttttaaaaaa 15300
gaattctcaa agcgtcacaa aaactggaga ttaaggtaca ggaagtgtga agtaatatta 15360
ctatgctaat ggtttttttt ttttttagaa aggtataacc aaaagatttc tttctcaagt 15420
cgataaactg agaaagataa gcatatcttc caattaacag agggggagga aaagccagat 15480
acaacaaaat aagatataaa ttagtttcca gttgaaaaca agagtaggag ttattttgca 15540
tcacctcacc tgtgacctcc cccagcccaa aaaacactac tgataaacag ggtagaaaag 15600
catcatctca gataaagcag gaaaaactgc cacagtctca aaccacaaac tataagcaca 15660
cacctggcca accctgccaa gtctgggctc agtaggagga acgtgctgag agctaggatg 15720
taccaactta gacattctgt gggatacaga tgtccctgga agggtcacac catctcaaag 15780
gcacctgtaa tgcccactga ttacagccac catatgtgag agagaaactc agggcactta 15840
gagagtataa caagaacctt atgtcatctg agatgaggaa tcctcagccc tgcaaattaa 15900
ccaactcttt agaacaactg gcaaaacata aatatccaca acttttgttt cagtaattcc 15960
actcttagat atcaatccaa agtacatgag acagcagata cacacacaaa atggtattta 16020
ctgcagcatt gtttataata gcaaaaaaca agaaataatc catatgtctc aataggatac 16080
tgggtacatg agggtatgta cccatcattc aaccatcaaa aagagtgata tggatgtcca 16140
cagatggaca taaaaagctg tgtgttacgt gaaaacaaac tcaagcagca gcaggatggg 16200
cttatgatag tcagtatgag ctaatttctg gaaaaaaaaa tctagtgtgt gcacagaaaa 16260
catctgaaag aacagaaaca aaactatcag cagaatattg agatgtttta ctaagttgta 16320
tatctatact gcttgtaatt tttaccccaa gcaagaatta ctttttggaa aaagaaaatt 16380
caggaaataa agcatttctt taaacttcat gtttaaacaa atggtgatgg aataaaagag 16440
ttcttattca tcataaacac acacagcaca catgcacgca tgtgcgtgag cacacccttt 16500
acttgataaa taccatgttg aatattttag tctttccttt taggttctat cccttcactc 16560
aaaatgcggt tataaataaa tgtacttttc atgtgccttc tgcctaaacc cactttaata 16620
taactttaca gtcccattat cattatagtc tcaaagctag actcagcctg aaactaccct 16680

ttcatttgga acccttatta aaatgccaca tacagctcct tcaaataaaa acaaacccta 16740
ggacctgaca ctaggcttcc tttgttgcta ctcataatgg ccaagttctg tgcttataat 16800
acatcttctt tcattttatt gctacatatc caagggtttt atatgttttt cttattatat 16860
cttaattcaa aacaccatca cgctcttttc cagatgaaaa taaggaaaag aaattgagca 16920
actgactgac ttaaaggtca taaaactata tagtagcaga gtcagcaaaa gaagaaacac 16980
acatctccca agtagaggct gaaaaccagt accattcacc tccagggtga gctatataca 17040
gattacaaag tcaccttctc taaatgttca aactgaatcc catacccata ctttaccact 17100
acctcgtaag aacagcctca gatcttgtta tagccttttt tttagcatgc tgaagccaat 17160
aaaatgcttc ccattcagca agagaaacaa gttctgaaac actgaataat ctgcccaggg 17220
cctatgaaca tttccactgt gagaaatgtt ctccactgtg tggagaagat ccttactctt 17280
ctccacacag gcagaacatt agaaaaattc ttggattcta tgatgcacag cttaggagtc 17340
tgtttagcac aatttaagtc caaatagtta ttaaatcctc ctctgttcca gaaacagtgc 17400
taaatactgt gaatataaaa attgaaaaga tactctcctg gctcccaaga aagtcagcca 17460
gatagaggag acacaggcac acaaatcact gtcacatgaa gctctacctc cctaacttca 17520
aacgagggcc taagtcacca agaatacagt agcagttgtg actacgagta actactataa 17580
ttcaatactt tatcttccct tagaaaactc ttctcccttg gaaatttatt tgcatttcta 17640
aataccattc cttactaaaa ggaagcaggg ctccttgggg aaatagctga ttctaggtgt 17700
ggactatgaa atgaaaatgg tgagtctggg acatcccatg ttgcccagaa atcaaggaac 17760
tgcccaaaga ttaacagagt catgttaaat ggacctaaga gtgaaccaga aggagctcac 17820
tttgccccgc gtggaacaat ttcaagaaaa acatgacagt aatgaattat aaaacatgaa 17880
ttaaaataca tattggtact aaaaagagaa caaaaggatg tggctttgga taaagctctt 17940
cttcatggaa gaataccagc taataaatgt aaaggaaatg agagaattag aaaaattatc 18000
attttgtaaa ccttaatata ttcacctaga catgctaaaa ccactgagta aaaggctgct 18060
tgggaagagg atgctcacat gatctcagag tttcacacca cagataattt attagataca 18120
ggaaggaaga tgtgatcaag cttcctgtga cccccagcca ggccccacaa cactatgtgc 18180
ctccttgtga tgtgggagct acacagcatc gcccacacag cttctcgcca aaactgtttg 18240
aagctaatca caagggaaga actggacagc ttctgaccat gagacgctcc accagacaac 18300
ttgcttggcc tctccaaaga aacttgcttg gcctctccaa agaaaactca gtttcattta 18360
aaaacaaaac taattattta aaaacaaacg aaaagcaagt tgtggacttg agctccaggg 18420
acagagcaga catacttttc cctgttcttc ccagtaagtg gtaataaaaa ccctcaacac 18480
tagatataaa acaaatataa gaaggttctg gaaggggaag aggaggcaga ctatccaggt 18540
gccttgaggc ccacagaaca acccagtgat gggttcactg ggtcttcttt ttgcttcatt 18600
atctcagact tggagctgaa gcagcaggca acttcaaaac accaaggggc acagattgaa 18660
aagccccaag aaaagcctgc cctctctagc caaaggacca ggaaggagac agtctaatga 18720
gatggaacac atttagacag taactgccca tttaccagca ataactgagc agggagccta 18780
gacttccagt cttgtgagga cgtaccaagg tacccaacac ccccaccaag gctgagtaag 18840
gactgcgact tttatccctg catggcagta gtaaggagcc catccctcac ccgccagcag 18900
tgtcagggga acctggactt ccactcccac ccaggagtga tgaggccctc cctgctgggg 18960
tcatgtcaga ggaggcctag tggagattca gtgacttaac cttttcccag agataatgag 19020
gccacctttc ctccctcttc ccccatggtg acagtgaaag cactgtggca agcagtaggc 19080
actcctaccc ctcctagcca gggaggtatc agggaggcca agtagggaac cagaataccc 19140
acaaccaccc agcagcaaca ggggtccccc accccattgg gtgtcaatgg aagcagagcg 19200
gaaagcctgg atatttaccc ccatctagaa gtaacaagct gatgtccccc ttcttctact 19260
acaatggtgt tcaaaacagg tttaaataag gtctagagtc tgataacgta atacccaaat 19320
cgttgaagtt ttcattgagg atcatttata ccaagagtca ggaagatccc aaactgaaag 19380
agagaaaaga caattgacag acactagcac taagagagca cagatattag aactacctga 19440
aaggatgtta aagcacatat cataagcctc aacaggctgg gcgcggtggc tcacgcctgt 19500
aaccccagca ctttgggagg ccgaggcagg tggatcacaa gatcaggaga tcgagaccat 19560
cctggctaac acggtgaaac cccgtctcta ctaaaaatac aaaaaaaaat agcaaggcat 19620
ggtggtgggc acctgtagtc ccagctactc gggagcctga ggcaggagaa tggcatgaac 19680
ctgggaagag gagcagtgag ccgagatcgc accaccgcac tccagcctgg gcaacagagc 19740
aagacttcgt cccaaaaaaa aaaaaaaaaa aaaaaaaagc ctcaacaaac aactacaaac 19800
gtgcttgaaa caaatgaaaa aaaaatcttg gcaaagaaat aaaagatata tattttggcc 19860
aggtgcagtg gctcacagcc tgtaatccct gcactttggg aggctgaggc aggcggatca 19920
cctgaggtca ggagtttgag accagcctga ccaacatgga gaaaccccgt ctctactaaa 19980
aatacaaaat tagccagtca tggtggcaca tgcctgtaat cctagctact caggaggccg 20040
aggcaggaga atcgcttgaa ctcaggaggt ggaggttgcg gtgagccgag atcccgccat 20100
tgcacattgc actccagcct gggcaacaag agcaaaactc catctcaaaa aaatagatac 20160
atattttaat ggaaatttta gaattgaaaa atacagtaac caaattgaat ggaaagacaa 20220
catagaatgg agggggcaga caaaataatc agtgaacttc aacagaaaat aatagaaatt 20280

acccaatatg aagaacagaa agaaaataga ctggccaaaa aataaagaag aaaaaagagg 20340
agcagcagga ggaatgatgg aaaaagagaa aggaaggaag gaagggaagg agggagggaa 20400
ggagtgaggg agaaagtctc aaagacctct gagactaaaa taaaagatct aacacttgtc 20460
atcagggtcc aggaaagaga caaagatggc acagctggaa acgtattcaa aaaataatag 20520
ctgaaaactt cccaaatttg gcaagagaca taaacctata gattcgaaat gctgaacccc 20580
aaataaaaag cccaataaaa tccacaccaa aatacatcat agtcaaactt ctgaaaagac 20640
gaaaagagaa aacgtcttga aagcagtgag tgaaacaaca cttcatgtat aagggaaaaa 20700
caattcaagt aacagatttc ttacagaaat taaggaagcc agaaggaaat gacacaatgg 20760
ttttcaagtg ctgaaagaaa agaagtgtca acacaaaatt ctagattcag taaaaatatc 20820
cttcaagaat caatgggaaa tcaagacagt ctcagataaa gcaaaataag agaatatgtt 20880
gccagcagat ctcccctaaa ggaatggcaa aaggaagatc atgcaacaga ccaaaaaatg 20940
atgaaagaag gaatccagaa acatcaagaa gaaagaaata acatagtaag caaaaataca 21000
tgtaattaca ataaaatttc tatctcctct taagacttct aaattatatt gatggttgaa 21060
gcaaaaatta taaccctgtc tgaagtgctt ctactaaatg tatgcagaga attataaatg 21120
gggaaagtat aggtttctat acctcattga agtggtaaaa tgacaacact gtgaaaagtt 21180
acatacacac acacacgtaa gtatatataa atatatgtgt gtatatgtgt gtgtatatat 21240
atatatacat ataatgtaat acagcaacca ctaacaacac tatacaaaga gataataacc 21300
aaaaacaatt tagataaatt gaaatggaat tctaaaaaat attcaaatac tctacaggaa 21360
gacaagacaa aaagagaaaa aaagaggagg acaaactaaa ttttttaaaa acataaataa 21420
aatggtagac ttaagcccta acttatcaat aattacataa atgtaaatga tctaattata 21480
tcaattaaaa gacagagata gcagagttaa tttaaaaaca tagctataag aaacctgctt 21540
tgggctgagt gcagtgactc acacttgtaa tcccagcact tcgggaggcc aaggcgggtg 21600
gatcacctga ggtcaggagt tccagaccag cctggacaac atggtaatac cccatctcta 21660
ctaaaaatac aaaaaaatta gccaggcatg gtggcacacg cctgtagtcc caactactca 21720
ggaggctgcg acacaagaac tgcttgaacc cgggcagcag aggtagcagt gggccaagat 21780
tgcgccactc cagcctgaac gacagagtga gactccacct cagttgaaaa acaaaaaaga 21840
aacctgcttt aaatatacca acatatgttg gttgaaatta aaagaataaa atatatcatg 21900
aaaacattaa tcaaaagaaa ggagtggcta tattaataac ataaaataga cttcagagaa 21960
aagaaaattt caagagacag gaataaaagg atcaagaaaa gatcctgaaa gaaaagcagg 22020
caaatcaatc attctgcttg gagattcaac accctctctt aacaactgat agaacaacta 22080
gacaaaaaaa tcagcatgga gttgagaaga acttaacacc actgaacaac aggatctaat 22140
agacatttac ggaacactct acccaacaat agcaaaataa acattctttt caagtattca 22200
ctgaacatat ccttagaccc taccctgggc cataaaacaa agctcactag tgattgccga 22260
aggcttggat ggacagtgga agagctgcat ggggagggag aaggtgacag ttaaagagtg 22320
taggatttct ttttgggata atgaaaatgt tccaaaattg attgtggtga tgttggcgca 22380
actctacaaa tataaaaaag gccattgaat tgtacgtttt aagtgggtga aacatatggt 22440
atgtggatta tatctaacgc tttttaaaaa cttaacacat ttcaaagaat agaagtcata 22500
cagagtgtgc tctactggaa tcaaactaga aagaggtaac tggaggataa cgagaaaagc 22560
ctccaaatac ttgaaaactg gacagcacat ttctaaaatc atccgtgggt caaagatatt 22620
catttctgat attcattttt attgtttaat gtatttttaa aaatttctta agggaaataa 22680
actgactaaa aatgaatatg gctgggtgcg gtggctcacg cctgtgatcc cagcactttg 22740
ggaggccgag gctggtggat cacaagatca ggagttcgag accagcctgg ccaagatggt 22800
gaaaccccgt ctcaactaaa aaactacaaa aagtagccaa gcgcagtggc gggagcctgt 22860
ggtcccagct acttgggagg ctgaggtagg agaatcgctt gaacacaggc agcagaggtt 22920
gcagtgagcc aagattgtgc cactgcacgc cagcctgggc gacagagact gcctcaaaaa 22980
aaaaaaaaaa aaaaagaata tcaaaatttg tgggacatag ttaaagcaat gctgagaggg 23040
aaatttataa cactaaatgt ttacattaga aaagagaaaa agtttcaaat caatagtctc 23100
cactcccatc tcaagaacac agaagatgaa gagcaaaata aacccaaagc aagcaaaaga 23160
aagaaaatat aaaaataaat cagtaaaatt gaaaacagaa acacaataaa gaaaatcagt 23220
gaaacaaagt actgattctt cgaaagatta ataaaattga caaacctcta gcaaggctaa 23280
caaacaaaaa agaaagaaga cacggattac cagttattag aatgaaagca taattagaaa 23340
caactctaca cattataaat ttgacaatgt agatgaaatg gactaattac tgaaaaaaca 23400
caaattacca caactcaccc aatatgaaat agataattgg gatagcctga taactactga 23460
gaaaattgaa tttgtaattt taacactctt aaaacagaaa cattaaactt aatattttat 23520
aaatattaga taaggtaatt atacccttcc ttaacaaata aaaacgacaa attattttgc 23580
agctaaagag atgtatgtac tgtgaaaaat atcttcagaa aaatagaact ttgtttgaag 23640
aataaggatt taaaaaatgt ttttaactct caagaagcaa atatctgggc ccagatggtt 23700
tcactgaaga attctaccaa atgtttaatg aagaattacc accaactcta catagcatct 23760
ttgagaaaac tgaagagaag ggaacatctc ccagttcatt ttatgaagtg ggtgttactc 23820
tgatactaga actgtataag gacagctact cttgacacac tgcctatggg tagctctgct 23880

ctgcaggaac agtcagaaaa aaaaaaaaaa gaagcactgg acaagggcag tataaaaaaa 23940
gaaaactggg ccaggtgcag tggctcacac ctgtaatctc agcactttgg gaggctgacg 24000
ctggtggatc acctgaggtc aggagtttga gactagcctg gccaacatgg taaaaccctg 24060
tctctactaa aatacaaaaa ttagccaggc agggtggtgg ggaaaataaa aaggaaaaaa 24120
aaacaaaaat aaactgcaga ccaatatcct tcatgagtat agacacaaaa ctccttaaac 24180
tccttaacaa aatattagca agtagaagca atatataaaa ataattatac accatgatca 24240
agtgggactt attccagaaa cgcaagtctg gttcaacatt tgaaaacaag gtaacccact 24300
atatgaacgt actaaagagg aaaactacat aatcacatca atcaatgcag aaaaaagcat 24360
ttgccaaaat ccaatatcca ttcatgatac tctaataaga aaaataagaa taaaggggaa 24420
attccttgac ttgataaagc ttacaaaaga ctacaaaagc ttacagctaa cctatactta 24480
atggtgaaaa actaaatgct ttcccctacg atcaggaaca aagcaaggat gttcactctc 24540
attgctctta tttaacatag ccctgaagtt ctaacttgtg caaaacgata agaaagggaa 24600
atgaaagacc tgcagattgg caaagaagaa ataaaactgt tcctgtttgc agatgacatg 24660
attgtctcat agaaaatgta aagcaactag gggtaggggg gcagtggaga cacgctggtc 24720
aaaggatacc aaatttcagt taggaggagt aagttcaaga tacctattgc acaacatggt 24780
aactatactt aatatattgt attcttgaaa atactaaaag agtgggtgtt aagcgttctc 24840
accacaaaaa tgataactat gtgaagtaat gcatacgtta attagcacaa cgtatattac 24900
tccaaaacat catgttgtac atgataaata cacacaattt tatctgtcag tttaaaaaca 24960
catgattttg gccaggcaca gtggctcata cctgtaatcc cagcatttta ggaggctgag 25020
gcgagcagaa aacttgaggt cgggagtttg agaccagaat ggtcaacata gtgaaatccc 25080
gtctccacta ataatacaaa aattagcagg atgtggtggc gtgcacctgt agacccagct 25140
acttgggagg ctgaggcacg agaattgctt gaacaaggga ggcagaggtt gcagtgagct 25200
gggtgccact gcattccagc ctggtgacag agtgagactc catctcaaaa aaaataaaat 25260
aaagcatgac ttttcttaaa tgcaaagcag ccaagcgcag tggctcatgc ctgtaatccc 25320
accactttgg gaggccgagg caggcagatc acaaggtcag gagtttgaga ccagcctgac 25380
caacatggtg aaaccccatc tctactaaaa aatatataaa ttagccaggc atgtgtagtc 25440
tcagctactc aggaggctga ggcaggagaa tcacttgaac ccggaggcag aggttgcagt 25500
gttgagccac cgcactccag cctgggtgag agaacgagac tccgtctcaa aaaaaaaaag 25560
caaaataacc taatttttaaa aacactaaaa ctactaagtg aattcagtaa gtctttagga 25620
ttcaggatat atgatgaaca tacaaaaatc aattgagctg gacaaaggag gattgtttta 25680
ggtcagtagt ttgaggctgt aatgcacaat gattgtgcct gtgaatagct gctgtgctcc 25740
agcctgagca gcataatgag accacatctc tatttaaaaa aaaaaaaatt gtatctctat 25800
gtactagcaa taagcacatg ggtactaaaa ttaaaaacat aataaatact gtttttaatt 25860
gcctgaaaaa aatgaaatac ttacatataa atctaacaaa atgtgcagga cttgtgtgct 25920
gaaaactaca aaacgctgat aaaagaaatc aaagaagact taaatagcgt gaaatatacc 25980
atgcttatag gttggaaaac ttaatatagt aaagatgcca attttatcca aattattaca 26040
caggataaca ttattactac caaaatccca gaaaaatttt acatagatat agacaagatc 26100
atacaaaaat gtatacggaa atatgcaaag gaactagagt agctaaaaca aatttgaaaa 26160
agaaaaataa agtgggaaga atcagtctat ccagtttcaa gacttacata gctacagtaa 26220
tcaagactgt gatattgaca gagggacagc tatagatcaa tgcaaccaaa tagagaacta 26280
agaaagaagc acacacaaat atgcccaaat gatttctgac aaaggtgtta aaacacttca 26340
acgggggaag atatgtctct cattaaaggg tgtagagtca ttgcacatct ataggcaaaa 26400
agatgaacct gaacctcaca ccctacagaa aaattaactc aaaatgactc aaggactaaa 26460
cataagatat acatctataa aacatttaga aaaaggccac gcacggtggc tcacgctcgt 26520
aatcccagca ctttgggagg ccaaggcagg tggatcacct aaggtcagga gtttgagacc 26580
agccggatca acatggagaa gccccatctc tactaaaaat acaaaattag ctggacgtgg 26640
tggcacatgc ctgtaatccc agctacttgg gaggctgagg catgagaatc gcttgaaccc 26700
gggggggcaga ggttgcggtg agccaagatc acaccattgc actccagcct gggcaacaag 26760
agcaaaactc caactcaaaa aaaaaaaaaa aaaggaaaaa tagaaaatct ttgggatgta 26820
aggcgaggta aagaattctt acacttgatg ccaaactaag atctataagg ccagtcgtgg 26880
tggctcatgc ctgtaattcc agcactttgg tcaactagat gaaaggtata tgggaattca 26940
ctgtattatt ctttcaactt ttctgtaggt ttgacatttt tttagtaaaa aattgggggа 27000
aagacctgac gcagtggctc acacctgtaa tcccagcact ttgggaggcc ggggcaggtg 27060
gatcacacgg tcaggagttc gagaccagcc tggccaacat ggtgaaaccc cgtctctacc 27120
aaaaatataa aaaattagcc gggtgtcatg gtgcatgcct gtaatcccag ctactgagga 27180
ggctgaggca ggagaatcac ttgaacctgg gaggtggaag ttgcagtgag ccgagattgt 27240
gccactgcac tccagccttg ggtgacagag cgagactccg tctcaaaaga aaaaaaaaaa 27300
aaagaatatc aaacgcttac tttagaaact atttaaagga gccagaattt aattgtatta 27360
gtatttagag caatttttat gctccatggc attgttaaat agagcaacca gctaacaatt 27420
agtggagttc aacagctgtt aaatttgcta actgtttagg aagagagccc tatcaatatc 27480

actgtcattt gaggctgaca ataagcacac ccaaagctgt acctccttga ggagcaacat 27540
aaggggttta accctgttag ggtgttaatg gtttggatat ggtttgtttg gccccaccga 27600
gtctcatgtt gaaatttgtt ccccagtact ggaggtgggg ccttattgga aggtgtctga 27660
gtcatggggg tggcatatcc ctcctgaatg gtttggtgcc attcttgcag gaatgagtga 27720
gttcttactc ttagttccca caacaactgg ttattaaaaa cagcctggca ctttccccca 27780
tctctcgctt cctctctcac catgtgatct cactggttcc ccttcccttt atgcaatgag 27840
tggaagcagc ctgaagccct cgccagaagc agatagtgat gccatgcttc ttgtacagcc 27900
tacaaaacca tgagcccaat aaacctttt tctttataaa ttatccagcc tcaggtattc 27960
ctttatagca agacaaatga accaagacag ggggaaatca acttcattaa aataatctat 28020
gcagtcacta aacaaataag aacaagaggc tccagaagtg ggaagccaat acccagagtt 28080
cctacaatac agtatctgaa aagtccagtt tccaaccaaa aaatatatat atacaggccg 28140
gacatggtag cttatgtctg taatcccagc actttgggat gctgaggcgg gcagatcacc 28200
ctaggtcagg agttcgagac cagcctggcc aatatggcaa aaccccgtct ctactaaaaa 28260
tacaaaaatt agccaggcat ggtggtggat gcctgtaatc ccagctactc gggaggctga 28320
ggcagggaat cacttgaacc caggaggcag aggttgcagt gagccgagat cacgccactg 28380
aactccagcc tgggcaacaa agtgagactc cacctcaaaa aaaaaaaaaa tatacatata 28440
tatatgtgtg tgtgtgtgtg tgcgcgcgtg tgtgtatata cacatacaca tatatacata 28500
tatacagaca cacatatata tatgaagcat gaaaagaaac aaggaagtat gaaccatact 28560
ttctgtggtt atgataggat ggggtatcac gggggaagta gacaagggaa actgcaagtg 28620
agagcaaaca gttatcagat ttaacagaaa aagactttgg agtaaccatt ataaatatgt 28680
ccacagaatt aaagaaaagc gtgattaaaa aaggaaagga aagtatcata acaatattac 28740
tccaaataga gaatatcaat aaaggcatag aaattataaa atataataca atggaaattc 28800
cggagttgaa aggtagaata actaaaattt aaaattcact agagaaggtt caacactata 28860
tttgaactgg cagaagaaaa atttagtgag acaaatatac ttcaatagac attattcaaa 28920
tgaaaaataa aaagaaaaaa gaatgaagaa aaataaacag aatctcagca aaatgtggca 28980
caccattaat cacattaaca tatgcatact gagagtaccg gaagcagatg agaaagagga 29040
agaaaaaata ttcaaatgat ggccagtaac ttcctagatt tttgttttaa agcaataacc 29100
tatacaatca agaaactcaa tgaattccaa gtaggataaa tacaaaaaga accacaaaca 29160
gatacaccat ggtaaaaatg ctgtaagtca aaaacagaga aaatattgaa agcagctaga 29220
ggaaaactta taagagaacc tcacttacaa aagaacatca cttataaaag aaccacaata 29280
atagaaacag ttgacctctc atcagaaaca atgaatgata acatatttga agtgctcaaa 29340
gaaaaaaaat aaagattcct atatacgaca aagctgtctt tcaaaaatat acatccaaaa 29400
ggattgaaac cagggtcttg aagagttatt tgtacatcca tgttcatagc agcattattc 29460
acaatagcca aaaggtagaa gcaacccaag ggtccatcga caaataaata aaatgtggta 29520
tatgtataca caatggaatt tattcagtat taaaaaggaa tgaaattctg acacatgcta 29580
caacatggct aaaccttgag aacactatgc taagtgaaat aagccagcca caaaaggaca 29640
aataccatat tacttcactt gtatgaaata cctagggtag tcaaattcag agatagaaag 29700
taaaacagtg gttgccaagg gctgagggag ggagtaacgt ggagttattg ttgaatgggt 29760
acagaatttc agttttgcaa gataaaaaga gttctggaga cagatggtgg tgagggtggt 29820
acaacaatac aaatatactt tatactactg aacagtatac ttaaaaatga ttaacatggt 29880
gaaaccccgt ctctactaaa aatacaaaaa aattagctgg gtgtggtggc gggcacctgt 29940
aatcccagct acttgggagg ctgaggcagc agaattgctt gaaaccagaa ggcggaggtt 30000
gcagtgagct gagattgcgc caccgcactc tagcctgggc aataagagca aaactccgtc 30060
tcaaaaaata aaaaataaaa aaaatttaaa aatgattaag caggaggcca ggcacggtgg 30120
ctcacaccta taatgccagc actttgggag gccgaggcag gcgatcactt gagaccagga 30180
gtttgagacc agcctggcca acatggcaaa accctgtctc tgctaaaaat acaaaaatta 30240
gccaggcatg gtggcatata cttataatcc cagctactgg tgagactgag acacgagaat 30300
tgcttgaacc caggaggcag agattgcagt gagtcgagat cgcgccactg aattccagcc 30360
tgggcgacag agcaagattc tgtctcgaaa aaacaaaaac aaaaacaaaa agcaaaacca 30420
aaaaataatt aagcaggaaa cgagattgct gctgaggagg agaaagatgt gcaggaccaa 30480
ggctcatgag agcacaaaac ttttcaaaaa atgtttaatg attaaaatgg taaattttat 30540
atgtatctta ccacaaaaaa aagggctggg gggcaggaaa tgaaggtgaa ataaagacat 30600
cccagagaaa caaaagtaga gaatttgttg ccttagaaga aacaccacag gaagttcttc 30660
aggctgaaaa caagtgaccc cagagggtaa tctgaattct cacagaaaat tgaagcatag 30720
cagtaaaggt tattctgtaa ctatgacact aacaatgcat atttttcct ttcttctctg 30780
aaatgattta aaaagcaatt gcataaaata ttatatataa agcctattgt tgaacctata 30840
acatatatag aaatatactt gtaatatatt tgcaaataac tgcacaaaag agagttggaa 30900
caaagctgtt actaggctaa agaaattact acagatagta aagtaatata acagggaact 30960
taaaaataaa attttaaaaa atttaaaaat aataattaca acaataatat ggttgggttt 31020
gtaatattaa tagacataat acaaaaatac cacaaaaagg gaagaagaca atagaactac 31080

ataggaataa cattttggta tctaactaga attaaattat aaatatgaag tatattctgg 31140
taagttaaga cacacatgtt aaaccctaga tactaaaaag taactcacat aaatacagta 31200
aaaaaataaa taaaataatt aaaatgtttg tattagtttc ctcagggtac agtaacaaac 31260
taccacaaat tgagtggctt aacacaactt aaatgtattt tctcccagtt ctggaggcta 31320
aacacctgca atcaaggtga gtacagggcc atgctccctg tgaaggctct aggaaagaat 31380
cctcccttgt ctcttccagc ttccagtggt tctcagtaac cctaagtgct ccttggcttg 31440
tagctatatc attcctagca accagaaaga agaaaataat aaagattatg gcaaaaaata 31500
atgaaatcaa aaggagaaaa atggaaaaaa ataaataaaa ccaaaagcta gttctttgaa 31560
aagatcaacc aagttaacaa acctttttaac tagactgaca aaaaggaggt aagactcaaa 31620
ttactagaat cagaaataaa agaggggaca ttactaatga gggattagaa aagaatacta 31680
cgaacaaatg tgtgccaaca aattagaaaa cttagatgaa atggacaggt tcctaggaca 31740
acatcaacta ccaaaattta ctcaagaaga aagagacaat ttgaatgagc tataacaagg 31800
gaagagactg aattgacaac caagaaacta tccacaaaga aaatcccagg cccagaagat 31860
ttcactgtga aattctttca aacttataaa tataaattaa catcagttct tcacaaactc 31920
ctccaaaaaa aagaacagat ctctatttac aggcgatacg atctttagaa aatcctaagg 31980
gaactactaa gacactatga taactgataa acaagttcag caaggctgca ggatagaaaa 32040
ccaatataca aaaatctatt atatttctat acacttgcag tgaacaaccc aaaaatgaga 32100
ttaagaaaat aattcaattt acaataacat caaaaagaat aaaaacactc aaaaataaat 32160
ttattcaagt aagtgcaaaa cttatactct agaagctaca aaacactgtt aaaagaaatt 32220
aaaggtttac ataaatgaaa aactatccca tgttcatgga tcaaaagact tattactggc 32280
aatgctctcc aaattgatct ataaattcaa caaaatcctt atcaaaatcc cagatgaggc 32340
tgggggtggc ggttcatgcc tgtaatccca gcactttggg aggctgaggc acgcagatta 32400
cctgaggtcg ggagctcgag atcagcctga ccaacatgga gaaaccctat ctcttctaaa 32460
aatacaaaat tagtcaggcg tggtggcaca tgcctataat cccagctact cgggaagctg 32520
aggcaggaga atcgcttgaa cccaggaggc agaggttgca gtgagccaag atcgtgccat 32580
tgcactccag cctgggcaac aagagcaaaa ttccatctca aaaaaaaaaa aaaaaaaatc 32640
ccagatgact tcactgttga aattgaaaag attattctaa aattcacatg gaattgcaag 32700
accttgagaa tagccaaaac aaacttgaaa aacacgaaca aaatatagga tgactcactt 32760
gccaattgca aatgttacga cacagcaaca gtaatcaaga ctgtgtggta ctggcaaaag 32820
acacatacat acatacatat caatggaata taattgagag tacagaaaca agcctaaaca 32880
tctatggtaa gtgcttttct attttttttct ttttttttttt ctttttgtga gagatagaat 32940
ctcaccatgt tgcccaggct ggtcttcaac ttctgggctc aagcaatcct cccactgtgg 33000
cctcccaaag tgctgggata actggcatga gccaccacat ccagcccaga tgattttcaa 33060
aaaagtcaac aagaccattc ttttcaacaa ataggtctgg gatgatcaga tagtcacatg 33120
aaaaaaaaaa tgaagttgga ccctccatca cactaaagtg ctgcgattat aggcatcagc 33180
caccacatcc agcccaaatg attttcaaaa aggtcaacaa gaccattctt ttcaacaaat 33240
aggtctggga taatcagata gtcacatgaa aaaaaaaatg aagttggacc ctccatcaca 33300
ccatatgcaa aaattaattc aaaaatgaat tgatgactta aacgtaagag ttacgactgt 33360
aaaactctta gaaggaaaca tacgggtaaa tcttaaagac gttaggtttg acaaagaatt 33420
cttagacatg acaccaaaag catgaccaac taaggtaaaa tagggtaaat tgtacctacc 33480
aaaatgaaaa acctttgtgc tggaaaggac accatcaaga aatggaaagc caaaatagcc 33540
aaggcaatat taagcaaaaa gaacaaagct ggaggcatca tactacctga cttcaaagca 33600
acagtaacca aaacagcatg gtactagtag aaaaacagac acatagacca atggaacaga 33660
ataaagaacc caaaaataaa tccacatatt tatagtcaac tgatttttga caatgacacc 33720
ccttcaataa atgatactag gaaaactgga tatcgatatg cagaagaata aaactagacc 33780
cctatctctc accatataga aaaatcaact cagactgaat taaagacttg aatgtaagac 33840
ccaaaactat aaaactactg gtagaaaaca taaggaaaaa cgcttcagga cattggtcca 33900
ggcaaagatc ttatggctaa aacctcaaaa acacaggcaa caaaaacaaa aatggaaaaa 33960
tagcacttta ttaaactaaa aagctcctgc acagcaaagg aaacaacaga atgaaaagac 34020
aacctgtaga atgggagaaa atatttgcaa actatccatc catcaaggga ctagtatcca 34080
gaacacacaa gtgactaaaa caactcaaca gcaaaaaagc aaataatctg gtttttatat 34140
gggcaaaaga tctgaataaa cattctcaaa ggaagacata caaatgtcac tatcattctg 34200
ccagtaccac actgtcttga ttacttgtta gtgtataaat ttttaaattg ggaagtgtga 34260
gtcatcctac actttgttct tgtttttcaa gtttgttttg gctattctgg gagccttgca 34320
agtataaaat agccaacaag tatgaaaaaa tgctcaccat cactaatcat cagagaaata 34380
aaaatcaaga ccactatgag atatcctctc actccagtta gaatggctac tatcaaaaag 34440
acaaaatata atggatgctg gcaaagattt ggagaaaggg gaactcctat acactgtggg 34500
tagggatgca aattggtaat ggccattatg gaaaataata ctgaggtttt tcaaaaaact 34560
gaaaatagaa ctaccatatg atccagcaac cctactactg ggtatttatc caaaggaaag 34620
aagtcagtat actgaagaaa tatatgcact ctcatgttaa ttgcaacact gttcacaaca 34680

gccaagacag ggaataaatc taaatgtgca tcaacagatg aatggataaa gaaaatgtgg 34740
catatacact caatagaata ctattcagcc attaaagaag aatgaaatcc tgtcatccca 34800
gcaacatgga tgaacctgga ggacattata tttaatgaaa taagtaaagc acaaaaagat 34860
aaacagtaca tgttctcact cagacatggg tgctaaaaag aaaatggggt cacagaatta 34920
gaaggggagg cttgggaaaa gttaatggat aaaaatttac agctatgtaa gaagaataag 34980
ttttagtgtt ctatagaact gtagggcgag tatagttacc aataacttat tgtacatgtt 35040
caaaaagcta gaagagattt tggatgttcc cagcacaaag gaatgataaa tgtttgtgat 35100
gatggatatc ctaattaccc tgattcaatc attacacatt gcatacatgt atcaaattat 35160
cactctgtac ctcataaata tgtataatta ttacgtcaac aaaaaaagga aaaaaaagaa 35220
aattaagaca acccacataa tggaagaaat aaaatatctg caaattatat atatctgata 35280
aatatttaat atttataata tataaagaac tcctacaact caagaacaac aacaaaacaa 35340
cccaattcaa aaatgggtaa aagccttgaa tatacactta tctaaagact atatacaatt 35400
ggccaataaa gacacgaaaa gatgctcaac atcactagtc atcagggaaa tataaatcaa 35460
aaccacaatg tagaatgtag acaccacttc atatgcacta ggatggctag aataaaaagg 35520
taataacaaa tgttggtaag gatgtgaaaa aatcagaaac ctcattcgct gctgttggga 35580
atgtaaagtg atgcagccac tttggaaaac agtctggcag ctcctcaaat tattaaatac 35640
agagttaccg tatgacccag gaatattcct cctgggtcta taaccaaaaa aatgaaaaca 35700
tatatccaca taaaaacttg tacatgggca tttatagcaa cattattcat aacagcaaag 35760
gtggtaagaa cccatatgcc catcatctga tgaacaggta aataacatgc ggtattatcc 35820
atacactaga atattatctg cccatacaag gagtgacatc cagctacatg ctacaaggat 35880
gaatctcgga aaccttatgc taagtgaaag aagccagtca caaatgacca cagattatga 35940
ttccatgcat cggaaatgac cagaataggg aaatctatag agacagaaag tagattagtg 36000
gttgggtggg gctgggagga caggtagtac actactttcc cagaactact ggaacaaagt 36060
accacaaact ggggagctta aacatagaaa ttgatttcct cacagttctg gagactagga 36120
ctctgagatc aaggtgtcag cagagctggt tctttctgag ggccctgagg caaggctctg 36180
tcccaggcct ctctccttgg ctggcaggtg gccatcttct ccctgcgtct tcacatcatc 36240
ttttctctgt gtgtgcccat gtccaaattt tgattggctc attctgggtc atggccaatt 36300
gctatgcaca aagtgaagtc tacttccaaa agaagggaag agggaacact gactaggcta 36360
aacttatagt cattttaatg tccgcttttc ctatgagatt gtgaacacac agaagtaggg 36420
tttttatcta cattgtgcaa agtttaataa gaaaaatagc attcaagaga agcagttcaa 36480
tagcaggaat ttaatatggg aactaattac aaggtttagg gcaggactaa aaagccagtt 36540
gggatggtga gccaacccag agattagcaa cagtgggacc ccatctacct accacccatg 36600
aagctggaag gataaaggag gggctattat cagagtccac aagccagtgt cagagtcctt 36660
ggctggagct gggaccaccc tagagacact gtgcaaagca gaaaacaagg gggaaaaacc 36720
ctgacttctc ccttcctccc acctttcaat ctcccactag tgcttcctac tagccatact 36780
tggccagaga cagtgacaag gaacactgca aaatgaagtt tgtaggaatc atctccctct 36840
gagacagaga aatatggaag ggtagaaaat gaatcagagg ataaagagaa aaaaccctga 36900
gtactatctt atttatcttt gtatctccag tgcctaatct gtctctcaaa aaaggaaagc 36960
aattgagaga aactgaaaac tccaattgaa atgaaagaat ggagaattac tggactagaa 37020
gagaagagaa aaatttattc cgcatagagt aaacaagaat ggattcacaa aggacgtgat 37080
gaatgaaaag ctataatcag caaagatttg ccagagaaat taaaaagtgg taaactcagc 37140
cacgctgtac aacctgaagg cacaatgcat gaaaacgttt caagaaatga caagatttga 37200
agtcaaattc taagtgcttt tccagaatct ctcaagacga ttatatagct accccatttt 37260
attaaataaa atggaaactt actaaacttt ccccttgtat taaactaaca tatgtcctaa 37320
tagcaaacga ttctggaatt cctagagtaa aatatatttc gtcaaagtgt attgctcttt 37380
taatattctg ctgacctcct tttgctattt aggatatttg tatacacatc acacgtaaat 37440
ttggtctata gtttacatct acgggcttat actgttcttt ttttcatttt tttaaaattt 37500
ccaaccccca gtatccatat actgctctct atcagggtta ttttaacttt gtaaaatcag 37560
ctgagatgct ttccatgttt tttttttta ttttctgcca catttgaata gcataggagt 37620
taccaccatc aaccttggat tatttaagca ttcacgattc cacgtgtgga ttttttattc 37680
agagtctttc ttgtcattcc tgctatcagc acagaaccca atctcagctt tccagctata 37740
ctctcacccc atggaatttg cagatgaagt tcaaaaggac ctttgcatta tcctgcctcg 37800
ccctcttccc ccttcattta gacatcacct tcttctagaa cgtcttacct gacatgccct 37860
gctcccaacc cctgctgccc aattgtgtgc tctcccgtgt cctggcctgc catcctcttt 37920
agtaattgcc tgctccctca tctgtctccc cacccagaca ttaagctgaa tagactggat 37980
ttgtgtcttg tccatcacta taatctcagc acctagtacc tagtaggtac ttaccatgta 38040
ttcattagca aaatgttatg tataaccttg caccttaaaa acaagagaag gaagacaaaa 38100
ttaagtctta agactatggt ttagaacatg gatcagaaac tacagtctgc agcccaaatc 38160
cagaccaaat gaagagacca tgttcattta catacaacct atagcagctt tcacactaca 38220
ggagcagagc taagtagttc caagggaaca cacggccctg caaagcctaa aatatttact 38280

ctatagctct tcacagaaaa agttttcaga tccctcgttt agaactcttg ttcatatgca 38340
atttcactaa accatagttt tttgggtttg tttggttttt tttggcaaaa aggaatgagc 38400
cgatccagaa aaggttgaaa agaatgaatc attactgctg aaagaatgtg cacacagtcc 38460
gtcagtattc tgctgccatg ctgacaccca tccaatagtg tcatgagatg cagcagctac 38520
tactgtgttc tcaatgccga gtccacccac tccataacca tgtccaagca atcttgggaa 38580
catcatcacc atgcttgttt atccttaagg tattgcctca catacagcag tggctggtca 38640
taaagtcaaa tgacactagt ggccaggagg tcaagagaat gagtgaggac aggtgggtag 38700
gcagcccagg ccctagcaac agcaggagct caccctcag tcactctagc caggactgaa 38760
atacttttca ccctttcaag agagactagg aatctggatt tttatgtgaa atatcttgat 38820
tactaaatgt tgtcaacaga catgtcaaaa ggtaaaacta agtaagttca tggggcagat 38880
tgactattca ggttatagaa ttaaggattc ttatccaaca cagataccaa ccaaaaagct 38940
gacgtataac atattaggag aaactatgtg cactgtcgaa acatcaacaa ggggctaatg 39000
tctaaaatag tctatattgg attccagttg aaacatgggg aaaggacatg aacaggcaac 39060
ttatgtcaat ggaaactcaa aaagataaca agcatatata aaagcattct caaattcagt 39120
agtaaacaga cagatgcaaa taaaaagagg gaaactgctg ccgggcacag tggctcacac 39180
ctgtaatccc agcactttgg gaggccgagg cgggcggatc atgaagtcag gagatcgaga 39240
ccatcctggc taacatggtg aaaccccgtc tctactgaaa acacaaaaaa ttagccaggc 39300
gtagtggtgg gcaccagtag tcccagctac tcaggaggtt gaggcaggag aatggcatga 39360
acccaggagg cggagattgc agtgagccga gaccatgcca ctgcactcca gcctgggcga 39420
ctgagtgaaa ctccatctca aaaaatataa taataattat aattataata ataataaata 39480
gtaaataaat aaaaagagag agactgctaa agtctagaaa gttgaatgat gccaagcgca 39540
tgcaaagatc agggccttgg gatggccggg tgcagtggct cacgcctgta atcccaccac 39600
tttgggaggc caaggcgggc ggatcatgag gtcaagagat caagaccatc ctggccgaca 39660
cagtgaaacc cggtctctac taaaagtaca aaaaaatata tatatatata tatattatta 39720
tattatatat atatatatca gagccttggg aatccttgtg tgctgctggg gaaggtagtg 39780
gtgcagccac ccttgacagc aatctggcag tacttggtta tattaagtat aggcacacac 39840
cacgaccagg cagtcctact cctgggtcta aatcccaaag aattctcaca caagtccata 39900
aggagacatg tacgaggctc attcagcatt actgggagtg ggaatcaacc tgggtgtcca 39960
tctacaggag acgagatgga caaaatgtgg tggatattaa gaccagaatc accaagtaac 40020
agagatgggt ggtgagtgac aatcctaaga tacagaataa aggctagaac atgatgccat 40080
tcatgtaaat taaaaataga tgcacacaaa gcagtatacg cgtgaccctt gaatagcaca 40140
ggtttgaact gcctgtgtcc acttacatgt ggattttctt ccacttctgc tacccccaag 40200
acagcaagac caacccctct tcttcctcct ccccctcagc ctactcaaca tgaagatgac 40260
aaggatgaag acttttatga taatccaatt ccaaggaact aatgaaaagt atattttctc 40320
ttccttatga ttttctttat ctctagctta cattattcta agaatatggt acataataca 40380
catcacacgc aaaataaatg ttaattgact gtttatatta tgggtaaggc ttccactcaa 40440
cagtaggctg tcagtagtta agttttggga gtcaaaagtt atacacagat tttcaactgt 40500
gcaggcaatc agttcccctg acccccctcat tgttcacggg tcaactgtat atacacaaaa 40560
gtattatatg aacctcatta gaatagctgt ctatagggag aagagaatga gagtgggata 40620
aaacggaatg aacaaataaa ccaacaaatg cattaacaag caaaacaaca gaggggcttg 40680
catgggccag tgatgataaa gggctaagaa tgagaatata attaattcaa ttcctcacac 40740
ctgaggtcta aaaccaagga aagggagggc caggcgtgga ggctcacgcc tgtaatccca 40800
gcactttggg aggctgaggc gggcggatca caagattagg agtttgagat cagcctggcc 40860
aacacagtga aagcccatct ctacaaaaaa tacaagaatt acccaggtgt ggtggcacat 40920
gcctgtagtt agctactctg gaggctgagg caggagaatc acttgaaccc aggaggcgga 40980
ggttgcaggg agccgagatc acaccattgc actccagcct gggtgacaga gtaagactct 41040
gtctcaaaaa aataaaaaaa ataaaaaaac agagaaaggg aggaaactag atccaggctg 41100
actagataca gcctttagag ttagaaaaga tgatttgaca atctaagccc acactcagat 41160
tgaatgaaat tgaaaagcct ttcaaactaa aacatttaat tacaccatct gctgcagaca 41220
gaactcagac aactcaaaca ggtaatgtca gcgtggtgtt ttatatcacc accctcaaca 41280
cagaataaaa atcagctgca tgtgaagcag tgactagaat gaagaaaagg ctgcttctta 41340
cttccttcta gtggttcttt ccgaaaacat taataggcac cagctctatg catgtcaccc 41400
tgcagggaga catggggtat ataactatga cttactgttc attcctcaag gaattcccaa 41460
tcttgtggaa gattatacac aatgaggcaa caaaaactat ccaataaaac cacggaaaag 41520
aagccagtga caaagaagcc agtgatgaaa ggccctgtga gcagagctga tggccatttg 41580
gggaagaaag accaacatgg atgggggtga tcagggtggc tccgtgggaa agctggaaga 41640
gaagtggcag atctctgagc tggatgatgg gccactacca tctgtatatg gctaattaaa 41700
gaccatgtgt ggatttttta ttcagctctt tcgtgtcatt cctgctatca gcacagaacc 41760
caatctcaac tttccagcta tattgagcta aacttctcac ctcatggaat ttgcagataa 41820
agttcaaaag gatccttgcc ttttcaaaat aattttgaat ggttgagtag tccctctgtg 41880

ctctctcact gacaccctct caaggctgct gagcacgtgc catgctatgg ctttctccaa 41940
catcaggaaa tgttctccac tcagtttcac cttaatacaa atgtgttctc tcttcagaga 42000
aggcaaaaaa attcatgacc atctgactgg gagaagtcat ttctaggtaa agtgtccatc 42060
tttttctgag gaacacagga ggaaaatctt acagaaaaga gttaacacag caggcctaag 42120
actgcttttt aaaataaata aataaataaa taaataaata aataaataaa taaataaata 42180
aataaatgaa tgatagggtc ttctgtattg gccaggctag tctcaaattc ctggcttcaa 42240
gagatcctcc caccttggtc tcccacagtg ttgggattat agacatgagc cattgtgctt 42300
ggcccaagac tgttattctt aaaaagtctc ataaaaagca tggttaatcc ttggctggca 42360
cctgggaact tagatttcag aagggttccc accatccaac ctggaaagag ggactcactg 42420
tgcctaaatt attgtgtggt ttatgctgaa ctcctgcttt tcttcaggta gcgtggaatg 42480
tggtatgtgc tgggcaaagg gggcctgcat gaccagcccc caataaaaac cctgggtgtt 42540
gggtctctag tgagtttccc tggtagacag catttcacat gcgttgtcac agctccttcc 42600
tcggggagtt aagcacatac atcctgtgtg actgcactgg gagaggatgc ttggaagctt 42660
gtgcctggct tcctttggac ttggccccat gcacctttcc ctttgctgat tgtgctttgt 42720
atcctttcac tgtaataaat tacagccgtg agtacaccac atgctgagtc ttccaagtga 42780
accaccagat ctgagcatgg tcctgggggc ccccaacaca gaaataaatt ataaaagacc 42840
aaggactggg catggtggcc catgccggta atctcagcgc tttgggaggc cgaggcagga 42900
ggaccagtta agcccaaaag ttcaaagtta cagtgaccta tgactgcgcc aatgcactct 42960
aacctgggag acagagcaag accctgtccc caaaacaata aactaaacac atacttctgc 43020
cttccaagtg tcttaaaatt caatggaatg gtagaaacat ttttaaaaca ctaaatcaaa 43080
agaaacctgg aaaacaagag tgccgatggc caactaaaat gtctaggaaa tttctgaaaa 43140
gtaaaaagta ctcagaacca gattacctga gcaaaccata gcccaataca agcttgggag 43200
gaggctgtta tgcagaagga aatggtaaca ggtttccagg aacagacttg taacagcaga 43260
tagaacagca gaggtagaac ctgacaaggt gattacctgg ggaactgcag tctgaatgac 43320
caggactgtt ggacccttcc cctcacatgg aatacacacg ccactcagca gcacaccaca 43380
gctcttcaac aatcacagga ggcacgctac gcctagtaag acaggaaaaa aggaattctc 43440
aaacttcgaa gatgaacaca taaagaatca ccaagttttt attcagtatg atgaaacagg 43500
gacactgaat caacagaaca caaacccaag caaagataat tactagagca catagaagaa 43560
attattagat attcttggga agacctaagg ggacattata aagagcaagc agttggtatg 43620
tgacgatctt tgtgatatac caagaaataa aaacacagga tgaagaccag atagagaata 43680
atgctactat ttgtgcaaaa aaggagaaat ggagaatctg attcatattt gcttgtattt 43740
gcatgaagaa actttggaag gtacataagt aactaacaac aatggttacc tacttgtaag 43800
gcgagagaag taagaggaca ggaatggtgg gaacaccttt tgtgtccgga attggtgggt 43860
tcttggtctg acttggagaa tgaagccgtg gaccctcgcg gtgagcgtaa cagttcttaa 43920
aggcggtgtg tctggagttt gttccttctg atgtttggat gtgttcggag tttcttcctt 43980
ctggtgggtt cgtagtctcg ctgactcagg agtgaagctg cagaccttcg cggcgagtgt 44040
tacagctctt aaggggggcgc atctagagtt gttcgttcct cctggtgagt tcgtggtctc 44100
gctagcttca ggagtgaagc tgcagacctt cgaggtgtgt gttgcagctc atatagacag 44160
tgcagaccca aagagtgagc agtaataaga acgcattcca aacatcaaaa ggacaaacct 44220
tcagcagcgc ggaatgcgac cgcagcacgt taccactctt ggctcgggca gcctgctttt 44280
attctcttat ctggccacac ccatatcctg ctgattggtc cattttacag agagccgact 44340
gctccatttt acagagaacc gattggtcca tttttcagag agctgattgg tccattttga 44400
cagagtgctg attggtgcgt ttacaatccc tgagctagac acagggtgct gactggtgta 44460
tttacaatcc cttagctaga cataaaggtt ctcaagtccc caccagactc aggagcccag 44520
ctggcttcac ccagtggatc cggcatcagt gccacaggtg gagctgcctg ccagtcccgc 44580
gccctgcgcc cgcactcctc agccctctgg tggtcgatgg gactgggcgc cgtggagcag 44640
ggggtggtgc tgtcagggag gctcgggccg cacaggagcc caggaggtgg gggtggctca 44700
ggcatggcgg gccgcaggtc atgagcgctg ccccgcaggg aggcagctaa ggcccagcga 44760
gaaatcgggc acagcagctg ctggcccagg tgctaagccc ctcactgcct ggggccgttg 44820
gggccggctg gccggccgct cccagtgcgg ggcccgccaa gcccacgccc accgggaact 44880
cacgctggcc cgcaagcacc gcgtacagcc ccggttcccg cccgcgcctc tccctccaca 44940
cctccctgca aagctgaggg agctggctcc agccttggcc agcccagaaa ggggctccca 45000
cagtgcagcg gtgggctgaa gggctcctca agcgcggcca gagtgggcac taaggctgag 45060
gaggcaccga gagcgagcga ggactgccag cacgctgtca cctctcactt tcatttatgc 45120
ctttttaata cagtctggtt ttgaacactg attatcttac ctatttttt ttttttttt 45180
tgagatggag tcgctctctg tcgcccagac tggagtgcag tggtgccatc ctggctcact 45240
gcaagctccg cctcccgggt tcacaccatt ctcctgcctc aacctcctga gtagctggga 45300
ctacaggcaa tcgccaccac gcccagctaa ttttttattt tatttttttt ttagtagaag 45360
cggagtttca ccatgttagc cagatggtct caatctcctg acctcgtgat ccatccgcct 45420
cggcctccca aagtgctggg attacagacg tgagccactg cgccctgcct atcttaccta 45480

tttcaaaagt taaactttaa gaagtagaaa cccgtggcca ggcgtggtgg ctcacgcctg 45540
taaccccagc actttgggag gccgaggcgg gcggatcacg aggtcaggag atcgagatca 45600
tcctggttaa cacagtgaaa ccccgtcgct actaaaaata caaaaaatta gccgggcgtg 45660
gtggtgggca ccggcagtcc tcgctactgg ggaggctgag gcaggagaat ggcgtgaacc 45720
tgggaggcag agcttgcagt gagccgagat agtgccattg ccttccagcc tgggcgacag 45780
agcgagactc cacctcaaaa aaaaaaaaaa aaaatagaga cccggaaagt taaaaatatg 45840
ataatcaata tttaaaaaca ctcaagagat gggctaaaga gttgacggaa caaatctaaa 45900
tattagattg gtgacctgca aaaccagccc aaggaacatc ccagaatgca gcccataaag 45960
ataaagagag catttccgct gggcacagtg gtatggcagg ggaattgcct gagtccaaga 46020
gttgcaggtc acattgaacc acaccattgc actccaggcc tgggcaacac agcaatactc 46080
tgtctcaaaa aaaaaaaaaa ttaaattaaa aaagacagaa tatttgagag aaaaaaatgc 46140
ttatttcaag aaacatgaaa gataaatcaa gatattctaa ttcccaagta agaataattc 46200
cagaagcaga aaatagaata gaggcaagga aacactcaaa acttctccag tgccatagaa 46260
atgtgtatta atctttagaa tgaaacggac taccaaatgc tgagcaggaa gaacaaaaga 46320
gatccactct taagccagtg tggtgcccaa gcgcagtggc tcatgcctgt aatcccagca 46380
ctttgggagg ccgaggcagg tggatcacct gaggtcagga gtttgagatc agtcaggcca 46440
acatggtgaa accctgtctg tactaaaaat acaaacatta gctgggtatg gtggtgcaca 46500
tctgtaatcc caactacttg ggaggctaag gcaggagaat cacttgaaac caggaggtgg 46560
aggttgtagt gagccgagat catgccacac tcccagcctg ggtgacagag caagattcca 46620
tctcaaaaaa aaaatccact cctagacaaa taatagttaa attttagaac accaaggaga 46680
aagaaaaaaa attgtaaagc ttcagagaaa ataaacatta actacaaaga aacgagagtc 46740
agacgcgtgc acttcttcct agataccagc agataaagca atatctccaa aattcagaag 46800
gttttaacgt agaatcctat acccagtcaa gaatattcac atggaaaagt gaaataaaaa 46860
acattgttta aacatgcaag ggttcagaaa gtttaccatt cacagaatcc ctgaaaacaa 46920
aaccaaataa tcacttaagg actcattaag aaaacaaatg aaataaaagc accaatgatg 46980
agtaaataat cagaaaaatt tacagtttac ctaaataact gtttatgcat aatgtatgaa 47040
aacccaaaaa tttaatatgg gacagaatta aaatcatgat aagattcttt tttgctttac 47100
tcatggagag ttcacataaa cagattatct tttaatagca agagaaaaaa atgtttagat 47160
atgtgtgaaa aactaagggt accaaaacag tgcaaattca tttatcatca ggaaaatcca 47220
aattaaaacc acagtatcca ccagaataac taaaaggtaa aagacagaaa ttaccaagag 47280
ttggcaagaa tgtggagcaa ccacatatac ttctggggta aataagttgg tgcaaccggt 47340
actgaaaact gtttgctagt atctactaaa accgagcaca tgcacagact acaaccaagc 47400
agttccactc ccagatacac actcaacaga aatgcacaca ctcactcaac aaaagacgtg 47460
tactagagtg ttcatgtact tactattcat aatagtccaa aaatgcaaac aaccaactgc 47520
caatcaaagt caaatgtata tctatattag ggatatatac aatggcatat acacagcaat 47580
gagaatgaaa tgaaccagct cggcacagtg gttcatgcct gtaatctcag cactttgggc 47640
gggtaaggca ggcagatcac ttgaggtcag aaatttgaga ctagcctggc caacacggtt 47700
aaaacctgtc cccactaaaa acacaaaaat tagccgggca tagtggttgc aggcctgtaa 47760
ttccagctac tcgggaggct gggttgggag aatcgtttga acccgaaagc cggaggtcgc 47820
agtgagcgga gatcgtgcca ctgcactcca gcctggacga tagagcaaga ctccgtctca 47880
aaaaaggaaa tcaaaaatat aaaataagat gacaggaata atccgcaaaa gatcagtaat 47940
caaaataaat ataaatgggc taaagctacc tattaaaaga caaagatttc acacccataa 48000
ggatagctac tatcaaaaaa agagagagaa taacagatgt tagcaaggat gtatggaaac 48060
tgaaattctc acgcattgct ggtgagaata taaaatggtt cagcctctgc ggaaaacact 48120
atgctgggtc atcaaaaaat taaaaataga agtactactt gatccaacaa ttctacttct 48180
gggtatatac ccaaataact gaaagcaggg tcttgaagag atatttgtac acccatgatc 48240
atggcagcat tattcataat agctatgatg tggaaccaac ataaatatcc tttgataaat 48300
atatggataa gcaaaatgtg gtgtatacat tcaatggaat attaattagc aataaaaatg 48360
aagaaaattc tgacacatgc tacaacatgg atgaaccttg agggcattac attaaatgaa 48420
ataagccagt tataaaaaga caaatactat atgaggtact atattagata ctcatgcaag 48480
gtacctaaaa taggcaaatt catagagaca aaaagcagaa tggtggttgc caggggctgc 48540
ggtaatggat acagagcttc aattttgtaa gatgaaaaaa ttctggagat tggttgcata 48600
acaatgtgca cacacttaac actggggaac tgtaaactta aaagtagtaa atggtaaaaa 48660
taaaaataat aaataataaa ttttatgtta ttttaccaca atatttatta aaagacaaag 48720
attaactaat taaacaaaat ccagccataa gctaatggta agagtaacaa ttaaagaaga 48780
cacagaaaat tgaaaatcag tgactagaaa aagatattcc atataaatgc taacaaaaag 48840
caagtacagc aatataaaga gaatgaacaa aaaaaaaatt aaataagatg gctcgtttat 48900
tcccaaaagg tacaattcac caagaagata caagaattgt gaacctttaa gcacataaaa 48960
cagcttcaaa aatacaacat ttaaagaaaa atatatatta aacatagaaa tagtacaaaa 49020
acccctacaa gaatcataat gggagtcttc aatacaactc tccatatcaa caggtcaaac 49080

agagaaaaaa aataagttaa ggatgcagaa aacctgaatt accatcaata aacttgagat 49140
taatatagaa ctgtataccc aatatactaa gagttcaggg aacagtcgtg actgacagtg 49200
gactgcaaat taatctgttc ttaatctttg tttttctttc agcactgtgg cagaatagag 49260
atcctaaaaa ccttccagct acaaaacatc tttttaaaaa tataaaaaaa tacaaaaata 49320
actctgaaat caatagaaga cacatggtga aaccaaaatt ctagaataca gggagaataa 49380
aggcattttc agatattaca aaaacagaaa attgatcatt gctgaagtaa tttctaaaga 49440
atgtacttga gggagaagaa aaatgttcca aagaaaagta tctgtgatac aagaaggaat 49500
ggaaagtgaa gaaatggtaa acaggtagat aaagctaata aatgttgacc tagaaaataa 49560
caaaaacaat agcaataatg tctcgttgga agggttgaag taaaaataca attaaggcca 49620
aatgtgaggt aagtggaatg aaagaattag aagtccttgc cttgttcaca ggactgatta 49680
aataaatgag ccaggttttc cattcaaaca gttaaaactt gaacaaaata aactcaaatt 49740
aagtagaaag ataaaaaaca gaaattaatg tcatagaaaa ataaaaaatc aatagaatta 49800
atcaataaat cctggttaat aaaagctggt tctttgaaag gattaataaa ataatcatta 49860
agcaagtctg atcaaaaaaa aagagaaaag gtaccaaaaa aagtactgta tcagaaagag 49920
aacatacaga tacatacaga tatgtaagag tctgttttct tacaccagaa tactatatac 49980
aacattatgc tagcatatat taaatttcaa taatgttaat gattttctag gaaaacagaa 50040
aatattaaat ttactttgaa gaaacagaaa aactgagaaa aataaatgat catgaaaaaa 50100
atgaaaaggt aattaaatac tgatattaac tgcctaaaca acaccagcag cagcccaggc 50160
agtctgcagt caagttctgc caaacttgag ggaacagata attcttctat tccagagcat 50220
agaaaatgat ggaaagtttc ccaatttaat cagagaggac agcctgatcc ttgttatgaa 50280
cacagataaa aatggggtaa actatatgcc aaactcagat accaaaaccc taaataagat 50340
gctagcttat tgatgtgaac aatccaaaag tgcattttaa attagcccag ggttttagag 50400
aaagaaaatc tagcaatgtg accaccactt atgttaacaa ttttaagacg aaaatctaca 50460
tgatcatatc aatgcatgct acacaaaagc atttgggcaa aaaacccaac acccaccctt 50520
gacttttta actcttagta attaggcata aacagaaatg tacttaatgt gatagaatac 50580
actcggtgaa gatacagagg gaatgctccc taaaaccaag cccaagacaa agattcctat 50640
ttaacctcaa tagtcaacac tgcagcgaga gtaatctatg gaagacaagg aaaaaagtaa 50700
aaacatgaga gacatctgtt gtttaacaga caataagatc acctacttgg aagaggcaaa 50760
cgaatcaagc gaaaaactat taaaactgag acaggcttta gtatggaggc tcagcttcag 50820
ctgtagtttg ggctaccaaa ttcaactcgc ttgcttggag agttaatcct gcaaagctaa 50880
tttctgttga ggtattagga ttgacaagcc tgtgctcctc cctcctcccc catcttcaac 50940
actgaaataa cacggtgttt ggaactggat aacagaatct tccaaaaaca aaaattgtcc 51000
tgaagggctg acttgtgccc ttactcaaaa aacactttat ctgctgcctg cagctcctac 51060
agttgctggt ggataagcct gccaaccagc tcggcgtaat tcttcctgca gagggcaagg 51120
aagagcactt tcacaggaaa attttttttcc gaactgtatg ccgcttatta cataaactta 51180
cgtgctggca aatggagctc cagcaaaata agatattcag agtcaaactt ccttaggaaa 51240
aaaaaaaaaa aaaagcaagc acataacact aatttccttg catgggcact ggggaaggag 51300
gtcgttactt ccgcacgccc gcaggtccgc accaccggga aacccacggg caccgcgcgc 51360
tgcccccggg ccttccaggt gcactgcgcc gcggcgcccc agctgacccg ggatgcgcag 51420
ccctagccct tcccctgtca ccccggccag gaaggggcgg gagcgcggcg gacgccgagg 51480
gcgaagggct tctcggtcct ctgcaccacg cagcaccccc aaggcacaac agggagggtg 51540
cgggaggctc ccgagaccca ggagccgggg ccgggcgtgc ccgcgcacct gtcccactgc 51600
ggcgagggct ggggtcgcct ccagggccgc agctgtcggg agccacctgg ctctcagtcc 51660
cgggtccctg cgacaaccct cgggcccgga ggggaggagg cggccacctg ccgctgccac 51720
ctgcggcacc ggtcccaccg ctccgggccg ggcaggacag gccaggacgt ccctcctggg 51780
ctggggacag gacacgcgac gaggggaccg gggcccccgc ggcgaagacg cagcacgcct 51840
tcccagaaag gcagtcccgt gcccccacga cggactgccg gacccccgcg ctcgcccgcc 51900
catcccttca gaccacgcgg ctgaggcgca aagagccggc cggcgggcgg gctggcggcg 51960
cggctagtac tcaccggccc cgctggctca gcgccgccgc aacccccagc ggccacggct 52020
ccgggcgctc actgatgctc aggagaggga cccgcgctcc gccggcgcct ccagccatcg 52080
ccgccagggg gcgagcgcga gccgcgcggg gctcgctggg agatgtagta cccggaccgc 52140
cgcctgcgcc gtcctccttc agccggcggc cgggggcccc ctctctccca gctctcagtg 52200
tctcatctcc ctatctgctc atcctctggt cgcacataat cgatgtttgg gcgtcccaag 52260
ccagatgtgg accccatttc cgcactctac actggaggtt ttctaagggt ggtgcccgga 52320
ccagcagctt cagcctcatc tgggaacttg agaaaatgca gattctccgt cccacccagc 52380
ctattcggtt tttcctgcac taaaaccatg aaggtggggc ccagcagtcc acattctcgc 52440
aagcccgtca agtgattctg aggcgccctc cagtttgaga gctatgctca cggcctcacc 52500
tccgccccgc aaggagcccg gtcttgcctg tggcgctagc cgcacacgga cacctcatcc 52560
tgcggggccc gccccccccgc tgcaccctca ccgcccaacg cctcctccgg gatgcagcgg 52620
aggcgcctgg aagtcggcaa ggtcaacatc cccctcagca tcttccctac cctcacggct 52680

cctcctccag gggtgcctca tggccagggg ttagaaagag ccactgtgtt tcttgacatg 52740
gaagtggcct aagaccttaa tgaaaactgc aggagtggaa tgacagaacc tttggtcata 52800
cttgagggcg tgaagctcaa atgaggagga aggaaaggat ccagggagaa taaccaaccc 52860
tggcaagttg tggcgcccag gtagaggggc gagcctaggc tagcggttct cgaccagggc 52920
cggtgttgcc cctcctcgcc gccccgcgta catttgggga ggtctggaga catttttggt 52980
tgtcatgatg cgggagttgc tactgttgcc taagtgggta gacacgaggg tgctcctcaa 53040
catcctacct gaaggacagg actgccccac aaggaagaat gatccggccc caaataagaa 53100
accctgggct ggtcagcaac aacccctttg ttctgagaag agaggaggaa agaataaaag 53160
aagtggggtg aagttttggt ttggtagagg aaacttgaag acattttcac tggaaaggaa 53220
gagaggaaga ggagggagat gtctgtaagg acgagcaaac cgggtgacag ctgatttcct 53280
catattgaag taatgagtcc tagttataat aaattcctaa taaaaaccca gtttatccct 53340
gcaataaact tgtcttttt ttttaaatat actgcttgat tctgtttgct aatatttat 53400
ttacaggctt tgcattgata tgcaaaaatg agatgggcaa taatttctt tttgaatgtc 53460
taatgttgtt tggtttcaga atcaatgtta tgctcacatc ataaaaaatt tggaaccgag 53520
gcaggaggag tgcttgaggc cagaagttcg agaccagtct aggaaacaca gtgagacccc 53580
cccatctcta caaaaaaaaa aaaagaaaaa aaaatgggca tgtttgcttt ttccttttac 53640
tctgaacaat ttaaggagca ttaaaattat ctattctttg aggtttgatc atttcccagt 53700
taaaaatgtt cctcccagcc tgatgctttc tttggggagg gtaaatcttt taaggctaga 53760
aaagtttctt ctgtggcaat tttattattt acattttaaa aattattcta gagttaattt 53820
tgataaagca tgtatttctt aaaacaaatt atccttttt tccagatgtt caagtgtatt 53880
tgcataaagt tgaggaaagt agtcttttgt gaatctttta acttctccca aatatcttat 53940
tttgtgtatt tttgcttctt tattttgtta acttttaaaa gtgtattttt ttttcaaaga 54000
atcagctctt aggtttatgt ttttggttat actggagctt ttttcttctt ctttttaaaa 54060
tatttttct cctttatttt ttagacgtat tttgatctaa cgtaatcgga agaaggtaaa 54120
ttagaatctt ttgttactat tgtgttttta tttctcctta tttctctgaa gtcctgcttt 54180
ataaatagta ccatgttatt tgtgcataaa tattcatttg tcttatattc ttgggaattt 54240
tcccacttca tcataaaatg accttccttg tctcatttaa tgtgttcaaa ctttgccctg 54300
aatttaactt tgtctgatat tttaccatcc tgctgaattt tgtttgttac cccaaacaac 54360
ctttgctgtt ttcgtctttt ctgaaccctt tattttaggt aatcccttga attagagcac 54420
taagttttgc tttgtgatta aatctgaaaa tctttatctt gccatagatg agttgagccc 54480
tattcatgtg acagctatat tatgctgttt catagccctt ttggtccttt tttcactctt 54540
gcattgcata ttttgtgttt attgtgtttt gtgtttcttc tgataatttg gaaggtttgt 54600
atttttattc agggagttgc cttataatca tactccgcaa tacacatcgt cctcagtttc 54660
ttcagactgt ctgttaactc cctattctga ataaaaatga cattgtaatt tccctctttt 54720
ttctttaccc cttttcttct cctcacctaa tgtaaatgat tttatccttc tttagtattt 54780
gctttttaa ttaactacat ttataaatat ctttatcact tgatttttaa atcagctttg 54840
aatgagatat ttggattcct agatataaaa gatgttaatt ataccatttc cacgttagta 54900
ggtttataaa atcatacatt ctgctgtgta accataatcc cacgtttgtt ttagttccac 54960
tcctacagtt aaaagattca gaagtattat taacagttat tttgccatag ttttttcccc 55020
aacccatttt gtggtaagtt atgatcctgc tttagtttct taagaataat ttatagagca 55080
gagtgtggtg gctcacgttt gtaatcccag cactttggga gacaagaggt agaaggatcg 55140
cttgaagcca gcagttcaag accaccctga gcaacatagt gagaccttgt ctctacaaaa 55200
aattttaaaa tttagccaga cgtagtggcg tgtgcctata gtcccagcta ctcaggaggc 55260
tgaggcaaga ggattgctag agcccagaag tttgaggctg cagtgacctc tgattgtgcc 55320
actgcacccc agtctgggca agaaagtgag aacctatctc tttaaaataa caataataac 55380
ttatgaaaat tatattccct gagttttca tgtttaaaaa tatttgttgc ctttatcctg 55440
taaaagtttg agtataaatt cttgggttat actttattta ttgaagaatg tataagtatt 55500
gtcttctaga attgagtgtt gctgtaatga aaccagaagt cagcctggtt tatttttcct 55560
cagaaatgag gtaattgccg gccggacacc gtggctcatg cctgtaatcc caacactttg 55620
ggaggccgag acaggtggat cacgaggtca ggagattgag accatcctgg ctaacatggt 55680
gaaaccccgg ctctactaaa agtacaaaaa gttagctggg catggtggtg gacgcctgta 55740
atcccagcta cccgggaggc tgaggcagga gaatggcgtg aacctgggag gaggagcttg 55800
cagagagctg agatcgcgcc actgcactcc agcctgggcg acagagtgag actccgtctc 55860
aaaaaaacaa aaaaaaaaca aagaagtgaa gtaattgcca tgatgctcca agaattatct 55920
ctttgtctat gaaatccaga aatctcactg ttatacattt tggaattatt attctgggcc 55980
aatatttcct gggacacaat agattgactc tatagattta attttttttt ttttttgag 56040
acagagtctc actgcaatct cagcttactg caacctctgc ctcacgggtt caagcaattc 56100
tcctgcctca gcctcccaag tagctgggac tacaggcgcg tggcaccatg cctggctaat 56160
ttttgtcttt ttagtagaga cagggtttca ccatgttggc caggctggtc ttgaacgcct 56220
aacctcaagt gatccacctg cctcagcctc ccaaagtgct gggattacag gcgtgagcca 56280

ccatgcccag cctcaattcc tctttctatc tggtaatttt tctgaagttg aaaacatttg 56340
ttctaatacg ttatttcagt gttcttctaa gatgtgtaaa gcaccctatt cccaggtcag 56400
cccccatctt gctagtgagc tcggctggtt cttcacaaga gctctggttt tctcctgctt 56460
aatctcaagt acctctgtca gcctccacct ggtttatgat ttggagtttt ttggtttttg 56520
ttttttgttt ttgacagagt cttactctgt cacccaggct ggagagcagt ggcataatct 56580
cagctcactg caacctctgt ctcccaggtt tgagcgattc tcctgcctca gcctactgag 56640
tagctgggat tacaggcgcg tgccaccaca cccggctaat ttttgtattt ttagtagaga 56700
tggggtttca ccatgttggc cagggtggtc ttgaactcct gacctcaggt aatccacctg 56760
cctcagcctc ccaaagtgct gagattacag gcgtgagcca ccgcgcctgg catggtttgg 56820
agttttaatc tgtagtttta ataaagatag tgcttatgtt tgtgtttctt atatttcttg 56880
gtactcttgg gtaatttgta agatccccat atctacacaa gaagtccatt ttcaattctt 56940
ttcttcagac tgtttatttt attttatttt attttatttt tatgtttgag atggagtctc 57000
gctgtgtcac ttctggaggc tggagtgcag tggcgcgatc tcaggtcact gcaacctccg 57060
tctcccgggt tcaagcaatt ctcctgcctc agcctcccga gtagctggga ttacaggcac 57120
ctgccacttt ttaatttttt tagagacaga gtctcgcttt gttgaccagg ctggagtgcg 57180
gtggtgcaat catggctgac tataacctcc aaatcctggg ctcaagtgat cctcctgcct 57240
cagcctcctg agtagctggg actacaggca catgccacca tgcccagtta attttaattt 57300
ttttgtagag acagggtctc catatgttgc ccaggctggc ctcctactcc tggcctcaag 57360
taatcctcct acctcagcct cccaaattac taggattata agcatgagcc accatgccca 57420
gccttgttct actactttaa tttcatatgt taggtgacca tgtaattgat catccaaacc 57480
aggatactgt aagaatgaaa gaggctgaca gtagtatgat gctgggacta gcattgtgca 57540
ctgagattat ttctgggaaa gcaggagata cggtcaccct acttatagtg tgcttgtctt 57600
tggattgttg aatttggagt ttctatttgc aggcttattt caactgggca gccttgatcc 57660
gccctgccca gcaatgctac cgttctctcc accgggtctc tgggacccct tcagtcacta 57720
tacttagctc agttccccac cctcccactc cctaaaagcg taaccaggaa tcctgcctca 57780
ggtctactgc cgtcttccgt gggctgtttc agttcctatt acccagagtc aaactcccag 57840
cattccctac ctgattccag acttggagtc cagagcttta acctcttcag gccaactccc 57900
cactttgcat ttctgtccct atatcttagt ccatggagat acatttcatg tctttgagtc 57960
tacttacaaa gtaaattttg ctgtttttta attttttttt tgagatggag tcttgccctg 58020
tcacccaggc tgtggtgcaa tgacgccatc tcggctcact gcaacctccg cctcctgggt 58080
tcaagcgatt catctgcctc agcctcccaa gtagctgtga ttacagacag gcaccaccac 58140
gcccagctaa ttttttttat cttttagtag agacagggtt tcaccatgtt ggccaggctg 58200
gtcttgaatt cctgacctcg tgatctgccc atctcggcct cccaaagtgc tgagattaca 58260
ggcgtgagcc actgtgccca gccaattttg ctttttttat atttcattgc tatatgttta 58320
gaggataagt ttacagtgct atatgcattc ccaaatatta gaccaaaaaa atctccaaaa 58380
aattagaaag aaaatccaaa aaatctcaaa aaataccaaa aagcaacaat ctcacagacc 58440
atactcactg acccccaata aaataaaatt agaaattaac cacaacttaa caaaataaag 58500
tactcaagtc agagaggaaa gaggaaataa acatcaaaat tacaaagtct aggcggtggc 58560
tcacgcctgt aatcccagca ctttgggagg ccaaggcggg cagatcacaa ggtcaggaat 58620
tcgagaccag cctggccaat atggtgaaac cccgtttcca ctaaaaatac aaaaattagc 58680
caggcatagt gatgtgtgcc tgtaatccag ccacttggga ggctgaggca ggagaatcac 58740
tgaacccagg gagacgaaga ttgcagtgag ccaaaatcgt gccactgcac ttcggcctgg 58800
gtgacaaagc gagactccat ctcaaaaaaa aaaaaattac aaactcttta gatagaaatt 58860
ttggtgtttt tttttgagac ggagtctcac tctgtcgcag aggctggagt gcagtgggac 58920
tatgtcagct caccgcaacc tccatctcct ggattcaagc aattctcctg tctcagcctc 58980
ccaagtagct aggattacag gcgcccacca ccagacccag ctagttttta tatttttagt 59040
agagatggtg tttcaccatg ttggccaggc tggtctcaaa ctcctgacct caagtgatcc 59100
acctgcttca gcctcccaaa gtgctcagat tacaggcgtg agccaccgca ccccacctag 59160
atagaaattt caacatgagg ccgggcacaa tggctcacgc ctgtaatctc agcacttcag 59220
gaggctgagg cgtgggagga tcacttgggc ccaggagttc aggaccagca tgggtgacag 59280
agacagaccc tgtctctatt tatttgaaaa aaaaaaaaaa aaagagagag agaaagaaat 59340
ttcaacatga aaagtatctc tcaaaccctt cgagatgttg gcaaaaagcg actcaaagga 59400
aaatgtatta ctgtgtgtga atttgcttga aaataagaaa gaggccgggt gtggtggcta 59460
acacctgtaa tcccaacact ctgggagtcc gaatcaagtg gatcatgagg tcaggagatc 59520
gagaccatcc tggctaacat ggtgaaaccc tgtctctact aaaaatacaa aaaattagct 59580
aggcgcggtg gctcatgcct gtaatcccag cactttggga ggctgaggca ggtggatcac 59640
ctgaggtcag gggtttgaga ccagcctggc ctacatggtg aaacctcgtc tcttctacaa 59700
atacaaaaat tagctgggcg tggtggtggg tgcctgtaat cccagctact cagaggctga 59760
ggcaggagaa tcgcttgaac ccgggaggcg gaggttgcgg tgagccgaga tcgcaccact 59820
acactccagc ctgggcaaca gcctgggtga cacagtgaga ctccatctca aaaaatacaa 59880

aaaattagct gggtgtggtg gcctgcgcct gtagtcccag ctacccggga ggctgaggca 59940
ggagaatgga gtgaacctgg gaggaggagc ttgcagtgag ccgagatccc accactgcac 60000
tccagcctgg gcgacagagc aagactcttg tctcaaaaaa aagaaaaaaa aaggaaaaaa 60060
gaaccctgat aataaagaaa ccaaatgttc aactctcaaa gctcggacac tttaaagaaa 60120
taattaataa aggcagaagt taaagggagg atgataaagc aatttttttt gttggttttt 60180
ttgagatgga gtcttgctct gtcacccagg ctggagtgca gtgatgcgat cttggctcac 60240
tgcaacctct gcctcccggg ttcaagcaat tctcctgcct cagcctcctg agtagctggt 60300
actacaggtg cgcgccacct ggcccagcta atttttgtat ttttattaga gacggggttt 60360
caccatattt gttaggctgg tctcaaactc ctgatctcag gtaatctgcc cacctcggcc 60420
tctcaaagtg ctgggattac aggcaggcgc caccgcgcct ggcctaaagc aaaatattgg 60480
ttctgtgcaa aaggtcaata aaaagagcaa acgtttacaa actggagcca gcacccattc 60540
agctcagtgt gtctggagaa aaaacaatct cgcttcagaa ttcatgatta cgcagccctt 60600
tttgcttcct aaaaatccta ctatgttgct gttgaccatt ctctctcttt ctctctctct 60660
tgctttctct ccagaaaagc tattcagaca ttctcctctt tcctcaaacc tccaacactt 60720
cctcctccat ccttagcctc agctgctgac ctcacttcta atcattgaga aaccaggaga 60780
agcatttaag agtgaacctc cgcctccccg cacgggcaaa accacccacc cacagaattg 60840
tgccccaatt ctgcgtcctc tcctctcacc atggatggac ggtccaggct ccgagccaaa 60900
gccaggcctc ccctggagct ctggatccac cacctgcagc ttctcaggca gggccccagc 60960
agctcccctg ctcccttgta ccatcaatcc ctcccctcac tgggtcactc ccaacaatat 61020
atatatttag tgatgtttct cccatgtggt aaaatcactt agcctctctc ctcccccagc 61080
tactatccta tttgtttctt tccattctct gcaaaacttc tcaaagcatt gtgtctatgt 61140
gctgactcca tttatcttct cccgttctct gctgagtcct tcccacagac tctcacccca 61200
gttactccat gaaatgacct ctgcactgcc acatccaatg gtgaatgttc agttcttaat 61260
tttattcagt ctttcagcag catttgacct ggccgatcac tccctcttct taaaaatact 61320
tttctcagcc aggcgtgatg gctcacacct gtaatcccaa cactttggga ggccaaggcg 61380
ggaggatcat gagagcccag gagttcaaga tcagcctggg caacatggca agaccctatc 61440
tctacaaaaa ctaaaaagta gccagtgtga tggcatgcac ctgtagtccc atctacttag 61500
gaggctgagg cagtaggatg acttgagcct gggaaatcaa ggctgcagtg agccatgatt 61560
gcaccactgc actccagcct gagtgacagc gagaccctgt ctcaaaaaga caaaatagga 61620
aacttttctc agcatattcc tctgattctc ctgctgcttc tgtctgcaca gattcagtct 61680
cctttgccgg ttcttcctca tcctcctgat ctcttgacct tgaagtgccc cagagtacag 61740
tctttttttt ttttttgag acgcagtctc gtctgtcacc caagctggag tgcaatggcg 61800
aggtctcagc tcatgcaacc tctgcctcct gggttcaagc gattctcctg cctcagcctc 61860
ccaagtagcc aggactacag gcacatgcca ccatgcccag caaattgttg tatttttagt 61920
agagacaggg ttttactata ttggccacgc tggtctcaaa ctcctgaact cgtgaaccac 61980
ccgcctcggc ctcccaaagt gctgagatta caggcatgag ccaccacacc cggcccagag 62040
tacagtcttt agacggcctc tctacctata cttgctcccc tcataaactc ctcctgcctc 62100
atggctttaa ataccatcgg tagactgatg actcccatat ttctcttttt tttttggaga 62160
cggagtctcg ctcagtcccc caggctggag tgcagtggcg cgatctcggc tcactgcaag 62220
ctccacctgc caagttcaca ccattctcct acctcagcct ctccagtagc tgggactaca 62280
ggcacccgcc accacgcctg gctaattttt ttgtattttt agtagagatg gggtttcacc 62340
atgttagcca ggatggtctc gatctcctga cctcgtgatc cgcccatctc ggcctcccaa 62400
agtgctggga ttataggtgt gagccaccgt gcccagccga tgactcccat atttctatct 62460
cttgctgtgt gggagttctc ctcagaactc catactcata aatccaactc tcataaatag 62520
tatctcaaat gggcaatatg ctcaaaagtc aattcctact tttctcccta aacttgcttt 62580
cctgcagtct ccaccatctt aatgtccaat ctaacattag gaggcaaaaa ctttgaagtc 62640
attcttgact cttctctatt acacacccta tccaatcttt ctgcagatcc agtcgacccc 62700
caaatccagt tagctctcat catctccccc gttacccccc ggtccaggcc atcttcctct 62760
ctcacctgaa tcactgcagc attctcctca ctggtctctt tggttctgtt ttcactccac 62820
cttagcatag tctccacaga gcagtcagag ggatcctttt aaagtgtaat tcccatcctg 62880
tccctgctct gctcaaaacc ctgtcgtgat tcccgtttta atctgtcaga ttaaaagcca 62940
gagtctttcc agtgacctac atgatctgcc tattatcacc tcccacttct ttccccttgc 63000
tcactccact ccagctctgc agctgtcctt tctgtttcct gaacagccca gattttgctt 63060
ctttagaacc tttgtatttg ctgtcccctc tgtctggaat gtttttccag gaagtcacct 63120
ggctctctcc tgcacttcct tcctgaccac catgtttaaa aatcactcaa acacacttca 63180
ggccggacat ggtggctcac gcctgtaatc ccagcacttt gggaggccaa ggtgggtgga 63240
tcacctgagg tcaggagttc gagaccagcc tggccaacat ggtgaaactt cgtctctact 63300
acaaatacaa atagtagcca ggtgtagtgg cacacacctg taatctcagc tactcaggag 63360
gctgaggcag gagaatcgct tgaacccaga aggcagagga ggtgcagtga gccaagatca 63420
cgccacaaca ccccagcctg ggtgacagag caagacccca tctcaaaaaa aaaaaaagaa 63480

aaaaaaatca cacaaacaca cttctcttca tattcctttt ccaagtttta tttttctcca 63540
gaatacttta cattgtttta atggaagttc tccgtttccc cccaactaga atggatactt 63600
cctgcaggta ggcactctag tcctcccatc caagtactaa ccaggctcaa ccctgcttag 63660
cttctgagag caggggagat caggcctgtt cagggtggta tggcccagga attttgattc 63720
tgttttattc attgctgttc tgttgattct cttttgttcc tcctcctagt gctgagaaca 63780
ctacttgtac ataataagca ttcaataaat atttgttgaa tgaatgactt gttgaatgaa 63840
ttaatctcag aaatgcagga ctggttctac attagaaaat ttttcaaggt cattctctgt 63900
tgtcgtaaca cattaagaga ggaaaatttt gtactctaaa tcatttgata aaatacatac 63960
tgatttctgt tttcaaaaac tcttagtggc tgggcgaggt ggctcacatc tataatccca 64020
gcattttggg aggacgaggt gggcggatca cttgaggtca ggagtttgag accagcctgg 64080
ccatcatggt gaaaccctat ctctactgaa aatagaaaaa ttagccgggt gtggtggcgc 64140
atgcctgtag tcccagctac ctgggaggct gaggcaggag aatggcttga acccgggagg 64200
cggaggttgc agtgagccaa gatcatgcca ttgcactcca gcctgggtaa cagagtgaga 64260
ctccatctca aaagaaaact cttagtgagt ttaggaatcc aaggaagacc ctcaaactaa 64320
atagataatc tagctaccag aagccttcag taaaccttaa cactccatgg tgaaacatta 64380
gaaacattcc tactaaaaga caggctaaga atgcctgcaa tcttcacggc tagtccaaga 64440
agtcaaaaag aagaaatgag cgctgattta aaaaaataaa caaacaaaaa actaccgatg 64500
cagaggctgg cagcaaggac tgaaggactg tacagtactt gcctggagca ggcggatggc 64560
cacacccctg cgaagcctgc tcagctggct gggggacgct ccagtgtgtg agtggcagga 64620
tgcagggtac ttcctctgcc agggagttgc actggggaga tcctcccccа ctcacacttt 64680
ggcagctggg gctttggaat gtgacttagc ttctgtcaaa gggtcaatcc acccтttgat 64740
atatgatgca aaggcgaaca tatgatgcaa aggtgagaga acagcccaaa ttaggacttt 64800
taccacagct gtggaggtgg acagcgacag tggtgggccc tggccagact tttcatgctc 64860
aaaggtggtg gttgttcttc ctacttcttg tccctccagg gcttcctttg cctgtgtgct 64920
gaacctgctt cttttaattt tttttaactt ttttaaattt ttaattgttt taattaaaac 64980
aaattttgaa aactgtctga acctgctttt gaaccctgct atgatttgaa tgtttgtccc 65040
ctgccaaact gattttgaaa cttaatctcc aaagtggcaa tattgagatg gggctttaag 65100
cagtgactgg atcatgagag ctctgacctc atgagtggat taatggatta atgagttgtc 65160
atgggagtgg catcagtggc tttataagag gaagaattaa gacctgagct agcatggtcg 65220
ccccttcacc atttgatatc ttacactgcc taggggctct gcagagagtc cccaccaaca 65280
agaaggctct caccagatac agctcctcaa ccttgtactt ctcagcctct gtaactgtaa 65340
gaaataaatg ccttttcttt atgaattacc cagtttcaga tattctgtta taaacaatag 65400
aaaacgaact aaggcaaact ctcatgattc tactgccatg ccattccaat aaactccctt 65460
tatgcttaag agagccagag ttggccaggc gtggtgactc acgcctgtaa ttccagcact 65520
ttgggaggcc gaggcaggtg gatcacaagg tcaggagatc gagaccatcc tggctaacac 65580
ggtgaaaccc cgtctctact aaaaatacaa aaaaattagc tgggcgtggt agtgggtgcc 65640
tgtagtccca gctactcggg aggctgaagc aggaggagaa tggcgtggac ccaggaggcg 65700
gagcttgcag tgagtcgaga tcgtgccact gcactccagc ctgggtgaca gaatgagact 65760
ccgtctcaaa aaaaaagaga gccagagttt atttctgttg cttgcaacca agaaatctgg 65820
ctggtgcact gaagtttcca taaataatag caatttaaag actctttcca agccaggcaa 65880
tgcctagcct tgtgtagtcc ttgtggtaat acattcattc attcatttgt tcaaccaact 65940
gtgctccaga gactaagaat acaaaaatgg gggccgggtg tggtggctca cacctataat 66000
cctagcactt tgggaggccg aggcaggtag atcacctgag gtcaggagtt cgagaccaac 66060
ctggccaaaa tggtgaaacc cctactctac taaaaataca aaaaattagc tgggggtggt 66120
ggcggacacc tgtaatccca gctactcgtg agactgaggc aggagaatca cttgaacccg 66180
ggaggcagag gttgcagtga gccgagatcg caccactgca ctccagcctg ggcaacaaga 66240
gcgaaactcc acctcgaaaa aaaaaaaaaa aaaaaaagag ggccgggggct gggcgcagtg 66300
gctcacgcct gtaatcccag cactctggga ggccaaggca ggagaattac gaggtcagca 66360
gatcgagacc agcctgacca acatggtgaa accccatctc tactaaaaat acaaaaatta 66420
tccgggcgtg gtggcgcaca cctctagtcc cagctacttg ggaggctgag gcaggagaat 66480
cgcttgaacc cgggaggcag aggttgcagt gagccgaaat catgccactg cactccagcc 66540
tgggtgacag agtgagactc cgtctcaaaa aaaaaataaa aaaaaaaaaa gaattcaaaa 66600
attgtagagt tatagtgtgc ttctagttta gttgagagga catctgtcct tcaaggaagg 66660
ctagaatcta taccctgagt ccttactgaa atcaatccag cagtcaaaac atgggaccaa 66720
cgatcacagc agtaagatag gaagagcacc tttgtacatt tagctcatgt tgagataagc 66780
cactgacaga gctgaaggaa gctcacagtt ctgggttcca tcctttggca tttaaaaaga 66840
aaagtgctaa gaaaattcgg ttggtcacgg tggctcacgc ctgtaatccc aacactttga 66900
gaggccaagg caggcagatc acgaggtcag gagttcgaaa ccagcctggc caacatggtg 66960
aaaccccgtc tctactaaaa acagaaaaat tagccgggca tggtggcgca tgcctataat 67020
cccagctact caggaggctg aggcaggaga attgcttgaa cccgggaggg ggaggttgca 67080

gcgagtgaga gcaggccact gcactccagc ctgggagaca gagcaagact ctgtctcaaa 67140
aaaaaaaaag aaaaaaagaa agaaaggaaa aaaagaaaga aaaaaaaaga aaaaagaaaa 67200
ttcaggccag gccaggcctg gtggctcaca cctgtaatcc caacactttg ggaggctgaa 67260
gcgagacggt gccttagccc aggagtttga gaccagcctg agcaacatag cgagaccctg 67320
tctctataaa aaaaaatttt tttttggcca gacgcagtgg ctcacgcctg taatcccagc 67380
actttgggag gccgaggcag gtggatcacg aggtcaggag atggagacca tcctggctaa 67440
cacggtgaaa ccccatctct actaaaaaat acaaaaaatt aaccgggcgt ggtggcgggc 67500
gcctgtagtc ccagctactc gggaggctga ggcaggagaa tggcgtgaac ccgggaggcg 67560
gagcttgcag tgagccgaga ttgcgccact gcactccaga ctgggagaga gtgagactcc 67620
gtctcaaaaa aaaaaaaaaa aaaaaaaaat taattgtcag gtgtgctggc atgcagctgt 67680
agtcctagct actcgggagg ctgaggtaag aagatcgctt gagcccagga gttcaaggct 67740
gcagtaatag tgcctctcac tctaccctgg gtgacaatga gaccctctct caaaaagaaa 67800
gaaaaaaggg aaagaagaaa agaaagaaag aaagagaaga aaggaaggaa gaaagaaaga 67860
aaaagaaaag gaaggaagga agaagaaaaa aaaagaaaga aagaaaagag agagaagttc 67920
aaagaccaaa gggtcaggat cccaaaatag tttttatgtt ttatttattt atttacttat 67980
ttatttttga gacagtatgg ctctgtcgcc caggctggag tgcagtgatg cgattgcggc 68040
tcactgcagc ctccaaactg ggctcaggtg gccctcccac ctcagcctcc cgagtagctg 68100
ggaccacagg cgcgtgccac catgcccagc taatttttta attctttgta gagatgaggt 68160
ctctatatgc tgcccaggct ggtctcgagc tcctgggctt aagccatcca cccgcctggg 68220
cctcccaaag tgctgggatt acagaagtga gccaccgcgc ctaatcgggt ggtttgtttg 68280
tttattgacg gggtctcgct gctgcccagg ctggagtgcc agtggctgtt cacaggtgca 68340
gtcctggagc attgcatcag ctcttgggct ctagcgatcc tccagagtag ctgcagctgg 68400
gattccaggc gcgccaccgc gcggggctca gaatgggttt ttatattgag ggttatgctg 68460
ccacctagag gatatatgta gtaccgaact gtgtgcgcag ggaggctgag gttgcagtga 68520
gccaagatga tgccagggca ctccagcgtg ggtgacagag caagatttca tctcaaaaaa 68580
aaaaaaaaaa aaaaaaaaaa aagaattgaa agtaaggtct tgaagagata tttgtgcctg 68640
tatggtcata gcagtattaa ctttgaccca ctagctaaaa cacaaaagca acatgtgtct 68700
gtcagcaggt gaacggataa acaaaatgtg gtatatatgt acaattgaat attattcagc 68760
ctttaaaaag gaataaaagg ctggatgcgg gggctcacgc ctgtaatcct aacactttgg 68820
gagactgagg tgggtggatc acccgaggtt aggagtttga gaacagcctg gccaacatgg 68880
tgaaacttca tctctactaa aaatactaaa attagccggg catggtggca cttgtctgta 68940
atccaagcta ctggggaggc taaggcagga gaattgcttg aactcaggag ccggaggttg 69000
cagtgagcta agatggcacc actgcactcc agcctgggca acagagtgag actccatctc 69060
aaaacaaaca aacaaaaaat tattatttcc aaagaaacaa gaccctgggt ccatttccca 69120
gcccacacct gatgttgact cacaacacac agcctggttt gctatgagcc tgcttcattt 69180
aattgtcacc ttaacttcac atcaccctca agtcctggaa taactctttg ctgacctttg 69240
tgtgctgagc catctccatg tcgctcaacg tgcagtccct ctcactgcac tgagtcaata 69300
gccagacgtg gtctgactgc agggtcatcc ttggtggctt aggctgactc gggcatagca 69360
gggtgctctg agacctcacc gcatataggc tttgccccca ataaactcta tataatattc 69420
atattatgtg gtctgggtgt gtgtagcttt gcactgtctt ctcgtgacag tgccctcaac 69480
ctctttccca ggatttcctc ctctacctcc tcaagtccca ctgctctgca aagaccaaaa 69540
gctgcagagt cccagctccc tcctttacac cccacgacgc agcctcctct ctcagaaccc 69600
tttaaacaga gtcttttact gcagatccca agaacagcca cacccctctc tcccacccac 69660
tccagacaca cccaggtaat tatagcaccc agggtaacta tgtagatgga gtccctggaa 69720
catgtggata gtgccccctg ggagtatgca aaagcaacat tgctggcacc tgcagagaac 69780
agggtgacat ccaggaatca gagcatgggc ctctgggagg tagggatgtg gccaggcagg 69840
ctgccaaaaa ttggtagagc aaggccacag gatctttctg accttccttc caaacagagg 69900
ctcctgtact ggtgatccct gtgttgattg accactccct tcctgggggt cgtggtctct 69960
gtcccagttg cccggacttc tgtgagtgtc ctactgaggt ccttttcatg agaagcatgc 70020
tgtccttcca cctgctggga gcaagagtga caacttcaat actataatag cagtggcata 70080
cagagaagaa gaaagatgaa gtggcaagaa aaacaggctt ccaagcagga gtttttctat 70140
aaaaacaaaa acgtttacaa gcaaactttt tataaagggc tagatagtaa atattttagg 70200
ctttgagagc cacatagact tgtttgcagg gactcaatgt cgctattgta gtttgaaagc 70260
agccatcagg gttatgtaaa tgagtgagtc tgattttgtt tcagcaaaat tttatttacc 70320
aaaacagaca atgagtgggc tggatttggc ccatgatcct tagtttgcca actcctgctt 70380
tgggctcacc cagatctgat tttgaattct ggctctgcta ctggttagct gcaggagctt 70440
ggaaggctct ctgagcctgt ttcctcatct gtaaaattaa agcaataatt tctaacactc 70500
aagagtgtta cctcacgcct gtaatcccag cactttggag gctgaggcag gcggatcacc 70560
tgaggtcaga agttcaagac cagcgtggcc aacgtggcaa aaccctgtct ctactaaaaa 70620
atacaaaaag tagccgggca tggtggcgcg catctgtaat cccagctact tgggaggctg 70680

aggcagggat actgctagaa cctgggaggt ggagcgtgca gtgagtggag atcacacctc 70740
cacactccag cctggccgac agagcgagac tccatctcaa aaaaaaaaaa aaaaagagtg 70800
ttagaaggtt ttgagataat gaataaaaga tgccttgtgt atactaagta ttcaacaact 70860
gatagctgca ttggtctaat tataacagtt tagaagcgat tgagtcaaca aatgctggat 70920
ttgtcaggga ggacttccta tcaggaggta gatcttgggc tgagtcctga agcaaagata 70980
ggcattggat agaggagttg agagaacacc ctaggactgt tattattatt attcgacacg 71040
gagtctcttg ctctgtcacc caggctggag tgcagtggcg cgatctcggc tcactgcaac 71100
ctctgcctcc caggttcaag cgattctcct gcctcctaag tagctgagac tacaggtgtg 71160
tgccaccaca cccggctaat ttttatattt ttagtagaga cagagtttca ccatgttggc 71220
catgctggtc tcgaactcct gacttcaggt gatccacccg cctcagcctc ccaaagtgct 71280
ggaataacag atgtgagcca ccgcacccag cccagaacca tttttcaatc cttggctctg 71340
ccttttatta gctgcaagat ctcaggcaat ttatttaacc tctccaaaga ctcatttct 71400
cattcacaaa atgaggcaaa taataatatc tactatccca ggttgtcatg agaattaaat 71460
gcaacatgac atttaatgaa atgagaagtc ccttggacat taactggcta aagtatgtgc 71520
tcgacaagga tatcatttta ggtggatact tagcatctca gaactgatgc tcacaatgga 71580
atatcattga aacgcattaa aattcatttt aaatgattgt aggtagtgag gcaattgaaa 71640
gaagaagaca agaggactga ttataatgct tcaggctcac tagtctcctt ttaggaggga 71700
aaaacaattt caagttaaat tttaggctct agatttttac ccctgctgct cattagaatc 71760
acccagattg atgaaatcag agcccatctg aggctgtgtt tttcatctcc agaatgagag 71820
ctgttgtggg gattaagttt ttgaaaaagt acatctaaca ggtgatcgaa aatgatagtg 71880
atattattgc agtgatggtc attattgttg ttattattat actgaaagag gcttcagttt 71940
tctgatccat aaagtgaggg aattgcatga gaccattgct aagattcctt ctagctctgt 72000
ttttttgttt ttgtttttta gacagagtct ctgtcgccca ggctggagtg caatggcatg 72060
atcttggctc actgcaacct ccgcctcccg ggttcaaatg atcctcctgt ctcagcctcc 72120
gaagtagctg ggactacagg cacacaccac catgcccagc taacttttat atttttaata 72180
gaggtggggt ttcaccatat tggtcaggct ggtctcaaac tcctgacctc aggtgatcca 72240
cccgcctcgg cctcccaaca tgctgggatt acaggcatga gccactgtgc ccaacccctt 72300
ctagctttct tgatcactga ttctagggtt ctctgctgaa atatatttga gacatcctgg 72360
ataaaagatc atgcaagagc tcccaatatg gtattaataa ttgattctgg aggcttagct 72420
actcctgatg gattagacat gactcaactg cctctcttat gtgtacaaca caacaacaca 72480
accaagaaag gttattctgg cattccattt attcagttta tttacagccc ttacttccag 72540
cagcacgtta aagatatggc cagggccggg tgcagtggct caagtctgta atcccaggac 72600
tttgggaggc caaggtgggc ggatcacaag gtcaggagtt tgagaatctg gcaattcttc 72660
agacttagaa gcaaccagct cgataacaca gtcttgtgtg ggctctccct ctgtccctcc 72720
ctcgcttccc tcatttctca tccctgcccc tgagactgtg caccttcaca tagccctgcc 72780
atgagacctt catctcaggc tttgctttct ggggtaactg aggctaaaca ctgagtggcc 72840
ctaaaagagg attgggattt ggaagttaga ttattcacca gagaacagac tttgctgatg 72900
atcaggccca ggttgtaatt gttgaaaaaa agagaggatg catagtctta tctcatctcc 72960
tagtcaaagt caacaccatg ataaataaga gtcaaatcct gagatgtgaa ttggggacat 73020
ttgagtggtt aaccctgaga agcttgcacc ttcagacccc tcaatacccc tgctccccag 73080
agaaggctgg acattgacct cagcacaggc aggagccctg caagatgcca tttgtcctac 73140
taaagatgga cccctccact ctgtttctag gtaaataacc aaagtcaagt ctccacacag 73200
cctgagcaag aaagtcagag cctgctacag gagaaaatac cacactggcc aaaggattca 73260
ctagccctgg ccactgtgtg tgggaggaac cagggaatca tgtgtgggag tcaatgttga 73320
agctgttgga ctgggggtgg ggtggaatat aagcctggcc ctggggagtt tttcccgttt 73380
gagggccttt acccacaact caagatccag tgctatagca ggagatccca gagctagtcc 73440
taacagatgg tcaggattga acttggccta gagtaaaatg aggaggatag tgccagaact 73500
ttctcaacat actattgagg aagaggtcag aaggcttaag gaggtagtgt aactggaaag 73560
gggtcctgat ccagacccca ggagagggtt cttggacctt gcataagaaa gagttcgaga 73620
cgagtccacc cagtaaagtg aaagcaattt tattaaagaa gaaacagaaa aatggctact 73680
ccatagagca gcgacatggg ctgcttaact gagtgttctt atgattattt cttgattcta 73740
tgctaaacaa agggtggatt atttgtgagg tttccaggaa aggggcaggg atttcccaga 73800
actgatggat ccccccactt ttagaccata tagagtaact tcctgacgtt gccatggcgt 73860
ttgtaaactg tcatggccct ggagggaatg tcttttagca tgttaatgta ttataatgtg 73920
tataatgagc agtgaggacg gccagaggtc gctttcatca ccatcttggt tttggtgggt 73980
tttggccggc ttctttatca catcctgttt tatgagcagg gtctttatga cctataactt 74040
ctcctgccga cctcctatct cctcctgtga ctaagaatgc agcctagcag gtctcagcct 74100
cattttacca tggagtcgct ctgattccaa tgcctctgac agcaggaatg ttggaattga 74160
attactatgc aagacctgag aagccattgg aggacacagc cttcattagg acactggcat 74220
ctgtgacagg ctgggtggtg gtaattgtct gttggccagt gtggactgtg ggagatgcta 74280

ctactgtaag atatgacaag gtttctcttc aaacaggctg atccgcttct tattctctaa 74340
ttccaagtac caccccccgc ctttcttctc cttttccttc tttctgattt tactacatgc 74400
ccaggcatgc tacggcccca gctcacattc ctttccttat ttaaaaatgg actggggctg 74460
ggcgcggtgg ctcatgcctg taatcccagc actttgggag gccgaggcgg gcggatcatg 74520
aggtcaggag atcgagacca tcctggctaa cacggtgaaa ccccgtctct actaaaaatg 74580
caaaaacatt agccaggcgt ggttgcaggt gcctgcagtc ccagcggctc aggaggctga 74640
ggcaggagaa tggcgtgaac ctgggaggtg gaggttgcaa tgagccgaga ttgtgccact 74700
gcactccagc ctgggtgaca gagcgagact ccgtctcaaa aaaaaaaaaa aaaaaaaaaa 74760
tagctgggca tggtggcgcg tgcctgtaat accagctact ctggaggctg aggcaagaga 74820
atcgcttgaa cccagtaggc ggaagttgca gtgagccgag atcttgacac tgcactccag 74880
cctggtgaca gagtgagact ctgtctcaaa aaaaaaaaaa agaaaaaaaa agacagaaag 74940
aaagagcaca gacagagtca caggtatttg cagtaggaag ctgtcaggtt agagtgcacg 75000
gaaatagaaa gtatatttta cacttacagc acatcttcgt ttgattagcc acatttaaaa 75060
tactgaatag caacgtgtgg ctatttagta ttcactaaaa tcttggacag tgcaagtcta 75120
aagaatcctt gatccgtccg gcatggtggc tcacgccttt aatcccagca ctttgggagg 75180
ccaaggtgga aggatcactt aaggtcagga gttcgagacc agcctggcca acatggtgaa 75240
acctcgtctc tactaataat acaaaaaaaa ttagccgggc atggtggtgc atgcctgtaa 75300
tcccaggtac ttgggaggct gaggcaggag aatagcttga atccaggagg cgctgcagtg 75360
agccgagatc atgccatgcc actactgcac tccagcctgg gcaacagagt gagactgtct 75420
caaaaaaaaa aaaaaaattg ttgggcgtgg tggctcacgc ctgtaatccc agcactttgg 75480
gaggctgagg ggggtggatc acctgggttc tggagttcga gaccagcctg gccaacatgg 75540
tgaaacccca tctctactaa aaatacaaaa attagctggg cgtggtggtg ggcacctgaa 75600
atctcagcta ctcaggaggc tgaggcagga gaatttcttg aacccaggag gcagaggttg 75660
cagtgagcca agatcgcgcc tctgcactcc atcctgggtg gcagagcaag actatgtctc 75720
aaaaaaaaaa aaaaaaatac ttgattgtct ggacattctg cagaacatca tatggagaca 75780
ctatgttgac gacatcatgc tgattgtaag caagaaatgg caagtgttcc agaaacacag 75840
tcaagacaca tacatgccag aaggtgagat ataaactcta ctaagattca gtggcctgcc 75900
acactggtga catttttaaa cctgctagat gtttgtgtag aaaaggattt aaccttgccc 75960
aaagaggggt ctggcctttg tccccagcta ctggacataa tctctttaaa ctcttgaaat 76020
atcattcctg atagaagtat ttttgttttg actaggggcc ttgggccagc cagatagcaa 76080
caatgtgatc tgggttgggg gctttggatc aggtggcatc agtgtgacct cctgagtggc 76140
tagagactag aatcaaccac atgggcagac aacccagctt acatgatgga attccaataa 76200
agactttgga cacaagggct tgggtaagct ttcctggttg gcaatgctct atactgggaa 76260
acccattctg actccatagg gagaggacaa ctggatattc tcatttggta cctccctggg 76320
ctttgcccta tgcatttttc ccttgtctga ttattattat tattatgaga tggaatctcg 76380
ctctgtcacc caggctggag tgcagtggaa tgatctcaac tcactgcaac ctctgcctcc 76440
ccggttcaag cgattttcct gtctcggcct cccgagtagc tgggactaca gatgcatacc 76500
accacacccg gctaattttt ttgtattttt agtagagacg gggtttcacg ttagccagga 76560
tggtctcgat ctcctgacct catgttccgc ctgcctcggc ctctcaaagt gctaggaata 76620
catgtgtgag ccaccgcgcc cagccccctt ggctgattat taaagtgtat ccttgagctg 76680
tagtaaatta taaccgtgaa tataacagct tttagtgagt tttgtgagca cttctagcaa 76740
attatcaaac ctaaggatag ccttggggac ccctgaactt gcagttggtg tcagaaataa 76800
gggtgctcat gtgtgtacca tgccctctaa ttttgtagtt aattaacttt cacaacttta 76860
ttattaccgc ttacactcaa tgtttattca catttatcca cataccactt attctagtgc 76920
cttgcatcaa agactttcta tctcatgtac tttattctgc ttgaagtaaa tcctttagga 76980
tattcttttt ttttttaaa ctttgcacat acatactttt attttttatt tatttttaat 77040
tttgttattt ttgtgggtac gtagtagata tatgtattta tggagtacat gagatgtttt 77100
gatacaggca tgcaatgtga aataagcaca tcatggagaa tggggtatcc atcctctcaa 77160
gcaatttatc cttcaagtta caaacaatcc aattacactc tttaagttat tttaaaatgt 77220
acatttaatt ttgtattgac tagagtcact ctgttgtgct atcaaatata attttttttt 77280
tttttgagac agagtctcac tcagtggccc agactgaaag tgcagtggca caagctcggc 77340
tcacttcaat ctctgcctcc ctggttcaag cgaatctcct gcctcagcct cccacatagc 77400
tgggattaca ggcacacacc accatgccca gctaattttt atatttttt agtagagacg 77460
ggttttcgcc atgttggcca ggctggtctt gaactcctgg cctcaaatga tctgaccacc 77520
tcagcctccc aaagtgctag gattacaggc atgagccacc acacctggcc aaaatagaat 77580
attctttagt gaggtctgct ggtgacaatt ttttttcttt ttttgagact gagtctcgct 77640
gttgtcagct tgggctggag tgcaatagca cgatctcagc tcactgcaac ctccacctcc 77700
cggattccag caattctcct gcctcagcct cccaagtagc tgagagatta caggcaccca 77760
ccaccacacg cggctaattt ttgtattttt agtagaaatg ggggttcacc gtgttggcca 77820
ggctggtctc gaactcctga cctcaggtga tccacccacc ttggcctccc aaagtgctgg 77880

gattacaagc atgagccacc acgcacagcc aatttttcc gtttttgtct gaaatcttat 77940
tttgtgtcat ctttgaaata tatttttgat ggatataaaa ttgttggttg atagttatta 78000
tcattattat tattattttg agacagggtc tcactctgtt gcctatgctg gggtgtagta 78060
atgtgatctc ggttcactgc agacttgacc tcctagggct caggtgatct tcccacctca 78120
gcctccctag tagctgggac tacagatgca tgccaccata cccaactaat ttttctattt 78180
tttgtagaga tgaggctttg ccacatttcc caggctggtc tctaactcct gagctctagc 78240
aatccaccca ccttggcctt acaaagtgct gggccatgac tagccagcag ttacttttta 78300
tagcatattg aatatttaat atgaatcttc tggcatccac tgtaactgtt taaaaaatca 78360
gctgtttact tggcactctt tttttttttt ttttttttga gacagagtct tgccctgtcg 78420
cccaggctgg agtgcagtgg cgtgatcttg gctcactgca agctctgcct cccgggttca 78480
cgccattctc ctgcctcagc ctccggagta gctgggacta aaggcgcccg ccaccacgcc 78540
cggctgattt ttttgtattt ttcgtagagt tggggtttca ccgtgttagc caggatggtc 78600
tcgatctcct gacctcgtga tctgtccgcc tcggcctccc aaagtgctgg gattataggc 78660
gtgagccacc gcgcccagcc tctttttttt ttttttttag acggagtctt actctgtcat 78720
ctaggctggt gtacagtggc gtgatctcag ctcagtgcaa cctccacctc ctgcctcagc 78780
ctgccaaata gctgggatta caggtgcgta ccatcacgcc cggctaattt ttgtattttc 78840
agtagagatg gggtttcacc atgttagaca ggctggtctc gaactcctgg cctcaagtga 78900
tctgcctgcc ccagcctccc aaagattaca ggcatgagcc accgcacccg gccaagtagc 78960
actcctttga aggtaatctg cttcccctac ccctagcaat ttttaacaat ttttcttcat 79020
ttttatttcc tgaagttttg ttattaataa tctgtgtgca gatttctttg tatttctttt 79080
gtttgcagtt catagtgatt cttgaattag tgtgttggtt tctgttatca ccacaggaaa 79140
attgtcagcc gttagctttt caaatatttc cttgctaaat tctctcttct ccccctttcgg 79200
tacaattgat ttgattaaaa ctaaaaccag ggccgggtgc agtgactcat gcctgtaatc 79260
ccaacacttt gagaggctga ggcaggtgga tcacctaagc tcaggagttc aagaccagcc 79320
tggccaatat ggtgaaaccc cgtctctact aaaaatacaa aaattaccag gcatggtggc 79380
acacatttgt agtcaggagg ctgaggcagg agaattgctt gaatccagga ggtggaggtt 79440
gcagtgagct gagatcccac cactgcagtc tggcctgggc gacagagtga gatgagaatc 79500
tgtctcgaaa aaaaaagtta tgaatgtttg ataaactata tttgttagaa tgtttgttgt 79560
agaatactat tcattgattt ttaaacaatg ttagattaaa ccattcactg gatttgtgat 79620
aattaactta ctgattttac ctcactgatt tgttgtaatt aatacaactg gtataaaaag 79680
actgtgacga ggccgggcat ggtggctccc gcctataatc ccagcacttt gggaggctga 79740
ggcaggcgga tcacctgagg tcaggagttc aagaccagcc tgaccaacat ggtgaaaccc 79800
catctttact aaaaatacaa aattagccgg tcgtggtggt gcatgcctgt aatcccagct 79860
cttcgggagg ctgtggcagg agaatcactt gaacccggga ggtggaggtt gcagtgagcc 79920
gatatcgcgc cattgcactc cagcctgggc aacaagagcg aaactccgtc taaaaaaaaa 79980
aaagaaaaaa aacacataaa acaaaacaac actgtgacgg ttcccaaaaa ttaggagcat 80040
aattaaagga actcctgata aaaattaatt ttatcttaca tgtaaactaa aatgacttta 80100
tgaagttaat tcagaaatac aatgcagggt attagtttgc cacagctgcg tattcagcct 80160
aatgtaatat tcttgttatt tttaaattct tcttttaact ttactcatat gtggatcatc 80220
aaatttcaaa agattaaatg acaatactct tagcagcaag cttccctaag catataaaca 80280
ttttaatggg tgatgattca gaaggtaccc gaagaatatg tactgccaga tatcattcac 80340
ccccatatac ctgcccgaca gacatcccat tttgggaccc tggataaatg tgtgggtgga 80400
gagaaagata ggagaaagtg gtataagcaa atggctttgg agtctgattg acagcgattg 80460
aaatcctgtc tctacctctt aacagcctca tgatcctaca taagttaccc cgatcctcag 80520
ggccacatct gtaaattggg ggttgcgatg gcagccatct cacagggtct cttttcgggg 80580
aagggcagga attatggatt aagtgagcta gtaattgtaa agcacttaat acaaggaggg 80640
cgcataataa gtacttcata aataatgacg gccattatca tgactgaggt gtatgcagct 80700
gtcggggatt acggcgactt cagaatttct ggtgggcagg gctcaaaggc agcaaatcac 80760
actggaagtc gaggtgaggc actgcttctg cacagactgc ttagctggag agaatgagga 80820
aggcttagag gagatttaga ggaacttaga gtcctccgcc tccaactctg tgggatctgc 80880
tcccgtgcca gagacattca ggggatttct cgcactctcc cctcccctac gtccctcccg 80940
ccccatccaa ctaaccacac aacacataca aaatagcccc tgcgaggttc tgcacgctgg 81000
aagggaacag gagaagggcg ctgcgctttc ttgctgatgc cctgtacttg ggcccctggt 81060
agacacagcc acttgtcccc tcagcctgca gagaaatccc acgtagaccg cgcccgggtc 81120
cttggcttca gccaatctcc ctttggtggg ggtgggatgc acgatccaag gttttattgg 81180
ctacagacag cggggtgtgg tccgccaaga acacagattg gctcccgagg gcatctcgga 81240
tccctggtgg ggcgccgctc agcctcccgg tgcaggcccg gccgaggcca ggaggaagcg 81300
gccagaccgc gtccattcgg cgccagctca ctccggacgt ccggagcctc tgccagcgct 81360
gcttccgtcc agtgcgcctg gacgcgctgt ccttaactgg agaaaggctt caccttgaaa 81420
tccaggcttc atccctagtt agcgtgtgac cttgagcagt tgactttatt tttcagtgcc 81480

tagttttcca gataccagga ctgactccaa ggactattac tcatctggag ggtttagcac 81540
agtaccgtcg catagtaaat ttccatgtca gttttggtta cctttcatgc acttgcaaac 81600
atgccatgct ctgaaacgaa ataggcacat ctttttttct ttttttttta aggagtcttc 81660
ctctcgccca ggctggagtg cagtggcgcg atcttggctc actgcaacct ccacctcccg 81720
tgttcgagat tctcctgcct cagcctcctg attagctggg actacaggca tgccacgacg 81780
cccagttaat ttttgtattt ttagtagaga cggggtttcg ccatcttggc caggctggtc 81840
taactcctga cctcaggtga tctgactgcc tcagcctctc aaagtgttgg gattacaggc 81900
ataagccact gcatctggcc agaaatgaaa taagtaaatc ttttaacctg ctctaacaat 81960
atagtgaaaa gaccatatta ttattagagc aggttaaggg atttgcctat ttcgggttct 82020
agttatagtc ttaaacttgg acattcttgt agaaagtaaa aagtttcctc ttcaaagttc 82080
cccttcttgt taaagaatac atcataagtg ttagaagtaa tagtttattt taaagactaa 82140
ctttcttcaa gcctccttgc tttgtgctaa taactctttg ttaagcccta tcctatgtaa 82200
ctgttggaca tgctcacagg cacgttccag ttcacagcct atgccccttc cttatttgga 82260
aatgttattg cttccttaaa cctttcggta agcaacttcc tctccttctt cgttcttcct 82320
tgcacttacc tatttagaaa gttttaggct attagcaaat cggctatcag tttaagagtg 82380
tgaggtcccg ctccagccaa tggatgcagg acatagcagt gaggacgacc caaatgcgta 82440
agggataaat atgtttgctt ttcctttgtt caggtgtgct ctcgacatcg ttccatctgc 82500
gattgagcac cctttctgca gaaagtaaag attgccttgc tggagatctt ttgtctccgt 82560
gctgactttt cttcgtggca ccgattatct atttctaaca attttggtat ttctaacatt 82620
ctgaacaatc ttgggctagt tgtctcttct gggcctgttt ccccatccgt cacatgataa 82680
acttcattgg tttaaaaacc ccagcgaaca tttattgagt tactattacc ttcctgccct 82740
ccccaacccc aaccccaggg agcagttaca acctcagccg ctgagcgcac tcgccgggtg 82800
ttaagaagca ccaaagacag ggaggcttga ttgattttgc tttgggagta gagggtcaga 82860
agattcacag gaaaatggca tttgagcaag gatgattcac tggagctagc ttttaaatac 82920
tggcgaggct tttatgttgc agtcccttac aaagttgagc attcgcaggg actgcactcc 82980
gaaataagcc cgcttccccct tttcattcgc taatgatcca gggagctgct ggttccgcat 83040
gcggcaggtt gtgccttttc ctaatcaggg ttctgcatcg cctcgaaccc gcaggccgtg 83100
gcgggttctc ctgaggaagc agggactggg gtgcagggtg aagctgctcg tgccggccag 83160
cgcctgtgag caaaactcaa acggaggagc aggaggggtc gagctggagc gtggcagggt 83220
tgaccctgcc ttttagaagg gcacaatttg aagggtaccc aggggccgga agccggggac 83280
ctaaggcccg ccccgttcca gctgctggga gggctcccgc cccagggagt tagttttgca 83340
gagactgggt ctgcagcgct ccaccggggg ccggcgacag acgccacaaa acagctgcag 83400
gaacggtggc tcgctccagg cacccagggc ccgggaaaga ggcgcgggta gcacgcgcgg 83460
gtcacgtggg cgatgcgggc gtgcgccccct gcacccgcgg gaggggggatg gggaaaaggg 83520
gcggggccgg cgcttgacct cccgtgaagc ctagcgcggg gaaggaccgg aactccgggc 83580
gggcggcttg ttgataatat ggcggctgga gctgcctggg catcccgagg aggcggtggg 83640
gcccactccc ggaagaaggg tccctttttcg cgctagtgca gcggcccctc tggacccgga 83700
agtccgggcc ggttgctgaa tgaggggagc cgggccctcc ccgcgccagt ccccccgcac 83760
cctccgtccc gacccgggcc ccgccatgtc cttcttccgg cggaaaggta gctgaggggg 83820
cgccggcggg gagtcaggcc gggcctcagg ggcggcggtg gggcaggtgg gcctgcgagg 83880
gctttcccca aggcggcagc aaggccttca gcgagcctcg acctcggcgc agatgccccc 83940
tgagtgcctt gctctgctcc gggactcttc tgggagggag aaggtggcct tcttgcgcga 84000
ggtcagagga gtattgtcgc gctggttcag aagcgattgc taaagcccat agaagttcct 84060
gcctgtttgg ttaagaacag ttcttaggtg ggggttagtt tttttgtgtt tctttgagga 84120
ccgtggatca agatcaagga aatctcttta gaaccttatt atggaagtct gaagtttcca 84180
aatgttgagg gttttatgtc taaaagcaac acgtgaaaaa attgttttct tcacccagtg 84240
ctgtcttcca atttcctctt tgggggggagg ggtagttact gctgttacta aaataaaatt 84300
acttattgct aaagttcccc aacaggaaga ccactacttt tgatgacttt ggcaagtttg 84360
ctaactactg gaaccctaac ttacaaacga actacttaca tttttgattt ccagttgtat 84420
tacctgccca atgtttacgt agaaacagct taattttgat tctgggtaac gttgttgcac 84480
ttcattaaaa atacatatcc gaagtgagca agtatgggtc tgtggacagc agtgattttt 84540
cctgtcaatt cctgttgctt cagataaaat gtaccagaca gaggccgggc gcggtggctc 84600
acgcctgtaa tcccagcact ttgggaggct tggcgggtgg atcacctgag atcgggagtt 84660
caagaccagc ctgaccaaca tggagaaacc ccgtgtctac taaaaatata aaattagcca 84720
gggtggtggc gcatgcctgt aatgccagct acttgggagg ctgaagcagg agaatcgctt 84780
gaacctggga ggcggaggtt gcggtgagcc gagatagcac cattgcactc cagcctgggc 84840
aaaaagagcg aaactccgtc tcaaaaaaaa agtaccagac agaaatgggt tttgttttct 84900
ttttttgttt tgagacggag tttcgctctt gttgcccagg ctcgagtgca atggcgcgat 84960
ctcagtctcg gctcactgca acctctgtct cccaggttta atcgattctc ctgcctcagc 85020
ctcccaagta gctgggatta cccatgcccc accatgcccg gctaattttt gtatttttag 85080

tagaaacggg gcttcaccat gttaggctgg tcttgaaccc ctgacctcaa gtgggcctcc 85140
cacctcggcc tcccaaagtg ccaggattac aggcatgagc caccgcggcc agccagaaat 85200
gggttttgga aaaagcacta aacaaaatcg aacttggttt catatgacag ctctgctgct 85260
aactgtaaca ggggcagacc agttaaccta cttttctgtc ttctgtcagc tgagaattag 85320
atgattccca aaggcccatt gaactctgaa tgactttaaa tacttcttct taagtgggta 85380
cacggttttg gtaactgatg ccaggtgatg aatgcatgaa agtgcttaat gaatgaaacc 85440
ggtaaaatag taggaggaag ctttattggt aaggcagggg tatacctaat agctctctaa 85500
tttattggta ttgaagtggt taacttttgt ttttttaagg ggggaaaaca ttctaagaat 85560
aatgaggcaa actgcatatt gcacaagaga ctgttgtctc tattcaacaa atacctttg 85620
agtgtccaga gtctgccagg tgctgtgcta ggccctcacg attgagtagt gaaccagaga 85680
atgtccctgc acccatggag cttattgtct actggggtag acagataata aataagcaaa 85740
caaatcttct ctcttctccc tttcgctcca tgtaagtgtg tgtgtatagg tgtatactta 85800
caagttgagt aaagtgttat gaaagattaa gaggagaaat gcattttggt tagatgttag 85860
aggactcagc aggtgacctt gaaacttaga gctgaaggat cagtaggagg taactagaga 85920
ggccagggaa tcgcatgttc aaaggccagg aggcaagaaa gagcatggtg cccttcaaga 85980
gaggaaagaa ggctactgtg actggagcat agatgtaggc aagtgttggg tgattgagag 86040
ctctacgggc catggttagg ttttattcct aatgccgaga tgccaaacat ggtggttcat 86100
atctgtaatc ccagtatttt aggaggccga ggcaggaata tagcttgaac ccaggagttc 86160
aagaccagcc tgagcaacat gagacctgta caaaacattt aaaaaattgc tgggtatgat 86220
ggtgcacacc tgtggtccca gctactcagg aggctgaggc agaaggatca cttgagccta 86280
ggaggtggag gctacaatga gccatatttg agtcactaca ctccagcctg gatgacaaag 86340
tgagaccatg tgtcaaacaa aatacagaaa gaatattaat ttaaaatttt gaaagaggag 86400
tgatctgaac ttatatctta aaaagatcat tctagggcat ggtggctcat gcctgtaatc 86460
aagggctttg ggaggctgag acaggaggat cacctgaggc cagttcgaga tcaacctgta 86520
cagcatagag agactccatc tctacaaaaa gaaaaaataa atagctgggt gttgtgagtt 86580
attcaggagg ctgaagcaga aagatcactt gagcccagga gtttgaggct gcagtaagct 86640
atgatcccac cactgcaaca cagtgagatc ttgtctcaaa aaaaaaaaaa aatcattcta 86700
ggtgcttttt ggaggctgga tgtggtaaga gtagaagctg gagatggtcc tgttagggat 86760
tcgattcaga ctttaaatac catcaatgca ttgagtccca aatttacatc actacgttgg 86820
atccttgccc ctgaatccag actggtatat ccaactttag gttcagtttg tatctctacc 86880
tgaccaatat agaggtgtcc agtcttttgg cttccctagg ccacattgga agaagaattg 86940
tcttgagcca cacatagagt acactaacgc taacaatagc agatgagcta aaaaaaaatc 87000
gcaaaactta taatgtttta agaaagttta cgaatttgtg ttgggcacat tcagagccat 87060
cctgggccgc gggatggaca agcttaatcc agtagatacc ttcaacttac aatatctaaa 87120
attttatgcc agatttagtc attttaaacc tgctcatcag ttttctcaa gaagtagtat 87180
tttggctttt tttcttttct ttttttgag atggagtttc gctcttatcg ttcaagctgg 87240
agtgcagtgg cggatcttgg ctcactgcaa cctccgcctc ctgggttcaa gtgattctcc 87300
tgcctcagcc tcgcaagtag ctggaattac aggcatgcgc caccatgacc agctaatttt 87360
tggagacagg gtttcaccat gttggtcagg ctggttttgt actcctgacc tcaggtgatc 87420
tgcctgcctc ggcctcccaa aggctgggat tacaggcatg agccaccgct cccggctgca 87480
tttttggatt tttagttgct cagcccaaaa ctttagtaca tctttgaacc tcttctttcc 87540
tcctactcta tatctgatcc atcagcaaat ctgttaggtc tacctcacac atatcgaaat 87600
cctaccacgt ctcaccatct gtgacaatta acaccctggt ctaggcagtc atctctgtta 87660
agattgagtg gttaaggatg tcctctaagg agatgacatt caaatcttag cttaaatgtc 87720
aagagggagc tggttttata aagattgagg aggcagcatt attttgccat aggcttccat 87780
ttggtttcca ttccattctt gatacttatg gtatatattc aaaacaaatg cacagaaaca 87840
gacccaggta tattgggaat ttcggatata gagttcctag ttgggaaaag atagactgat 87900
ctgtaaatga tgctagttat ccatcatctg gcaaaaaata atttcctgcc tcctctcata 87960
tatctcagat caacagactt tttctgttaa gggccaaatc ataaatattt taggctttcc 88020
agaccatatg gtttctgtca cactctcctt tatccttgaa gccatagaca atatgtaaac 88080
aaatgggcat ggctgtgcta cgataaaact ttacttacaa aaactggtag tgggccagtt 88140
taggcatggc cagcactttg ggaggctaag gcagatggat cacttggggt caggagtttg 88200
agaccagcct ggccaacatg gtgaaaccct gtctctacta aaaatacaaa aaatagctgg 88260
gcatggtggt gggtgtctat aattccagct actctggagg ctaagacaca agaatcactt 88320
gaacccagga ggcagaggtt gcagtgagct gagatagcac cactgcactc cagccagggt 88380
gacggagtct taaagcaaaa caaaacaaaa ggtagtgggt tgtatttggc ccatgggctg 88440
tagtttgcca atccctgatg cagaaacaaa ttccaggtaa ataagagcct ggaatgttaa 88500
aaaaacaaaa cttgaagtca tgtagaagaa caggtagggg gaacaatcct gatctcagga 88560
taggaaggga tattgcttaa aataagacac aggaaaatat aatccatgtt gtgtaaattt 88620
gactacgtta aaacttaaaa ctttcgccaa gcgcggtggc tcacgcctgt aataccagta 88680

ctttgggagg ccgaggtgag cagatcacca ggtcaggaga ttgagaccat cctggctaac 88740
acggtgaaac cccgtctcta ctaaaaatac aaaacattag ccgggcgtgg tggcgggcgc 88800
ctgtagtccc agctacttgg gaggctgagg caggagaatg gcctgaaccc gggaggcgaa 88860
gcttgcagtg agctgagatc gcgccactgc actccagcct gggcgacaga gtgagattcc 88920
gtctcaaaaa aacaaaacaa aacaaagcaa aaaacctaaa actttcatac aataaagtat 88980
acctaagata cttctagaag agaagattta catccaggac gtgtatggaa tttctgcaag 89040
taataagtaa aagacaaggg acatgaagag gcagttcaca aaagaggaag ccaaaatgac 89100
caataaacat gaaaggatgt ttaacctcaa aggaaacaag gaaatgaatt aaaaacatca 89160
aatgccattt caaaactagt aagttggcaa aattaaaaat accaaggatg agaatatgaa 89220
gcatggctat atgagtgcat ggaatggtac agtcactttc attaaaaatg cacataattt 89280
gttttttatt tatttttttg agacagtcta tgtcgcccag gctagaatgc agtggcatga 89340
tctcggctca ccacaatctc tgcctcctgg gttcaagcaa ttctcctgcc tcagcctcct 89400
gagtagctgg gattacaggc acatgccaca acgcccggtt aagttttgta tttttagtag 89460
agacagggtt ttgccatgtt ggccaggctg gtctcgaact cctgacctca ggtgagctgc 89520
ttcccaaagt gctgggatta gaggcgtgag ccaatgctcc tggctgaaaa aaatgcacat 89580
aatttgttac ctagcaattc catgtctaga ggcttatcct agagaaattc ttgcttatat 89640
gcataggaag acgtgtacta gaatgttcac tagttgaatg tttaagtgaa aattaggaaa 89700
taaagtaaat gttcattaac aggaaaatga gtaaaggtat atttataaaa caattaagta 89760
gctaaaatga ataaactaga gctgcgtgaa tgaactagaa ctggttcaat agtcatgtca 89820
gattattgaa tgaatacagg tcagatatgt atagagtgtc atttgtgtaa ttaatttttt 89880
ttttttttt gagatggagt ctcactctgt tgcccaggct ggagtgcagt ggcgtgatct 89940
cagctcactg caacctccac ctcctgggtt aaagtgattc tcctgcctca gcctcccgag 90000
tagttgggat tacaggcatg caccaccatg cccagctcat tttcctattt ttagtggcca 90060
cagggtttca ccatgttggc caggctggtc ttgaactcct gacctcaagt gttccaccca 90120
acttggcctc ccaaagtgct aggattacag gcgtgagcca ccgtgctcag ccatttgcgt 90180
gatttttaaa gatgtgcaga ataatgccat taaaaaaaat acacatacat gtatatatat 90240
acacgtttgg ctgggtgtgg tggctcacac ctgtaatccc agcactttgg gaggctgagg 90300
caggaggatc acttgagccc aggtgtacaa gactagcctg ggcgagatag caagacccca 90360
tctcaacaac agaaaggata attaggtatg gtggcatgag aggatcactt gagcccagga 90420
gttcgagtgt tatcaggcca ctgcactcta gcctggacaa caaagcaaga ccgtgtctca 90480
aaaaaataaa aataaaaagt atttgtatgt ggtcatagtc aaaaaacgta catggaagga 90540
aaatgtcttt atttatttat ttatttttt ttttttaaga cagagtcttg ctctgtcacc 90600
caggctgggg tacagtggtg taatctcagc tcaccgcaat ctcggcctcc cgggttcaag 90660
cgattcttct gcctcagcct tctaagtagc tgggactaca ggtacccgcc accacaccct 90720
gctaattctt gtgttttcag tagagacagg gtttcaccat gttggcaagg ctggtctcga 90780
actcctgacc ttaagtgagc cacccgcctt ggcctcccaa agtcctggga ttacaggtgt 90840
gagccactgc gcttggccag gaaatatcta atttagtaag tatttatatc tgggaaagga 90900
agggtcaggt ggtgattcat aggaactcta aagtctatgt ataatactta gggggacaga 90960
aggaaataaa gcaaaatgct gatatttgat tgttgagttg tgtatatgtt agaagtataa 91020
cataggagat ctgattgata gtaggagaat gtttttaggt ggtaaaagtg gaaccgtggt 91080
ggtttgtttt ggcagtagaa tcagttggtc atagtttgta tgtggaaggt aataaacaga 91140
ccatgttaag gatgacttcc ggaattttgg tctgagtagt gggtggatga cagtgtcatt 91200
catgagggaa gatgaagact gaggtaggaa caggtttggg agaagatgac atgttccctt 91260
ttagacaagt ggaattatgg aagatggcag gtaggtggtt agctatatga atttgagata 91320
aaagatttag gatggagata taaatttagg agtaacagcg tatctatggt attgtaagcc 91380
ttaagaatgg gtaggatcag ccaggaaata cagatgtata tgcagaagag aggagtcaag 91440
gaagccaaga caagttaatg tttaaagtga gtgatgtagt ccatgggcag atgctgctga 91500
gagggctgca aacaccagtg accctacaac atttttaaat gtcgtcttcc tgacagcagt 91560
gatcagtacc tgcaacgatc ttatttattt ttttcatgtt agtctccaca cacttgaatg 91620
tagacttttt gaaggcaaaa tcattgcctt ttctgagctg ggagcatgtc tggcacatac 91680
caagcactca acagttgatg tattgacttc atccagatac tctgagggcg agttatttcc 91740
tgctactagc ctttcacctt tcaatgttta agagcacaaa tacagagatg ggcacgtttt 91800
ggcatttctt attttgataa ccttttcctg gtaagatttt ttaatgttga aaaaaaaaaa 91860
caagaaaaga gggttaaaaa tagtcttatg tcagatcctg tgatagaatt cacacttggc 91920
ttaagctgct gggcaccttc ctatcttgga tgtcatatta gcttatctac agcagaattt 91980
ttactgtttt atgtagtaag gaagcaatta tatgattatt ttacagacaa attattcttt 92040
atcttttatt tttttagacg gagtctctct ttgtctccca ggctggagta cagtgtcgcg 92100
atctcggctc actgcaacct ccgcctcctg ggttcaagca attctctgcc tcagcctccc 92160
aagtagctgg gcttacaggt gtccgccacc acacccagct cattgttttg tatttttagt 92220
agagatgggg tttcaccatg ttggccaggc tggtcttgag ctactgacct caggtgatcc 92280

acccgccttg gcatcccaaa gtgctggaat tacaggcgtg agccaccgtg cctggcccag 92340
acaaattatt atactctgag tgttagaggc ttaggatgtt ttcacttgat gctatgggag 92400
gaataagtaa taagatatga tacacaacca aagacctttc ttcactatgc ttctagtagc 92460
tagtactatg gatgacacat ggtaataata ttggttagca tttgtcctca atttactgtg 92520
ctagttactc ttctaagccc cttacaggta tatatttttt ttcatcaata atcctctaag 92580
gtagttttta ttattgacct aattttataa atcaagaaaa ttaagaccca gagaagtaag 92640
taacttgtcc aagatcacat ggcttataag tggtagagcc agaatttgac cccagatgtt 92700
gtgactacat tgtctctcca taagcaggtt caactctttt gactggatgc tgttccaagg 92760
tcacttcctt agagaagcct ttgctgacaa ctaccctcct gtgccctcct ccaaggctgt 92820
ccattgttct agaactttga atactcatct tagaataaag ctggtctaat ttttacagtg 92880
ttatagaatg gatctctgac tgcaaaagtt ggtcataatt atctttttat gttctagtga 92940
aaggcaaaga acaagagaag acctcagatg tgaagtccat taaaggtaag ttctgccctt 93000
ggcagtccac tgcattaaaa agtgatgtgc tttgcatttg tgagttcttt aatcctgtta 93060
tactctctct tttggcatta atcatttctg ccttatttta taattactta tgattttgat 93120
ttatttccct ctttaacctg tataatgctt taacatctag catataataa gtaggctttt 93180
ttttttttt ttttttgga gacggagtct tgctctgtta cccaggctgg agtgcagtgg 93240
cgcgatcttg gctcactgca agctctgtct cccgggttca caccattctc ctgcctcagc 93300
ctccccagca gctgggacta caggtgcacg gcgccacgcc tggctaattt tttgtatttt 93360
ttagtagaga cagagtttca ccatgttagc cagtatggtc tcgatctcct gaccttgtga 93420
tccgcccgcc tcggcctccc aaagtgctgg gattacaagc gtgagccacc gcacccggcc 93480
gtaagtaggc ttttttacc ttaattttat ttttttgaga tggagtcttg ctcttatccc 93540
caggctggag tgcagtggtg ccatctcggc tcactgcagc atccacctcc cgggttcaag 93600
cgattctcct gcctcagcct cccgagtagc tgggattaca ggtggccgcc accatgccca 93660
gctaattttt gtatttttag tagagacagg gtttcaccgt gttggccagg ccagtctcaa 93720
actcctgacc tcaagtgatc cactcgcctt ggcctcccaa agtcctggga ttacaggcgt 93780
gagccaccat gcctggccat aagtaggctt ttactgagcc ttgtgtgtat tggctatcct 93840
agtgattaca gtgaaccagt gcccttctta ttaatcacac atttaattgt tccctaaaag 93900
tgattagttc actttattta tttagtaaga caaaaaatga agaatactct taactgagca 93960
gtctgttaac tgtaggaaag cactgacact tataaggctt agttttctgt catttatcca 94020
gaagtatggt tgattacagt ttttactttt ttatttgaat gaacaacctt aatttaaaat 94080
atattttgtt tatttttttgt tgggatcgat acattgtcct tgtttataga ttagagcatg 94140
ctttttaaag atgctgtatt actcactgat tttatttgtc cagtgtacag agattgaagt 94200
gggaaaatta taatggaaat tgtttccata gtcattacat attaatttca tcaatttatt 94260
tccataaaat ctgtagattg ctacttattt agatttttcc ttcaaatgtt tttatgttgt 94320
attgcttgca ctgagtattt attctatatg ctcaatttgc tggagaagaa gactaattat 94380
aacttaggca agttgtaaaa ttagggaaaa aagtaaggta ccttacagcc tagtttactt 94440
atttcttatg taaagccagt tagattccac attagttcaa actgccttct ttgagcaaaa 94500
cttgattggc agtgataaag gcttaaagcc cttctcaagc agagacctgt aaagactaga 94560
tctgactgta gtagaaggaa ggaacttaga tgtttcaggc agtgagaaca ccagtcttcc 94620
actctaaact ttgccactaa cagtatgacc ttgggaagtt gtaactttct tcagattctt 94680
catttgttga atgggggat tggcctagct aatttctaaa tctctactgg gctaaaaaat 94740
tctgtgctta tactctgatt atgaagtaca taatctgtgc ttaacattca ctgacttatc 94800
cttaggataa tacagaagca gtacaagaaa cagcccctca agatgtttgc agtctggtta 94860
gaaagacaaa cttatacaca gaacagtagc aaatagacca aaataataat agctgccatt 94920
tatagaacac ttcttctgtt ctgggcatta gacaaaaact gactataacg gtgaacaaaa 94980
aagacttagg tcctgccctc attgaactta cagattagta ggggagagga acattaatca 95040
agtaattcca cagatggctt agcctagatt ggtagtgatg gaagtaaaga gatgtgaacg 95100
gacttgaaaa aaaattcgga ggcaaaatgg atagaagttt attattgatt aaatatgagg 95160
tgtgagagag agggatattt aagattgata cctaccttct ggcttgccta acagaaccaa 95220
aacaggaaat tatatgttca gttttgttat gttgggtggg aggtgctttt gagtcattca 95280
tttatatatg ttatatatgt tattttatat gcatagtaat tttaaggtct gagttttaaa 95340
ccaaaggtta gagagtgatt ttttagagtc tagcaaacct aagttgaaat cctgcctgtt 95400
gaaatggctg tttactagct cattaaccta gggcaaagta ttcaacttgt tttcattttt 95460
gtcttcatct ctaaaatgag gaaaatatgg tcttacaaga ttgtcctgag agatagatga 95520
aataatatcc aaaaaaaaaa aaggtacata gagaaactcg tatagtgcct ggtatatagt 95580
aggtcctcca ttggtagcta tcattatcta gttttaacat agccttcagt ttgttgaatt 95640
agtcaaactg agtgaagcac tgcaaggaat tcagaggaat ttgagatcaa caaatgattt 95700
ctgaagttta gggaagactt catggcaatg acacttacct tgtataaaag ttgaagaata 95760
agaaagattt gaatgagaga ttctttctct tctccctacc agcccagctt cttatttgag 95820
gatatattgg gcaaaggggc cttcagacaa gtagagggag atttttacag aaagattgag 95880

atgaaggtat agaaggctgt aaagaccaga aaagagaatt gagacagagg aagcaggaag 95940
ccactgtagg tttttgagca agatattgat gctgtaagta tggtgtttat gaaaggttag 96000
tctggaagag atttgcagga tggagacccc ggaagttttt ttgttataat acagaaagac 96060
ttgcactgag ggtgaggtgt taaaaataaa caggtaagta aatgtttaaa catcttgaag 96120
gaaaagtcaa caaatcttgg caagtaaaca gataacagtg aaaaagaatg ggaccaagat 96180
tttgagtttt ggagactggt ggattgaaca gacagggaaa ttgagaggag aatcagatga 96240
tgatgtttta agttgatatt tagacagatt gtgcttgaga tggtaaagtc aatgtgggtg 96300
ggaatgctta gtagcgagta atcagtgata caagaccaaa gcccaggtca aagacaagtc 96360
acagatacag atcagggctt tttcatctgc tccacagagg tgtaccctag gagctgttgc 96420
aaacagtcca tgtggagggt gtgagtaaga tgtttccctt gaatttgcca gaattacttt 96480
tttgttgttg ttgttgtttt ttctgagaca gattctcgct ctgttgccca ggctggaggg 96540
cagtggcgag atcgcgcagc tcactgcaac ctctgcctct cgggttcgag tgattctcct 96600
gcctcagcct cccaagtagc tgggattaca ggcttgtgcc accaagccca gctaatttct 96660
tttgtatttt tagtagagat ggggtttcac catgttggcc agactggtct cgaactcctg 96720
gcctcgtgat ctgcctgcct cagcctccaa aagttctggg attacaggcg tgaaccactg 96780
cacccggtcc cttgttaagt ttattttggt gggaagcaaa ggaggtttca gcttttaaaa 96840
agtttgaaaa ttattgctct ggtaataatt aaagatttga gagtaaatat gctttctagc 96900
agaaagaata aaagaagaac agatagcctc aagaagggga gccaaagaag caggctatat 96960
ctgacacact gggtgttgat aaatgggtat taaaagaatg agagcaatga gcagatagaa 97020
gaggaaatta ggagagtata ataccatgga gaccaagaaa gatagactat caggaaggag 97080
tggtaaaaat aagttactag ttctaagaga gatgttaaga gggaccgggg aaagccttgt 97140
acaaatgagt tagtagcatt ttacattata tacatctaat taagaaacaa tgcgagagtc 97200
tcaccattcc tatagactct tacttgtact tgtctgaaca cgaaaactgg cttttgttta 97260
taaataagct aaaaattatt ttgctccaat ttctcatgaa aataaaaata aaccttcttt 97320
taacattgaa aaaatagttt gaagacagtc actcttcatt ttgtaattcc cacaactatt 97380
attgaatgac tgaaattatc tttattctga agccaaaggg gtgatactga tatttcttca 97440
gactactaaa aatatatttt atgaattttt agtgtgcttt atctttttct gttttttttt 97500
ttgagatgga gtttcactcc cgttgctcag gctggagggc agtggtgcaa tctcagctca 97560
ctgcaacctt cgcctcccag attcaagcaa ttctcctgcc tcggtctccc aagtagctgg 97620
gattacaggc acctgccccc acacccagct aatttttgt attttagta gagacagggt 97680
ttcaccatgt tggtcaggct ggtcttgaac tcctgacctc aggtgatcca cccaccttgg 97740
cctcccaaag tactgcgatt gcaggcatga gccaccatgc ctggcctgag gaatattttt 97800
ctaggttccc cccaccccaa gcatttattc tgcaatttta gttttgttcc taaagcaagc 97860
aaggtttaag gatttaaaaa taatccgtat tttagaatgc tttctggctt tgttacttt 97920
tatccacagt agaagttctc agagaatgat ctccctcttt taatttaact ttttggcaca 97980
gtattttgag aattataaat aatattagaa tgttttctgg ctgggtgtgg tggctcatgc 98040
ctgtaatcct ggctacttgg gaggctgagg caggagaatc acttgaacat gggaggcaga 98100
ggttgcagtg agccgaggtc atgccactgc actccagcct gggtgacaga gcaagactct 98160
gtctgggaaa aaaaaaaaaa aaaaaaagag tgttttcttt cctattttcc accacttgat 98220
taagttactt ttcctcttaa gtatttttg ctgagtatgc tgacttaaga gtaatgttac 98280
aaaatttaat ttttaaagtt ctctgaaagc ccctttatga gagttttagg ctatcaaatt 98340
gtgtttaatt cttaacaatt ttttgaaaaa ttatagcttc aatatccgta cattccccac 98400
aaaaaagcac taaaaatcat gccttgctgg aggctgcagg accaagtcat gttgcaatca 98460
atgccatttc tgccaacatg gactcctttt caagtagcag gacagccaca cttaagaagc 98520
agccaagcca catggaggcc gctcattttg gtgacctggg taagtaacta tcatttttta 98580
ttaacttgta ttagaaggat ttgagtacaa tatgtgaaac ttctgtcata ggatacagaa 98640
ctatataatt ggaaagtgct ttggaaaaaa tgtatttaaa ataacagcta caagtataat 98700
gggtagctgt gttgtgttcc tgtaaatata gaatataaag catgcccagt agaaaaacaa 98760
gcatttccag aagaaatata tctgatcact aaatataaat atatgaaaaa gatgtctcac 98820
tttattactg agggaagtgc aaattaaaat aatcagttaa tgttctccta acacattagc 98880
atatttttta aagtttgaca atttgaatgt cagtgaagat gcagggaaat acccctccta 98940
tttagtgata atataatctg gtgaagactc tttggaaagc aatttggaaa tcagtataaa 99000
atatgcatgt catttaggcc actctttcta agacctagcc ctcagatatg ctcattcata 99060
tgtgcaggtg tgtatgtgtg tgtgtgtgtg tgtgtgtgtg tgtatatgta tgtatgtatg 99120
tatgtatgta tgtatgttga aggctattca ttatagtatt gtttgtgata gcaaaaaatt 99180
atggacaaca tataaatatc tgttataggg aaataaccaa attgtggtat acgcatgctc 99240
tggagtataa tatagccatt tgtttctatt tatttatttt cttgagacag ggttttactc 99300
tgttgcccag gctggagtgc agtggtatga tcatggttca ctgcagcctt cacctcctgg 99360
gcacaagcca ttctctcgcc tcagcctcca gagttactag gactgcaggc atgtgtcacc 99420
acacccagat aatttttaa ttttttgtag agacagggtc tcactatgtt gcctaagctg 99480

gtctcaaact cctggcctca agcaattctc ccacacaggc ctcccaaagt gctgggatta 99540
ccaacgtgaa ccaccacacc tggttcagtg tagccattta gaaatctaaa aaagacgtgg 99600
gaaaatgtct aaggcatgtt taaatgtgag aaaagcaagt cacagtatgc atggtaaaat 99660
ccgttatatt aaaataagtt cttccaaaac aaaaacatat gcaggagacc tttatttttgt 99720
cagtatttct tacccaaatt tctgcactta gaaaattgca tgtcatgttg tcataagttg 99780
aaaaaaagat ccatgaacca atggacttct aataaaatca gtcctgcttt tgacatctct 99840
ctctactttt gtgtatattc aaaccagagt gtcaatgtgt ttgtggggca cacttagcaa 99900
taatacatag cagacaaaat gcatatagct cagagagtaa aattgtaagt tttgctagat 99960
cactcataaa ttgctgatga gaatttaaaa tggtgcagat gctctggaaa acaggcagtt 100020
tctttctttc ttttttttt tctttttgag acagggtctc actctgttgc gcaggctgga 100080
gtacagtggc gtgattacaa ctcactgcag cctcaccctc ctcaggttca ggtgatcctc 100140
cctcagtctc ctgagtagct gggactatag gcatgcacca ccacgcctgg ctaatttttg 100200
tatttttttt ttttttttt gtagagacgg ggtttcgcca tgtttcccag gctggtctca 100260
aactcctgga atcaagcgat ccacttgcgt aggcctccca aagtgctggg attacgggcg 100320
tgagctactg tgcctggcct aggcagtttg tttgtttgtt tgtttgtttg tttatttatt 100380
tgtagacgga gtctcacagg ctggagtgca gtggcccaat ttttggctca ctgcaacctc 100440
cgcctcccag gttcaagcta ttctcctgcc tcagcctcct gagtagctgg gatgacaggt 100500
gcctgccata atgcctggct gatttttgta tatttagtag atatggggtt tcaccatgtt 100560
ggtcaggctg gttttgaact cctgacctca ggtgatcagc ccgcctcggc ctcccaaagt 100620
gctgggatta caggcatgag ccgtcatccc tggctggtgg tttcttatga cgtgaaacat 100680
gcaattacca tatgacctag cagttgcact ctgtatttat cccagataaa tgaaaactta 100740
ccttccaata aaaacctgtg cacaaatgtt catagcagct taatattgaa aaactggatg 100800
ttcttcagca ggtgaatgaa ctggttcatt cataccatgg aataccattc agcaataaaa 100860
aggaacaaac tgttgataca tttaaccacc tggatgaata tcaagggaat tatgctgtca 100920
gacaaaaacc agtccctaaa gactacatat agtatgattc cgtttggata atattcttga 100980
aatagagaaa ttaagagaaa tgaaaagatt agtgtttgcc agatgttaga gacagggagg 101040
tgagaggggt aagtgggtgt agttataaaa gtgcaacatg agggatcttt gtgatgttga 101100
agttgtatct tggcagtgga tgcagaaatc tcaatgtgat aaaattacaa agaactaaaa 101160
acaagaatga gtatagataa aactggggaa atctgaacaa gttagagtgt tgtatcactg 101220
tcagtatctt agagtgatat tgtactatag ctttgcaaga tgttaccatg ggagaaacta 101280
aagtgtacaa gggatctcta ggtattatta ttttttaga gatggggttt cactatgttc 101340
cccaggccgg tcttgaactc ctgggctcta gtgatccgcc tgccccagcc tcctaaagta 101400
ctggaattac aggcgtgagc gaccatgcct ggccctttca gtattgtatc ttagaacttc 101460
atgtgaatct agcattatct catagaattt aattaaaaga aattgtaaac ctcacagaag 101520
atcagaattt cctcaagttt gtgatgttga caaagatgaa ctagttgaca ctgacagtaa 101580
gactgaggat gaagacacga cgtgcttcaa aaaaatgatt tgaatatcaa tggattaaga 101640
agaactcttt tgacaaattg atgaaaccct cagtcagttt tataagaatg cccatcttta 101700
tgatcatgct atgaaagcca atttttaaaa aaatttttg tctttcctaa caattagctt 101760
gtggttataa tttaaattta gttaaatata agataaatga ttttttatta agtttagttt 101820
catttttcaa ggtacgatct caaagctact ctttaaccta ctatgaatga ataatgctga 101880
gttcataaca tctttgtaga tatatccaca attttccctc aggataagtg cctacaagtg 101940
gaattactgg actgaaaata atgcagtttg ctaagacttt gctatctgtt cctgaatgct 102000
cctccaaaaa ggttttgcca gtttacatcc tcatgaccag cgaatgagag tgttgcctat 102060
tttcctgtgc ccttgttact gcttaataat ttttgaaaaa aatctaattt gacagacaaa 102120
aatgcatttt atgttaattt gcttttctgg gatttttaat gaggttgagt atagttttta 102180
atatttttat tggccccttt ggaactagta tcataagttt tttttcttaa gaatttatgt 102240
agtctgggct gggcgcagtg gctcacgcct gcaatcccag cactttggga ggccgaggtg 102300
ggtggattgc cgaaggtcag gagtttgaga ccatcctgac caacatggtg aaaccgaatc 102360
tctactaaaa gtacaaaaac tagctcagcg tggtggcggg tgcctgtaat cccagctact 102420
taggaggctg agtcaagaga atcgcttgaa cccgggaggt ggaggttggt tgcattgagc 102480
cgagatcgcg ccattgctct ccagcctagg caacaagagt gaaaagtctc aaaaaaaaaa 102540
aaaaaaaaaa aaaaaagaat ttacatggtc tgaattgcca ttaaaagaga tatgagaatt 102600
attgagtaac aaataacttt ttaataattt aggcaagttt tggacgattg tactttgttt 102660
agaaaccaaa agcatagtat ttgtagtttt tttatttact ttagttgcta ggaagtaaac 102720
tttattcaag gtctctggta ccagttgttg ctaaaagtga ttgactaatc tgtcaatctg 102780
aaattatttg ttgctgaact gctaattctt ttgcttctat cttttaggca gatcttgtct 102840
ggactaccag actcaagaga ccaaatcaag cctttctaag acccttgaac aagtcttgca 102900
cgacactatt gtcctccctt acttcattca attcatggaa cttcggcgaa tggagcattt 102960
ggtgaaattt tggttagagg ctgaaagttt tcattcaaca acttggtcgc gaataagagc 103020
acacagtcta aacacagtga agcagagctc actggctgag cctgtctctc catctaaaaa 103080

gcatgaaact acagcgtctt ttttaactga ttctcttgat aagagattgg aggattctgg 103140
ctcagcacag ttgtttatga ctcattcaga aggaattgac ctgaataata gaactaacag 103200
cactcagaat cacttgctgc tttcccagga atgtgacagt gcccattctc tccgtcttga 103260
aatggccaga gcaggaactc accaagtttc catggaaacc caagaatctt cctctacact 103320
tacagtagcc agtagaaata gtcccgcttc tccactaaaa gaattgtcag gaaaactaat 103380
gaaaagtgag tatgtgattt tcttgtgtgt acatatgtgt ctcactttct ttttttaatt 103440
tactaagcag aacttcagat gaggaataaa atgattggaa tatttttttt ctcctctaac 103500
tacttgtaaa tttgggagaa tttggagagt gtagtagagt cagatcagtg tatggaaaag 103560
gagcaggagt gactggacct tctaagaagt gtgttatcag aattagtaaa tgaagggtca 103620
aatgtcctac ttttcccctc cactgatttt gacatcaaac cattatccac atagccttat 103680
ttcctccctc ggtcttaatt ttattaatat tttactgcac tttgcagata aaatttttaa 103740
aaaattttta aaaattgcca ataagtgaca tttattaagt tcagtgctta gtgtatattt 103800
ggattttatt tattagtcac aagacctttg tgcaggtagt aggcatgatt atctttttt 103860
ttttgagatg gagtcttgct ctgtcgccca ggctggagtg caatggcgcg gtctcggctc 103920
actgcaacct ccgggttcat gccattctcc tgcctcagcc tcccaaatag ctgggactac 103980
aggcgcctgc caccacaccc ggctaatttt tttgtatttt tagtagagac ggggtttcac 104040
catgttcgcc aggatggtct cgatctcctg actttgtgat ccgcctgcct cggcctccca 104100
aagtgctggg attacaggca tgagccaccg cgcccggact gattatctta tttacacatg 104160
agaaaaccag ggcttagaaa ggttaggtaa cttcctctag gttgtacagt aaatgtggac 104220
ctagaagcat tttgacaaga gcacctgttt ttttttcttc tctattagtt tagaaattat 104280
atactcttaa ttatcacctg ggattttgat tagacagcct tcatgttctt tttcatctta 104340
aatgttcttt gtgtcttaaa gggctaagtg atttcttcag atcttttagt tcactcattc 104400
tcagtgaact aaaatgaggt ctaatctgct actgaatcaa gttttcagca tgttatttcc 104460
ttcctccctc cctccctcct tccttccctc aaccaggctc ccgaggagct gggattacag 104520
gcgcccgcca ccactcctgg ctaattttta tattttagta gagacggggt ttcaccatgt 104580
tggtcaggct gatcttgaac tcctgacctc aagtgaccca cctgcctcgg cctcccaaag 104640
tgctgggatt acaggcatga atcaccacac ctgacggcat gttattttca tcgcaaagtt 104700
actgtaagct gggagaagtg gcacacactt gtactcccag ctactcagga agcttaaggt 104760
gagaagattg cttgagccca ggagttttga gaccaacctg ggcaacacag caagacccca 104820
gctcaaacaa agaaaaaaag ttattgaatt ttttatttct atggatcatt ttttgtagtt 104880
tcttattcct ttcacccttc attcccactt ttgatcccat cttttattta tttagtttta 104940
ttaaatgtat atttgtctga taattctgct atctacagtt ttttgtggac ctgactcagc 105000
atttctttgt ttcttcggat tcagactgtt ggtggcttgt gattttagtg atttttggcc 105060
gtgaacatgt ttcttggact tttgtctgtg ggaattctct gtgtactctg tataaattaa 105120
gttacttcag gtgttttgca ttttcttttg ccatgcacct ggggcctggg tcactaccct 105180
tctggtacca cttaaaactg aatttttgtc ttgggtgctc gtactgatcc tgtatgagta 105240
caggtttata cttactgtag aaatatggtg tttgattatg gggtattgtc ccagatggtg 105300
ctggagtatt aatatgctct ctgttaaact taatgtgttg tccctgtaaa actccaaaat 105360
tctgaattcc agaatactac tggccccaaa tgtttaagat aagggcactg cctgtatttg 105420
tttctgcctc ccactatttt ccttagttta acacaaactc acctttttaa aaaacatttt 105480
gagagaattc agtattggga agagtttcta acctgtttct ggaaatggaa gtccaaagtc 105540
tgtttctgta attgtttttt ttttgagatg gagtctcact ctgtcaccca ggctggagtg 105600
caatgacgta ctctcagctc actgcaacct ccacctcccg ggttcaagcg attctcttgc 105660
ctcagccccc tgagtagctg ggattacagg tgcccaccac catgcctggc tgatttttgt 105720
atttttagaa gagatggggt ttcgccatgt tggccaggct ggtcttgaac tcctgacttt 105780
gtgatctgcc cacctcagcc tcccaaagtg ctaggattat gtttctgtaa ttgtaataca 105840
tttattgttt ttagaaactg tctttgcttt agtggtaatt ttcaataaaa atagaaatag 105900
cagtggagtt attaaaagag cattagttac atttttccct ttttcattat cttcaaatat 105960
tatatatagt aagtttgacc tttttaaaat gtatacttgt atcagtttta acacatacat 106020
agattcctgt aactgtcacc actataaggg taaagaacag ttagttcctt caccttttgaa 106080
gtcaagcccc acctctatcc caacacttgg caaccgctga tctttctccg tctcaatagc 106140
tttgcctttt ctctttttttt ttcttatttt ttttttgag acagcgtctt gctctgtcgc 106200
ccgagctgga gtgcagtgag gcaatctcgg ctcactgcaa cctccgcctc ctgggttcaa 106260
gcagttctcc tgccttagcc tccctagtag ctgggattat aggcacgcac caccacaccc 106320
ggctgatttt tttgtatttt tagtagaaat ggggtttcac catgttggcc aggctggtct 106380
caaactcttg acctcaagtg atccacctgc ctcggcctcc caaagtgctg ggattacagg 106440
cgtgagccac tgtgcccaat caggacttttt ttttttaaa tttacattca acttgtcatt 106500
tttttcttgt atggattgtg ccttcagagt cacacctaag agccctttgc ctaagcaaag 106560
gtcatgaaga ttttctcata tgtttccttt taaaagtatt gtggttggcc aggtgccatg 106620
gcttatgcct gtaatctcag cactttgaga agctgaggtg ggcagattac gaggtcagga 106680

gatcgagacc atcctggcta atgcggtgaa accccatctc tactaaaaat acaaaaaaaa 106740
aaaaaaatta gccgggcgtg gtggcgggca cctgtagtcc cagctacttg agaggttgag 106800
gcaggagaat agtgtgaacc cgggaggtgg agcttgcagt gagccgagat cgcgccactg 106860
cactccagcc tgggcaacac agtgagactc catctcaaaa aaaaaaaaaa agtattatgg 106920
ttttacactt tacgtttaga tatatatctt ttttgagtta atgtcgtata agtatgaggg 106980
ttacgtcaga ttttttgttt tttgtttatt tttacatatg gatgtctagt tgttctaata 107040
ccatttgttg aaaagacaac ctttactcca ttgaattgcc tttgtacttt tgccatattt 107100
gtctaggcct gtttttggac tccttttttct gtttcatgat gtgtgtgtct attcctttgt 107160
taataccaca tggtcttaat tactgtatag taagtcttaa aattgggtaa tgctggcctt 107220
ataaaacgaa ttgggaagtt tttatttttа ctcttatttc cattttctag aagagattgt 107280
gtagaattgg tgtcatttct tctttagata tttggttgaa ttgggaagtg atgccatctg 107340
ggcctagggt tttgtttttt gtgtgtgaga cagagtctca cttctgtcac ccaggttgga 107400
gtgcagtggt gagatcttgg cttactgcaa cctctgcctc ccaggttcaa gttatcctcc 107460
tgcctcagcc tcccaaatag ctgggattac aagcgtgtgc caccatgccc gactaatttt 107520
tgtattttta atgcagacag ggtttcacca tgttagccaa gctggtctcg aacttgtgac 107580
ctcaagtgat tagcccacct tggcctccca aagtgttagg attatagatg tgagccaccg 107640
tgcctggcag gggcctaggg ttttcttttt cagagtattt taaactatga attcagatta 107700
tttaatagat ataggactat ttaagttatc tgtttcttct tgagtgaatt tttactgtag 107760
tttatggcct ttgagtaatt aattgtattg aattgtcaaa tttatgagcg tgtaattatt 107820
tatagcattt cgggtttgta gtggtatccc tcttttattc ctggtgttgg caattgtgtc 107880
ttgtttttct ttgtcagatt gtatagggat ttattagtct tttcaaagaa ctagcttttg 107940
ttttgatttt tctgttgttt tgttttcaat tttattgatt ttctgctctt tattatttct 108000
tttctattat ttctgcttgc tttgggttta ttttactctt tttttttttct ccaagttgct 108060
taaagtagaa acttagattt ctggtttgag acctttcttt tctaagataa gcatttaata 108120
ctgtaaattt ccttctaacc actgctttag ttacaccccc acaaattctg gtattttgaa 108180
ctgagcacaa atgaaatgtt ctaatttccc ttgaatctta ttcttttacc aatgaattat 108240
ttagaaatat gttatttagt ttgcaagcaa ttggagactt ttttcctgtt atttttctac 108300
catttatttc tcatttcatt atattatggt cagagaatat attttgaatg atttcattta 108360
ttaattttta aaaataacat taaaaaattt tttaaaatgt gaatatacca catacagtat 108420
aaagattgta cattctgttt ttggacagtt ttctataaat gtcaagttga tttagttggt 108480
taatgatggt gttcagtttt tctttattct tgctgatact ttgtatgcag ttatatcact 108540
ttattactca gaagagtgtt gaactttcca actacaattt ttttttccaa ttttactttc 108600
agctctatct ggttttgctt catgtatttt gaggctctgt tgttaggtgt gtacacattc 108660
aggatgatat cttctgggtg aattgcctgt tttatcatta tgtaattccc tctttatggt 108720
aattttcctt gttctaagat cagaaatatc tgttgtccaa tttatataga cactgcagct 108780
ttcatttgat tagtgcttgc atggcatatc tttttccatt tttttacttt tgatctacct 108840
ttataattct atttaaaggg ggcttcttgt aggcagcata tagttgggta gtgttattta 108900
tttatttatt tatttattta tttatttatt tattgagaca gagttttgct cttgttgccc 108960
aagctggagt gcagtggtgc aatcctggct taccacaacc tccacctcct gggttgcagt 109020
gattctcctg cctcagcctc ccaagtagct gggattacag gcacgcgcac catgcctggc 109080
tgatttttтg tatttttagt agaaacggat tttcaccatg ttagccaggc tcgtcttgaa 109140
ctcctgacct caggtgatcc acctgctttg gcctcccaaa gtgctgggat tacaggcgtg 109200
agccactgca cccggctgag tcatgttatt tttaatcttt tctcacaata cagggttttt 109260
gttggtaaat ttaattattt taatataaat tttagtataa ttatttacat taaatgtaac 109320
tgttgcactg gggtatttat aatgtgtaaa tataattatt ggtattaata taattatatt 109380
actcataata atattaatat ctttggattt agattaccag tttagtatat gtttttctgt 109440
ttctccctct ttgatttccc ctttttttgct ttttttttttt ttttaattct tatttttttt 109500
tagtatttgt tgatcattct tgggtgtttc ttggagaggg ggatttggca gggtcatagg 109560
acaatagttg agggaaggtc agcagataaa catgtgaaca aggtctctgg ttttcctaga 109620
cagaggaccc tgcggccttc tgcagtgttt gtgtccctgg gtacttgaga ttagggagtg 109680
gtgatgactc ttaacgagca tgctgccttc aagcatctgt ttaacaaagc acatcttgca 109740
ccacccttaa tccatttaac cctgagtggt aatagcacat gtttcagaga gcagggggtt 109800
gggggtaagg ttatagatta acagcatccc aaggcagaag aatttttctt agtacagaac 109860
aaaatggagt ctcccatgtc tacttctttc tacacagaca cagtaacaat ctgatctctc 109920
tttcttttcc ccacatttcc ccctttttcta ttcgacaaaa ctgccatcgt catcatggcc 109980
cgttctcaat gagctgttgg gtacacctcc cagacggggt ggcagctggg cagaggggct 110040
cctcacttcc cagatggggc agccgggcag aggcgccccc cacctcccag acggggcagt 110100
ggccgggcgg aggcgccccc cacctccctc ccggatgggg cggctggccg ggcgggggct 110160
gacccccccac ctccctcccg gacggggcgg ctggccgggc gggggctgac cccccacctc 110220
cctcccagat ggggcggctg gccgggcggg ggctgccccc cacctccctc ccggacgggg 110280

cggctgccgg gctgaggggc tcctcacttc gcagaccggg cggctgccgg gcggaggggc 110340
tcctcacttc tcagacgggg cggccgggca gagacgctcc tcacctccca gatggggtgg 110400
cggtcgggca gagacactcc tcagttccca gacggggtcg cggccgggca gaggcgctcc 110460
tcccatccca gacggggcgg cggggcagag gtggtcccca catctcagac gatgggctgc 110520
cgggcagaga cactcctcac ttcctagacg ggatggcagc cgggaagagg tgctcctcac 110580
ttcccagacg gggcggccgg tcagaggggc tcctcacatc ccagacgatg ggcggctagg 110640
cagagacgct cctcacttcc cggacggggt ggcggccggg cagaggctgc aatctcggca 110700
ctttgggagg ccaaggcagg cggctgggaa gtggaggttg tagggagctg agatcacgcc 110760
actgcactcc agcctgggca acattgagca ttgagtgagc gagactccgt ctgcaatcct 110820
ggcacctcgg gaggccgagg caggcagatc actcgcggtc aggagctgga gaccagcccg 110880
gccaacacag cgaaaccccg tctccaccaa aaaatgcaaa aaccagtcag gtgtggcggc 110940
gtgcgcctgc aatcccaggc actctgcagg ctgaggcagg agaatcaggc agggaggttg 111000
cagtgagccg agatggcggc agtacagtcc agcctcggct ttcacaactt tggtggcatc 111060
agagggagac cggggagagg gagagggaga cgagggagag ccccttttt gctttctttt 111120
ggattatttg aatttttcct taaatttatt tatcttactt atttatttat ttttttgagt 111180
gattctcctg ccacagctcc caagtagctg ggactgcagg catgtgccac tacacccagc 111240
taatttttt gtatttttag tagagacagg gtttcaccat attggccagg ctggtcttga 111300
actcttgacc tcaagtgatc cacctgcctc ggcctcccaa agtgctggga ttacaggcgt 111360
gagccaccat gccctgcctt tttctagaat ttatatattg agttcttgat tgtatctttt 111420
tatgtaggct ttttagtggc ttctctagga attacaatat acatactttt cacagtgtac 111480
tcacatttaa tattttgtaa cttcaagtgg aatgtagaaa acttaaccac cataaaaata 111540
gaactaggga tgaggttaaa aaagagagag aaaagaaatg taataaagat ttaataacac 111600
cgtttttttt ttttttctc ttttttttt gagacagagt ctctctttct gttaccaggc 111660
tggagtgcag tggcgtgatc ttggctcact gcaacctccg cctcctgggt tcaagtgttt 111720
ctcctgcctc agcctactga gtagctggga ttacaggtgc gcgccaccat gcccagctaa 111780
tttttgtatt tttagtagag acggtttcac tgtgttggcc aggatggtct cgatttcttg 111840
accttgtgat tcgctctcct cagcctccca aagtgctggg attacaggcg tgagccaccg 111900
cgcccggcta agtctttaaa tatttttttg acattgcact ttttctcttt tccttctagg 111960
attttagtaa cccaaatgtt agttttgtta ttgtttggca ggttcctgag gctttccttа 112020
cttctttaaa ttttttttc ctgttgttca gcttcgaaaa tttctattca tctgtcttca 112080
aattcactgg ttctttcccg ttatttccat tctgttattg agtctttgta gtgaatttta 112140
aattttgttt attatgtttt ttagttctaa aatttttctt ttttgtgtat gtcttatact 112200
ttgctcctga aactcttatt tgtttcagga gtgatcttat ttcttagagc atggttttag 112260
tagctactta aaatttgttt tatcatccca gcatatgtgt cctcttgatt gtcttttctc 112320
ttgtgagata atgggatttt ctggttcttt atatgacaat taattttgga ttgtatcttg 112380
gacagtttga cttacgttac atgattctga atcttgttta aatcctgtgg aaaatattga 112440
agtttttgct ttaacaagca gttgacctag ttaggttcag tccacaaatt ctaagcagca 112500
ttctgtcggc tctggttcca tcatcagttc agttttgtat cttatctgct tatgtgcctt 112560
tctgtgtcca gtctgggacc tggccaatgg tcaggtccca aagcctttgt acacttttag 112620
aagcagggcc atgcacaccc agctcacgag tggccccggg agtgcacata caactcgacg 112680
ttttcatggg ctccttcttt tctgtgatgt ccctgacacg ttctgccttc taagaacctc 112740
cctttatccc tttcctgttg tctggctaga aagtcagggc tttagattcc ctatacttca 112800
gcacacttcc tgtagctatg tcaacctctg tggccacgac ttcttcttct tgggactgca 112860
gtttctcttg tcagaaagta ggattcttgg agctgctgtc attgctgctg tggctgctct 112920
gatgctgcct gggagtcgaa ggagagaaag gaacaaaaca aaacaaccca ggggatttcc 112980
tccactctct ttgatccgtg agagcccccт ttcctgttcc tcagaccaga aatagagggc 113040
ctgtcttgga acttcttctt tgtgcatctg gtgtgcagtt tcagcttttg agtccaggcc 113100
aggaggtgct ggacaaactt gtcaggagta cggaggtact gcaagttctg attacttttc 113160
tcagtccacc tgcttccaag tccttggatg catttgtcca ttgttttgag ttgcattcca 113220
tgggagagac agaagagtgt gcttatttca tcttgacata cttattagga tttcatatca 113280
aatcaacgga tgatattctc tatattaatt tgctgttttc cctttagcaa gcacattagg 113340
aaaataacac tttaacaccc gcctttggtg gtttctgtca taattattaa tacttgactt 113400
ttttttttt tttgagacgg agtctcactc tgtcctttga ggcattgtcc ccataaactt 113460
ttggtaaagc atcaataatt ttatctttca tccacacaag cttcaccata aatttgatgt 113520
ttattcttcc attttagcag aattcatgtt gctccaatag gggctgtctt caaactgatg 113580
ttttctcctt cttagtgcct cagagtagat cctgttcaga tacgttataa caggttaata 113640
tgagtttatt ttggtgtaaa agtactttga aattcatgca tagtttttc atcatatgca 113700
ttttccatag ctttgaacac ccccatgtaa ctctcctctt ccacaaacca aacaatgaaa 113760
aagcaccttt gtgatggaag tttattttgc aataggaact cacagtgatc taagccctgc 113820
tattcatgaa tataattcat tactggagtc caagttgctt tttggttttt gaagttctct 113880

tcttcccttg caggtataga acaagatgca gtgaatactt ttaccaaata tatatctcca 113940
gatgctgcta aaccaatacc aattacagaa gcaatgagaa atgacatcat aggtaagcag 114000
tgcttgaaac tatggcaaaa aaaaaatgac aaaaaatgca cagaactgac aattttcgtt 114060
attgactaag ataatttttt cttaacatgg aatttagcag ttcccttcct aatttgtttt 114120
ctgagtattt tttatatcgg attatagctc actttaaaag tttctcggct gcattcggtg 114180
cgagggtctt tgcctgggcc agatgggctg cagtgtagcg ggtgctcagg cctgcccgct 114240
gctgagcagc cgggccggcg ggcggctacg ctaaccggca cagaccaccg gatggactgg 114300
ccggcagccc cgcaccagtg cacgaagtgg gcgggacaga aacttctggg gttggaagtc 114360
cagtgaggct aaaagccggt accaaagtct ctaggcatca gggctgcagc ccaagagtct 114420
cacgaccagt gggcaactgg atggccagac aggtgtctca gtggtggcct ctccgtctca 114480
gggcttcatc ccacttctca gtgggcctga cgtccctggg caccctggat gtctacctgc 114540
attagccaga gccatcacat ggcctgtgac ttgccttttt ttgccagttg attgtgccac 114600
acacagtgtc atttctgtgt catttggcac agctggaggt gcaaggagga gggcagcctc 114660
atgtccagtc ccagtttcac gtaactttat tcttctgaat aaagacaatt tgctaacctt 114720
aaaaaaaaaa aaaaaaaaaa agtttttctt atatgttgga cccaaattct taggctttaa 114780
cctgaataac aatgacagca agatcaataa atagtacaca tttattaaac actcactgtg 114840
tcccagacaa tattccaagc actttttatg gatagactca ttttaacttc taaagaactt 114900
tgtgggataa atacagttat tttatagatg aagaaactga agcacagaga agttaagtgc 114960
tttgtccagg gtaacagctc agatatggca gagtcaggat ttgaaactag accctcacat 115020
accttaactg ctgtgctgtg gcagtgtttt tcatactgta ggttgggacc agccttctct 115080
tatgccctca ccccctgcca aaaaaaaaaa aaaaaaaaaa aaatatatat atatatatat 115140
atatatatat atatatatat aatatatata tatataaaat atatatatat ataaaatata 115200
tgtattagta tatatgcata tatagtatat attatatatt agtatatata ctaatatata 115260
atatacatat tagtgtgtgt atatatatat atactagaat aaaaaaatca aagtatctca 115320
gagtagtaag gacaaacatt tcagaaaaat gttttcatta tatatacatg tatgtatgtg 115380
tatgctgatt caacaaatat atttcttata ggttatagca aaatagtttg aaagctttta 115440
ctgtgtttta tcaggaagac cttaggtgaa cgtatattca cagataaaag aggttattta 115500
ttcattcaat aaatattaca ttctcataag tcctaatatt atgtattttt attcttcaaa 115560
aaagttagta tttgtgattt atgaaataag acatgttctt gcacttttag cagatctgtc 115620
ccgatgttgg gcttctttaa tccttagtgt gggtgctttg cactcactca ctgctgggga 115680
cagcaagacc cctgttagtc tcagctgtgt ttcttaaatt ggcccactgt accttccagt 115740
tagctattct ggggtccatg tcatgttggc tccattttcc ttttctttct cccacacaga 115800
tacctataac ggctataaca taggcctggt ggctgttggt ggcttatccc tatctgcttg 115860
tatttaaggg gtactgtttc actgagtttt gctgacagat gttgtcatga gatttgaggt 115920
tttctgtgtt gttgctctat ttttatgtgg gaatttgcta ctatcatcat ccctagacca 115980
gcttttccta gtaatacaac agggatgttc tgactgatta gagtttgcct gtttgaagaa 116040
ttggttggct agtgattttt ttttgagggg agtctgtacc agttaatagc ctgactggcg 116100
tgtggataaa aaggaagcag tttcaagtca aataaaacac ttaaaatgaa accacactgc 116160
aactctcttt cttttactta agcttaatca aattaatgat gatgtaatcc catgaaggaa 116220
aagtcttctg aaggatcaag ttgataacat tttgtgatca aagaatttga gaaaacctct 116280
atcccagtgt ctatcattat atattttagg atgttaatta cctgtgtggc tttaggcaag 116340
tcatttttcc tccttgagcc ccattcttaa tcctgtccaa attatttgtc tcctcttgca 116400
gttggactat tttaatatag ctgtccttca agtgagtttt gttcaaagga gccttcactt 116460
tagctcttac tgtgtaccca ctttgcatag tcttgtttta aatgtaatcc ttggattttt 116520
ggtgttgcta actaattact gtttttatgt gaggatttag agtgatccag aatctatact 116580
tgcactacct ccttcatctt ccacaaatgt ttgaagtggt agaattttta aaaactttga 116640
aggtacagct gacagaattt gctgatggtt tggaagtgag tggtatgaga gggaaaaaaa 116700
ggaataaagc atgactgcat tttttgtttg tttgtttgtt tgtttttgag acggagtctc 116760
actctcgcca ggctggagtg cagtggcgtg atcttggctc acggcaacct ccgcctcctg 116820
ggttcaagcg attcccctgc ctcagcctcc caagtagctg ggactacagg cgctcgccac 116880
cacgcctggc taatttttt ttttgtattt tagtagaaac ggggtttcac cgtgttggcc 116940
aggatggtct ccatctcctg acctcatgat ctactcacct tggcctccca aagtgctgag 117000
gttacaggca tatatataag catataaagt gtgttatagc atacaaacag gtatatatat 117060
aaacatgcag tccacacagc tgataggaat gaggcagtag tgaaggagaa gttgatgtag 117120
gagaggggac agttgttaca ggaaagaagt ctggaggcag aagggatgaa ttccagtgct 117180
cacatagaag attgcttaga tgggagcaag gacaatttat ctagagtcac aggaaagaat 117240
gcagtacacg ggtagagatg caggtgagtt gaaagatgtg agagatgatg gaaataattt 117300
tctgattgct tctatattct caaggaagca ggaagcaaag tcctcagcaa agagaataga 117360
agaggtgtta aatatttgag aaaggagatg tactgtagaa aaaaaaaaaa ctcagtttct 117420
ccttctgaac tctcacaaaa cagaaccctt ccatgactct agttgtgtgg ggtttttcc 117480

ctgtcagcta ccaattctgc agatgattgt tcagtgaaca ccaactgggt gtcctctaag 117540
tcagttcagt tctcacactg tttacctgga gatagcatca gatcccacag attgaggact 117600
ctgtcccaca agactgcctc cacttcagat gccagtctca agtacaagtt gtggcctgtg 117660
cttctgactg accttctata aattggagtt cccacagtcc cctccttggg ttcaataaat 117720
ttgctagagc agctctcaga actcagggaa atgctttaca tatatttacc catttattat 117780
aaaggatatt acaaaggata cagattgaac aggcagatgg aagagatgca tgggcaaggt 117840
atgggagagg ggcacagagc ttccatgcac tctccaggtc atgccaccct ccaagaacct 117900
ctacagattt agctattcag aagcccccct ccccattctg tccttttggg ttttttgtgg 117960
agacttcatt atataggcat gattgatcat tggctattgg tgatcagctc aaccttcagc 118020
cccctcatcc cgggaggttg gtgggtaggg ctgaaagtcc caaacgtgta attctgcctt 118080
ggtctttctg gtgattagcc ctcatcctaa agctctttag aggccacagc cacaagtcat 118140
ctcattagcc ttcaaaagaa tccagagatt ccatgaattt taggcgctgt atgctaagaa 118200
actggctaaa ggccagttgc aatgtctcag gcctgtaatc ccagcacttt gggaggctga 118260
ggcaggagga tcgtttcagg ccatgagatc aaaaccagcc tggtcaacat agtgagaccc 118320
ccttacaaaa aatttaaaaa ttggccaggc gtaatagctc ttgtctgtag tctcagctac 118380
tcagaaggct gaggatcact gagccctgga gttgaaggca gcagtgagcc atgatcgtgc 118440
cactgactcc ggcttgggtg acaaagtgag accttgtctc agaagaaaaa ggaaaaaaaa 118500
aaaactgggc aaagactaaa taacatattt cacagtatca cagatttgta ttgtctagga 118560
aagtgaatgt aaacagacca ggacactagt atgatccctt ggtttcatga aggtcccact 118620
aaagtcatga acacaaagtg agactaggca tcatgttata tggtttttcc agccatgttt 118680
aacagctagc taaatagcta attgtttcgc tgcagtttat tttagcagtt ccttatttta 118740
gcacatttca tgttttaaaa tttctaccaa taacatttta ataaactttt ttacagataa 118800
cttcacaaat ccataatttt ttaagttaca atcccagaaa tagaattgct cattgaaagg 118860
gtatgttcat ttttaaagtt atgctagaaa ctgccaaatt gccttcagaa aaaggtgttt 118920
gtatccccac taacactagt gttagttttc ttgtgccctt gctcaagtat acatattatt 118980
aaaaacaatg ttgggccagt ttactagata aaaggtgtag tgcctcctta ttctaatcta 119040
tttgattact agtgagtatg tatgtctttt cacgttggtc attttatgtt tgttcctttg 119100
tggattgtca tgtcctttgc tcatttttct tttggaacat ttcttagtag tttataagag 119160
ctcttggtat tttaatgata gtaacctttt aactgtcatg catgctgcaa atctttttttc 119220
tgtttgtttg cctttgtatt ttgtttttgg agggtttcta tgtataggaa ttaaatttta 119280
tgttgttaaa tcttttgatt tctgcttttg catatgtact tcaaaagact ttctatttta 119340
agatcaagtg ttacctgtat tttcttttag ttctatttaa aacctcttaa tttatatgcc 119400
tgtgctgtta actcccaagt tgattcacaa gtgtgtatac atagtttgaa tttagtggca 119460
atttaattat ttacaacttc ttttgcagca aggatttgtg gagaagatgg acaggtggat 119520
cccaactgtt tcgttttggc acagtccata gtctttagtg caatggagca agagtaagtt 119580
agttcatatt ttcacattgt gcatcctagg gaatttgggt tcattgttag gaatgggctt 119640
cactcagcta aaaacaaagt atttttgaga atttaaatat tttggatatt tacaagatca 119700
tataaagcat actctatctt ggttaacagt ttcttttaaa tataaattat gtgaactctt 119760
aaaattttca ttttcatttt caatgttaat atttcctaag ttaaaataat ttgtttttag 119820
ttctgaaata atttggggag tgattgagtc tgtagtgatt atgactatta gaattggttt 119880
atttatttaa ataatgcatg tcttcagatg gctctcctaa tttgttagtt aggctttaag 119940
ctaaatggat gctatataac taaatccaca tagatttgtt gaaatggctc cagaggtttt 120000
ttagatttat tactgctatg tgcccttaaa aaaaatctat tcattctttc acttaacatt 120060
tatcagaaga gtgctctgtg taagacgtgg ttaggcatag tgccagtctt gaaggaagtt 120120
acagcctaat aaaagacata gggcatgttg tttggttact gtaatatgaa gtggcatgtg 120180
ttaaatgtca ggggagaact acaaagtcat aaaaaggtgg gagagattac atacaggtaa 120240
aggaatcagg aatgacacca tggggagtaa ggtagtgttg acctaggcct ttaagataca 120300
atagggacag tatggaaaga gtatattttt cccacttaaa ctctttcctt ggtcgttccc 120360
tcaaattttc ccttttgtcc atgtgcaggc actttagtga gtttctgcga agtcaccatt 120420
tctgtaaata ccagattgaa gtgctgacca gtggaactgt ttacctggct gacattctct 120480
tctgtgagtc agccctcttt tatttctctg aggtaaagtc tgcatttctt ttcacactct 120540
attcgagcat tccagcctct aactatcaat gctggggccc tgtctatagg aaataacaca 120600
gaagagccaa gtcatttcca aaaagatgta tcattgtttc aagttgtttc tgatggcaag 120660
agtaatttaa taatatatta gagagaacat gaaaattcaa tgtattaaat aactctaatt 120720
ttgagaaacc taattaaact actgcatgta agagagtgca tgtttttaat tatttggagc 120780
tattttaaaa ccacagaatt tgaaacttgc ttccagtgca taaattgcag accagacttc 120840
agaagagaaa aaaagtagta aatttttttct tatgctcatc atttttactt tagtcacttg 120900
ataggattgc ccagtgaaga agcatttgca acagacaatg agtatattaa tctttttgag 120960
gcatacagtt tagtataatg ctctttgtta ggcttcaaca agtgaaatta ttttgttgga 121020
aagcaaatga ctattaagta gaaagaggat tcccagtctc acaaagcagt aatttagaca 121080

ctcgattctg cctctttaca agaatacagg tactcagttg atttgttttc tcactccctt 121140
tctttgctat aagtttaaat caacaatttg tttaggttaa tatgtcctca tggaatggtg 121200
gaaatgatca gatataaaat atttggtttg gttagtttac tctttatatg tttgctggca 121260
aggaaccaca aatccagttt agtataattt ttactctagt tcactaaaag tttgcatcca 121320
gctgtgtagg tagtgtttgt ttcttgttaa ctttttttc gtctaaaaga atactttaaa 121380
acttttcaat ctcaaatgac tgtaacttgc tgacaggtgt taacagaaga agtagatctt 121440
tttgtttttt gcttatgacc tgtattttaa tatttgagct tatagattag agattgtgag 121500
agaaatctgt ttatagtctt attttccctt gtgtattttt tcttcctagt acatggaaaa 121560
agaggatgca gtgaatatct tacaattctg gttggcagca gataacttcc agtctcagct 121620
tgctgccaaa aagggccaat atgatggaca ggaggcacag aatgatgcca tgattttata 121680
tgacaagtga gttatattga tagatggatt cagcagatac ttattgaaca tttgatatgt 121740
tttgtggaaa taaagatgaa taaactcagt ctctgttgtc aaggagctca caggaggcag 121800
cataaaagct gcttttatat ggtgtttgta aagctttggg ggttcttaga acaaaagttt 121860
ctgctgggaa aggggaggtg tatgtggggt aaacaggatg gcaatggtgg tgttcaagga 121920
gtgtttccca gaagagagat tttgtttgga tcccaaagaa agaagggaat tttgctaccc 121980
agagaaggca gaaaacaaca ttctaggcaa aggcattggc ccagaagcca tggaaacgta 122040
ggggaaagtg gcactttcaa gaaacttgag tttagataat caaaggagtg gggaataaat 122100
atgaggatgc tggtactaat tggaatagat tgtaagggac cttgaatgcc tatttatggg 122160
tatattatac tttctgtata aatctgctca ggcacgttgt taattagttt tttattagtt 122220
ttcactgaaa atgagaggat ggaaacatca tacagtaaac aaaattgaaa atatctggtc 122280
aggcagatga tgagcttgtg gccagctctg taacgtatgg tattcttttc atttaacttt 122340
tcttactctg taaaaaaagt aattcgtggt cgggcacggt ggctcactcc tgtaatcaca 122400
acactttgag aggcagaggc aggtgaatcg cttgagccca ggaatttgag accagcctgg 122460
gcaacatggc aaaacccgcc tttactaaaa atacaaaaat tagctgagcg tgatggcgtg 122520
cgcctgttgt cctagctact taggggcctg aggcagaagg atcacctgag ccttgggagg 122580
tcgaggctgc agtgagctgt gatccactgt actccaccct gggcagggca gtagagtgag 122640
accctgtctc caaaaaaaaa aaaaacaaca aaggtaattt gttatttgta tccttaagca 122700
aatgctaaag gggtaacttg gggatagaga aaagtccaca gatgttaggg tttgaagaca 122760
ctaatagtat ctaggccagt ggttcctgaa cattagtctg tgggctcttg ctgggctgtc 122820
tgcataggaa tcacctgaga gcttattaaa aataggtttt caggctggtt gcggtggctc 122880
acgcctataa tcccagcact ttgggaggct gaggcaggcg gattacttga ggtcaggcgt 122940
tcaagaccag cctggccaac atggtaaaac cccgtctcta ctaaaaatac aagaattagc 123000
caggcatgat ggcacacacc tgtaatccca gctactcagg aggctgagga aggagaattg 123060
ctcgagcccg ggaggtggag gttgcagtga gcggagatca tgccactgca ctccaggctg 123120
gctgacagag ggagactctg tctcagaaaa aaaaaaaaaa ataggttttc agtctgggta 123180
ccggtggctc acacctgtaa tcccagcact ttgggaggcc aaggcaggca gatcacttga 123240
ggtcaggagt ttgagaactg cctggccaac atagtgaaac cttgtctcta ctagaaacta 123300
caaaaaatta actgggcatt ttgacgggtg cctataatcc cagctactag ggaggctgag 123360
gcaggagaat tgcttgaacc cgggaggcag aggactgcat ctcaaaaaaa aaaaaaaaaa 123420
aaaggtttcc agtccccctg tctcagaaat tctgattctg caggtttgag gtgtgaccag 123480
gaatctttat ttttagaaga cataccagat aattctgata aatagccagt ttagggatgt 123540
agtctaattt tcctattttg caagtaagga aaataaggcc cagagaggta atgattttct 123600
caaagtcaca gaacaagtta gtggcagaat ttggactgga atgcagttct taatgttctg 123660
tccagtgttt attctggtac agtatgtttg tagaaggtat tacgtaagaa acattgttat 123720
atagatgttg agataggaag agtttacatt tagaaatttg gtctaaaatg cctgaacatt 123780
caagtcgtgg aggagtattg accaacttac tcaatacaac ataggagatt cacattttgt 123840
tacaaaaatg ctgatttaaa aggagagttt tctttttttt cttctttttt attttttgag 123900
atggagtctt gctctgtcac ccaggctaga gtgcagtgac acgatctcag ctcactgcaa 123960
cctccacctc ctgggttcaa gcggttctcc tgcctcagcc tcctgagtag ctgggattac 124020
aggtgggggc caccacgccc agctaatttt tgtattttta gtagagacag ggtttcacca 124080
tgttggccag gccggtcttg aactcctgac ctcaagtgat ccacccacca ctgcctccca 124140
aagtgctggg attataggcg tgagccactg tgcccagcct gcttgttttt gtatcatata 124200
tatgcatcat cataatcatg cattatcaac ctttgtattt ctgtcaggac atagaaacca 124260
ttagagtgct tggaagagag cctttttttt tttctcgcat ttaatgcttt ttttggtatt 124320
catttcataa tcagcttacc aaaacattac ctgcattata ccccatcaag gtagaaatct 124380
ttgtgttatc aatattggtt actccctttc cacaccgagt catcagtaag tcctgttcta 124440
tccaaatagg tcatatgcat ctagctcacc cctcagtgct gttttgtttt gaatttgtac 124500
atgtttactc ctgatgcctt gtagttatga tgatgtgttc ttattttatt ctgtgcatac 124560
aagttctcag ctcgcttttt agggaaaatg accatgtctt cctttcctat aaattccttt 124620
ctatctatca agtcctcaac agagaatagg tacccataaa tatgtgattg ttagtttctt 124680

tgcctcagtt gtagtctgat ccttacagct tttaaacaac agtagagttc accgtcaaga 124740
actaaggatg gttggcaggc agatagaaag gtagcaagtt gacccaacta tctctgggga 124800
agtgggaaca aagaaaggtt acatcagcac tgtcatcaca tagctctata gttctaggcc 124860
tgcaggctca atcaagtagc cttgtataag attctctgga ggaggtgctg aaagttgctt 124920
atacttgcta tggaatttga ttttacttcg gatatctttt taccataggt acttctccct 124980
ccaagccaca catcctcttg gatttgatga tgttgtacga ttagaaattg aatccaatat 125040
ctgcagggaa ggtgggccac tccccaactg tttcacaact ccattacgtc aggcctggac 125100
aaccatggag aaggtaaccc agaacttcaa acgtatcaaa ctacaagaag ttttattggt 125160
agaactcata aaatataagg tgggaaaacc aagcagaata gcacagtgga aattgaagca 125220
gtccagcaaa gtgattaaga gcagaggcct tgagtctggc ctggtatgta cagtcacgtg 125280
ccacataaca ttttagtcaa cagtggactg cgtgtacgat ggtcctgtac gattataatg 125340
gatcaaagct ggtagtgcaa taataacaaa agttagaaaa aataaatttt aataagtaaa 125400
aaagaaaaaa gaaaaactaa aaagataaaa gaataaccaa gaacaaaaca aaaaaaatta 125460
taatggagct gaaaaatctc tgttgcctca tatttactgt actatacttt taatcattat 125520
tttagagtgc tccttctact tactaagaaa acagttaact gtaaaacagc ttcagacagg 125580
tccttcagga ggtttccaga aggaggcatt gttatcaaag gagatgacgg ctccatgcgt 125640
gttactgccc ctgaagacct tccagtggga caagatgtgg aggtgaaaga aagtgttatt 125700
gatgatcctg accctgtgta ggcttaggct aatgtgggtg tttgtcttag tttttaacaa 125760
acaaatttaa aaagaaaaaa aaaattaaaa atagaaaaaa gcttataaaa taaggatata 125820
atgaaaatat ttttgtacag ctgtatatgt ttgtgtttta agctgttatg acaacagagt 125880
caaaaagcta aaaaaagtaa aacagttaaa aagttacagt aagctaattt attattaaag 125940
aaaaaaattt taaataaatt tagtgtagcc taagtgtaca gtgtaagtct acagtagtgt 126000
acaataatgt gctaggcctt cacattcact taccactcac tcgctgactc acccagagca 126060
acttccagtc ttgcaagctc cattcatggt aagtgcccta tacagatgta ccatttttta 126120
tcttttatac tgtattttta ctgtgccttt tctgtatttg tgtttaaata cacaaattct 126180
taccattgca atagtggcct acgatattca ttatagtaac atgtgataca ggtttgtagc 126240
ccaaaagcaa taggttgtac catatagcca aggggtgtag taggccatac catctaggtt 126300
tgtataagta cactctgtga tgttagcaca atggcaagca gcctaacgga aattctgttt 126360
attgattgat tgattgattg attgattgag acagagtttc actccattgt ccaggctgga 126420
gtgcagttgc acagtcttgg cacactgcaa cttctgcctc ccaggttcaa ccaattatcc 126480
tgcctcatcc tcccaagtag ctgggattac aggcaggcac caccatacct ggctaatttt 126540
tgtattttag tagagacagg gtttcaccat tttggccagg ctgttctcga actcctgacc 126600
ttaagtgatc tgcctgcttt ggcctccgaa agtgctggga ttacaggcat gagctaccat 126660
gcctgggcag taactgaaat tctctaatgc cattttcctt atctgtaaag tgacgataat 126720
atgcacgttt acctcaaagt tactttgatg attaaagtaa ggtaatgtat ataaaataca 126780
tattaacata gtacctgaca catggtaagc atcaaaaaat gttaactact tttattacta 126840
ttattattac gtatttttaa ataattagag agcagtatca aaaattagct gggcgtagtg 126900
gcatgcacct atagttccag ctactcagga ggctgaagct ggaggattgc atgagcctgg 126960
gaattaaagg ctgcagtgag ccgtgttcat gcccctgcac tccagccttg gtgacagagc 127020
aagaccctgt cttgaacaat taaagaaggc attatgccgc aacgttagct tagaaatgat 127080
ccacatatat caccagtaac tgtcaacagg attggaaccc tagttttggg tattatgatc 127140
acaaggtatt attaatagct tattaataat aaagcgttgg ctaggcacgg cgactcacat 127200
ctgtaatccc agcactttgg gaggccgagg tgggtggatc acctgaggtc aggagtttga 127260
gaccagcctg accaacatgg agaaacccca tctctactaa aaatacaaaa ttagccgggc 127320
gtggtggtgc atgcctgtaa tcccagctac ttaggaggct gaggcaggaa aatctcttga 127380
acccgggagg cagaggttgc agtgagctga gatcgcacca ttgcactcca gcctgggcaa 127440
caagagcaaa actccgtctc aaaaatataa ttataataaa taaataaaag taaagtattg 127500
atgtttgtga atgatttatt cttctaatga actagaggag atttttccag gaatttcaga 127560
gccagtgagg ttatgttgct tgtatgtgtc atgtgtatcc aggtgaaaaa acttaattaa 127620
acgctattat ataataccat acataaaaac tgaattttag gaatactgaa gaatgacata 127680
tagaagtcaa atcattaaat agctagtagt aaacagaata gagtgtcagc tgttacccaa 127740
tgatgataat attttcacga ttaaaattaa acctttttctg attttaaagg aaaagttcag 127800
atctgtatca tataaagaat gtaaattttc agggtaataa aattaaaatg cagagagaaa 127860
aatgcaaaaa tagttcttac tagatgtgtg tatgtaagga acttagacta attttaagaa 127920
cactgtcaag accctggtag ttaggtagga aaaaagacat gaatgattca ttcaacaaaa 127980
actttgagta tttctgtgct agatggtagt gttacagtgg taaacaaaat aaatgtgttt 128040
ctgctatcct ggagcttagt ctacaaaaaa ggtacatatt ggccgggcac ggtggctcac 128100
gcctgtaatc ctagcacttt ggaagatcga ggcgggtgga tcacctgagg tcaggagttc 128160
aagaccagct tggccaacat ggcgaaaccc cgtctctact aaaaatacaa aaattaactg 128220
ggtgtggtgg cggacacctg taatcccagc tactcgggag gctgaggcag gagaatcact 128280

tgaacctggg agacagaggt tccagtgagt cgagatcatg ccactgcatt ccagcccggg 128340
ggacaaaagc gaaaatacgt ctcaaaaaaa caaaaacaaa caacaaaggc acgtattaaa 128400
tacgaacata aatatttaca aattatactg aataagttct catgtttatt atttgcttgt 128460
ccagttacaa acttttcctt cgtagaatta gaaatataaa taataaacat gagaactcat 128520
tcagtataat taataattat taaatgtaaa taaaaacatc tatgtacaat taggcattta 128580
tttaagaatt atttgaaaaa aaaacaatgt ggaaacagat attttgatat attgctagtg 128640
attgaaattg ataatgttct tttgaagagt aaagtgacca tatatattaa agttaaaatt 128700
taactcagca atcacacgcc tggtgagtta tcttaaggaa atcagtttga aagtaaaatc 128760
aatatatgca caaagacttt aacatttatc ataaaccaga aaaatcgagt ttcaaattat 128820
atcctatgga ctattttctg ctaaaaagta ttaatatcaa ctttatgtaa tactttcgtg 128880
acaaatattt tgggggagaa aacccaacaa aattacatgc attgtaattt ttttttttt 128940
ttttttttta gacagtcttg ctccagcgtc caggctggag tgcagtggtg caatctcggc 129000
tcactgcaac ctccatctcc caggttcaag caattctcct gcctcaggcc tcccgagtag 129060
ctgggattac aggcgctcac caccatgcct agctaatttt tatagttttt agtagagatg 129120
gggtttcatc atgttggcca ggctggtctt gaactcctgg tctcaagtga tccgtctgcc 129180
tcggcctcct agagtgctga gattacaggt gtaagccact gcacccagcc ttatgcatta 129240
taattttaat ttgtaaactg tacaaaggga taatacttgt agtacaacaa gaagtaaaaa 129300
catttgttat aggtagttaa catttgtaac cagtagaatt ataggtaaaa tttatttatt 129360
taaaacagtt ttagttggat ttgatttcaa ctttaaaata atgcttttca tctctatcag 129420
gtctttttgc ctggcttttt gtccagcaat ctttattata aatatttgaa tgatctcatc 129480
cattcggttc gaggagatga atttctgggc gggaacgtgt cgctgactgc tcctggctct 129540
gttggccctc ctgatgagtc tcacccaggg agttctgaca gctctgcgtc tcaggtattg 129600
actgattgcg tctgccatta gggagaaaag catacacatc ctttccttca catcccagta 129660
acagatccta ttatttgtaa attttaagtt gtggaaaaaa aagataaaag ccaggcacag 129720
tggcctgtgc ctgtaatccc agcactttgg gaggctgcgg tgggcggatc acacgaggtc 129780
aggaattcga gaccagcctg gccgacatgg tgaaacccca tctctactaa aaatacaaaa 129840
attagccggg catggtggca ggcacctgta atcctagcta cttgggaggc tgaggcagga 129900
gaatcgcttg aacccaggag gcagaggttg caatgaacca aaatcacgcc actgcactcc 129960
agcctgggtg acaaagtgag actgtgtctc aaaaaaaaaa aaaaaagaga gaaataaaat 130020
tagcctactt actatcttct aatcaaagca tttgtggtaa cttaaaatat actgtattgt 130080
aaagtatcat gctgtttcat ttaggccatt attctatttg aatctgtggc tgtttctctt 130140
aataaatcaa gtaatatgga atatattcat agcctctgaa gagctcttta tgtaagtatt 130200
tatttaggat acttttttgta aaataagtga atgaattctt aggtctcctt ttttttctt 130260
ttcttgagac agggtctcct cgctgcaacc tggaaattct gggctcaaat aatccaccca 130320
ccacagcctc ctgaatagct gggactagag gcatgcacca ccacgcctgg ctaatttgaa 130380
atttttttt ggccaggcat gatggttcac gcctgtaatc ccagcacttt gggagaccga 130440
ggcaggcaga tcacgaggtc gggagatgga gaccagcctg gccaacgtgg tgaaaccccg 130500
tctctactaa aaatacaaaa attagctggt tatggtggct catgcctgta atcccagcta 130560
cttgggaggc tgaggcagga gaatggcttc aaccagggag tcggaggttg cagtgagccg 130620
agatcacgcc actgcactcc tgcatggtga cagagtgaga ctccatctca aaaaaaattt 130680
ttttttaaa tgatggagtc ttgctgtgtt gctcaggctg gtcttgaacc cctgacctca 130740
aatgccgcct gcttcagcct aagtttcttt ttttttgta aagagacagg gtcttgctat 130800
gttggccagg gtagtctcaa actcctggct tcaagcagtc ctcccacctt ggcctctcaa 130860
agtgctggga ttacaggcgt gaaccactac ctataatgtt gtgtttcact caaggccttt 130920
tgatttcgtt ttgcattacc gtgccacatt gtgcatttcc ttgacctttt ttgggttttt 130980
tggagtgctt tcatatgtta aaccatacct gattctcctc aaaatcacac aaagtagaat 131040
atcctaagac aagaaatcta aggaggcata aagaagttaa ctggttttat taaactcaca 131100
cagtaaatga tagagccaga aatattcccc ttctagtgtt cttcaccatc agcttaatgt 131160
agcataataa ttttctaatt actgttgaca aataaataac cctttgaatt ttcaatactg 131220
ggccttggat aaatttttcct aatttgtaag agagtattat cgtattgcca tttacaaagc 131280
tctcctgagt atctttttct tctgttaagt ttacctagga gataaactgc tgagtatggt 131340
tgccattttg gttttttgat ataggttaga atgtcttggt ttttttttt ttttttttg 131400
gtttttgttg ttgtcattgt ttgagacagc atcttgctct gtcgcccagg ctggagtgca 131460
atggcacgat cgtggctcac tgcaacctcc acctcccggg ttcaagcaat tctcctgcct 131520
cagcttcctg agtagctggg attacaggca tgtgcaacca cacctggcta atttttgtgt 131580
ttttagtaga gaaggggttt caccatgttg gtcaggctgg tattgaactg ctgacctcat 131640
gatccacctg cctcggcctc ccaaagtgct gggattgcag gcatgagcca ctgcacctgg 131700
ctgaatgtct tgtttttgat taggcactta agaaaggcct aggtactaac ataaaatat 131760
atttttatac cttttgttga tactatatat atagaaaact gcacttatca taaccttaga 131820
caccttgaag aatgttcaca agcagaacta acccatgtga cccagcatcc agatcaaaaa 131880

cagcattatc agcccctcta gaagccctct tgggcccctt ccattcactg tccttcttgt 131940
caccagggta gctactatcc tgacttttga tggcatagat tagcattacc tgttcttgtc 132000
attttataaa taaaaccata ctgtgtattc ttttcttgta cagctttatt gtgctaattc 132060
acatttacat catacaattc agtggttttt atatggtcac agagttaggt aaccattacc 132120
acatcgattt tagaacattt ttttcactcc agatagaaac ccccttttact taaactccaa 132180
atcccccact ccaccagccc taggcagcca ctagtctact ttttatctct atagagacaa 132240
tagatttgct tattctggac atttcataaa catggaaccg tatattatgt ggtcttttgt 132300
tgccaactgt ctttcactta gcatcatgtg ttcaaaagag catcatgtta tccatgtttg 132360
gcatgtatca gaatttttatt cctcattatg gccaaatatc ccattgcaag gatttatgac 132420
attttatttg aattgtaccc tcctttctgc catttatcaa taatgctact gtgaccattt 132480
gtgtacaagt ttttgtgtgg atacaggttt tctttttgtt tttaaatttg aggtggagtc 132540
ttgctctgtc gcccaggctg gagtgcagtg gcacaatctc ggctcactgc aacctctgtc 132600
tcctgggttc aagcagttct cctgcctcag cctcccgagt atctgggact ataggcacgc 132660
accaccacgc ccagctaatt ttttagtaga gatggggttt caccatgttg gccagtctgg 132720
tctcgaactc ttgacctcaa gtgatccacc catctcggcc tcccaaagtg ctgggattac 132780
aggggtgagc cactatgccc ggctgtggtt ttcatttctt ttgttgtata tacataggag 132840
tagaattgct gagtcaagag gtaactctta aacttattga aaaactgcca gattgttttc 132900
cgaaaaggct gcaccatttt gcaatcccac cagcagtgta tgagttttac agcttctcca 132960
catttcattg gaacttatta tctgtttggc tgtttttaaa aatgatagtc attccaataa 133020
gttctacttc agtgtggttt ttgcacttct ctgatgagta atgatgttga gcatcttttc 133080
atttgcttat tggcctttgt tctagctttg gaaaaatgtt tattcaaatc ctttggccat 133140
ttttattttt atttttattt atttattttt ttttgagacc aagtctcact ctgtcagcca 133200
ggctggagta caatggtgtg gtctcagctc actgcaacct ccgcctcctg tgttcaagtg 133260
attctcctgc ctcagcctcc cgagtagctg ggattacatt tcaggcacct gccagcatgc 133320
cgggctgatt tttgtatttt tactagtgac agggtttcac catgttagcc aggctggtca 133380
caaactcctg acctcaggtg atctgcctgc ctaggcttcc caaagtgctg ggattacagg 133440
cgtgagccat tgggcccagc ctagattttc ttttttcttt ttttttttga gaaggagtct 133500
tgctcttgtt gcccaggctg gagtgcaatg gcacaatctt ggctcactgc aacctctgcc 133560
tcctgggttc aagcgatttt cctgcctcag cctccccagt agctgggatt acaggtgcct 133620
accaccacac ccagctaact tttgtatttt ttttagagac agggtttcac catgttggcc 133680
aggctggtct caactcctga cctcaggtga tccacctgcc ttggcctccc gaagtgctgg 133740
gattaccggc atgagctacc aggcccagcc aattttctca ttatattgcc caggctggtc 133800
tcaaactcct gggttcaagt gatcctcctg ccttggcctc ccaaagtgtg gggagtacag 133860
gcgtgagcca ccttgctcag ccccttgcc catttttaaa ttagattgcc tttttatatt 133920
gagtttcagg agtcctttat atattctaga taaatgtccc ttatcaaatt atattatttc 133980
caggtatttt cttcattctg tgagttgtct ttcctctacc ttttaaaaaa ggtgggtttt 134040
tgtttgtttg tttgtttgtt tttttaagat aaggtctcat tctgctgccc aggctggagt 134100
gcagtggcac aatcacagct cactgccacc tcaacttcct gggccgaagt gatcctctta 134160
cttcagcctc ctgaatagct agggccatag atacacacta tcacacccag cttttttttt 134220
ctgtttgtag agacagatct tactgtgttg cccaagttgg tctcaaactc taggctcaaa 134280
gtgattctcc cacctctgcc tcccagagtg ctgggattac aggtgtgagc cacacgcaac 134340
ctgtcttttc actattaata gtgtcttcct gcttcagcct cccgagtagc tgggattaca 134400
ggcacccacc accatgcctg gctaattttt ttgcattttt agtagagaca gtgtttcacc 134460
atgttcaccc ggctggtctt gaactcctga cctcaggtga ttcacctgcc atggcctccc 134520
aaagtgctgg gattacaggc gtgagccact gcacccggcc aaaatattgc cttcttaaca 134580
gtattgtctt ctaatttgtg aacatggatg tatcttcatg tatttatgtg ttctttcatt 134640
tcagcagaat tttgtagttt tcagagtaga agcctttcac ctccttgggt catttattcc 134700
tatgttttaa gttcttttcg attccattat aaatagaatt gttttcttaa tttcattttc 134760
agattgtttg atgagagagc atagaaatac aagtgatttt tacatgttga tcttgcaact 134820
tcaactttga taaatctgat tgttagctct aatagttttc ttgtggattc tttaggattt 134880
tcaatatata agatcatgtc atttatggat agagatagtt ttttttctgg ctagaactta 134940
cagagcaatg atgagtagaa gtggcagaag caaaaatctt tgtcttgttt cctatctgac 135000
agggaaagct ttcagtttca tcatttaata tgatgttagg tgtgggtttt caataaatgc 135060
ctttttttcag attcaggaat ttccctatca ttcctgattt tttaaggctt ttttttttt 135120
ttaaatcatg aaagggtgtt gaatattgtc atgttctttc tgtatcagta taaatgatcc 135180
tatggatttt gggttttatt ctgttgatgt gaaatattaa ttgattttca gatgttaaac 135240
caaccttgca tacctgagat gaatctcact tggtcatggt gtataatctt ttcaatatgc 135300
tgctggattc catttactgg tattttgttg aagattttgt atctgaacgc ttaagataac 135360
atttacactc tatcagaaat gaattgacca taaatgtgag agtgtatttg tgggttcttg 135420
attctcttcc attccaaaga tagacataca tccgtctgta tgtctgtctt tatgccagta 135480

ccatactctc ttgattacta ttgctttgta ataagttttg aaatcagaaa gtataaatga 135540
gattttggta tctgagtaac agtcctcata gaattagttg ggaaatattc cctctttatt 135600
ctggtccctc tttctttttt gtttaactgt gtatcttgga gattgttcct tctcaacaca 135660
tgagagccgc tttccctacc ctcccacccc tgctatagag aggtctataa gtgtctgttc 135720
aattatttta tttacttaac ctattactta gtcggggaca ttaagcttgt ttatgtcttt 135780
tattttaaac aatgctgcag tgaataatct tgtatataag tcattttcca tcaatataag 135840
tctctctgta actgaatttt tagaagtgga atttctaggt caacctatgg ctctgtattt 135900
cacaaaaata ccaattctgg tttttcttgt ggaggtgggg agtaggaggt agaatgctgg 135960
aggagaactt gctgtactca gctggctagt cattttagaa aggtttcctt agcttctttt 136020
tgtcatatgg cctcaccaag aatcaaaaac attcctattt accctgtaaa catggggctt 136080
tactacccaa gatacatatt tctggatgta tgacagcttt tcatattgaa gaaataatgc 136140
tgtgagtaca gcacatttgt tggaacttag gtcgttaaga atgtcttata aattcataca 136200
ttatacattt tattttattt tatttttag tttttgatac agagtcttcc tctgtcgccc 136260
aggccagcgt gcagtggtac aatcttggct cactgcgacc tccatctcct gggctcaagt 136320
gattctcatg tctcagcctc cagagtagct atggttacag gcatgcacca ccatgcccgg 136380
ctaatttttt tatttttagt agaaactggg tttcaccata ttgaccatgc tggcctcgaa 136440
ctcttggcct caagtgatcg gcctgcctca gcctcccaaa gtgctgggat ccttgtattg 136500
ggtaaaagat gaatattgag ggctgcatgg tggctcatac ctgtaatccc agcactttct 136560
gagactgagg tgggaggagt cctggagccc aggagggtga ggctgcagtg agttgtgatc 136620
gcgccattgc acttcaacct aggaattata ggcttcagtc actgtgcccg gcatgtacat 136680
tttaatattg tgctttcctc ttttagctat agtatgaggt tacatttcag agtcattgtt 136740
gttaagcatc ttaatagtga tgaggttgag tgaaagttac ttctatttca aacactgaag 136800
aaaattttgt acaaatctgt cacattccaa gcccaggact gattgtttca tatacttcta 136860
attttacaat ttctattgta gtccagtgtg aaaaaagcca gtattaaaat actgaaaaat 136920
tttgatgaag cgataattgt ggatgcggca agtctggatc cagaatcttt atatcaacgg 136980
acatatgccg ggtaagctta gctcatgcct agaattttta caagtgtaaa taactttgca 137040
tcttttaaat tttttaatta aattttacat ttttttctaa tctattatta tatgcccaga 137100
actttcactt agagtgtgca gtataatgtg gtggttaagt ataaaggctc tggagtgact 137160
tcctgggttt taatcttggc tctgccattt attggcagcc gctaacctct tggtatctca 137220
gtttcttcat ctgtaaaatg agaataataa agtgaaaaga tgccaacatc atttactctg 137280
ggctgcataa ctgatacttg gaaaaagtat tcctttgagt ttaagaatta agttggttat 137340
tcattttagc ttgtaataaa aagatagtga ttcataggat atgccactta ctgaaattta 137400
ccacagatcc aatcataaaa tcactttctc ttccctaaag atagcttgat taacatgtaa 137460
aggtgtgtaa aggcttgatt acactaccct gatccgtacc ccagttccca gcagcaccat 137520
gaaaaaggga tttcaacata tttaattact ttcagtagaa agtaacagtg gtaggccagg 137580
cgcagtggct cacacctgta atcccagcac tttgggaggc cgaggtgggc ggatcacgag 137640
gtcaggagat tgagaccatc ctggctaaca cgatgaaacc ccgtctctac taaaaataca 137700
aaaaattagc cgggcatggt ggcaggcacc tgtagtccca gctacttggg aggctgagac 137760
aggagaatgg cgtgagcccg ggaggcggag cttgcagtga gcttagattg tgccactgca 137820
ctccagcctg cgcagtggag cgagactctt gtctcaaaaa aaaagaaagt aacagtggta 137880
ttgggagact gaggagccta gaaagtactt gaaggaagta aaaggtttgt ttgaccacat 137940
tgtatttgga aagccagctt tttcagctgt gtcagctttg tgtagtgatt tttagttctt 138000
cttttagaaa ataacggaca aggccgggca cggtggctca cgcctgtaat cccaccactt 138060
tgggaggccg agacgggcgg attacctgat ctcaggagtt cgagaccagc ctgggcaaca 138120
tggtgaaacc ccgtctctac taaaatacaa aaagttagcc gggcgtggtg gcgtgtgcct 138180
gtagtcccag ctactccgga ggctgaggca ggagaattgc ttgaacccgg gaggcggagg 138240
ttgcagtgag ccaagatcac accattgcac tgcagcctgc gcgacagagt aagactctgt 138300
ctcaaaaaat aataataaaa taaaaaagaa tggacagtaa acctaaatga gttcattccc 138360
aaagatgatg ttattcttaa gggatggttc atttatttaa gaccttacat aaagtctatc 138420
aattgcgtga tttttcactt ctgtaattgt gtgtatgtat aatgtaaata tatatgtttt 138480
tgttttgttt tggtttttg agacggagtc tcgctctgtt gctcaggctg gaatgcagtg 138540
gtgcaatctc agctctctgc aacctctgtc tcccaggttc aagcgtttct tctgcctcat 138600
cctcccaagt agctgggact acaggcacgt gccaccacgc ccggctaatt ttttgtattt 138660
ttagtagaga tggggtttca ccgtgttagc caggatggtc tcaatctcct gacctcgtga 138720
tccacccgcc ttggcttccc aaagtgttgc tattacaggc atgagccacc acacccagca 138780
tgtatttttt aaatgtataa aatgaagcag aaaagagaaa tgataatttt tcttcatctt 138840
gaaagattat cttcaccagg cgcagtggct cacacttgta atcccagcac tttgggaggc 138900
ctcggcaggc ggctcacttg agttcgaaac cagcctggcc gacatggtga aactccgtct 138960
ctactaaaaa taaataaata aagatggttt taatatatgt tttagtttta tgattttagc 139020
atctttctga aatttttctc aaggcaagta aatttgtatc agttggtata ttggtaccca 139080

tctatgaaat aacttattag gaagatatct ctaaaataag atcactttgc ctaaaataaa 139140
ctgatatatt gatgttcaca gaatttttct tttaaccgac ttgataaatg cattattctt 139200
gacgtcaagt gatccacctt cctcagcctc ccaaagtgct gggattacac acatgagcca 139260
ccgcacctgg cattattctt ataaaaggtt aaatttctag ttaagtttaa tgtcctcttt 139320
gttcatgtac cattgcttat tttcttccct tcctactcac agtaatcatt cttatggtat 139380
gcacttttgt ttgcttattt ttatgtaatt gatattacgc tccattctgt acgttgtact 139440
ttcattcaca gtgagttttg gacattccta tgttcatcta tacagactta cttcatttta 139500
actacactgt agtattccgt atgtaatatt tactataact catcactgta gcagagcatc 139560
tcatagtgta tgtattactg ttttgccatt ttggtatcaa tgagtattta agtcatttgc 139620
agtttttccc tcttataccc agtattacag aggatctctt tttatatgct tctttgtacc 139680
aagaggcaga ttaaaaaatt tttttttgaa aaaatttttg aaaaaaaatg aaatgaagtc 139740
tcactatgtt gcccaggctg gtctcaaact cctaggctca agcaatcctt ccatcttggc 139800
ctcccaaagt gctggggtta caggcatgag ccaccatgcc tggcctacat tttaaatttt 139860
gatagctctt acaatttact ttgtaaagta tctgcatcat tttatgttct caccagtctt 139920
taataagaat acttcatact tttggctgga cacagtggct cacgcctgta atcccagcac 139980
tttgggaggc cgaggcgggc agatcaagag atcgagacca ccctggccaa tatggtgaaa 140040
ccctgtctct actaaaaata caaaaattag ctgggcgtgg tggcgcaccc gtagtcccag 140100
ctactcgaga ggctgagaca ggagaatcac ttgaacccgg gaggtggagg ttgcagtgaa 140160
cttagatcac accactgcac tccagcctag caacagagtg agactctgtc tcaaaaaaaa 140220
aaaagaatac ttcagactta attttttttc cagtcttaag tgtttgctaa tgagattgag 140280
tttcttttgg tatgtctctt gattgttcag gtttttttctt ttatgaattg actgttcatc 140340
tctttttcac attatttctg ttgggtgatt ttattagtga cttgttaaaa ttctgtatat 140400
tttttcagca tgacacttca ttattcaaaa aaaaaaaaag attctctatg tttctcgata 140460
ctaatcattg gttggtaata ccttaaaaat aagaccctta ctgtattttt tgcttttttt 140520
ttttttttttt ttttttttttt tttgagatag agtcttgctc tgttgcccag gctggagtgc 140580
aatggtatga tctcggctct cagctcactg caactgcaac ctctacctcc ctgtttcaag 140640
caattctcct gccttagcct cccaagtagc tgggattaca ggcatccacc accacaccca 140700
gctaatttttt gtatttttag tagagacagg gtttcaccat gttggccagg ctggtctcaa 140760
actactggcc tcaagtgatc cgcctgcctc ggcatcccaa agtactggga ttacaggcat 140820
gagccacagt gcctagccac tttttgcttt ttaactttgt tttatagtac tatagtttta 140880
gtataaacag atgtatgtat acacacaact atggctttat aatatgtttc agtcattgtt 140940
agagcaaggc ctacctttttg ggtgcttctt ttacaaaatt gtcttggcta ttcttgtgcc 141000
ttttttctta tttgtgaatt ttagaattgt gaattacctg ttgactcacc atgttttgta 141060
aactgaggat tttgaatgga attgcactca attaaagatt atcttgcttt ctgtgcagca 141120
atgttttatt tcaaataatc cctactttaa attacttagg atagctataa attgtgtttc 141180
tggctttcta gatttagatg aaacgcttta aattgattgt tttctcctaa atttaaaact 141240
gattgttaga agttaaagtc ttctgttcat tcttatttag gaagatgaca tttggaagag 141300
tcagtgactt ggggcaattc atccgagaat ctgagcctga acctgatgta aggaaatcaa 141360
aaggtttgtg gtgtttttat acttcatatt aagcctttac tcacattagt gattgactgt 141420
aagtcaaaga ccacttaagg tttaaactgt ttattttgta aagtaaccac tgtatctttc 141480
accttgtgtt tatagtcaga agtaagtaca agggcttcct gtagtcacat ctttatgcaa 141540
tctcctctga atcaaaagtt agtgaacttg ctttgccact ccagaaggca catgaatatg 141600
aaaaagcatt gtctattttc ttatttaatg gcaaaatacc cgacctaagt tggacttaat 141660
gtttgagacc gtttatttta ttaaattata ttttttctct tttctttttt ttttttgaga 141720
cagttcttgc tctgtcaccc agaccggagt gcagtggtct gaccgcacct cactgcaacc 141780
tctgcttcct aggttcaagc gattttcctg cctcatcctc ctgagtagct gggactacaa 141840
gtgcgcacca ccacacctgg ctaatttttg tatttttagc agagatgagg tttcaccacg 141900
ttggctaggc tggtctcata ctccttgacct caagcaatcc atccgccttg gcttcccaaa 141960
gtgctgggat tacaagtgtg agccaccatg cctggcctta ttaaattatt tttattaaat 142020
ttcctcaaga ttgatgaaag taatgaaata taaaagtaat gaaatatatg tggaaaatag 142080
actggattaa gaaaatgtgg cacatataca ccatggatac tatgcagcca taaaaaagga 142140
tgagttcatg tcctttgtag ggacatggat gaagctggaa accatcattc tgagcaaact 142200
gtctcaagga tagaaaacca aacaccgcat gctctcactc ataggtggga attgaacaat 142260
gagaacactt ggacacaggg tggggaacat cacacgctgg ggcctgtcgt ggggtggggg 142320
gctgggggag gaatagcatt aggagatata cctaatataa atgacgagtt aatgggtgca 142380
gcacaccaac atggtacatg tatacatatg taacaaagct gcacgttgtg cacatgtacc 142440
ctagaactta aagtataata aatttaaaaa aaataaatat atgtggaaaa tattaatagg 142500
tcaaaattca aattgttcat ttaatcagaa gagtagttta gtcaaatcca agggttagac 142560
aacagaaatc ttttttgtca agtgcattct ttgtgactga tttcattttc ttcctggttt 142620
acacaggaag atttcagaaa caaatgtgga tccgtgacag atggtatcta gaagttttta 142680

gtttggttga attgacagta ttttattgag taaaagatac taatttttgt aagaagaaaa 142740
attcaatttt gataagtatg tttaagatta agagctattg gccaggcgct gtggctcatg 142800
cctgtaatcc tagcactttg ggaagctgga gcaggtgggt cacgaggtca agagattgag 142860
accatcctgg ccaacatggt gaaaccctgt ctctactaaa ttagccaggc gtggtggcac 142920
atgcctgtgc acccgcctcc gggtttaagc gatcctactg cctcaggctc ctgagtagct 142980
gggattacag gcgccatggc taatttttgc atttttagta gagacagggt ttcactacat 143040
tggccaggct ggtctggtct caaactcctg acctcaggtg atctgcccgc cttagcctcc 143100
caaagtgctg ggattacagg catgattcac catgtctggc catttatctt attttctttt 143160
ttttttttt ttttgtttga gacggagtct tgctgtgtcg cccagagctg gagtgcaatg 143220
gtgcgatctc agctcactgc aacctctgcc tcctgggttc aagcaattct cctgcctcag 143280
tcttccaagt agctgggatt acaggcgcgt gccaccacat ctagctaatt tttgtatttt 143340
tagtagagac agggtttcac catgttggcc aggctggtct cggaactcct gacctcgtaa 143400
tctgcccacc tcggcctccc aaagtgctga gattacaagt gtgagccact gtgcccagcc 143460
atcttatttt ctttcttttt ttttgtcggg tgggaggggg acagagtcta gctctgtcgc 143520
caggcttggc tcactgcaac ctctgccccc caggttctag caattattct gcctcagcct 143580
cccaagtagc tgggattata ggcacctgcc accacgcctg gctaattttt tgttattttt 143640
agtagagatg gggttttgct atgttgacca tgctggcctc aagtgatccg cccaccttgg 143700
cctcccaaag tactgggctt acaggcgtga gcttgtattg ggtaaaagaa caatattggg 143760
ggctgcatgg tggttcatac ctgtaatctg agcactttgt gagactgaga tggaaggagt 143820
gttggagccc aggagggtga ggctgcggct gcagtgaatt gtgatcacgc cattgcactt 143880
ccacctaggt aatggagcaa gaccatgtct ctaaaaaaca aaacacaatt tttttaagga 143940
atactgggaa gaggtcagtg gtggttttag aacagaggaa gtgccagatg acctttgtga 144000
ggcattggcc aggaagaact ctacagtgtc tttaggtagc ttctgtccat aaggataatg 144060
gggtctcctc cccagtatta atagaaaatc tctgagctgt tttttttgt ttgtttgttt 144120
tgttttttt tcctgagatg gagtctctct ctgtcggcca ggctggagtg ctgtggcgcg 144180
atcttggctc actgcaagct ctgcctccca ggttcacacc attctcctgc ctcagcctcc 144240
caagtagctg ggactacagg tgtccaccac cacgcccagc taatttttg ttatttttag 144300
tagagatggg gtttcaccat gtcagccagg atggtctcga tctcctgacc tcgtgatccg 144360
ctcgcctctg ccttgcaaag tgctggagtt acaggcgtga gccaccgtgc ctggcctggt 144420
ttttttgttg ttgttattta tttatttatt tatttatttt ttgagacaga ctctcgctct 144480
gtcgcccggg ctggagtgta gtggcacgat gtcggctcac tgcaagctct gcctgccagg 144540
ttcaagccat tctcctgcct cagcctcctg agtagcaggg accacaggcg ctcgccacca 144600
cgcccggcta attttttgta tttttagaag agacggggtt tcaccgcatt agccaggatg 144660
gtctcgatct cctgatgtcg tgatccgccc acctcggcct cccaaagtgc tgggattaca 144720
ggtgtgagcc accgtgcctg gcctgatttt ttttttttt taatctggtc tcatacctct 144780
gacagctcat gaagaagtgc tcctgcttca tatgtatatg tgttagcata gtgttaacat 144840
agcataggtg ttcggtgttt gcagtttctg tttgttttat atgaattaag gtgtattatg 144900
agcagttgaa gatatatagg aaatttttc ccaaaccact atctctgctc gttctattca 144960
ttcagtctgt ttatgttatt ccttcattca ttcattttat agaacagtgg agtgcctact 145020
gtatgcatct attgttctgg gtcctgggga agaaaacaaa gttcctgctt tcatggaact 145080
tacattatat tggcggagac agtaacagac aaacaaatgt agcctgtgta catgtgttac 145140
atgaaaagca gggtaggggg ctgggagaga gtagtaggga gtgctatttt cgaggtggtt 145200
gtcaggaaag gcctcactga ggaggtggca ttttgagtag acctgagcgc agcgggggcg 145260
taagcccagg cagcatgtgg aggaagagtg ttcttggtga aaggaacaag gatagaggcc 145320
cgaagctaga gagctcagca tgatcaagga acagcaagcc ccgtgtggct ggaatggagt 145380
gagcaaagga atgagcagta gaaggtgagt gagttgggag gtcaccagag accatggcaa 145440
ggacttgaaa gtgtcaggga cacattggaa gttggagcag ggaaatgatg ggatttatgt 145500
tttgtttttg ttttatgttt agtgttttta agggattgct ctatcagcta tttggaaaat 145560
ttagtgtagg gcttcaagaa gagaagcaga gaaacaacat tcttgccata gtcatagtct 145620
aagtaaggga tgatggtggt gtggattagg ctggtagtgg aagaccagtc cagttcgggt 145680
tgtatttgaa ggtagaggca aaaagattat atttctacca gcaagcccat ctatgaagtt 145740
acttgtatta ttaatttaat tgagacatgc ccacataaac taataaatag gaatttctgc 145800
agtttggtta aacacccctg tatatcctgg ttcttctttt agttgtccag atgtctcttt 145860
aagtcaagta ttttttggtg gtgtaggagc ctagagattg aatttattca cccaaaaggc 145920
atttgagtga ttactatgtg ccaggcacta tgctgaatgc caaggatgta aataagaggg 145980
cgtagtctca gtctgtttta ctccagcttg gttccttttt aatgaccctg acttgttaag 146040
catatcagtt atcctacaga atgtttaatc ttctgtactt tcctggttgt gttatttagc 146100
ttatttctct ttccttgaca tttcttgtaa actggaagtt acacctatag tcttgatgat 146160
tcgtgttaca cattttagat tagaacacat catgtgttgt atatggtgtt tttgaaagcc 146220
tctctgtata ttggtctgta cattaaaatg ttgcctgaat ggatacacat aaaatttaac 146280

agtgattaca ttagagatga gaagaaagag gtgcctttta cttttcaata tacctttcc 146340
tctgcttttt gaactttctt gccctatgca tacgttattg cttaatcatc cacctcatct 146400
cttcccctgt ggctttctgt tgcatttgga atgaaatcta gcctctttgc tgttacctgt 146460
ggatgtccct tgctggcctc tatcacctta ctttgaacca ctcctttcat ggactgagct 146520
ctcattggac tatcttttat tcttttgctg aagtttcttc actttgagtg cctctgcagt 146580
tgctatttca tggctgtggc aagccctgcc atggctttca tgcaaggatg gttcctcctt 146640
ctcatctcaa tattatctct tcagagaggg accttcccaa ctccgatgat ctaaaatcct 146700
ttgtatatac cactcactac cacttctttc ttttcttttc cttttatctt ttttttttt 146760
ttttttttt gagatagggt cttgctctgt tgcccaggct ggaatcacga ctcactgcag 146820
cctcatcttc ttgggctcaa atgatcctct cacctcagcc tctcgagtag ctggaactgc 146880
aggcacacac caccatactt ggcttattat tttacttttt gtagagacag ggtttcacca 146940
aggctggtct caagctcctg ccgcaagcaa tccacatctc tcagcctccc aaagtattgg 147000
gattatagga gtgagccact actcctggcc tattttctta ttcactgtct aaaattatct 147060
tgttcattta tttacatact tgtttatagc ttatttctca gctggacatg gtgcctcaca 147120
cctgtaatct caatactttg ggaggctggg ttggagaatt ggttgagccc aggacttcaa 147180
gaccagcctg ggcaacaaag tgagaccctg tctataaaaa attgtttaaa aattagctgg 147240
gcatggtggc acatgcctgt ggtcccagct acttgggagg cagaggtggg agaatcgctt 147300
gggcccagga ggttgaggcg acggtgagcc atgattgtgc cactgcactc tagcctagtg 147360
acagagtgag accatgtgtc taaaaagtaa ataaaaatag tttctctttc atgactagaa 147420
tattacctct atgtgggcag ggagtttgtc tatactattt ggcactatat ttcctgattc 147480
tgaaattatg cctagcacat ggtaagtact ccttaaatat ttattgactg aattatttaa 147540
tacttaagaa tttcatttgg gattatctga gtggtaagat tacggattat atttatgtaa 147600
gaaaaaatca ttttttaaac ttggttgccc tttgccacac tgacatagac actaagtttt 147660
cttagccaga ttacttccga ggatactcac agaggccatt ctcttctcaa tccccaaata 147720
attgatattt cttagcactt tcaagctaat gcaattctta gatgatgtat ctgtgtatat 147780
catatcctca ttctacaaat gtagaaattg aagtctgggc acagtggctc tcacctgtaa 147840
tctcagcagt ttgggaggcc aaggcgagcg gatcactgag gacaagagtt aagaccagcc 147900
tggccaacat ggtaaagcct tgcctctatt aaaaatacaa caattagggc cgggcgtggt 147960
ggctcacgcc tataatccca gcacgttggg aggccaaggc aggcagatca cgaggtcagg 148020
agttcgagac catcctggct aacacagtga aaccccatct ctactaaaaa tacaaaaaat 148080
tagccaggca tggtggcacg cgcttgtagt cccagctatc gggaggctga ggcaggtgaa 148140
tcccttgaac ccgggaggcg gaggttgcaa tgagctgaga ttgcaccgct gaactccagc 148200
ctggtcaaca gagggagact ctgtctcaaa aaaaaaaaaa aaaaacaatt agccaggcgt 148260
ggtggcgggt acgagtacct gtaatcccag ctactaggga ggctgaggga ggagaatcac 148320
ttaaacccag gaggtggagt ttgcagcggg ctgataatgc accactacat tccagcctgg 148380
gcaacagagt gagactctgt cttaaaaaaa aaaaaaagaa agaaagaaat tgaggaatgt 148440
ggagattgtg gtctgtgatt tgttaggaat cacacagcag gttagtagca actacagggc 148500
tttggttcag aataccacct tgacaatggt ttgtttacag ttcggctccc cttcctctgc 148560
ctttctctcc ttccttattg agggcagctg gaaagaattt tcatcattta ctagcctata 148620
gctttaattt gagttttgaa accttgataa tagagcacag aggaaaagac tgagttttct 148680
ttttttgaga cagtcttgct ctatggccca ggctggagtg cagtgacacc atctcagctg 148740
gttgcaacct ctgcctccca ggttcaagca attctgcctc agcctctcga gtagctgaga 148800
ttacaggcac gtgtcaccac gcccagctaa ttttctgttt ttgtttcgtt ttgttttttt 148860
ctgagatgga gtcttgctct gtcacccagg ctggagtgca gtggtgcgat gttggctcac 148920
tcaaacctct gtctcctggg ttcaagcaat tcttctgcct cagcctcccc agtagctggg 148980
actacaggta cgtgccacca tccctagttc atttttgtat gtttagtaga gatggggttt 149040
cactatgttg accaggctgg tctcgaactc ctgatctcag gtgatctact cgtctcagtt 149100
tcccaaagtg ctgggattat tggcacacgc ctatttttgt atttttagta gagacggggt 149160
ttcaccatgt tggttagact ggtctcaaac ttctgacctc aagtgatttg cccgccccag 149220
cctcccaaag tgctgggatt acaggcgtga gccaccgtgc ccagccaaga ttgagttttg 149280
aaaagagcct tctgagatta tgagaagggc aagcaagata acttaagaag ttacattaaa 149340
atcatctaag agacagtgta acaagaagga attgtaaaat gatgttatga gcacgtgccc 149400
aatgtagtgg caatcccttg tgcttcgata cattggtggg agacaaaact gtacttaaat 149460
tgataaatcc cttacatgtc atttaagga gcttagactg actcccatca tgtagacatc 149520
agagatttct ttttttttt ttttttttt ttttttttt tttgtgacag agttttgctc 149580
ttgttgccga ggctggagtg caatggcgtg atctcggctc accacaacct ccacctccca 149640
ggttcaagca attctcctgc ctcagcctcc cgagtagctg ggattacagc catgcaccac 149700
cacgcctggc taattttgta tttttagtag agacggggtt tctccatgtt gtggctggtc 149760
tcgaactcct gacctcaggt gatcctcccg cctcagccac ccaaagttct gaaattacag 149820
gcgtgagcca ccgcgcccag cccagagatt tctaaacaga gttctaacca gatgcttttc 149880

cctgtcagta gaatgagaat gaattggagg tgggagagac tggcatgagg gacaccagtc 149940
agccagtgga attagctggt aatgttgata ggagaagaaa aagattcaaa gttaggtagt 150000
ggtagcaaga attagaggga aggtcggatt tatgatatgt ccaaggttga attctaaggt 150060
gaaatttggt ggcagatttc atgtgtaaat tgggaaggta gattgagttt ttttaacatg 150120
ggttttctaa catgtcaata gagtgactct gcaggggggc ctgacgagag aacagtgcat 150180
ggggtgattc aacagccagt tgagccttca tgcagagcat ttaacactgt gactctgtag 150240
actctggttg gcagtaaaat ttcattaaac caatatttaa acccttaggt aataataaaa 150300
attgagggaa aaggatccag gttttgtatt ttttatgaat tcagttattg aattaaacag 150360
gaccttgcct caagaaataa tctaccaaca attaacttgt tttaaagcaa agttaggaag 150420
tgagcatgtt caaattatta aataaaaaag taagctgtgt atttcattca tagaaataga 150480
ggctggccta cttcggatga ttctcagcat gtgattacag atgtgggctt atacatccta 150540
gggagttaag gcgtactctg gcttggatag agtagagctc tttgaaactc ttctctcacc 150600
cagctagttt atatagacta gagaactaga atgtagcagc atactctgtc ttagaagccc 150660
ttttatatag gagctggtct ggaaggtttg aaaacataac aaatgtgttg gtgtctccca 150720
atgtattgct agattcttac ccaagagcat tatcctggtt agggtttggt ttggttttgt 150780
tttgtttttt aatgtttgcc acaaactaac actagatgtt agttctttca tcaagtgagg 150840
agagtagaag aaaagtccag aactctgaaa caccttttca aaagtttttc aagccatgat 150900
gtttgcaagt taaatgctct gttatgtaag caatataatc agtttttatt aatgtaacat 150960
tccttagtgt tttggggtat cacacaaaaa agaatatcca tatctggaag caacagcttt 151020
taaataagag cattgtggtg gtggtggtga tagtggtttt ttttttttt tttgagttgg 151080
agtctcgctc tgttgcccag gttggagtgc agtggcacga tctcagctcg cttcaacctc 151140
tgctcccagg ttcaagcaat tcttctgcct cagcctcctg agtagctggg attataggca 151200
cctgctacca tgcctggctg atttttatta ttttagtaga gacaggtttc accatgttgg 151260
ccaggctggt cttgaactct taacctcagg tgaatcaccc acctcggcct cccaaagtgc 151320
tggaattaca ggcatgaacc accatggcca gccaaataag agcattttta atgtaaaatt 151380
atgcatgaaa tgtacattca attttgtctt tgtttactag gatccatgtt ctcacaagct 151440
atgaagaaat gggtgcaagg aaatactgat gaggtaaatc ctacctttag gataaaaaga 151500
tttctgttta taagtgccac cctcatgtaa gtgaggttta aaattttcct tttctttagg 151560
tcccatgttt aagcagcatg gcacatttat gttctcttac ccagaatgta ccaagaaagg 151620
gtggtccctt cttaacatct aacaattgcc tggtagtagc agtgaaggta tcttcagtca 151680
gaggctagga ccactgaagg atatacatgc attcaagttt ccatcagcca gcaggcatca 151740
gtaatcagtg tgtagatcaa aagctcaaat gtttccttcc ccactggcag ttttacttca 151800
agtagtggag gcttgctttt ttaatagtta attaagtaca ttgagagatg ggaggtgaaa 151860
aaaggaaaat gttttatttt gaccatctaa tatgaaagta gttcggtgtt aggtatccag 151920
tagttgacac tggaagacag ggaatgacat gttaatattc atagccagag ggtggcccag 151980
gtttttcgt acatgggaat gaaattctta tccaaataag tagaaattat gtgcgtaagc 152040
catttgttaa gagcactgag tatgtgcatc tcgatccatc taatgaataa ccattatcac 152100
cagtttaaat tattttcttt aggcccagga agagctagct tggaagattg ctaaaatgat 152160
agtcagtgac attatgcagc aggctcagta tgatcaaccg ttagagaaat ctacaaaggt 152220
aaggatgact tcgttttgtg taaactaaaa agtattattt tccaggtgta aaaataaaaa 152280
agaacataag gggtttcttt gcctttgaag gattaactgc tgtggggatt accttcttat 152340
cataagcaac tagaaaattg acaaactaaa tgaaacaact gtttgcatat attggacaat 152400
gggcaataca gggaaaccat ggaaaccaaa cagagcccag tagtcttgct gaacgaaaga 152460
gttaaatatc aaagttcagg ccaggtgcag tggctcacgc ctgtaatccc agcactttgg 152520
gaggccaagg cgggtgaatc acttgaggtc aggagttcaa gaccagcctg gccaacatgg 152580
tgaaaccctg tcttagccgg gtgtggtggc aggcacctgt aatcccaact atttgggagg 152640
ctgaggcagg agaatcgctt gaaccaggga ggcggaggtt gcagtgagcc gagatcacac 152700
cactgcactc cagcctgggc gacgagcgaa accccatttc aaaaaaaaaa tcaaagttca 152760
gagagctcaa tttgagtaga agttgtagga taaggtagca gaaaagagga agctgcccag 152820
aaagaaagcc gtagagatat ttagagagat tcccatggat ccttggccta ggagtgatct 152880
gtatatgtgt ggggtgaaaa cgcatgtgtc caggtagaga acccccaga aattagtagg 152940
ctgaatgatt gctggaacat agggctaaga aaagttcatg gccagaagga tctggccaga 153000
gtagagagac ttagtaatac acaaggcatt gggtagtgtc ttcacagagg ttatgcctta 153060
ctactgaaga taaattagtc ctagagtaca agcacctgaa ccaagtttca aagcaaattt 153120
ttaaagggtc aaattaccta acaactgcat gccaaaacaa aggcctaacc ctctttacag 153180
taacacaaca aaattcagca cttcacagtg taaagttaga atgtctgacg tccaggctgg 153240
gcgcagtggc tcatgcctgt aatcccagca ctttgggagg ccgaggcagg tagatgacct 153300
gaggtcagga gttcaagacc agcctggcta acatggtgca accccgtctc tattaaaaat 153360
acaaaaactt agccaggcat ggtggccggc acctgtgatc ccggctactt gggaggctga 153420
ggcaggagaa ttgcctgaac ccaggaggtg aaggttgcag tgagccgaga tcgcaccact 153480

gcactctggt ctgggcaaaa agagcaaaac tcaggctcaa aaaaaaaaaa gaatgtctga 153540
cgtcaatcac aaattaccaa gcatgacatg aagttgacct ataaccagga gaaaactcaa 153600
tctatagaaa cagacccaga tgtgagaaag atgatgaatt tagcagacaa agaccatcaa 153660
gtggctattt taaatattaa aaatatgttc aagtggccag gtgcagtggc tcatgcctgt 153720
aatcccagca ctttgggagg ccaaggtggg taggagttca agaccagctt ggccaatatg 153780
gtgaaacccc ttctctacta aaaatacaaa aaaattagct gggcatggtg gcaggtgcct 153840
atagtcccag ctatatggga ggctgaggca caagaatcac ttgaacccgg gaggtggagg 153900
ttgaggttgc agtaagccga gattgtgcca cttgtactcc agcctggaca acagagtgag 153960
actctgtctc aaaaaaaaaa aaaaaaaagt taaagaaaac aagagtataa tgagaaaaat 154020
gcaaaatagt tttaaaagaa ccaaatggaa tttcttaaaa taaaaaatac cagaaatggg 154080
ggccgggcgt ggtagctcac gtctataatc ccagcacttt gtgggggctg aggcaggcag 154140
atcacctgag atcggtagtt caaggccagc ctgaccaaca tggagaaacc tcatctctac 154200
taaaaataca aaattagctg ggcgtggtgg cgcattgcct gtaatcccag ctacttggga 154260
ggctgaggca ggagaattgc ttgaacccgg gaggcagagg ttgcggtgag ctgagattgc 154320
accagtgcac tccagcttgg gccacaagag tgaaactccg tctcaaaaaa aaaacaaaaa 154380
aaaacagtag actcgaagaa ctagctgagt ttttctttac tttaggcagt aagtgtgacc 154440
ttttgcaggt gactacttta gttcctcatg tcctcattag tagatcagag aaattcgaca 154500
ccaaaacccc aaaagaaaaa ccccttctaa tcctcattcc atgattttat gaatgcatga 154560
agtcctaggc ctgcgaagga atactcattc tctttatcct gtgttgatac ctctctgctt 154620
caacctccaa ctcgacattt gcctatagga tgtacttgga cattcagcat aaactacctc 154680
acaccattac tgaattgctt catgtgcaca tgtcccatgc cacaataccg gggaccttgt 154740
cttccgtgat atttgtccgc agtgctgtga ctacaggagg gagtcagtga atgtctgcat 154800
gtgtgtcttt accatccctc ttgaatatgc tctagggtta attcctagaa gtagaattac 154860
tctattgaaa attggcaata tttttcattc taatatctat tgccaacatg ggaaagcaag 154920
tctggatgcc agtccttgtt atatgcccct tgggtaagtt acgtaacctc tttaagcttc 154980
tgttcactca tattttaaca aggaaaatta caatatttta cctcacaaaa ttgtagtcag 155040
cttctggctg tcttaaactc tggtatatag taaacactaa gtgttggtgt ccatccttaa 155100
tttgtaataa taggtcactt gttagagaaa tgcaccttac cattttcttt tcttttcttt 155160
tttcagttat gactcaaaac ttgagataaa ggaaatctgc ttgtgaaaaa taagagaact 155220
tttttccctt ggttggattc ttcaacacag ccaatgaaaa cagcactata tttctgatct 155280
gtcactgttg tttccaggag agaatgggag acaatcctag acttccacca taatgcagtt 155340
acctgtaggc ataattgatg cacatgatgt tcacacagtg agagtcttaa agatacaaaa 155400
tggtattgtt tacattacta gaaaattatt agttttccaa tggcaataac ccatttatga 155460
gagtgtttta gcctactgga atagacaggg accacatcct ctgggaagca gataagcata 155520
gaactgatac ttgatgcaca ctcgtagtgg taactcatcc ctaatcagca ttgtaaagca 155580
ggtgccagag gtggtttgct ttgtccttcc aaagcaggtg agtcagcccc accgagagcc 155640
aggcagcttt gagtggcagc gtggtgctag cagcttcagc ggaacagggt gagagttaat 155700
tatgcagtct tcttgacagc ggcattaatt tggaaggaaa ctgacaagtc atgggtcaag 155760
tttcagtgac ttcctccttc ctctgatggc agtatatagt tttcacattt taattcctcc 155820
tcctgagatg cactatactt aaaaccattc tctcccctgc taacagaagg gtgtgaatct 155880
ggtttacttt gagcattagg atttgcccct ttggaattct gcactccagt tacttaactt 155940
tcccttcaga atacatgtgg aaagaaagaa agaaatagcg atgactccac ttttgccact 156000
gtggcacctt gaacaaagca gttcttccca aattatactt ttttttttt taaataaggt 156060
gagcaggatg actggggaga gagaaacatt tgactttgac tgcctccccc attctttgct 156120
gtgagctgga aagtgtgcag ttggtcgtct ttcttctcct ttctttagga tagtaagaga 156180
ctcactcact gcacttctgc tcagttggct tctgcatcgg gatcacacag ccatcagcag 156240
gactgcccag ttggtgagca cactccattg accacgtggc gccagcgctt cctcaatgca 156300
catgattgag aggaaagaaa gttctcttag atgttactgc ttttgctcag actttgcaaa 156360
aaaaaaaata tatatatata tgtataaata tataattatt aatcactttt gtccttgaga 156420
aagtcttgaa tgaacagaga atttattcca ttgcaatatt tgattgtata gaggcacact 156480
gtttcatcga cagaagaagc aaaaaggctt tgtgtaagtt tttggtacta tgtaccacct 156540
ctgttattct tttaaagctg aagtattcat gtacttaaac catattatat ttaattgtgt 156600
ttgatttaa aatatatata tatgaattct atttaaaatt gtgtcaactt tctgctttca 156660
gggcatttat ggctcttctg ttgaaatata ttgatctttc caaatatttt catttgcttt 156720
ctaaaaaccc agaacatgag ccactactgg actttgcctt gtgtttgaag tgtatggcat 156780
aaacccaagg tttttattag tcatctatgc tgtgattaat tcattttgtt cttttaacaa 156840
aatatttcca tccacttcac attgcttcaa tctttaacag aaaagcaata taaaggttat 156900
agaataaaat gtggttttgg gcaactcttg ctgcctctgc atgttttgga ataacaattt 156960
ctacaagact ctaggctgtt taaactagtg ctttcagtta agataaattc taatcatttc 157020
tttgtatata cattttgtgc ttctgagcta gagatgccaa gtagttgtaa actgcttata 157080

aagagaatag cagcaaattt gagactcggc tacttttttc tgccccacct gctttgagac 157140
acagaagcgg agtgtggccc gaaattatta gccagattta atatttgatc taaagtaggt 157200
ccttgtactc attttaaagt tggaatttga ttcctccaac attgagcacc caccatgttc 157260
caggctctgt gcattgtgcc cacaaaataa gattccctgg tggagttttt atgggttcaa 157320
ataatcagtt gaacaccctt catctttatc atgttgttga cattgacaca aattgtttaa 157380
aaagaaaaga tattagagag aaagtggtac ctttgtaact tgatgtgtct tcatcattcg 157440
gtaagatttg atgaaagtaa aaagcaaatg tcagccaaat ccagtgaaca gcaataaaac 157500
agggagtaac tttttataac tttttctact tggatttcaa cattcagtag agcttttcga 157560
aatgtaagta gtttacagta ctggaggttt gactagttca gtaggaattt ggaggggaag 157620
gtcattctga attgtaacaa agtacaaact tctttgctgt tttatttaag tactgagagc 157680
taagcacctg atgaagtgac tgacctctct ccagtgacag tgtttgggta cctgcctgac 157740
ttcaggagtg gggtttatgt ttctacacag tgacctttc tctcgccctc tcctccctct 157800
tgcccacaca ccagttgatt ggacctgggt tgaactcctg atccagacag gcccaagaca 157860
gttcttaatg ttaagaattt tggggccggg cacggtggct catgcctgta attgcaacac 157920
tttgggaggc cgagacaggc ggatcacttg aggtcagggg ttcgaggcca gcctggccaa 157980
catggtgaaa ccctgtcttt actaaaaata caaaaattag ctgggcatgg tggcgcacgc 158040
ctgtaatccc agctacgtgg gtggctgaga caggggaatc gcttgaacct ggaggcggag 158100
gttgtgcaat gagccgagac cgtgtcactg cattccagcc tgggtgacag agggagactc 158160
tgtctccaaa aataaaaata agaaaaagaa ttttgggcta ggtgcagtgg ctcacgcctg 158220
taattacagc attttggaag gcccaagatg ggcagatcac ttgaggacag gagttcgaga 158280
ccagcctgga caacatggtg aaactccatc tctactaaaa agacaaaagt tagccagatg 158340
tggtgatggg cacctataat cctagctcct cgggaggctg gggcaggaga atcacttgaa 158400
cccaggaagc agagattgca gtgagccaag atcacatctc tgcactccag cctgggcaac 158460
agagcaagac tctgtctcaa aaaaaaaaga atttggccag gcgcagtggt tcacgcctgt 158520
aatcccagca ctttgggagg ccaaggcagg cagatcacga ggtcaggaga tcgagattgt 158580
cctggctaac atggtgaaac cctgtctcta ctaaaaatac aaaacattag ccgggtgtgg 158640
tggtgggcac ctgtagtccc agctactagg gaggctgagg cagaggaagg atgtgaaccc 158700
aggaggcgga gcttgcagta agccaagatc gtgccactgc actacagtct gggcgacaga 158760
gtgagactcc gtctcaaaaa aaaaaagaat tttggccggg tgcggtggca catgcctgta 158820
gtcccagcac tttgggagac caaagtgggc ggattacctg aggtcaggag ttcaagacca 158880
gtccggccaa tatggcgaaa ccctgtctct tactaaaaaa aatacaaaaa ttagccaggt 158940
gtggtggcgg gcacctgggg aggctgaggc agggagaaat gcttgaaccg gggaggcaga 159000
ggttgcagta agccaagatc gtgccactgc actccagagc aagactcttt ctcaaaaaaa 159060
aaaaaaaaag aattttgcat ggggaaggag agatactgtt caccatctgg aatggtgctt 159120
ggatgtggca cttacaaaat caggagccag cactgcatgg acaaacagaa gcatgtgggc 159180
ctgagatagc aggtaccttg ataaccctga agacatcctt ggtttctgca tctattcctg 159240
catccttgca ttggactaca ttaatctgtc agttatcctt ataatgattt ttgatttttt 159300
ttttttgaga tggagtttcg ctcttgttgc ccaggctgga gtgcaatggc acgatctcgg 159360
ctcaccacaa cctccacctc ccaggttcaa gtgattctgc tgcctcagcc tcctgagtaa 159420
ctgggattac aggcatgcgc caccacacct ggctaatttt gtatttttag tagagacggg 159480
gtttctccat gttggtcagg ctggtctcga actcccaacc tcaggtgatc accctgtctc 159540
ggcctcccaa agtgctggga ttacaggcgt aagccatggt acccggtctg ttttttgatt 159600
ttttgaaacc agtctgaagt gagtttttt aattacgtga aaggagtttg gctaaaatac 159660
tgccatactg ccctaatgcc taatgattat gtattctcag catgtctgca aagtactgct 159720
gatttctgga gaataatttt tctttagtaa acttcactta agtcgtcatg tgtattctct 159780
caaaatggta tcctaaccta atggagctaa aagacacccc ttgtttttat aacaagcagt 159840
tactgaggcc caggaagggg agaagtccct ggcttgtgag atgatcacca ttagaactca 159900
ggcctgggcc agtgcctttt catgcttctc agatccttcc aaagaataat gaagattata 159960
accgctttta gcaattgtaa taaacccaga aatagaaagc tttttggtta gagtactggt 160020
agaagtttgg cgggagagat aatttttaca aaatttgtaa atacctgcca attctatata 160080
ctaggcaagg tctctggcct tgtaaaaccc ctcaaggtta caactttggt ggcccacact 160140
aatagttacc cactgaggcc ctctccgggt gaacattgag cactagagga agcccctctg 160200
cttgggcagg actgggcgtg gtgcagagta ggagcggtga tactgtggat tctgggcagg 160260
tggagatggc cagtgatgtc caataaagga cactggaggg agcagtgtga gtaaaggccc 160320
tgagggcatt catgttcagg gagggttgct gcccactggc ttgcttggca cacaggagag 160380
tgggtattcc tgccttagta actttatgta aacaagtatt tcctcagtct gttcctctca 160440
aactgcctgc tctggcacat tcagaatgtc acagaactca cctggatgca ttcagcccct 160500
tgcctaaagg tgacagtgca tctccttccc caccccaccc ctcataccac tgaagcacct 160560
gtcagactgg cccagtctgt gggcaaggag cctagagagg gcttagtttc agcttgaaag 160620
gagctgggat ttaccaagaa gcaaatgaga gacgaggatt gcaacaactg tgccatttcc 160680

ccagcttcag ctgactcctg tatattgact gtgccttcag actcatccgt aagtgacccc 160740
aggctggcct ctcccacatc acagtaagaa ttccacacac catacaactt ggaaagaggc 160800
tccagctgaa ggaagcccca cacttctttc aagtttttct tagtcttctc ttcttggcaa 160860
agagtacctt ttgtttcttc taattatgta actattggtt tagtaaatat tcacccattc 160920
agtcaccctg taagtggcag gcactgttta cagggacaca ggaaggaata aaaacttgca 160980
ggcaccttgg agcttgcatt ctattgaaga ggtaatggaa gttgggatag cagctaaact 161040
atgctggtat tggccaggcg cagtggctca cacctgtaat cccagcactt tggaggccaa 161100
ggtgggcaga tcatgaagtc aggagatcga gaccatcctg gctaacatgg tgaaaccccg 161160
tctctactaa aagtaaaaaa aaaaattagc caggtgtggt ggcgggcgcc tgtagtccca 161220
gctacttggg aggctgaggc aggagaatgg tgtgaaccca ggaggcgaag attgcagtga 161280
gccgagatgg caccactgca ctccagcctg ggtgacagag cgagactctg tctcagaaaa 161340
aaaaaatatg ctggtagttt tgattcaaga tggcctttgg agcccatgat ttaggtctcg 161400
tacccaccaa ggtctactgg aaaacatcag gctctcctgc tatagaccca tagggagagc 161460
tgcagccgag agggggagct gaagagaagt gcccccttctg tgtcctgtca gcctcatcct 161520
tccgcaagga ccagttgctg tgccactcca ttcacttgct gcaagactgg aggtttttcc 161580
tcaggtgttg agcacctggt ttacaagatg tcagcatctt gatgcctgag accatcaagg 161640
caagtctctg aacagggctt accttagagt aaggcttaga agaggccgta aagtcagtct 161700
cagctccgtg gctctgcaga gctttgggac atgtgaattc ttaaaaacaa gactattgta 161760
cagttactat atgcatgcag tataaaatta taaccttgga aaatcctagc tagctgttga 161820
gctaattcca taaagtaatc agctcctgag ttctgcagtg gtaataataa tcagcataat 161880
gagtaaacac tgtgtgtgcc aggcagcgtc tcatttgatc cttgtgataa tcttgtaagt 161940
actgattttc tcccttcttt aaacaaagtt ttttttttttt ttttagagag ggtctcacta 162000
tgttgcccag gctagtcttg aattc 162025

<210> 36
<211> 162025
<212> DNA
<213> Homo Sapien

<220>
<221> mutation
<222> 156,277
<223> Nucleotide Base Change: T to C

<400> 36
gaattcctat ttcaaaagaa acaaatgggc caagtatggt ggctcatacc tgtaatccca 60
gcactttggg aggccgaggt gagtgggtca cttgaggtca ggagttccag gccagtctgg 120
ccaacatggt gaaacactgt ctctactaaa aatacaaaaa ttagccgggc gtggtggcgg 180
gcacctgtaa tcccagctac tcaggaggct gaggcaggag aattgcttga acctgggaga 240
tggaggttgc agtgagccga gatcgcgcca ctgctctcca gcctgggtgg cagagtgaga 300
ctctgtctca aaaagaaaca aagaaataaa tgaaacaatt ttgttcacat atatttcaca 360
aatttgaaat gttaaaggta ttatggtcac tgatatcctg tttcattctt tatataatca 420
ttaagtttga aatgtatact tgcactacta acacagtagt taatcttagt cctacaagtt 480
actgctttta cacaatatat tttcgtaata tgtatgcact ggtgtttatg tacgtgttta 540
tgtttatatc tgttaaaatt agcagtttcc atctttttct attttgtacc atcacatcag 600
ttcagaagga ttgacagagc aaaatgattt gatgaagtat aaaagtcaca tggtgagtgg 660
cataaataca actctgaaca attaggaggc tcactattga ctggaactaa actgcaagcc 720
agaaagacac atatcctata tgtcaagaga tgtaccaccc aggcagttaa agaagggaag 780
tacacataga aagcacaatg gtgaataatt aaaaaattgg aatttatcag acactggatt 840
catttgctcc taaagtcaga gtcctctatt gtttttttgt ttttgtgggt ttctttttaa 900
atttttttat tttttgtaga gtcggagtct cactgtgtta cccgggctgg tctagaactc 960
ctggcctcaa acaaacctcc tgcctcagct tcccaaagca ttgggattac agacatgagc 1020
cactgagccc agcccagacg ctttagcatt tatgaagctt ctgaaatagt tgtagaaacc 1080
gcataagctt tccatgtcac tttcaaagtt tgatggtctc tttagtaaac caaccaagtt 1140
attcctcaag ggcaaaataa catttctcag tgcaaaactg atgcacttca ttaccaaaag 1200
gaaaagacca caactataga ggcgtcattg aaagctgcac tcttcagagg ccaaaaaaaa 1260
aggtacaaac acatactaat ggaacattct ttagaagagc cccaaagtta atgataaaca 1320
ttttcatcaa agagaaaaga gaacaaggtg ttagcaaatt cctctatcaa ataacactaa 1380
acatcaagga acatcaatgg catgccatgt ggaagaggaa gtgctagctc atgtacaaac 1440
cagtagataa tttcaacttg ctgccgaatg aaacctcttt gcaaggtatg aatcagcact 1500

tctcatgttt gttttgcttt gttttgtttt gtttttagag acaggccctt gctctgtcac 1560
acaggctgga gtgcagtggc acgatcagag ctcactgcaa cctgaaactc ctgggctcaa 1620
gggatcctcc tgccttagcc tcccaagtag ctgggactac aggcccacca tgcccagcta 1680
atttttaaa ttttctatag agatgggatc tcactagcac ctttcatgtt tgatgttcat 1740
atacaacgac caaggtacaa tgtggaaaag ggtctcaggg atctaaagtg aaggaggacc 1800
agaaagaaaa ggggttgcta catagagtag aagaagttgc acttcatgcc agtctacaac 1860
actgctgttt tcctcagagc agagttgatg atctaaatca ggggtcccca acccccagtt 1920
catagcctgt taggaaccgg gccacacagc aggaggtgag caataggcaa gcgagcatta 1980
ccacctgggc ttcacctccc gtcagatcag tgatgtcatt agattctcat aggaccatga 2040
accctattgt gaactgagca tgcaagggat gtaggttttc cgctctttat gagactctaa 2100
tgccggaaga tctgtcactg tcttccatca ccctgagatg ggaacatcta gttgcaggaa 2160
aacaacctca gggctcccat tgattctata ttacagtgag ttgtatcatt atttcattct 2220
atattacaat gtaataataa tagaaataaa ggcacaatag gccaggcgtg gtggctcaca 2280
cctgtaatcc cagcacttcg ggaggccaag gcaggcggat cacgaggtca ggagatcgag 2340
accatcctgg ctaaaacggt gaaaccccgt ctactaaaaa ttcaaaaaaa aattagccgg 2400
gtgtggtggt gggcacctgt agtcccagct actcgagagg ctgaggcagg agaatggtgt 2460
gaacctggga ggcagagctt gaggtaagcc gagatcacgc cactgcactc cagcctgggc 2520
gacagagcga tactctgtct caaaaaaaaa aaaaaaaaaa aaagaaataa agtgaacaat 2580
aaatgtaatg tggctgaatc attccaaaac aatcccccca ccccagttca cggaaaaatt 2640
ctcccacaaa accagtccct ggtgccaaaa aggttgggga ccgctaatct aaataatcta 2700
atcttcattc aatgctaaaa aatgaataaa ctttttttta aatacacggt ctcactttgt 2760
tgcccaggct ggagtacggt ggcatgatca cagctcactg tagcctcaat cacccaggcc 2820
ccagcgatcc tcccacctaa acttcctgag tagctgggac tacaggcacg caccaccatg 2880
cccagctaat ttttaaattt tttatagaga tgggggtctc accatgttgc ccagactggt 2940
ctcaaaccct gggctcaagt gatcctccct caaactcctg gactcaagtg atcctccttc 3000
cttggcctcc caaagtgctg ggattacaag catgagccac tgtacccagc tggataaaca 3060
ttttaagtcg cactacagtc atggacaatc aggcttttca acatgcagta tggacagtga 3120
gtcccagggt ctgcttttcc atactgaaat acatgtgata ctaaggagaa aggtgctcgc 3180
aaggatattt aaaatgaaga atatttaaaa tgaggaaaaa actgtttctt catgactttg 3240
ataaggctga taaagaccat ttctgtgatc tcaggtgatt cactcaagta gtatatttca 3300
gtaatcatta tctggaacag cctgaatctt aaccaaaata ccatgatttt ttaatgctgt 3360
tatgatacct tgatgatatg accaaactgc aatgtaggca gctaaatctc cacgagtttg 3420
acttccccga gagttgacag ttttcttcac aaattaaaga aatatatttt ttgatacatg 3480
attggcatat ttaaaaacta cactgaaatg ctgcaaaatg atataaagaa acattttcca 3540
gaatcaaatg caatcaaaga gtggattagg aatctactca ccattatcaa ctaaatagaa 3600
acacttggac tgggtgtggt ggctcacatc tgtaatctca gcactttggg aggccaaggc 3660
aggtggattg cttgaggcca ggagctcaag accagcctga gcaacatagc aaaactctgt 3720
ctctacaaaa aaaaaaaaaa attaaccagg catggtggca gatgcttgta atcccagcta 3780
ctctggaagc tgaagtagga ggactgcttg agcccaggag atcaagactg cagtgagccg 3840
tggtcatgct gcgccacagc ctgagtgaca gagagagacc ctgtctcaaa aacaaaaaca 3900
aacaaaaaac acttaacctt cctgtttttt gctgttgttg ttgttgtttg tttgttttga 3960
gatggagtct cactctgttg cccaggctgg agtgcagtgg cgtgatcttg gctcactgca 4020
agctctgcct cccgggttca cgccattctc ctgcctcagc ctcccgagta gctgggacta 4080
taggcgcccg ccaccacgcc cggctacttt tttgcatttt tagtagagat ggggtttcac 4140
cgtgttagcc aggatggtct tgatctcctg acctcgtgat ccacctgcct cggcctccca 4200
aagtgctggg attacaggca tgagccaccg cacccggcca acctttctgt tttttagttt 4260
gatatgcttg ttaactcagc agctgaaaga atgctgaaag tggccttcag taaaaaaatt 4320
tcactagaat ctctacatcc atatttaatc tgaatgcata tccagattga tcagttagag 4380
caaaaacact catcatcatt cctgatgacc tctaattctg gtttcggctt tctatttcaa 4440
tggaaacaga ataaggaaag aaatggaagg gctctggaaa tttgtcctgg gctatagata 4500
ctatcaaaga tcaccaacaa taagatctct cctataaata taaaacaagt ataattaatt 4560
ttttaattat ttttttctct tcagaggatt ttatttcaag ataaaacata acttctaccc 4620
atactattga ttccaaaggt tagaaaaagt gtttttcctc atcttatcct tcaaagaggt 4680
cacagcaatg caaacatcta taaaatgcct ctgcataatt gtcagaagct atagtccaga 4740
aatcattgaa aatgcttttc cattttaagc ttaggtgagg tgtcttagga aacctctatg 4800
acaacttact ctatttattg ggaggtaaac tcccagactc tcccagggtc tcctgtattg 4860
atctcatttt ttaggcttcc taatcccttg aagcacaatc gaaaaagccc tggatctctt 4920
ttctgcacat atcatcgcgg aattcattcg gcttccagca agctgacact ccatgataca 4980
agcggcctcg cccttctccg gacgccagtc cttgctgcgg ttagctagga tgaggggttt 5040
gctgggcttc agtgcaggct tctgcgggtt cccaagccgc accaggtggc ctcacaggct 5100

ggatgtcacc attgcacact gagctcctgg caggctgtac caatttttta attatttaat 5160
atttatttt aaaattatgg tgaatatttt ggtattctgc tctaaaatag gcccataaat 5220
gcacagcaga tatctcttgg aacccacagc tttccactgg aagaactaag tatttttctt 5280
ttaaagatgc tactaagtct ctgaaaagtc cagatcctct acctctttcc atcccaaact 5340
aagacttgga atttatgaga gatctagcta acagaaatcc cagacacatc attggttctt 5400
cccagagtgc agtcctccta aagaggctca gccctaagca ggcccctgca ccaggagggt 5460
gggtctgaga cccacatagc acttcccaag gtgcatgctc cagagaggca ctgaaacagc 5520
tgagcacaag cctgcaagcc tggagaactc tcacagtcag aacggagggg gcccagtggg 5580
actaacataa agagaaaagg gaacacagag aaatggatgg caccaacaac cagcaaagcc 5640
ttcatggcca atgaaagcat cagtgacggg gccagaaccc tcatccccaa agactcttca 5700
ctgcctttag tgaaaaacaa tggctagaga gtgaagttat gatcatgtat agagaggtaa 5760
agttacattt ttatattctg actctgctaa tgtgaaattc cctatctgct agactaaaag 5820
tttcagacac cctgttcaaa tatcccatta gttgctagag acttaaaatg aacagaacgc 5880
acattgtcag gatgactatt accaaaaaat caaaagacag caagtattgg tgaggatgta 5940
gagaaactgg aacttttgtg cactgtttat gagaatgtaa aatggagcag ctgctgtgga 6000
aaagagtatg caggttcctc aaagagtaaa accaagatgt ggaaacaact aaatgcccat 6060
cagtggatga aggggtagac aatatgtggt atatacatac catggagtac tattcagcct 6120
ctaaaaaaaa aaaaggaaat tctataacat gcaacagcat ggatgaatct tgaggacatt 6180
ttgctaatga aataaggcag tcatagaaag acaaatactg cacgactcca cttatatgag 6240
ataccaaaaa tagacaaatt catagaatca aagagtacaa tggaggttac ctggagctgc 6300
agggcgggaa acgaggagtt actaatcaac gaacataacg ttgcagttaa gtaagatgaa 6360
taagctctca agatcagctg tacaacactg tacctagagt caacaataat gtattgtaca 6420
cttaaaaatt tgttaagggt agattaacaa atgtagtaga tccacaaatg tggttaagtg 6480
ttcttaccac agtaaaataa aaaaagaata tcaagcccag gagttcgaga ctagcctggg 6540
taacatggtg aaaccctgtc tctacagaaa atacaaaaat tagccagctg tggaggtgca 6600
ctcctaggga ggctgaggtg ggaggcttgc ttgagcccag gaggtcaagg ctgcagtgag 6660
ccatgattgc accactgtac tccagcccag atgacagagc aagacaccac ccccccaaa 6720
aaaagaaaaa gaatatcaaa cattttaaaa gatcagatac gcaagaacaa caacaaaaaa 6780
gagatgaaca gagcatcgac cctcatctag tgggattctt ggtctaactg aaaaacagac 6840
attgagagac aaacaatgac agtgatgtga tcacagcaat tacacaggta tcccctgggg 6900
actgcagaag aaaggaggaa tgcctaactt tcagaaaata gagaaagcgt caaacagttg 6960
gtgaaagcct tccaaaacta gagagaactg cacacaccaa atcacagaaa gaagaaaagc 7020
cgtgggagat tctgggaccc accggctatt tttgatggct gaacaccctg ctgcaggaga 7080
gacaggagct ggaaagcatg gtgggatgaa acctcaaaca gctttgcctg cattgcttaa 7140
gatgactggg cttgattaac tctagtcaat ggggacaatt caatcaaaga agaaagatgc 7200
tcaaattcac attttagaat gatttttat ggcagtatgg ggaatagatt aaaagagagt 7260
gaagctggag gcaagaaact tgttaagagg caactgaaac agtctagatg ataaataata 7320
aactgacaga gtgactagaa aaatcagaac aggctgaatc aacagatacc tagatgaaaa 7380
taacaggact tgatcaccag ttgtatcttg gagaggaagg agttgtttcc ttgctttccc 7440
tacgactggg aatacggaag gtttgccgtg tgtattggtt atatactggt gtgtagccaa 7500
tcactgacaa ccatttagca gcttaaaaca caaaggctta tctcccagtt tctgtgggcc 7560
aggaatctaa gataggctta gctggctggt tctggctcag agtttctcaa gaggttgcaa 7620
tcaagatgtc agctggggtt gcatcatctg aaggctcaac tggggccgga gggtccactt 7680
ccaaggagtt cactcacctg cctgacaagg cagtgctggt tgttggcagg agatctcaat 7740
tcattgccaa gtgagcctct ctatagcatt gctggaacat cctccccatc tggcagttgg 7800
cttctctcag catgagtgat ctgagagaga gagcaaggag gaagccacag tgttcttcct 7860
actcctactc ctaacactat ggacctactc ctaacactct cacttctgcc ttattccatt 7920
agttagaaag ggaactaagc tccacctctt gaaataagaa gtgtcaaaga atttgtggat 7980
atatttaaaa atcatcacac tgtggaagtg gataggggtt tcaattaatg ctgaacttga 8040
aatgcctgag acattcaaat gtccaacagg caatgaacat acccatagat ggtcatgact 8100
ttagcaagaa tagaggaaga tcacagaatt aaggaggaat tgaaaggtaa aagaagtgga 8160
gtcagattcc ccctgaaaag tgagccatga aaggaacttt aactattgag ttagaggtca 8220
gagtaggaaa tttcggtgga attcttttt aaagaaagga accatataag catgttttga 8280
ggtagaggga gaataaatca gtagacaggg agaggtaaaa aacataaatg ataggggata 8340
gttgacaaag gtcttggcag aatcccttac ccattgactt ggggccaaga gagggacact 8400
tctttgtttg agggataagg aaaataagaa agaatgggtg ctatttagtg tggtcctgtc 8460
tctagggcaa acgcataggt aacaaactgt gtgtgttagg aatatagatg tgacctcaca 8520
ttgagattct cacctcaaat ccattttgtt gttacctgta ccttcctacc ttctcttttt 8580
gctacatgca gactgctgtt ttgtcttcct ggcctgttcc aggtttcagc attctggcat 8640
atctgctacc ctgttcccaa acctctctag agtccatgct ccttccttgg atagtgtttg 8700

attgggccac gtatctaaga agtgatgcct tcagttaggc ctgagaacct cctctatgga 8760
aatctccatc agtgaccctg acagacttgg tatcttggag atgtcactgc tcccagcctg 8820
tggtctagga gaatctcagc ctgggcctct agtagtatgg ataaggcgtt aaggtatctt 8880
tgaaccagag tctgtcatat tcctcaatgt gggacagata aaacagtggt agtgctggtg 8940
tttctgagct agaactctgg tttttggtct agattctttg atgtatgacc tttcagaggt 9000
attaaaattt gttctaatac aatgttcaat acaaatgtag ttccttttct gttaggacct 9060
caacaaaaca tgaccaactg tagatgaaca ttaaactatg acaattcatg gaaatgaata 9120
cagtaatacc tgcggttccc ccattttagc agtcactatg gtgacatttg gcacaaatgg 9180
ctatttaagg gtgcttttgt taaaacctac catcttacta ggcacatgat attgaaacta 9240
atgaaataat ggagaaactt cttaaaaact tttaatgaat aaagtgatga agtgataata 9300
ttttagctgc tatttataaa gtgactatta caggtcaaac attcttctag ggtttttttg 9360
ttgaagttgt cacatttaat ccttaataac ccactatgag tcaggtattc ttctctcccc 9420
tttggacagt tggggaaatg ggggtcagag aggttaggta atttgctcag ggccacacaa 9480
cctgcatgta gaaaatctga gatttgtaca ggaacgtatc aaactctgaa gtccatgctt 9540
ctattttccc atgctgcctt tctaataaaa ggtaactaat gctactggat gctgccccca 9600
aagtgagtca ctttcacccc accctacttg attttctcca taaaactaat cacatcctga 9660
caacttattt attgctgatc tcccccacta gattataaac tcaataaaag caagatcctt 9720
gtctgctgaa tatcagtacc taaaacgctg tctagcacag agcaagtaat taatatttgt 9780
tgaatgaaca aataaaggaa aaaaattcaa aggaagaaaa agccctaaaa cagatgttta 9840
cctaaacata cattttaaaa gaaagcatat aacaaattca ggacagaatt taaatttgat 9900
tttttaaaga aataaccaag tgctagctgg gcacagtggc tcacacctgt aatcctagca 9960
ctctgggagg ccgaggcagg cagatcactt gaggtcaaga gttcaagacc agcctggcca 10020
acatggtgaa acctgtctct actaaaaata cagaaattat ccaggcatgg tggcaggtcc 10080
ctgtaacccc agctactcag gaggctgagt caggagaatt gcttgaaccc aggaggcaga 10140
ggttgcagtg ggccaagatt gcaccactgc actccagcct gagtaacaaa gcaagactct 10200
gtctgaagga gaaggaaaga aagaaggaaa gaaggaaaga aggaaagaag gaaagaagga 10260
aagaaagaaa gaaagaaaga aagaaagaaa gaaagaaaga aagaaagaaa gaaagaaaga 10320
aagaaagaaa aagaaagaaa gaaagaaaga accaagtgct tatttgggac ctactatgct 10380
atgtttttcc atgcacgcta ttttcagtaa agcagttagc aaacttgcaa gatcataaca 10440
acaaatatat gcttctataa ctctaaaatt gtgctttaag aagttcctct ttaccagctc 10500
atgtatgcat tagttttcta agagttacta gtaacttttt ccctggagaa tatccacagc 10560
cagtttattt aaccaaagga ggatgcttac taacatgaag ttatcaaatg tgagcctaag 10620
ttgggccagt tcatgttaat atactccaga acaaaaacca tcctactgtc ctctgacaat 10680
tttacctgaa aattcatttt ccacattacc aaggagccag ggtaggagaa tatagaaaga 10740
ccacccaaga atccttactt ctttcagcaa aatcaattca aagtaggtaa ctaaacacat 10800
gccctaacaa tgaatagcag attgtgctca gaagaatgat ctacaacatc ttactgtgaa 10860
ggaactactg aaatattcca ataagacttc tctccaaaat gattttattg aatttgcatt 10920
ttaaaaaata ttttaagcct aaattttaaa aggtttgata ttggtacatg aatagacaaa 10980
cagacatgga ctagaccaag aattaggttc aaacatatac aggaatttaa tatacgataa 11040
atctagtatt ccaaaggaac caacaaatgg tgttcagaca gcaggatagg catcaggaaa 11100
aacacagttg ggcaccctac cttactccta acaccaggag taactgaagg agcaccaaat 11160
atttatttat tttaattata gttttaagtt ctagggtacg tgtgcacaac atgcaggttt 11220
attacatagg tatacatgtg ccatgttggt gaggagcacc aaatatttaa aagaaaaaaa 11280
ttggccaggg gcggtggctc acacctgtaa tcccagcact ttgggaggcc aaggtgggca 11340
gatcacctga ggtcgggagt tcgagaccag cctgagcaac atggagaaac cccatctcta 11400
ctaaaaatac aaaattagcc aggcatggtg gcacatgcct gtaatcccag ctacttggga 11460
ggctgaggca ggagaatagc tttaatctgg gaggcacagg ttgcggtgag ctgagatatt 11520
gcactccagc ctgggcaaca agagcaaaac ttcaactcaa aaaaattaat aaataaataa 11580
aaataaagaa agaaaagaaa aaaatgaaaa tagtataatt agcagaagaa aacaccgtag 11640
aatcctcgga ctcttaggat ggggaatgcc tataatataa aaaccctgaa gttataaaag 11700
agaaaatcac ctacatacaa accaaatctt tctacatgcc taaaacatag cacaaacaca 11760
gctaaataat catagctgaa tgaactggga aaacaaaact tgactcatat ccagacagag 11820
ttaattttcc tacacataaa gagtacctat ataaacccaa caaaaaaacc accactaacc 11880
caaaataaaa atgtgacagg taatgaacag gtagttcaca gagaatacaa atggctcttc 11940
ggcacataag atgctcagac tgacttttac ttatttattt tttgagagac agggtctcac 12000
gatgttgccc aggttaggct caaactcctg ggctcaaatg atagtaccag gactacaggt 12060
gtgccccacc gcacctggct cctcaaccac ctgtattaac aggaaatgca aaataaaact 12120
ttcaaatcta ttttacctat tagaatggca aaaatttgaa aaacttcaaa catcatcatg 12180
ttggtgagaa tgtgaggaga ctggcactct catttttgc tgatagcata tatatactga 12240
tggcttctat ggaaagcaat ctggcagcgt ctatcaaatg tacaagtgca tatatccttt 12300

gacaaagcaa ttccactcta ggaatgtgtt ctatatggtt gtgcttcctg gggctgggaa 12360
ctgggagcta agggacaggg gcagaagata atcttctttt ccctccttcc ccgttaaaca 12420
tgttgaattt tatatactgt aatatattat ttttcacaaa agataatttt taagcgatat 12480
gtctgggaat ttttttttt cttttctgag acagggtctc actctgtcat ccaggctgga 12540
atgccatggt atgatctcag ctgactgcag cctcgacctc ctgggttcaa gcaatcctcc 12600
cacctcagcc tcctgagtag ctgggactac aggcacgtgc catcatgcta atttttgtat 12660
atacagggtc tcactatgtt gcccaggcta atgtcaaact cctaggctca agcaatccac 12720
ccacctcagg ctccaaagtg ctgggattac aggcgtgagc caccgcgcct ggccctggga 12780
attcttacaa aagaaaaaat atctactctc cccttctatt aaagtcaaaa cagagaagga 12840
aattcaacct ataatgaaag tagagaaggg cctcaaccct gagcaacaaa cacaaaggct 12900
atttctgaga caggaatttg ctgaacaaaa tcgagggaag atgacaagaa tcaagactca 12960
cttctcggct gggcgcagtg gctcacacct gtaatcccag cactttggga ggccgaggcg 13020
gacagatcac gaggtcagga gattgagacc atactggcta acacagtgaa acccagtctc 13080
tactaaaaat acaaaaaatt agccgggcgt ggtggcaggt gcctgtagtc ccagctactt 13140
gggaagctga ggcaggagaa tggcgtgaac ccaggaagcg gagcttgcag tgagccgaga 13200
tcacgccact gcactccagc ctgggtgaca gagcaagact ctgtctcaaa aaaaaaaaaa 13260
aagactcatt tctctagatc ttgagccgta ttcaaattta tctcagctta gtgagaggtt 13320
aaagcaagga atatccttcc ctgtgggccc tgctccttac tgaaggaagg taacggatga 13380
gtcaaggaca ccaatggaga aaagcactaa caccattatc tgatgaacat tacgtgaaga 13440
agggtaagaa gtgaagtgga attgctgaag aagtcagtga aagcggacat tcatttgggg 13500
aaatggaata taggaaatcc ataaaagtga ttaaaaagat gttagaggct gaggcggggg 13560
gaccacaggg tcaggagatc gagaccatcc tggctaacac ggtgaaaccc catctctact 13620
aaaaatacaa aaaattagcc aggcgtggtg gcaggcacct gtagtcccaa ctactcggga 13680
gactgaggca ggagaatggc atgaacctgg gagacggagc ttgcagtgag ccgagatcac 13740
gccactgcac tccagcctgg gtgacagagt gagactccat ctcaaaaaaa aaagttagat 13800
acgagagata aagatccaac agacacacaa ctgctaattc tgaacagaac aaaacaaatg 13860
gcacaggaaa agaaaattta agatataaca ccggaaaact ttcctgaaat tgagtaactg 13920
aatctatagc ttgaaagggt ttagcatatg ccaagaaaaa tcagtagagt ccaaccagca 13980
caagacacat ctagcaaggc tggtgattct accaacacag agaaagaagt gggtgaccca 14040
taatgcggaa aaaggcagac catctgcagt cttctccaga acactggagt ctgaagacaa 14100
aagaatgctg cctactgagc cagaagggag agaaagtgac ccaacacatc tttaccaagt 14160
tagaatgtca cgcattattt aaaggctgca aaagccatga aagacatgaa agaacacaag 14220
catttacaac atgaaagaac acaagcattc tcatactcaa gaatccttaa gaaaaatgta 14280
gtcctaatcc agcccactga aagttaaatg tacttaatgt gctcattaat gggaacttca 14340
tagcttcaaa tcagtctggt cccatctacc aacatctctc gcccggcttt cctgcaatag 14400
tcagcacctt tccctcctcc cagtcttgtc ccctggagtc tgctctcagc atagcagagt 14460
gaccacatca acacccaagt cagagccctc cagtgcgcac tggtctacaa agcccttccc 14520
acccccacc ccacgtgccc tccggatcct tgtgacgtgt ctcctgcata ccctagcagc 14580
cctggcctcc tcactgcccc tcctgtacat caggaaggcg actccttgag tcttggctct 14640
ggccgcctcc tccacctgca gtgagttaac tcccttacct actctaggtc attgctcaaa 14700
tgtcagcatc tcaatggggc cctccctgac taccctattt aaattctaca tactcccctt 14760
gaccccatgg acctcactca ccctattcca cttttattct tacaatttag cacttgttct 14820
cttctaacgt attctaagac ttactcattt attacattgt ttgccacccc ctctagtaca 14880
taaactccag aggggcaggg atttctgtct atttattcat ttctttatcc ctaggacata 14940
gaacagggca tagttcagag tattcaatgt tatcaatgaa tgaactagca gtagtaccag 15000
ttccagttag gcacagaatt aaatctaaat agaattaaat ctcatggtct gggttaacta 15060
tggatagaaa attagatata attttaagaa gcctagaaag aaaaaattaa taatgtaaaa 15120
ataatattaa tttgataata ataacaaaaa ctctgccagg cactgtggct caaatctgca 15180
atcccagcta ctcaggaggc tgaggtggaa ggatcacttg agaccagagt tcaagactca 15240
gcctaggcaa cacggcaaga aactgtctct aaaaaaatta aaacttaaat ttttaaaaaa 15300
gaattctcaa agcgtcacaa aaactggaga ttaaggtaca ggaagtgtga agtaatatta 15360
ctatgctaat ggtttttttt ttttttagaa aggtataacc aaaagatttc tttctcaagt 15420
cgataaactg agaaagataa gcatatcttc caattaacag agggggagga aaagccagat 15480
acaacaaaat aagatataaa ttagtttcca gttgaaaaca agagtaggag ttattttgca 15540
tcacctcacc tgtgacctcc cccagcccaa aaaacactac tgataaacag ggtagaaaag 15600
catcatctca gataaagcag gaaaaactgc cacagtctca aaccacaaac tataagcaca 15660
cacctggcca accctgccaa gtctgggctc agtaggagga acgtgctgag agctaggatg 15720
taccaactta gacattctgt gggatacaga tgtccctgga agggtcacac catctcaaag 15780
gcacctgtaa tgcccactga ttacagccac catatgtgag agagaaactc agggcactta 15840
gagagtataa caagaacctt atgtcatctg agatgaggaa tcctcagccc tgcaaattaa 15900

ccaactcttt agaacaactg gcaaaacata aatatccaca acttttgttt cagtaattcc 15960
actcttagat atcaatccaa agtacatgag acagcagata cacacacaaa atggtattta 16020
ctgcagcatt gtttataata gcaaaaaaca agaaataatc catatgtctc aataggatac 16080
tgggtacatg agggtatgta cccatcattc aaccatcaaa aagagtgata tggatgtcca 16140
cagatggaca taaaaagctg tgtgttacgt gaaaacaaac tcaagcagca gcaggatggg 16200
cttatgatag tcagtatgag ctaatttctg gaaaaaaaaa tctagtgtgt gcacagaaaa 16260
catctgaaag aacagaaaca aaactatcag cagaatattg agatgtttta ctaagttgta 16320
tatctatact gcttgtaatt tttaccccaa gcaagaatta ctttttggaa aaagaaaatt 16380
caggaaataa agcatttctt taaacttcat gtttaaacaa atggtgatgg aataaaagag 16440
ttcttattca tcataaacac acacagcaca catgcacgca tgtgcgtgag cacacccttt 16500
acttgataaa taccatgttg aatattttag tctttccttt taggttctat cccttcactc 16560
aaaatgcggt tataaataaa tgtacttttc atgtgccttc tgcctaaacc cactttaata 16620
taactttaca gtcccattat cattatagtc tcaaagctag actcagcctg aaactaccct 16680
ttcatttgga acccttatta aaatgccaca tacagctcct tcaaataaaa acaaacccta 16740
ggacctgaca ctaggcttcc tttgttgcta ctcataatgg ccaagttctg tgcttataat 16800
acatcttctt tcatttttatt gctacatatc caagggtttt atatgttttt cttattatat 16860
cttaattcaa aacaccatca cgctcttttc cagatgaaaa taaggaaaag aaattgagca 16920
actgactgac ttaaaggtca taaaactata tagtagcaga gtcagcaaaa gaagaaacac 16980
acatctccca agtagaggct gaaaaccagt accattcacc tccagggtga gctatataca 17040
gattacaaag tcaccttctc taaatgttca aactgaatcc catacccata ctttaccact 17100
acctcgtaag aacagcctca gatcttgtta tagccttttt tttagcatgc tgaagccaat 17160
aaaatgcttc ccattcagca agagaaacaa gttctgaaac actgaataat ctgcccaggg 17220
cctatgaaca tttccactgt gagaaatgtt ctccactgtg tggagaagat ccttactctt 17280
ctccacacag gcagaacatt agaaaaattc ttggattcta tgatgcacag cttaggagtc 17340
tgtttagcac aatttaagtc caaatagtta ttaaatcctc ctctgttcca gaaacagtgc 17400
taaatactgt gaatataaaa attgaaaaga tactctcctg gctcccaaga aagtcagcca 17460
gatagaggag acacaggcac acaaatcact gtcacatgaa gctctacctc cctaacttca 17520
aacgagggcc taagtcacca agaatacagt agcagttgtg actacgagta actactataa 17580
ttcaatactt tatcttccct tagaaaactc ttctcccttg gaaatttatt tgcatttcta 17640
aataccattc cttactaaaa ggaagcaggg ctccttgggg aaatagctga ttctaggtgt 17700
ggactatgaa atgaaaatgg tgagtctggg acatcccatg ttgcccagaa atcaaggaac 17760
tgcccaaaga ttaacagagt catgttaaat ggacctaaga gtgaaccaga aggagctcac 17820
tttgccccgc gtggaacaat ttcaagaaaa acatgacagt aatgaattat aaaacatgaa 17880
ttaaaataca tattggtact aaaaagagaa caaaaggatg tggctttgga taaagctctt 17940
cttcatggaa gaataccagc taataaatgt aaaggaaatg agagaattag aaaaattatc 18000
attttgtaaa ccttaatata ttcacctaga catgctaaaa ccactgagta aaaggctgct 18060
tgggaagagg atgctcacat gatctcagag tttcacacca cagataattt attagataca 18120
ggaaggaaga tgtgatcaag cttcctgtga cccccagcca ggccccacaa cactatgtgc 18180
ctccttgtga tgtgggagct acacagcatc gcccacacag cttctcgcca aaactgtttg 18240
aagctaatca caagggaaga actggacagc ttctgaccat gagacgctcc accagacaac 18300
ttgcttggcc tctccaaaga aacttgcttg gcctctccaa agaaaactca gtttcattta 18360
aaaacaaaac taattattta aaaacaaacg aaaagcaagt tgtggacttg agctccaggg 18420
acagagcaga catacttttc cctgttcttc ccagtaagtg gtaataaaaa ccctcaacac 18480
tagatataaa acaaatataa gaaggttctg gaaggggaag aggaggcaga ctatccaggt 18540
gccttgaggc ccacagaaca acccagtgat gggttcactg ggtcttcttt ttgcttcatt 18600
atctcagact tggagctgaa gcagcaggca acttcaaaac accaaggggc acagattgaa 18660
aagccccaag aaaagcctgc cctctctagc caaaggacca ggaaggagac agtctaatga 18720
gatggaacac atttagacag taactgccca tttaccagca ataactgagc agggagccta 18780
gacttccagt cttgtgagga cgtaccaagg tacccaacac ccccaccaag gctgagtaag 18840
gactgcgact tttatccctg catggcagta gtaaggagcc catccctcac ccgccagcag 18900
tgtcagggga acctggactt ccactcccac ccaggagtga tgaggccctc cctgctgggg 18960
tcatgtcaga ggaggcctag tggagattca gtgacttaac cttttcccag agataatgag 19020
gccacctttc ctccctcttc ccccatggtg acagtgaaag cactgtggca agcagtaggc 19080
actcctaccc ctcctagcca gggaggtatc agggaggcca agtagggaac cagaataccc 19140
acaaccaccc agcagcaaca ggggtccccc accccattgg gtgtcaatgg aagcagagcg 19200
gaaagcctgg atatttaccc ccatctagaa gtaacaagct gatgtccccc ttcttctact 19260
acaatggtgt tcaaaacagg tttaaataag gtctagagtc tgataacgta atacccaaat 19320
cgttgaagtt ttcattgagg atcatttata ccaagagtca ggaagatccc aaactgaaag 19380
agagaaaaga caattgacag acactagcac taagagagca cagatattag aactacctga 19440
aaggatgtta aagcacatat cataagcctc aacaggctgg gcgcggtggc tcacgcctgt 19500

aaccccagca ctttgggagg ccgaggcagg tggatcacaa gatcaggaga tcgagaccat 19560
cctggctaac acggtgaaac cccgtctcta ctaaaaatac aaaaaaaaat agcaaggcat 19620
ggtggtgggc acctgtagtc ccagctactc gggagcctga ggcaggagaa tggcatgaac 19680
ctgggaagag gagcagtgag ccgagatcgc accaccgcac tccagcctgg gcaacagagc 19740
aagacttcgt cccaaaaaaa aaaaaaaaaa aaaaaaaagc ctcaacaaac aactacaaac 19800
gtgcttgaaa caaatgaaaa aaaaatcttg gcaaagaaat aaaagatata tattttggcc 19860
aggtgcagtg gctcacagcc tgtaatccct gcactttggg aggctgaggc aggcggatca 19920
cctgaggtca ggagtttgag accagcctga ccaacatgga gaaaccccgt ctctactaaa 19980
aatacaaaat tagccagtca tggtggcaca tgcctgtaat cctagctact caggaggccg 20040
aggcaggaga atcgcttgaa ctcaggaggt ggaggttgcg gtgagccgag atcccgccat 20100
tgcacattgc actccagcct gggcaacaag agcaaaactc catctcaaaa aaatagatac 20160
atattttaat ggaaatttta gaattgaaaa atacagtaac caaattgaat ggaaagacaa 20220
catagaatgg agggggcaga caaaataatc agtgaacttc aacagaaaat aatagaaatt 20280
acccaatatg aagaacagaa agaaaataga ctggccaaaa aataaagaag aaaaaagagg 20340
agcagcagga ggaatgatgg aaaaagagaa aggaaggaag gaagggaagg agggagggaa 20400
ggagtgaggg agaaagtctc aaagacctct gagactaaaa taaaagatct aacacttgtc 20460
atcagggtcc aggaaagaga caaagatggc acagctggaa acgtattcaa aaaataatag 20520
ctgaaaactt cccaaatttg gcaagagaca taaacctata gattcgaaat gctgaacccc 20580
aaataaaaag cccaataaaa tccacaccaa aatacatcat agtcaaactt ctgaaaagac 20640
gaaaagagaa aacgtcttga aagcagtgag tgaaacaaca cttcatgtat aagggaaaaa 20700
caattcaagt aacagatttc ttacagaaat taaggaagcc agaaggaaat gacacaatgg 20760
ttttcaagtg ctgaaagaaa agaagtgtca acacaaaatt ctagattcag taaaaatatc 20820
cttcaagaat caatgggaaa tcaagacagt ctcagataaa gcaaaataag agaatatgtt 20880
gccagcagat ctcccctaaa ggaatggcaa aaggaagatc atgcaacaga ccaaaaaatg 20940
atgaaagaag gaatccagaa acatcaagaa gaaagaaata acatagtaag caaaaataca 21000
tgtaattaca ataaaatttc tatctcctct taagacttct aaattatatt gatggttgaa 21060
gcaaaaatta taaccctgtc tgaagtgctt ctactaaatg tatgcagaga attataaatg 21120
gggaaagtat aggtttctat acctcattga agtggtaaaa tgacaacact gtgaaaagtt 21180
acatacacac acacacgtaa gtatatataa atatatgtgt gtatatgtgt gtgtatatat 21240
atatatacat ataatgtaat acagcaacca ctaacaacac tatacaaaga gataataacc 21300
aaaaacaatt tagataaatt gaaatggaat tctaaaaaat attcaaatac tctacaggaa 21360
gacaagacaa aaagagaaaa aaagaggagg acaaactaaa ttttttaaaa acataaataa 21420
aatggtagac ttaagcccta acttatcaat aattacataa atgtaaatga tctaattata 21480
tcaattaaaa gacagagata gcagagttaa tttaaaaaca tagctataag aaacctgctt 21540
tgggctgagt gcagtgactc acacttgtaa tcccagcact tcgggaggcc aaggcgggtg 21600
gatcacctga ggtcaggagt tccagaccag cctggacaac atggtaatac cccatctcta 21660
ctaaaaatac aaaaaaatta gccaggcatg gtggcacacg cctgtagtcc caactactca 21720
ggaggctgcg acacaagaac tgcttgaacc cgggcagcag aggtagcagt gggccaagat 21780
tgcgccactc cagcctgaac gacagagtga gactccacct cagttgaaaa acaaaaaaga 21840
aacctgcttt aaatatacca acatatgttg gttgaaatta aaagaataaa atatatcatg 21900
aaaacattaa tcaaaagaaa ggagtggcta tattaataac ataaaataga cttcagagaa 21960
aagaaaattt caagagacag gaataaaagg atcaagaaaa gatcctgaaa gaaaagcagg 22020
caaatcaatc attctgcttg gagattcaac accctctctt aacaactgat agaacaacta 22080
gacaaaaaaa tcagcatgga gttgagaaga acttaacacc actgaacaac aggatctaat 22140
agacatttac ggaacactct acccaacaat agcaaaataa acattctttt caagtattca 22200
ctgaacatat ccttagaccc taccctgggc cataaaacaa agctcactag tgattgccga 22260
aggcttggat ggacagtgga agagctgcat ggggagggag aaggtgacag ttaaagagtg 22320
taggatttct ttttgggata atgaaaatgt tccaaaattg attgtggtga tgttggcgca 22380
actctacaaa tataaaaaag gccattgaat tgtacgtttt aagtgggtga aacatatggt 22440
atgtggatta tatctaacgc ttttttaaaaa cttaacacat ttcaaagaat agaagtcata 22500
cagagtgtgc tctactggaa tcaaactaga aagaggtaac tggaggataa cgagaaaagc 22560
ctccaaatac ttgaaaactg gacagcacat ttctaaaatc atccgtgggt caaagatatt 22620
catttctgat attcattttt attgtttaat gtatttttaa aaatttctta agggaaataa 22680
actgactaaa aatgaatatg gctgggtgcg gtggctcacg cctgtgatcc cagcactttg 22740
ggaggccgag gctggtggat cacaagatca ggagttcgag accagcctgg ccaagatggt 22800
gaaaccccgt ctcaactaaa aaactacaaa aagtagccaa gcgcagtggc gggagcctgt 22860
ggtcccagct acttgggagg ctgaggtagg agaatcgctt gaacacaggc agcagaggtt 22920
gcagtgagcc aagattgtgc cactgcacgc cagcctgggc gacagagact gcctcaaaaa 22980
aaaaaaaaaa aaaaagaata tcaaaatttg tgggacatag ttaaagcaat gctgagaggg 23040
aaatttataa cactaaatgt ttacattaga aaagagaaaa agtttcaaat caatagtctc 23100

cactcccatc tcaagaacac agaagatgaa gagcaaaata aacccaaagc aagcaaaaga 23160
aagaaaatat aaaaataaat cagtaaaatt gaaaacagaa acacaataaa gaaaatcagt 23220
gaaacaaagt actgattctt cgaaagatta ataaaattga caaacctcta gcaaggctaa 23280
caaacaaaaa agaaagaaga cacggattac cagttattag aatgaaagca taattagaaa 23340
caactctaca cattataaat ttgacaatgt agatgaaatg gactaattac tgaaaaaaca 23400
caaattacca caactcaccc aatatgaaat agataattgg gatagcctga taactactga 23460
gaaaattgaa tttgtaattt taacactctt aaaacagaaa cattaaactt aatattttat 23520
aaatattaga taaggtaatt atacccttcc ttaacaaata aaaacgacaa attattttgc 23580
agctaaagag atgtatgtac tgtgaaaaat atcttcagaa aaatagaact ttgtttgaag 23640
aataaggatt taaaaaatgt ttttaactct caagaagcaa atatctgggc ccagatggtt 23700
tcactgaaga attctaccaa atgtttaatg aagaattacc accaactcta catagcatct 23760
ttgagaaaac tgaagagaag ggaacatctc ccagttcatt ttatgaagtg ggtgttactc 23820
tgatactaga actgtataag gacagctact cttgacacac tgcctatggg tagctctgct 23880
ctgcaggaac agtcagaaaa aaaaaaaaaa gaagcactgg acaagggcag tataaaaaaa 23940
gaaaactggg ccaggtgcag tggctcacac ctgtaatctc agcactttgg gaggctgacg 24000
ctggtggatc acctgaggtc aggagtttga gactagcctg gccaacatgg taaaaccctg 24060
tctctactaa aatacaaaaa ttagccaggc agggtggtgg ggaaaataaa aaggaaaaaa 24120
aaacaaaaat aaactgcaga ccaatatcct tcatgagtat agacacaaaa ctccttaaac 24180
tccttaacaa aatattagca agtagaagca atatataaaa ataattatac accatgatca 24240
agtgggactt attccagaaa cgcaagtctg gttcaacatt tgaaaacaag gtaacccact 24300
atatgaacgt actaaagagg aaaactacat aatcacatca atcaatgcag aaaaaagcat 24360
ttgccaaaat ccaatatcca ttcatgatac tctaataaga aaaataagaa taaaggggaa 24420
attccttgac ttgataaagc ttacaaaaga ctacaaaagc ttacagctaa cctatactta 24480
atggtgaaaa actaaatgct ttcccctacg atcaggaaca aagcaaggat gttcactctc 24540
attgctctta tttaacatag ccctgaagtt ctaacttgtg caaaacgata agaaagggaa 24600
atgaaagacc tgcagattgg caaagaagaa ataaaactgt tcctgtttgc agatgacatg 24660
attgtctcat agaaaatgta aagcaactag gggtaggggg gcagtggaga cacgctggtc 24720
aaaggatacc aaatttcagt taggaggagt aagttcaaga tacctattgc acaacatggt 24780
aactatactt aatatattgt attcttgaaa atactaaaag agtgggtgtt aagcgttctc 24840
acçacaaaaa tgataactat gtgaagtaat gcatacgtta attagcacaa cgtatattac 24900
tccaaaacat catgttgtac atgataaata cacacaattt tatctgtcag tttaaaaaca 24960
catgattttg gccaggcaca gtggctcata cctgtaatcc cagcatttta ggaggctgag 25020
gcgagcagaa aacttgaggt cgggagtttg agaccagaat ggtcaacata gtgaaatccc 25080
gtctccacta ataatacaaa aattagcagg atgtggtggc gtgcacctgt agacccagct 25140
acttgggagg ctgaggcacg agaattgctt gaacaaggga ggcagaggtt gcagtgagct 25200
gggtgccact gcattccagc ctggtgacag agtgagactc catctcaaaa aaaataaaat 25260
aaagcatgac ttttcttaaa tgcaaagcag ccaagcgcag tggctcatgc ctgtaatccc 25320
accactttgg gaggccgagg caggcagatc acaaggtcag gagtttgaga ccagcctgac 25380
caacatggtg aaaccccatc tctactaaaa aatatataaa ttagccaggc atgtgtagtc 25440
tcagctactc aggaggctga ggcaggagaa tcacttgaac ccggaggcag aggttgcagt 25500
gttgagccac cgcactccag cctgggtgag agaacgagac tccgtctcaa aaaaaaaaag 25560
caaaataacc taattttaaa aacactaaaa ctactaagtg aattcagtaa gtctttagga 25620
ttcaggatat atgatgaaca tacaaaaatc aattgagctg gacaaaggag gattgtttta 25680
ggtcagtagt ttgaggctgt aatgcacaat gattgtgcct gtgaatagct gctgtgctcc 25740
agcctgagca gcataatgag accacatctc tatttaaaaa aaaaaaaatt gtatctctat 25800
gtactagcaa taagcacatg ggtactaaaa ttaaaaacat aataaatact gtttttaatt 25860
gcctgaaaaa aatgaaatac ttacatataa atctaacaaa atgtgcagga cttgtgtgct 25920
gaaaactaca aaacgctgat aaaagaaatc aaagaagact taaatagcgt gaaatatacc 25980
atgcttatag gttggaaaac ttaatatagt aaagatgcca attttatcca aattattaca 26040
caggataaca ttattactac caaaatccca gaaaaatttt acatagatat agacaagatc 26100
atacaaaaat gtatacggaa atatgcaaag gaactagagt agctaaaaca aatttgaaaa 26160
agaaaaataa agtgggaaga atcagtctat ccagtttcaa gacttacata gctacagtaa 26220
tcaagactgt gatattgaca gagggacagc tatagatcaa tgcaaccaaa tagagaacta 26280
agaaagaagc acacacaaat atgcccaaat gatttctgac aaaggtgtta aaacacttca 26340
acgggggaag atatgtctct cattaaaggg tgtagagtca ttgcacatct ataggcaaaa 26400
agatgaacct gaacctcaca ccctacagaa aaattaactc aaaatgactc aaggactaaa 26460
cataagatat acatctataa aacatttaga aaaaggccac gcacggtggc tcacgctcgt 26520
aatcccagca ctttgggagg ccaaggcagg tggatcacct aaggtcagga gtttgagacc 26580
agccggatca acatggagaa gccccatctc tactaaaaat acaaaattag ctggacgtgg 26640
tggcacatgc ctgtaatccc agctacttgg gaggctgagg catgagaatc gcttgaaccc 26700

```
gggggggcaga ggttgcggtg agccaagatc acaccattgc actccagcct gggcaacaag   26760
agcaaaactc caactcaaaa aaaaaaaaaa aaaggaaaaa tagaaaatct ttgggatgta   26820
aggcgaggta aagaattctt acacttgatg ccaaactaag atctataagg ccagtcgtgg   26880
tggctcatgc ctgtaattcc agcactttgg tcaactagat gaaaggtata tgggaattca   26940
ctgtattatt ctttcaactt ttctgtaggt ttgacatttt tttagtaaaa aattgggggа   27000
aagacctgac gcagtggctc acacctgtaa tcccagcact ttgggaggcc ggggcaggtg   27060
gatcacacgg tcaggagttc gagaccagcc tggccaacat ggtgaaaccc cgtctctacc   27120
aaaaatataa aaaattagcc gggtgtcatg gtgcatgcct gtaatcccag ctactgagga   27180
ggctgaggca ggagaatcac ttgaacctgg gaggtggaag ttgcagtgag ccgagattgt   27240
gccactgcac tccagccttg ggtgacagag cgagactccg tctcaaaaga aaaaaaaaaa   27300
aaagaatatc aaacgcttac tttagaaact atttaaagga gccagaattt aattgtatta   27360
gtatttagag caatttttat gctccatggc attgttaaat agagcaacca gctaacaatt   27420
agtggagttc aacagctgtt aaatttgcta actgtttagg aagagagccc tatcaatatc   27480
actgtcattt gaggctgaca ataagcacac ccaaagctgt acctccttga ggagcaacat   27540
aaggggttta accctgttag ggtgttaatg gtttggatat ggtttgtttg gccccaccga   27600
gtctcatgtt gaaatttgtt ccccagtact ggaggtgggg ccttattgga aggtgtctga   27660
gtcatggggg tggcatatcc ctcctgaatg gtttggtgcc attcttgcag gaatgagtga   27720
gttcttactc ttagttccca caacaactgg ttattaaaaa cagcctggca ctttccccca   27780
tctctcgctt cctctctcac catgtgatct cactggttcc ccttcccttt atgcaatgag   27840
tggaagcagc ctgaagccct cgccagaagc agatagtgat gccatgcttc ttgtacagcc   27900
tacaaaacca tgagcccaat aaacctttt tctttataaa ttatccagcc tcaggtattc   27960
ctttatagca agacaaatga accaagacag ggggaaatca acttcattaa aataatctat   28020
gcagtcacta aacaaataag aacaagaggc tccagaagtg ggaagccaat acccagagtt   28080
cctacaatac agtatctgaa aagtccagtt tccaaccaaa aaatatatat atacaggccg   28140
gacatggtag cttatgtctg taatcccagc actttgggat gctgaggcgg gcagatcacc   28200
ctaggtcagg agttcgagac cagcctggcc aatatggcaa aaccccgtct ctactaaaaa   28260
tacaaaaatt agccaggcat ggtggtggat gcctgtaatc ccagctactc gggaggctga   28320
ggcagggaat cacttgaacc caggaggcag aggttgcagt gagccgagat cacgccactg   28380
aactccagcc tgggcaacaa agtgagactc cacctcaaaa aaaaaaaaaa tatacatata   28440
tatatgtgtg tgtgtgtgtg tgcgcgcgtg tgtgtatata cacatacaca tatatacata   28500
tatacagaca cacatatata tatgaagcat gaaaagaaac aaggaagtat gaaccatact   28560
ttctgtggtt atgataggat ggggtatcac gggggaagta gacaagggaa actgcaagtg   28620
agagcaaaca gttatcagat ttaacagaaa aagactttgg agtaaccatt ataaatatgt   28680
ccacagaatt aaagaaaagc gtgattaaaa aaggaaagga aagtatcata acaatattac   28740
tccaaataga gaatatcaat aaaggcatag aaattataaa atataataca atggaaattc   28800
cggagttgaa aggtagaata actaaaattt aaaattcact agagaaggtt caacactata   28860
tttgaactgg cagaagaaaa atttagtgag acaaatatac ttcaatagac attattcaaa   28920
tgaaaaataa aaagaaaaaa gaatgaagaa aaataaacag aatctcagca aaatgtggca   28980
caccattaat cacattaaca tatgcatact gagagtaccg gaagcagatg agaaagagga   29040
agaaaaaata ttcaaatgat ggccagtaac ttcctagatt tttgttttaa agcaataacc   29100
tatacaatca agaaactcaa tgaattccaa gtaggataaa tacaaaaaga accacaaaca   29160
gatacaccat ggtaaaaatg ctgtaagtca aaaacagaga aaatattgaa agcagctaga   29220
ggaaaactta taagagaacc tcacttacaa aagaacatca cttataaaag aaccacaata   29280
atagaaacag ttgacctctc atcagaaaca atgaatgata acatatttga agtgctcaaa   29340
gaaaaaaaat aaagattcct atatacgaca aagctgtctt tcaaaaatat acatccaaaa   29400
ggattgaaac cagggtcttg aagagttatt tgtacatcca tgttcatagc agcattattc   29460
acaatagcca aaaggtagaa gcaacccaag ggtccatcga caaataaata aaatgtggta   29520
tatgtataca caatggaatt tattcagtat taaaaaggaa tgaaattctg acacatgcta   29580
caacatggct aaaccttgag aacactatgc taagtgaaat aagccagcca caaaaggaca   29640
aataccatat tacttcactt gtatgaaata cctagggtag tcaaattcag agatagaaag   29700
taaaacagtg gttgccaagg gctgagggag ggagtaacgt ggagttattg ttgaatgggt   29760
acagaatttc agttttgcaa gataaaaaga gttctggaga cagatggtgg tgagggtggt   29820
acaacaatac aaatatactt tatactactg aacagtatac ttaaaaatga ttaacatggt   29880
gaaaccccgt ctctactaaa aatacaaaaa aattagctgg gtgtggtggc gggcacctgt   29940
aatcccagct acttgggagg ctgaggcagc agaattgctt gaaaccagaa ggcggaggtt   30000
gcagtgagct gagattgcgc caccgcactc tagcctgggc aataagagca aaactccgtc   30060
tcaaaaaata aaaaataaaa aaaatttaaa aatgattaag caggaggcca ggcacggtgg   30120
ctcacaccta taatgccagc actttgggag gccgaggcag gcgatcactt gagaccagga   30180
gtttgagacc agcctggcca acatggcaaa accctgtctc tgctaaaaat acaaaaatta   30240
gccaggcatg gtggcatata cttataatcc cagctactgg tgagactgag acacgagaat   30300
```

tgcttgaacc caggaggcag agattgcagt gagtcgagat cgcgccactg aattccagcc 30360
tgggcgacag agcaagattc tgtctcgaaa aaacaaaaac aaaaacaaaa agcaaaacca 30420
aaaaataatt aagcaggaaa cgagattgct gctgaggagg agaaagatgt gcaggaccaa 30480
ggctcatgag agcacaaaac ttttcaaaaa atgtttaatg attaaaatgg taaatttat 30540
atgtatctta ccacaaaaaa aagggctggg gggcaggaaa tgaaggtgaa ataaagacat 30600
cccagagaaa caaaagtaga gaatttgttg ccttagaaga aacaccacag gaagttcttc 30660
aggctgaaaa caagtgaccc cagagggtaa tctgaattct cacagaaaat tgaagcatag 30720
cagtaaaggt tattctgtaa ctatgacact aacaatgcat atttttttcct ttcttctctg 30780
aaatgattta aaaagcaatt gcataaaata ttatatataa agcctattgt tgaacctata 30840
acatatatag aaatatactt gtaatatatt tgcaaataac tgcacaaaag agagttggaa 30900
caaagctgtt actaggctaa agaaattact acagatagta aagtaatata acagggaact 30960
taaaaataaa attttaaaaa atttaaaaat aataattaca acaataatat ggttgggttt 31020
gtaatattaa tagacataat acaaaaatac cacaaaaagg gaagaagaca atagaactac 31080
ataggaataa cattttggta tctaactaga attaaattat aaatatgaag tatattctgg 31140
taagttaaga cacacatgtt aaaccctaga tactaaaaag taactcacat aaatacagta 31200
aaaaaataaa taaaataatt aaaatgtttg tattagtttc ctcagggtac agtaacaaac 31260
taccacaaat tgagtggctt aacacaactt aaatgtattt tctcccagtt ctggaggcta 31320
aacacctgca atcaaggtga gtacagggcc atgctccctg tgaaggctct aggaaagaat 31380
cctcccttgt ctcttccagc ttccagtggt tctcagtaac cctaagtgct ccttggcttg 31440
tagctatatc attcctagca accagaaaga agaaaataat aaagattatg gcaaaaaata 31500
atgaaatcaa aaggagaaaa atggaaaaaa ataaataaaa ccaaaagcta gttctttgaa 31560
aagatcaacc aagttaacaa acctttaac tagactgaca aaaaggaggt aagactcaaa 31620
ttactagaat cagaaataaa agaggggaca ttactaatga gggattagaa aagaatacta 31680
cgaacaaatg tgtgccaaca aattagaaaa cttagatgaa atggacaggt tcctaggaca 31740
acatcaacta ccaaaattta ctcaagaaga aagagacaat ttgaatgagc tataacaagg 31800
gaagagactg aattgacaac caagaaacta tccacaaaga aaatcccagg cccagaagat 31860
ttcactgtga aattctttca aacttataaa tataaattaa catcagttct tcacaaactc 31920
ctccaaaaaa aagaacagat ctctatttac aggcgatacg atctttagaa aatcctaagg 31980
gaactactaa gacactatga taactgataa acaagttcag caaggctgca ggatagaaaa 32040
ccaatataca aaaatctatt atatttctat acacttgcag tgaacaaccc aaaaatgaga 32100
ttaagaaaat aattcaattt acaataacat caaaaagaat aaaaacactc aaaaataaat 32160
ttattcaagt aagtgcaaaa cttatactct agaagctaca aaacactgtt aaaagaaatt 32220
aaaggtttac ataaatgaaa aactatccca tgttcatgga tcaaaagact tattactggc 32280
aatgctctcc aaattgatct ataaattcaa caaaatcctt atcaaaatcc cagatgaggc 32340
tgggggtggc ggttcatgcc tgtaatccca gcactttggg aggctgaggc acgcagatta 32400
cctgaggtcg ggagctcgag atcagcctga ccaacatgga gaaaccctat ctcttctaaa 32460
aatacaaaat tagtcaggcg tggtggcaca tgcctataat cccagctact cgggaagctg 32520
aggcaggaga atcgcttgaa cccaggaggc agaggttgca gtgagccaag atcgtgccat 32580
tgcactccag cctgggcaac aagagcaaaa ttccatctca aaaaaaaaaa aaaaaaaatc 32640
ccagatgact tcactgttga aattgaaaag attattctaa aattcacatg gaattgcaag 32700
accttgagaa tagccaaaac aaacttgaaa aacacgaaca aaatatagga tgactcactt 32760
gccaattgca aatgttacga cacagcaaca gtaatcaaga ctgtgtggta ctggcaaaag 32820
acacatacat acatacatat caatggaata taattgagag tacagaaaca agcctaaaca 32880
tctatggtaa gtgcttttct atttttttct ttttttttt cttttttgta gagatagaat 32940
ctcaccatgt tgcccaggct ggtcttcaac ttctgggctc aagcaatcct cccactgtgg 33000
cctcccaaag tgctgggata actggcatga gccaccacat ccagcccaga tgattttcaa 33060
aaaagtcaac aagaccattc ttttcaacaa ataggtctgg gatgatcaga tagtcacatg 33120
aaaaaaaaaa tgaagttgga ccctccatca cactaaagtg ctgcgattat aggcatcagc 33180
caccacatcc agcccaaatg attttcaaaa aggtcaacaa gaccattctt ttcaacaaat 33240
aggtctggga taatcagata gtcacatgaa aaaaaaaatg aagttggacc ctccatcaca 33300
ccatatgcaa aaattaattc aaaaatgaat tgatgactta aacgtaagag ttacgactgt 33360
aaaactctta gaaggaaaca tacgggtaaa tcttaaagac gttaggtttg acaaagaatt 33420
cttagacatg acaccaaaag catgaccaac taaggtaaaa tagggtaaat tgtacctacc 33480
aaaatgaaaa acctttgtgc tggaaaggac accatcaaga aatggaaagc caaaatagcc 33540
aaggcaatat taagcaaaaa gaacaaagct ggaggcatca tactacctga cttcaaagca 33600
acagtaacca aaacagcatg gtactagtag aaaaacagac acatagacca atggaacaga 33660
ataaagaacc caaaaataaa tccacatatt tatagtcaac tgatttttga caatgacacc 33720
ccttcaataa atgatactag gaaaactgga tatcgatatg cagaagaata aaactagacc 33780
cctatctctc accatataga aaaatcaact cagactgaat taaagacttg aatgtaagac 33840
ccaaaactat aaaactactg gtagaaaaca taaggaaaaa cgcttcagga cattggtcca 33900

ggcaaagatc ttatggctaa aacctcaaaa acacaggcaa caaaaacaaa aatggaaaaa 33960
tagcacttta ttaaactaaa aagctcctgc acagcaaagg aaacaacaga atgaaaagac 34020
aacctgtaga atgggagaaa atatttgcaa actatccatc catcaaggga ctagtatcca 34080
gaacacacaa gtgactaaaa caactcaaca gcaaaaaagc aaataatctg gtttttatat 34140
gggcaaaaga tctgaataaa cattctcaaa ggaagacata caaatgtcac tatcattctg 34200
ccagtaccac actgtcttga ttacttgtta gtgtataaat ttttaaattg ggaagtgtga 34260
gtcatcctac actttgttct tgtttttcaa gtttgttttg gctattctgg gagccttgca 34320
agtataaaat agccaacaag tatgaaaaaa tgctcaccat cactaatcat cagagaaata 34380
aaaatcaaga ccactatgag atatcctctc actccagtta gaatggctac tatcaaaaag 34440
acaaaatata atggatgctg gcaaagattt ggagaaaggg gaactcctat acactgtggg 34500
tagggatgca aattggtaat ggccattatg gaaaataata ctgaggtttt tcaaaaaact 34560
gaaaatagaa ctaccatatg atccagcaac cctactactg ggtatttatc caaaggaaag 34620
aagtcagtat actgaagaaa tatatgcact ctcatgttaa ttgcaacact gttcacaaca 34680
gccaagacag ggaataaatc taaatgtgca tcaacagatg aatggataaa gaaaatgtgg 34740
catatacact caatagaata ctattcagcc attaaagaag aatgaaatcc tgtcatccca 34800
gcaacatgga tgaacctgga ggacattata tttaatgaaa taagtaaagc acaaaaagat 34860
aaacagtaca tgttctcact cagacatggg tgctaaaaag aaaatggggt cacagaatta 34920
gaaggggagg cttgggaaaa gttaatggat aaaaatttac agctatgtaa gaagaataag 34980
ttttagtgtt ctatagaact gtagggcgag tatagttacc aataacttat tgtacatgtt 35040
caaaaagcta gaagagattt tggatgttcc cagcacaaag gaatgataaa tgtttgtgat 35100
gatggatatc ctaattaccc tgattcaatc attacacatt gcatacatgt atcaaattat 35160
cactctgtac ctcataaata tgtataatta ttacgtcaac aaaaaaagga aaaaaaagaa 35220
aattaagaca acccacataa tggaagaaat aaaatatctg caaattatat atatctgata 35280
aatatttaat atttataata tataaagaac tcctacaact caagaacaac aacaaaacaa 35340
cccaattcaa aaatgggtaa aagccttgaa tatacactta tctaaagact atatacaatt 35400
ggccaataaa gacacgaaaa gatgctcaac atcactagtc atcagggaaa tataaatcaa 35460
aaccacaatg tagaatgtag acaccacttc atatgcacta ggatggctag aataaaaagg 35520
taataacaaa tgttggtaag gatgtgaaaa aatcagaaac ctcattcgct gctgttggga 35580
atgtaaagtg atgcagccac tttggaaaac agtctggcag ctcctcaaat tattaaatac 35640
agagttaccg tatgacccag gaatattcct cctgggtcta taaccaaaaa aatgaaaaca 35700
tatatccaca taaaaacttg tacatgggca tttatagcaa cattattcat aacagcaaag 35760
gtggtaagaa cccatatgcc catcatctga tgaacaggta aataacatgc ggtattatcc 35820
atacactaga atattatctg cccatacaag gagtgacatc cagctacatg ctacaaggat 35880
gaatctcgga aaccttatgc taagtgaaag aagccagtca caaatgacca cagattatga 35940
ttccatgcat cggaaatgac cagaataggg aaatctatag agacagaaag tagattagtg 36000
gttgggtggg gctgggagga caggtagtac actactttcc cagaactact ggaacaaagt 36060
accacaaact ggggagctta aacatagaaa ttgatttcct cacagttctg gagactagga 36120
ctctgagatc aaggtgtcag cagagctggt tctttctgag ggccctgagg caaggctctg 36180
tcccaggcct ctctccttgg ctggcaggtg gccatcttct ccctgcgtct tcacatcatc 36240
ttttctctgt gtgtgcccat gtccaaattt tgattggctc attctgggtc atggccaatt 36300
gctatgcaca aagtgaagtc tacttccaaa agaagggaag agggaacact gactaggcta 36360
aacttatagt cattttaatg tccgcttttc ctatgagatt gtgaacacac agaagtaggg 36420
tttttatcta cattgtgcaa agtttaataa gaaaaataga attcaagaga agcagttcaa 36480
tagcaggaat ttaatatggg aactaattac aaggtttagg gcaggactaa aaagccagtt 36540
gggatggtga gccaacccag agattagcaa cagtgggacc ccatctacct accacccatg 36600
aagctggaag gataaaggag gggctattat cagagtccac aagccagtgt cagagtcctt 36660
ggctggagct gggaccaccc tagagacact gtgcaaagca gaaaacaagg gggaaaaacc 36720
ctgacttctc ccttcctccc acctttcaat ctcccactag tgcttcctac tagccatact 36780
tggccagaga cagtgacaag gaacactgca aaatgaagtt tgtaggaatc atctccctct 36840
gagacagaga aatatggaag ggtagaaaat gaatcagagg ataaagagaa aaaaccctga 36900
gtactatctt atttatcttt gtatctccag tgcctaatct gtctctcaaa aaaggaaagc 36960
aattgagaga aactgaaaac tccaattgaa atgaaagaat ggagaattac tggactagaa 37020
gagaagagaa aaatttattc cgcatagagt aaacaagaat ggattcacaa aggacgtgat 37080
gaatgaaaag ctataatcag caaagatttg ccagagaaat taaaaagtgg taaactcagc 37140
cacgctgtac aacctgaagg cacaatgcat gaaaacgttt caagaaatga caagatttga 37200
agtcaaattc taagtgcttt tccagaatct ctcaagacga ttatatagct accccatttt 37260
attaaataaa atggaaactt actaaacttt ccccttgtat taaactaaca tatgtcctaa 37320
tagcaaacga ttctggaatt cctagagtaa aatatatttc gtcaaagtgt attgctcttt 37380
taatattctg ctgacctcct tttgctattt aggatatttg tatacacatc acacgtaaat 37440
ttggtctata gtttacatct acgggcttat actgttcttt ttttcatttt tttaaaattt 37500

ccaaccccca gtatccatat actgctctct atcagggtta ttttaacttt gtaaaatcag 37560
ctgagatgct ttccatgttt ttttttttta ttttctgcca catttgaata gcataggagt 37620
taccaccatc aaccttggat tatttaagca ttcacgattc cacgtgtgga ttttttattc 37680
agagtctttc ttgtcattcc tgctatcagc acagaaccca atctcagctt tccagctata 37740
ctctcacccc atggaatttg cagatgaagt tcaaaaggac ctttgcatta tcctgcctcg 37800
ccctcttccc ccttcattta gacatcacct tcttctagaa cgtcttacct gacatgccct 37860
gctcccaacc cctgctgccc aattgtgtgc tctcccgtgt cctggcctgc catcctcttt 37920
agtaattgcc tgctccctca tctgtctccc cacccagaca ttaagctgaa tagactggat 37980
ttgtgtcttg tccatcacta taatctcagc acctagtacc tagtaggtac ttaccatgta 38040
ttcattagca aaatgttatg tataaccttg caccttaaaa acaagagaag gaagacaaaa 38100
ttaagtctta agactatggt ttagaacatg gatcagaaac tacagtctgc agcccaaatc 38160
cagaccaaat gaagagacca tgttcattta catacaacct atagcagctt tcacactaca 38220
ggagcagagc taagtagttc caagggaaca cacggccctg caaagcctaa aatatttact 38280
ctatagctct tcacagaaaa agttttcaga tccctcgttt agaactcttg ttcatatgca 38340
atttcactaa accatagttt tttgggtttg tttggttttt tttggcaaaa aggaatgagc 38400
cgatccagaa aaggttgaaa agaatgaatc attactgctg aaagaatgtg cacacagtcc 38460
gtcagtattc tgctgccatg ctgacaccca tccaatagtg tcatgagatg cagcagctac 38520
tactgtgttc tcaatgccga gtccacccac tccataacca tgtccaagca atcttgggaa 38580
catcatcacc atgcttgttt atccttaagg tattgcctca catacagcag tggctggtca 38640
taaagtcaaa tgacactagt ggccaggagg tcaagagaat gagtgaggac aggtgggtag 38700
gcagcccagg ccctagcaac agcaggagct cacccctcag tcactctagc caggactgaa 38760
atacttttca ccctttcaag agagactagg aatctggatt tttatgtgaa atatcttgat 38820
tactaaatgt tgtcaacaga catgtcaaaa ggtaaaacta agtaagttca tggggcagat 38880
tgactattca ggttatagaa ttaaggattc ttatccaaca cagataccaa ccaaaaagct 38940
gacgtataac atattaggag aaactatgtg cactgtcgaa acatcaacaa ggggctaatg 39000
tctaaaatag tctatattgg attccagttg aaacatgggg aaaggacatg aacaggcaac 39060
ttatgtcaat ggaaactcaa aaagataaca agcatatata aaagcattct caaattcagt 39120
agtaaacaga cagatgcaaa taaaaagagg gaaactgctg ccgggcacag tggctcacac 39180
ctgtaatccc agcactttgg gaggccgagg cgggcggatc atgaagtcag gagatcgaga 39240
ccatcctggc taacatggtg aaaccccgtc tctactgaaa acacaaaaaa ttagccaggc 39300
gtagtggtgg gcaccagtag tcccagctac tcaggaggtt gaggcaggag aatggcatga 39360
acccaggagg cggagattgc agtgagccga gaccatgcca ctgcactcca gcctgggcga 39420
ctgagtgaaa ctccatctca aaaaatataa taataattat aattataata ataataaata 39480
gtaaataaat aaaaagagag agactgctaa agtctagaaa gttgaatgat gccaagcgca 39540
tgcaaagatc agggccttgg gatggccggg tgcagtggct cacgcctgta atcccaccac 39600
tttgggaggc caaggcgggc ggatcatgag gtcaagagat caagaccatc ctggccgaca 39660
cagtgaaacc cggtctctac taaaagtaca aaaaaatata tatatatata tatattatta 39720
tattatatat atatatatca gagccttggg aatccttgtg tgctgctggg gaaggtagtg 39780
gtgcagccac ccttgacagc aatctggcag tacttggtta tattaagtat aggcacacac 39840
cacgaccagg cagtcctact cctgggtcta aatcccaaag aattctcaca caagtccata 39900
aggagacatg tacgaggctc attcagcatt actgggagtg ggaatcaacc tgggtgtcca 39960
tctacaggag acgagatgga caaaatgtgg tggatattaa gaccagaatc accaagtaac 40020
agagatgggt ggtgagtgac aatcctaaga tacagaataa aggctagaac atgatgccat 40080
tcatgtaaat taaaaataga tgcacacaaa gcagtatacg cgtgaccctt gaatagcaca 40140
ggtttgaact gcctgtgtcc acttacatgt ggattttctt ccacttctgc tacccccaag 40200
acagcaagac caacccctct tcttcctcct ccccctcagc ctactcaaca tgaagatgac 40260
aaggatgaag acttttatga taatccaatt ccaaggaact aatgaaaagt atattttctc 40320
ttccttatga ttttctttat ctctagctta cattattcta agaatatggt acataataca 40380
catcacacgc aaaataaatg ttaattgact gtttatatta tgggtaaggc ttccactcaa 40440
cagtaggctg tcagtagtta agttttggga gtcaaaagtt atacacagat tttcaactgt 40500
gcaggcaatc agttcccctg acccccctcat tgttcacggg tcaactgtat atacacaaaa 40560
gtattatatg aacctcatta gaatagctgt ctatagggag aagagaatga gagtgggata 40620
aaacggaatg aacaaataaa ccaacaaatg cattaacaag caaaacaaca gaggggcttg 40680
catgggccag tgatgataaa gggctaagaa tgagaatata attaattcaa ttcctcacac 40740
ctgaggtcta aaaccaagga aagggagggc caggcgtgga ggctcacgcc tgtaatccca 40800
gcactttggg aggctgaggc gggcggatca caagattagg agtttgagat cagcctggcc 40860
aacacagtga aagcccatct ctacaaaaaa tacaagaatt acccaggtgt ggtggcacat 40920
gcctgtagtt agctactctg gaggctgagg caggagaatc acttgaaccc aggaggcgga 40980
ggttgcaggg agccgagatc acaccattgc actccagcct gggtgacaga gtaagactct 41040
gtctcaaaaa aataaaaaaa ataaaaaaac agagaaaggg aggaaactag atccaggctg 41100

actagataca gcctttagag ttagaaaaga tgatttgaca atctaagccc acactcagat 41160
tgaatgaaat tgaaaagcct ttcaaactaa aacatttaat tacaccatct gctgcagaca 41220
gaactcagac aactcaaaca ggtaatgtca gcgtggtgtt ttatatcacc accctcaaca 41280
cagaataaaa atcagctgca tgtgaagcag tgactagaat gaagaaaagg ctgcttctta 41340
cttccttcta gtggttcttt ccgaaaacat taataggcac cagctctatg catgtcaccc 41400
tgcagggaga catggggtat ataactatga cttactgttc attcctcaag gaattcccaa 41460
tcttgtggaa gattatacac aatgaggcaa caaaaactat ccaataaaac cacggaaaag 41520
aagccagtga caaagaagcc agtgatgaaa ggccctgtga gcagagctga tggccatttg 41580
gggaagaaag accaacatgg atgggggtga tcagggtggc tccgtgggaa agctggaaga 41640
gaagtggcag atctctgagc tggatgatgg gccactacca tctgtatatg gctaattaaa 41700
gaccatgtgt ggatttttta ttcagctctt tcgtgtcatt cctgctatca gcacagaacc 41760
caatctcaac tttccagcta tattgagcta aacttctcac ctcatggaat ttgcagataa 41820
agttcaaaag gatccttgcc ttttcaaaat aattttgaat ggttgagtag tccctctgtg 41880
ctctctcact gacaccctct caaggctgct gagcacgtgc catgctatgg ctttctccaa 41940
catcaggaaa tgttctccac tcagtttcac cttaatacaa atgtgttctc tcttcagaga 42000
aggcaaaaaa attcatgacc atctgactgg gagaagtcat ttctaggtaa agtgtccatc 42060
tttttctgag gaacacagga ggaaaatctt acagaaaaga gttaacacag caggcctaag 42120
actgcttttt aaaataaata aataaataaa taaataaata aataaataaa taaataaata 42180
aataaatgaa tgatagggtc ttctgtattg gccaggctag tctcaaattc ctggcttcaa 42240
gagatcctcc caccttggtc tcccacagtg ttgggattat agacatgagc cattgtgctt 42300
ggcccaagac tgttattctt aaaaagtctc ataaaaagca tggttaatcc ttggctggca 42360
cctgggaact tagatttcag aagggttccc accatccaac ctggaaagag ggactcactg 42420
tgcctaaatt attgtgtggt ttatgctgaa ctcctgcttt tcttcaggta gcgtggaatg 42480
tggtatgtgc tgggcaaagg gggcctgcat gaccagcccc caataaaaac cctgggtgtt 42540
gggtctctag tgagtttccc tggtagacag catttcacat gcgttgtcac agctccttcc 42600
tcggggagtt aagcacatac atcctgtgtg actgcactgg gagaggatgc ttggaagctt 42660
gtgcctggct tcctttggac ttggccccat gcacctttcc ctttgctgat tgtgctttgt 42720
atcctttcac tgtaataaat tacagccgtg agtacaccac atgctgagtc ttccaagtga 42780
accaccagat ctgagcatgg tcctgggggc ccccaacaca gaaataaatt ataaaagacc 42840
aaggactggg catggtggcc catgccggta atctcagcgc tttgggaggc cgaggcagga 42900
ggaccagtta agcccaaaag ttcaaagtta cagtgaccta tgactgcgcc aatgcactct 42960
aacctgggag acagagcaag accctgtccc caaaacaata aactaaacac atacttctgc 43020
cttccaagtg tcttaaaatt caatggaatg gtagaaacat ttttaaaaca ctaaatcaaa 43080
agaaacctgg aaaacaagag tgccgatggc caactaaaat gtctaggaaa tttctgaaaa 43140
gtaaaaagta ctcagaacca gattacctga gcaaaccata gcccaataca agcttgggag 43200
gaggctgtta tgcagaagga aatggtaaca ggtttccagg aacagacttg taacagcaga 43260
tagaacagca gaggtagaac ctgacaaggt gattacctgg ggaactgcag tctgaatgac 43320
caggactgtt ggacccttcc cctcacatgg aatacacacg ccactcagca gcacaccaca 43380
gctcttcaac aatcacagga ggcacgctac gcctagtaag acaggaaaaa aggaattctc 43440
aaacttcgaa gatgaacaca taaagaatca ccaagttttt attcagtatg atgaaacagg 43500
gacactgaat caacagaaca caaacccaag caaagataat tactagagca catagaagaa 43560
attattagat attcttggga agacctaagg ggacattata aagagcaagc agttggtatg 43620
tgacgatctt tgtgatatac caagaaataa aaacacagga tgaagaccag atagagaata 43680
atgctactat ttgtgcaaaa aaggagaaat ggagaatctg attcatattt gcttgtattt 43740
gcatgaagaa actttggaag gtacataagt aactaacaac aatggttacc tacttgtaag 43800
gcgagagaag taagaggaca ggaatggtgg gaacaccttt tgtgtccgga attggtgggt 43860
tcttggtctg acttggagaa tgaagccgtg gaccctcgcg gtgagcgtaa cagttcttaa 43920
aggcggtgtg tctggagttt gttccttctg atgtttggat gtgttcggag tttcttcctt 43980
ctggtgggtt cgtagtctcg ctgactcagg agtgaagctg cagaccttcg cggcgagtgt 44040
tacagctctt aaggggggcgc atctagagtt gttcgttcct cctggtgagt tcgtggtctc 44100
gctagcttca ggagtgaagc tgcagacctt cgaggtgtgt gttgcagctc atatagacag 44160
tgcagaccca aagagtgagc agtaataaga acgcattcca aacatcaaaa ggacaaacct 44220
tcagcagcgc ggaatgcgac cgcagcacgt taccactctt ggctcgggca gcctgctttt 44280
attctcttat ctggccacac ccatatcctg ctgattggtc cattttacag agagccgact 44340
gctccatttt acagagaacc gattggtcca tttttcagag agctgattgg tccattttga 44400
cagagtgctg attggtgcgt ttacaatccc tgagctagac acagggtgct gactggtgta 44460
tttacaatcc cttagctaga cataaaggtt ctcaagtccc caccagactc aggagcccag 44520
ctggcttcac ccagtggatc cggcatcagt gccacaggtg gagctgcctg ccagtcccgc 44580
gccctgcgcc cgcactcctc agccctctgg tggtcgatgg gactgggcgc cgtggagcag 44640
ggggtggtgc tgtcagggag gctcgggccg cacaggagcc caggaggtgg gggtggctca 44700

ggcatggcgg gccgcaggtc atgagcgctg ccccgcaggg aggcagctaa ggcccagcga 44760
gaaatcgggc acagcagctg ctggcccagg tgctaagccc ctcactgcct ggggccgttg 44820
gggccggctg gccggccgct cccagtgcgg ggcccgccaa gcccacgccc accgggaact 44880
cacgctggcc cgcaagcacc gcgtacagcc ccggttcccg cccgcgcctc tccctccaca 44940
cctccctgca aagctgaggg agctggctcc agccttggcc agcccagaaa ggggctccca 45000
cagtgcagcg gtgggctgaa gggctcctca agcgcggcca gagtgggcac taaggctgag 45060
gaggcaccga gagcgagcga ggactgccag cacgctgtca cctctcactt tcatttatgc 45120
ctttttaata cagtctggtt ttgaacactg attatcttac ctatttttt ttttttttt 45180
tgagatggag tcgctctctg tcgcccagac tggagtgcag tggtgccatc ctggctcact 45240
gcaagctccg cctcccgggt tcacaccatt ctcctgcctc aacctcctga gtagctggga 45300
ctacaggcaa tcgccaccac gcccagctaa ttttttattt tatttttttt ttagtagaag 45360
cggagtttca ccatgttagc cagatggtct caatctcctg acctcgtgat ccatccgcct 45420
cggcctccca aagtgctggg attacagacg tgagccactg cgccctgcct atcttaccta 45480
tttcaaaagt taaactttaa gaagtagaaa cccgtggcca ggcgtggtgg ctcacgcctg 45540
taaccccagc actttgggag gccgaggcgg gcggatcacg aggtcaggag atcgagatca 45600
tcctggttaa cacagtgaaa ccccgtcgct actaaaaata caaaaaatta gccgggcgtg 45660
gtggtgggca ccggcagtcc tcgctactgg ggaggctgag gcaggagaat ggcgtgaacc 45720
tgggaggcag agcttgcagt gagccgagat agtgccattg ccttccagcc tgggcgacag 45780
agcgagactc cacctcaaaa aaaaaaaaaa aaaatagaga cccggaaagt taaaaatatg 45840
ataatcaata tttaaaaaca ctcaagagat gggctaaaga gttgacggaa caaatctaaa 45900
tattagattg gtgacctgca aaaccagccc aaggaacatc ccagaatgca gcccataaag 45960
ataaagagag catttccgct gggcacagtg gtatggcagg ggaattgcct gagtccaaga 46020
gttgcaggtc acattgaacc acaccattgc actccaggcc tgggcaacac agcaatactc 46080
tgtctcaaaa aaaaaaaaaa ttaaattaaa aaagacagaa tatttgagag aaaaaaatgc 46140
ttatttcaag aaacatgaaa gataaatcaa gatattctaa ttcccaagta agaataattc 46200
cagaagcaga aaatagaata gaggcaagga aacactcaaa acttctccag tgccatagaa 46260
atgtgtatta atctttagaa tgaaacggac taccaaatgc tgagcaggaa gaacaaaaga 46320
gatccactct taagccagtg tggtgcccaa gcgcagtggc tcatgcctgt aatcccagca 46380
ctttgggagg ccgaggcagg tggatcacct gaggtcagga gtttgagatc agtcaggcca 46440
acatggtgaa accctgtctg tactaaaaat acaaacatta gctgggtatg gtggtgcaca 46500
tctgtaatcc caactacttg ggaggctaag gcaggagaat cacttgaaac caggaggtgg 46560
aggttgtagt gagccgagat catgccacac tcccagcctg ggtgacagag caagattcca 46620
tctcaaaaaa aaaatccact cctagacaaa taatagttaa attttagaac accaaggaga 46680
aagaaaaaaa attgtaaagc ttcagagaaa ataaacatta actacaaaga aacgagagtc 46740
agacgcgtgc acttcttcct agataccagc agataaagca atatctccaa aattcagaag 46800
gttttaacgt agaatcctat acccagtcaa gaatattcac atggaaaagt gaaataaaaa 46860
acattgttta aacatgcaag ggttcagaaa gtttaccatt cacagaatcc ctgaaaacaa 46920
aaccaaataa tcacttaagg actcattaag aaaacaaatg aaataaaagc accaatgatg 46980
agtaaataat cagaaaaatt tacagtttac ctaaataact gtttatgcat aatgtatgaa 47040
aacccaaaaa tttaatatgg gacagaatta aaatcatgat aagattcttt tttgctttac 47100
tcatggagag ttcacataaa cagattatct tttaatagca agagaaaaaa atgtttagat 47160
atgtgtgaaa aactaagggt accaaaacag tgcaaattca tttatcatca ggaaaatcca 47220
aattaaaacc acagtatcca ccagaataac taaaaggtaa aagacagaaa ttaccaagag 47280
ttggcaagaa tgtggagcaa ccacatatac ttctggggta aataagttgg tgcaaccggt 47340
actgaaaact gtttgctagt atctactaaa accgagcaca tgcacagact acaaccaagc 47400
agttccactc ccagatacac actcaacaga aatgcacaca ctcactcaac aaaagacgtg 47460
tactagagtg ttcatgtact tactattcat aatagtccaa aaatgcaaac aaccaactgc 47520
caatcaaagt caaatgtata tctatattag ggatatatac aatggcatat acacagcaat 47580
gagaatgaaa tgaaccagct cggcacagtg gttcatgcct gtaatctcag cactttgggc 47640
gggtaaggca ggcagatcac ttgaggtcag aaatttgaga ctagcctggc caacacggtt 47700
aaaacctgtc cccactaaaa acacaaaaat tagccgggca tagtggttgc aggcctgtaa 47760
ttccagctac tcgggaggct gggttgggag aatcgtttga acccgaaagc cggaggtcgc 47820
agtgagcgga gatcgtgcca ctgcactcca gcctggacga tagagcaaga ctccgtctca 47880
aaaaaggaaa tcaaaaatat aaaataagat gacaggaata atccgcaaaa gatcagtaat 47940
caaaataaat ataaatgggc taaagctacc tattaaaaga caaagatttc acacccataa 48000
ggatagctac tatcaaaaaa agagagagaa taacagatgt tagcaaggat gtatggaaac 48060
tgaaattctc acgcattgct ggtgagaata taaaatggtt cagcctctgc ggaaaacact 48120
atgctgggtc atcaaaaaat taaaaataga agtactactt gatccaacaa ttctacttct 48180
gggtatatac ccaaataact gaaagcaggg tcttgaagag atatttgtac acccatgatc 48240
atggcagcat tattcataat agctatgatg tggaaccaac ataaatatcc tttgataaat 48300

atatggataa gcaaaatgtg gtgtatacat tcaatggaat attaattagc aataaaaatg 48360
aagaaaattc tgacacatgc tacaacatgg atgaaccttg agggcattac attaaatgaa 48420
ataagccagt tataaaaaga caaatactat atgaggtact atattagata ctcatgcaag 48480
gtacctaaaa taggcaaatt catagagaca aaaagcagaa tggtggttgc caggggctgc 48540
ggtaatggat acagagcttc aattttgtaa gatgaaaaaa ttctggagat tggttgcata 48600
acaatgtgca cacacttaac actggggaac tgtaaactta aaagtagtaa atggtaaaaa 48660
taaaaataat aaataataaa ttttatgtta ttttaccaca atatttatta aaagacaaag 48720
attaactaat taaacaaaat ccagccataa gctaatggta agagtaacaa ttaaagaaga 48780
cacagaaaat tgaaaatcag tgactagaaa aagatattcc atataaatgc taacaaaaag 48840
caagtacagc aatataaaga gaatgaacaa aaaaaaaatt aaataagatg gctcgtttat 48900
tcccaaaagg tacaattcac caagaagata caagaattgt gaacctttaa gcacataaaa 48960
cagcttcaaa aatacaacat ttaaagaaaa atatatatta aacatagaaa tagtacaaaa 49020
acccctacaa gaatcataat gggagtcttc aatacaactc tccatatcaa caggtcaaac 49080
agagaaaaaa aataagttaa ggatgcagaa aacctgaatt accatcaata aacttgagat 49140
taatatagaa ctgtataccc aatatactaa gagttcaggg aacagtcgtg actgacagtg 49200
gactgcaaat taatctgttc ttaatctttg tttttctttc agcactgtgg cagaatagag 49260
atcctaaaaa ccttccagct acaaaacatc tttttaaaaa tataaaaaaa tacaaaaata 49320
actctgaaat caatagaaga cacatggtga aaccaaaatt ctagaatata gggagaataa 49380
aggcattttc agatattaca aaaacagaaa attgatcatt gctgaagtaa tttctaaaga 49440
atgtacttga gggagaagaa aaatgttcca aagaaaagta tctgtgatac aagaaggaat 49500
ggaaagtgaa gaaatggtaa acaggtagat aaagctaata aatgttgacc tagaaaataa 49560
caaaaacaat agcaataatg tctcgttgga agggttgaag taaaaataca attaaggcca 49620
aatgtgaggt aagtggaatg aaagaattag aagtccttgc cttgttcaca ggactgatta 49680
aataaatgag ccaggttttc cattcaaaca gttaaaactt gaacaaaata aactcaaatt 49740
aagtagaaag ataaaaaaca gaaattaatg tcatagaaaa ataaaaaatc aatagaatta 49800
atcaataaat cctggttaat aaaagctggt tctttgaaag gattaataaa ataatcatta 49860
agcaagtctg atcaaaaaaa aagagaaaag gtaccaaaaa aagtactgta tcagaaagag 49920
aacatacaga tacatacaga tatgtaagag tctgttttct tacaccagaa tactatatac 49980
aacattatgc tagcatatat taaatttcaa taatgttaat gattttctag gaaaacagaa 50040
aatattaaat ttactttgaa gaaacagaaa aactgagaaa aataaatgat catgaaaaaa 50100
atgaaaaggt aattaaatac tgatattaac tgcctaaaca acaccagcag cagcccaggc 50160
agtctgcagt caagttctgc caaacttgag ggaacagata attcttctat tccagagcat 50220
agaaaatgat ggaaagtttc ccaatttaat cagagaggac agcctgatcc ttgttatgaa 50280
cacagataaa aatggggtaa actatatgcc aaactcagat accaaaaccc taaataagat 50340
gctagcttat tgatgtgaac aatccaaaag tgcattttaa attagcccag ggttttagag 50400
aaagaaaatc tagcaatgtg accaccactt atgttaacaa ttttaagacg aaaatctaca 50460
tgatcatatc aatgcatgct acacaaaagc atttgggcaa aaaacccaac acccaccctt 50520
gacttttta actcttagta attaggcata aacagaaatg tacttaatgt gatagaatac 50580
actcggtgaa gatacagagg gaatgctccc taaaaccaag cccaagacaa agattcctat 50640
ttaacctcaa tagtcaacac tgcagcgaga gtaatctatg gaagacaagg aaaaaagtaa 50700
aaacatgaga gacatctgtt gtttaacaga caataagatc acctacttgg aagaggcaaa 50760
cgaatcaagc gaaaaactat taaaactgag acaggcttta gtatggaggc tcagcttcag 50820
ctgtagtttg ggctaccaaa ttcaactcgc ttgcttggag agttaatcct gcaaagctaa 50880
tttctgttga ggtattagga ttgacaagcc tgtgctcctc cctcctcccc catcttcaac 50940
actgaaataa cacggtgttt ggaactggat aacagaatct tccaaaaaca aaaattgtcc 51000
tgaagggctg acttgtgccc ttactcaaaa aacactttat ctgctgcctg cagctcctac 51060
agttgctggt ggataagcct gccaaccagc tcggcgtaat tcttcctgca gagggcaagg 51120
aagagcactt tcacaggaaa attttttcc gaactgtatg ccgcttatta cataaactta 51180
cgtgctggca aatggagctc cagcaaaata agatattcag agtcaaactt ccttaggaaa 51240
aaaaaaaaaa aaaagcaagc acataacact aatttccttg catgggcact ggggaaggag 51300
gtcgttactt ccgcacgccc gcaggtccgc accaccggga aacccacggg caccgcgcgc 51360
tgccccgggg ccttccaggt gcactgcgcc gcggcgcccc agctgacccg ggatgcgcag 51420
ccctagccct tcccctgtca ccccggccag gaaggggcgg gagcgcggcg gacgccgagg 51480
gcgaagggct tctcggtcct ctgcaccacg cagcaccccc aaggcacaac agggagggtg 51540
cgggaggctc ccgagaccca ggagccgggg ccgggcgtgc ccgcgcacct gtcccactgc 51600
ggcgagggct ggggtcgcct ccagggccgc agctgtcggg agccacctgg ctctcagtcc 51660
cgggtccctg cgacaaccct cgggcccgga ggggaggagg cggccacctg ccgctgccac 51720
ctgcggcacc ggtcccaccg ctccgggccg ggcaggacag gccaggacgt ccctcctggg 51780
ctggggacag gacacgcgac gaggggaccg gggccccccgc ggcgaagacg cagcacgcct 51840
tcccagaaag gcagtcccgt gcccccacga cggactgccg gacccccgcg ctcgcccgcc 51900

catcccttca gaccacgcgg ctgaggcgca aagagccggc cggcgggcgg gctggcggcg 51960
cggctagtac tcaccggccc cgctggctca gcgccgccgc aacccccagc ggccacggct 52020
ccgggcgctc actgatgctc aggagaggga cccgcgctcc gccggcgcct ccagccatcg 52080
ccgccagggg gcgagcgcga gccgcgcggg gctcgctggg agatgtagta cccggaccgc 52140
cgcctgcgcc gtcctccttc agccggcggc cgggggcccc ctctctccca gctctcagtg 52200
tctcatctcc ctatctgctc atcctctggt cgcacataat cgatgtttgg gcgtcccaag 52260
ccagatgtgg accccatttc cgcactctac actggaggtt ttctaagggt ggtgcccgga 52320
ccagcagctt cagcctcatc tgggaacttg agaaaatgca gattctccgt cccacccagc 52380
ctattcggtt tttcctgcac taaaaccatg aaggtggggc ccagcagtcc acattctcgc 52440
aagcccgtca agtgattctg aggcgccctc cagtttgaga gctatgctca cggcctcacc 52500
tccgccccgc aaggagcccg gtcttgcctg tggcgctagc cgcacacgga cacctcatcc 52560
tgcggggccc gccccccccgc tgcaccctca ccgcccaacg cctcctccgg gatgcagcgg 52620
aggcgcctgg aagtcggcaa ggtcaacatc cccctcagca tcttccctac cctcacggct 52680
cctcctccag gggtgcctca tggccagggg ttagaaagag ccactgtgtt tcttgacatg 52740
gaagtggcct aagaccttaa tgaaaactgc aggagtggaa tgacagaacc tttggtcata 52800
cttgagggcg tgaagctcaa atgaggagga aggaaaggat ccagggagaa taaccaaccc 52860
tggcaagttg tggcgcccag gtagaggggc gagcctaggc tagcggttct cgaccagggc 52920
cggtgttgcc cctcctcgcc gccccgcgta catttgggga ggtctggaga catttttggt 52980
tgtcatgatg cgggagttgc tactgttgcc taagtgggta gacacgaggg tgctcctcaa 53040
catcctacct gaaggacagg actgccccac aaggaagaat gatccggccc caaataagaa 53100
accctgggct ggtcagcaac aacccctttg ttctgagaag agaggaggaa agaataaaag 53160
aagtggggtg aagttttggt ttggtagagg aaacttgaag acattttcac tggaaaggaa 53220
gagaggaaga ggagggagat gtctgtaagg acgagcaaac cgggtgacag ctgatttcct 53280
catattgaag taatgagtcc tagttataat aaattcctaa taaaaaccca gtttatccct 53340
gcaataaact tgtcttttt ttttaaatat actgcttgat tctgtttgct aatattttat 53400
ttacaggctt tgcattgata tgcaaaaatg agatgggcaa taattttctt tttgaatgtc 53460
taatgttgtt tggtttcaga atcaatgtta tgctcacatc ataaaaaatt tggaaccgag 53520
gcaggaggag tgcttgaggc cagaagttcg agaccagtct aggaaacaca gtgagacccc 53580
cccatctcta caaaaaaaaa aaaagaaaaa aaaatgggca tgtttgcttt ttccttttac 53640
tctgaacaat ttaaggagca ttaaaattat ctattctttg aggtttgatc atttcccagt 53700
taaaaatgtt cctcccagcc tgatgctttc tttggggagg gtaaatcttt taaggctaga 53760
aaagtttctt ctgtggcaat tttattattt acattttaaa aattattcta gagttaattt 53820
tgataaagca tgtatttctt aaaacaaatt atcctttttt tccagatgtt caagtgtatt 53880
tgcataaagt tgaggaaagt agtcttttgt gaatctttta acttctccca aatatcttat 53940
tttgtgtatt tttgcttctt tattttgtta acttttaaaa gtgtattttt ttttcaaaga 54000
atcagctctt aggtttatgt ttttggttat actggagctt ttttcttctt ctttttaaaa 54060
tatttttct cctttatttt ttagacgtat tttgatctaa cgtaatcgga agaaggtaaa 54120
ttagaatctt ttgttactat tgtgttttta tttctcctta tttctctgaa gtcctgcttt 54180
ataaatagta ccatgttatt tgtgcataaa tattcatttg tcttatattc ttgggaattt 54240
tcccacttca tcataaaatg accttccttg tctcatttaa tgtgttcaaa ctttgccctg 54300
aatttaactt tgtctgatat tttaccatcc tgctgaattt tgtttgttac cccaaacaac 54360
ctttgctgtt ttcgtctttt ctgaaccctt tattttaggt aatcccttga attagagcac 54420
taagttttgc tttgtgatta aatctgaaaa tctttatctt gccatagatg agttgagccc 54480
tattcatgtg acagctatat tatgctgttt catagccctt ttggtccttt tttcactctt 54540
gcattgcata ttttgtgttt attgtgtttt gtgtttcttc tgataatttg gaaggtttgt 54600
atttttattc agggagttgc cttataatca tactccgcaa tacacatcgt cctcagtttc 54660
ttcagactgt ctgttaactc cctattctga ataaaaatga cattgtaatt tccctctttt 54720
ttctttaccc cttttcttct cctcacctaa tgtaaatgat tttatccttc tttagtattt 54780
gctttttaa ttaactacat ttataaatat ctttatcact tgatttttaa atcagctttg 54840
aatgagatat ttggattcct agatataaaa gatgttaatt ataccatttc cacgttagta 54900
ggtttataaa atcatacatt ctgctgtgta accataatcc cacgtttgtt ttagttccac 54960
tcctacagtt aaaagattca gaagtattat taacagttat tttgccatag ttttttcccc 55020
aacccatttt gtggtaagtt atgatcctgc tttagtttct taagaataat ttatagagca 55080
gagtgtggtg gctcacgttt gtaatcccag cactttggga gacaagaggt agaaggatcg 55140
cttgaagcca gcagttcaag accaccctga gcaacatagt gagaccttgt ctctacaaaa 55200
aattttaaaa tttagccaga cgtagtggcg tgtgcctata gtcccagcta ctcaggaggc 55260
tgaggcaaga ggattgctag agcccagaag tttgaggctg cagtgacctc tgattgtgcc 55320
actgcacccc agtctgggca agaaagtgag aacctatctc tttaaaataa caataataac 55380
ttatgaaaat tatattccct gagtttttca tgtttaaaaa tatttgttgc ctttatcctg 55440
taaaagtttg agtataaatt cttgggttat actttattta ttgaagaatg tataagtatt 55500

gtcttctaga attgagtgtt gctgtaatga aaccagaagt cagcctggtt tatttttcct 55560
cagaaatgag gtaattgccg gccggacacc gtggctcatg cctgtaatcc caacactttg 55620
ggaggccgag acaggtggat cacgaggtca ggagattgag accatcctgg ctaacatggt 55680
gaaaccccgg ctctactaaa agtacaaaaa gttagctggg catggtggtg gacgcctgta 55740
atcccagcta cccgggaggc tgaggcagga gaatggcgtg aacctgggag gaggagcttg 55800
cagagagctg agatcgcgcc actgcactcc agcctgggcg acagagtgag actccgtctc 55860
aaaaaaacaa aaaaaaaaca aagaagtgaa gtaattgcca tgatgctcca agaattatct 55920
ctttgtctat gaaatccaga aatctcactg ttatacattt tggaattatt attctgggcc 55980
aatatttcct gggacacaat agattgactc tatagattta attttttttt ttttttgag 56040
acagagtctc actgcaatct cagcttactg caacctctgc ctcacgggtt caagcaattc 56100
tcctgcctca gcctcccaag tagctgggac tacaggcgcg tggcaccatg cctggctaat 56160
ttttgtcttt ttagtagaga cagggtttca ccatgttggc caggctggtc ttgaacgcct 56220
aacctcaagt gatccacctg cctcagcctc ccaaagtgct gggattacag gcgtgagcca 56280
ccatgcccag cctcaattcc tctttctatc tggtaatttt tctgaagttg aaaacatttg 56340
ttctaatacg ttatttcagt gttcttctaa gatgtgtaaa gcaccctatt cccaggtcag 56400
cccccatctt gctagtgagc tcggctggtt cttcacaaga gctctggttt tctcctgctt 56460
aatctcaagt acctctgtca gcctccacct ggtttatgat ttggagtttt ttggtttttg 56520
ttttttgttt ttgacagagt cttactctgt cacccaggct ggagagcagt ggcataatct 56580
cagctcactg caacctctgt ctcccaggtt tgagcgattc tcctgcctca gcctactgag 56640
tagctgggat tacaggcgcg tgccaccaca cccggctaat ttttgtattt ttagtagaga 56700
tggggtttca ccatgttggc cagggtggtc ttgaactcct gacctcaggt aatccacctg 56760
cctcagcctc ccaaagtgct gagattacag gcgtgagcca ccgcgcctgg catggtttgg 56820
agttttaatc tgtagtttta ataaagatag tgcttatgtt tgtgtttctt atatttcttg 56880
gtactcttgg gtaatttgta agatccccat atctacacaa gaagtccatt ttcaattctt 56940
ttcttcagac tgtttatttt attttatttt attttatttt tatgtttgag atggagtctc 57000
gctgtgtcac ttctggaggc tggagtgcag tggcgcgatc tcaggtcact gcaacctccg 57060
tctcccgggt tcaagcaatt ctcctgcctc agcctcccga gtagctggga ttacaggcac 57120
ctgccacttt ttaatttttt tagagacaga gtctcgcttt gttgaccagg ctggagtgcg 57180
gtggtgcaat catggctgac tataacctcc aaatcctggg ctcaagtgat cctcctgcct 57240
cagcctcctg agtagctggg actacaggca catgccacca tgcccagtta attttaattt 57300
ttttgtagag acagggtctc catatgttgc ccaggctggc ctcctactcc tggcctcaag 57360
taatcctcct acctcagcct cccaaattac taggattata agcatgagcc accatgccca 57420
gccttgttct actactttaa tttcatatgt taggtgacca tgtaattgat catccaaacc 57480
aggatactgt aagaatgaaa gaggctgaca gtagtatgat gctgggacta gcattgtgca 57540
ctgagattat ttctgggaaa gcaggagata cggtcaccct acttatagtg tgcttgtctt 57600
tggattgttg aatttggagt ttctatttgc aggcttattt caactgggca gccttgatcc 57660
gccctgccca gcaatgctac cgttctctcc accgggtctc tgggacccct tcagtcacta 57720
tacttagctc agttccccac cctcccactc cctaaaagcg taaccaggaa tcctgcctca 57780
ggtctactgc cgtcttccgt gggctgtttc agttcctatt acccagagtc aaactcccag 57840
cattccctac ctgattccag acttggagtc cagagcttta acctcttcag gccaactccc 57900
cactttgcat ttctgtccct atatcttagt ccatggagat acatttcatg tctttgagtc 57960
tacttacaaa gtaaattttg ctgtttttta attttttttt tgagatggag tcttgccctg 58020
tcacccaggc tgtggtgcaa tgacgccatc tcggctcact gcaacctccg cctcctgggt 58080
tcaagcgatt catctgcctc agcctcccaa gtagctgtga ttacagacag gcaccaccac 58140
gcccagctaa ttttttttat cttttagtag agacagggtt tcaccatgtt ggccaggctg 58200
gtcttgaatt cctgacctcg tgatctgccc atctcggcct cccaaagtgc tgagattaca 58260
ggcgtgagcc actgtgccca gccaattttg ctttttttat atttcattgc tatatgttta 58320
gaggataagt ttacagtgct atatgcattc ccaaatatta gaccaaaaaa atctccaaaa 58380
aattagaaag aaaatccaaa aaatctcaaa aaataccaaa aagcaacaat ctcacagacc 58440
atactcactg acccccaata aaataaaatt agaaattaac cacaacttaa caaaataaag 58500
tactcaagtc agagaggaaa gaggaaataa acatcaaaat tacaaagtct aggcggtggc 58560
tcacgcctgt aatcccagca ctttgggagg ccaaggcggg cagatcacaa ggtcaggaat 58620
tcgagaccag cctggccaat atggtgaaac cccgtttcca ctaaaaatac aaaaattagc 58680
caggcatagt gatgtgtgcc tgtaatccag ccacttggga ggctgaggca ggagaatcac 58740
tgaacccagg gagacgaaga ttgcagtgag ccaaaatcgt gccactgcac ttcggcctgg 58800
gtgacaaagc gagactccat ctcaaaaaaa aaaaaattac aaactcttta gatagaaatt 58860
ttggtgtttt tttttgagac ggagtctcac tctgtcgcag aggctggagt gcagtgggac 58920
tatgtcagct caccgcaacc tccatctcct ggattcaagc aattctcctg tctcagcctc 58980
ccaagtagct aggattacag gcgcccacca ccagacccag ctagttttta tatttttagt 59040
agagatggtg tttcaccatg ttggccaggc tggtctcaaa ctcctgacct caagtgatcc 59100

acctgcttca gcctcccaaa gtgctcagat tacaggcgtg agccaccgca ccccacctag 59160
atagaaattt caacatgagg ccgggcacaa tggctcacgc ctgtaatctc agcacttcag 59220
gaggctgagg cgtgggagga tcacttgggc ccaggagttc aggaccagca tgggtgacag 59280
agacagaccc tgtctctatt tatttgaaaa aaaaaaaaaa aaagagagag agaaagaaat 59340
ttcaacatga aaagtatctc tcaaaccctt cgagatgttg gcaaaaagcg actcaaagga 59400
aaatgtatta ctgtgtgtga atttgcttga aaataagaaa gaggccgggt gtggtggcta 59460
acacctgtaa tcccaacact ctgggagtcc gaatcaagtg gatcatgagg tcaggagatc 59520
gagaccatcc tggctaacat ggtgaaaccc tgtctctact aaaaatacaa aaaattagct 59580
aggcgcggtg gctcatgcct gtaatcccag cactttggga ggctgaggca ggtggatcac 59640
ctgaggtcag gggtttgaga ccagcctggc ctacatggtg aaacctcgtc tcttctacaa 59700
atacaaaaat tagctgggcg tggtggtggg tgcctgtaat cccagctact cagaggctga 59760
ggcaggagaa tcgcttgaac ccgggaggcg gaggttgcgg tgagccgaga tcgcaccact 59820
acactccagc ctgggcaaca gcctgggtga cacagtgaga ctccatctca aaaaatacaa 59880
aaaattagct gggtgtggtg gcctgcgcct gtagtcccag ctacccggga ggctgaggca 59940
ggagaatgga gtgaacctgg gaggaggagc ttgcagtgag ccgagatccc accactgcac 60000
tccagcctgg gcgacagagc aagactcttg tctcaaaaaa aagaaaaaaa aaggaaaaaa 60060
gaaccctgat aataaagaaa ccaaatgttc aactctcaaa gctcggacac tttaaagaaa 60120
taattaataa aggcagaagt taaagggagg atgataaagc aatttttttt gttggttttt 60180
ttgagatgga gtcttgctct gtcacccagg ctggagtgca gtgatgcgat cttggctcac 60240
tgcaacctct gcctcccggg ttcaagcaat tctcctgcct cagcctcctg agtagctggt 60300
actacaggtg cgcgccacct ggcccagcta atttttgtat ttttattaga gacggggttt 60360
caccatattt gttaggctgg tctcaaactc ctgatctcag gtaatctgcc cacctcggcc 60420
tctcaaagtg ctgggattac aggcaggcgc caccgcgcct ggcctaaagc aaaatattgg 60480
ttctgtgcaa aaggtcaata aaaagagcaa acgtttacaa actggagcca gcacccattc 60540
agctcagtgt gtctggagaa aaaacaatct cgcttcagaa ttcatgatta cgcagccctt 60600
tttgcttcct aaaaatccta ctatgttgct gttgaccatt ctctctcttt ctctctctct 60660
tgctttctct ccagaaaagc tattcagaca ttctcctctt tcctcaaacc tccaacactt 60720
cctcctccat ccttagcctc agctgctgac ctcacttcta atcattgaga aaccaggaga 60780
agcatttaag agtgaacctc cgcctccccg cacgggcaaa accacccacc cacagaattg 60840
tgccccaatt ctgcgtcctc tcctctcacc atggatggac ggtccaggct ccgagccaaa 60900
gccaggcctc ccctggagct ctggatccac cacctgcagc ttctcaggca gggccccagc 60960
agctcccctg ctcccttgta ccatcaatcc ctcccctcac tgggtcactc ccaacaatat 61020
atatatttag tgatgtttct cccatgtggt aaaatcactt agcctctctc ctcccccagc 61080
tactatccta tttgtttctt tccattctct gcaaaacttc tcaaagcatt gtgtctatgt 61140
gctgactcca tttatcttct cccgttctct gctgagtcct tcccacagac tctcacccca 61200
gttactccat gaaatgacct ctgcactgcc acatccaatg gtgaatgttc agttcttaat 61260
tttattcagt ctttcagcag catttgacct ggccgatcac tccctcttct taaaaatact 61320
tttctcagcc aggcgtgatg gctcacacct gtaatcccaa cactttggga ggccaaggcg 61380
ggaggatcat gagagcccag gagttcaaga tcagcctggg caacatggca agaccctatc 61440
tctacaaaaa ctaaaaagta gccagtgtga tggcatgcac ctgtagtccc atctacttag 61500
gaggctgagg cagtaggatg acttgagcct gggaaatcaa ggctgcagtg agccatgatt 61560
gcaccactgc actccagcct gagtgacagc gagaccctgt ctcaaaaaga caaaatagga 61620
aacttttctc agcatattcc tctgattctc ctgctgcttc tgtctgcaca gattcagtct 61680
cctttgccgg ttcttcctca tcctcctgat ctcttgacct tgaagtgccc cagagtacag 61740
tctttttttt ttttttgag acgcagtctc gtctgtcacc caagctggag tgcaatggcg 61800
aggtctcagc tcatgcaacc tctgcctcct gggttcaagc gattctcctg cctcagcctc 61860
ccaagtagcc aggactacag gcacatgcca ccatgcccag caaattgttg tatttttagt 61920
agagacaggg ttttactata ttggccacgc tggtctcaaa ctcctgaact cgtgaaccac 61980
ccgcctcggc ctcccaaagt gctgagatta caggcatgag ccaccacacc cggcccagag 62040
tacagtcttt agacggcctc tctacctata cttgctcccc tcataaactc ctcctgcctc 62100
atggctttaa ataccatcgg tagactgatg actcccatat ttctcttttt tttttggaga 62160
cggagtctcg ctcagtcccc caggctggag tgcagtggcg cgatctcggc tcactgcaag 62220
ctccacctgc caagttcaca ccattctcct acctcagcct ctccagtagc tgggactaca 62280
ggcacccgcc accacgcctg gctaatttttt ttgtattttt agtagagatg gggtttcacc 62340
atgttagcca ggatggtctc gatctcctga cctcgtgatc cgcccatctc ggcctcccaa 62400
agtgctggga ttataggtgt gagccaccgt gcccagccga tgactcccat atttctatct 62460
cttgctgtgt gggagttctc ctcagaactc catactcata aatccaactc tcataaatag 62520
tatctcaaat gggcaatatg ctcaaaagtc aattcctact tttctcccta aacttgcttt 62580
cctgcagtct ccaccatctt aatgtccaat ctaacattag gaggcaaaaa ctttgaagtc 62640
attcttgact cttctctatt acacacccta tccaatcttt ctgcagatcc agtcgacccc 62700

caaatccagt tagctctcat catctcccct gttacccccct ggtccaggcc atcttcctct 62760
ctcacctgaa tcactgcagc attctcctca ctggtctctt tggttctgtt ttcactccac 62820
cttagcatag tctccacaga gcagtcagag ggatcctttt aaagtgtaat tcccatcctg 62880
tccctgctct gctcaaaacc ctgtcgtgat tcccgtttta atctgtcaga ttaaaagcca 62940
gagtctttcc agtgacctac atgatctgcc tattatcacc tcccacttct ttccccttgc 63000
tcactccact ccagctctgc agctgtcctt tctgtttcct gaacagccca gattttgctt 63060
ctttagaacc tttgtatttg ctgtcccctc tgtctggaat gtttttccag gaagtcacct 63120
ggctctctcc tgcacttcct tcctgaccac catgtttaaa aatcactcaa acacacttca 63180
ggccggacat ggtggctcac gcctgtaatc ccagcacttt gggaggccaa ggtgggtgga 63240
tcacctgagg tcaggagttc gagaccagcc tggccaacat ggtgaaactt cgtctctact 63300
acaaatacaa atagtagcca ggtgtagtgg cacacacctg taatctcagc tactcaggag 63360
gctgaggcag gagaatcgct tgaacccaga aggcagagga ggtgcagtga gccaagatca 63420
cgccacaaca ccccagcctg ggtgacagag caagacccca tctcaaaaaa aaaaaaagaa 63480
aaaaaaatca cacaaacaca cttctcttca tattcctttt ccaagtttta tttttctcca 63540
gaatacttta cattgtttta atggaagttc tccgtttccc cccaactaga atggatactt 63600
cctgcaggta ggcactctag tcctcccatc caagtactaa ccaggctcaa ccctgcttag 63660
cttctgagag caggggagat caggcctgtt cagggtggta tggcccagga atttgattc 63720
tgttttattc attgctgttc tgttgattct cttttgttcc tcctcctagt gctgagaaca 63780
ctacttgtac ataataagca ttcaataaat atttgttgaa tgaatgactt gttgaatgaa 63840
ttaatctcag aaatgcagga ctggttctac attagaaaat ttttcaaggt cattctctgt 63900
tgtcgtaaca cattaagaga ggaaaatttt gtactctaaa tcatttgata aaatacatac 63960
tgatttctgt tttcaaaaac tcttagtggc tgggcgaggt ggctcacatc tataatccca 64020
gcattttggg aggacgaggt gggcggatca cttgaggtca ggagtttgag accagcctgg 64080
ccatcatggt gaaaccctat ctctactgaa aatagaaaaa ttagccgggt gtggtggcgc 64140
atgcctgtag tcccagctac ctgggaggct gaggcaggag aatggcttga acccgggagg 64200
cggaggttgc agtgagccaa gatcatgcca ttgcactcca gcctgggtaa cagagtgaga 64260
ctccatctca aaagaaaact cttagtgagt ttaggaatcc aaggaagacc ctcaaactaa 64320
atagataatc tagctaccag aagccttcag taaaccttaa cactccatgg tgaaacatta 64380
gaaacattcc tactaaaaga caggctaaga atgcctgcaa tcttcacggc tagtccaaga 64440
agtcaaaaag aagaaatgag cgctgattta aaaaaataaa caaacaaaaa actaccgatg 64500
cagaggctgg cagcaaggac tgaaggactg tacagtactt gcctggagca ggcggatggc 64560
cacacccctg cgaagcctgc tcagctggct gggggacgct ccagtgtgtg agtggcagga 64620
tgcagggtac ttcctctgcc agggagttgc actggggaga tcctcccccа ctcacacttt 64680
ggcagctggg gctttggaat gtgacttagc ttctgtcaaa gggtcaatcc acccctttgat 64740
atatgatgca aaggcgaaca tatgatgcaa aggtgagaga acagcccaaa ttaggacttt 64800
taccacagct gtggaggtgg acagcgacag tggtgggccc tggccagact tttcatgctc 64860
aaaggtggtg gttgttcttc ctacttcttg tccctccagg gcttcctttg cctgtgtgct 64920
gaacctgctt cttttaattt tttttaactt ttttaaattt ttaattgttt taattaaaac 64980
aaattttgaa aactgtctga acctgctttt gaaccctgct atgatttgaa tgtttgtccc 65040
ctgccaaact gattttgaaa cttaatctcc aaagtggcaa tattgagatg gggctttaag 65100
cagtgactgg atcatgagag ctctgacctc atgagtggat taatggatta atgagttgtc 65160
atgggagtgg catcagtggc tttataagag gaagaattaa gacctgagct agcatggtcg 65220
ccccttcacc atttgatatc ttacactgcc taggggctct gcagagagtc cccaccaaca 65280
agaaggctct caccagatac agctcctcaa ccttgtactt ctcagcctct gtaactgtaa 65340
gaaataaatg ccttttcttt atgaattacc cagtttcaga tattctgtta taaacaatag 65400
aaaacgaact aaggcaaact ctcatgattc tactgccatg ccattccaat aaactccctt 65460
tatgcttaag agagccagag ttggccaggc gtggtgactc acgcctgtaa ttccagcact 65520
ttgggaggcc gaggcaggtg gatcacaagg tcaggagatc gagaccatcc tggctaacac 65580
ggtgaaaccc cgtctctact aaaaatacaa aaaaattagc tgggcgtggt agtgggtgcc 65640
tgtagtccca gctactcggg aggctgaagc aggaggagaa tggcgtggac ccaggaggcg 65700
gagcttgcag tgagtcgaga tcgtgccact gcactccagc ctgggtgaca gaatgagact 65760
ccgtctcaaa aaaaaagaga gccagagttt atttctgttg cttgcaacca agaaatctgg 65820
ctggtgcact gaagtttcca taaataatag caatttaaag actctttcca agccaggcaa 65880
tgcctagcct tgtgtagtcc ttgtggtaat acattcattc attcatttgt tcaaccaact 65940
gtgctccaga gactaagaat acaaaaatgg gggccgggtg tggtggctca cacctataat 66000
cctagcactt tgggaggccg aggcaggtag atcacctgag gtcaggagtt cgagaccaac 66060
ctggccaaaa tggtgaaacc cctactctac taaaaataca aaaaattagc tgggggtggt 66120
ggcggacacc tgtaatccca gctactcgtg agactgaggc aggagaatca cttgaacccg 66180
ggaggcagag gttgcagtga gccgagatcg caccactgca ctccagcctg ggcaacaaga 66240
gcgaaactcc acctcgaaaa aaaaaaaaaa aaaaaaagag ggccggggct gggcgcagtg 66300

gctcacgcct gtaatcccag cactctggga ggccaaggca ggagaattac gaggtcagca 66360
gatcgagacc agcctgacca acatggtgaa accccatctc tactaaaaat acaaaaatta 66420
tccgggcgtg gtggcgcaca cctctagtcc cagctacttg ggaggctgag gcaggagaat 66480
cgcttgaacc cgggaggcag aggttgcagt gagccgaaat catgccactg cactccagcc 66540
tgggtgacag agtgagactc cgtctcaaaa aaaaaataaa aaaaaaaaaa gaattcaaaa 66600
attgtagagt tatagtgtgc ttctagttta gttgagagga catctgtcct tcaaggaagg 66660
ctagaatcta taccctgagt ccttactgaa atcaatccag cagtcaaaac atgggaccaa 66720
cgatcacagc agtaagatag gaagagcacc tttgtacatt tagctcatgt tgagataagc 66780
cactgacaga gctgaaggaa gctcacagtt ctgggttcca tcctttggca tttaaaaaga 66840
aaagtgctaa gaaaattcgg ttggtcacgg tggctcacgc ctgtaatccc aacactttga 66900
gaggccaagg caggcagatc acgaggtcag gagttcgaaa ccagcctggc caacatggtg 66960
aaaccccgtc tctactaaaa acagaaaaat tagccgggca tggtggcgca tgcctataat 67020
cccagctact caggaggctg aggcaggaga attgcttgaa cccgggaggg ggaggttgca 67080
gcgagtgaga gcaggccact gcactccagc ctgggagaca gagcaagact ctgtctcaaa 67140
aaaaaaaaag aaaaaaagaa agaaaggaaa aaaagaaaga aaaaaaaaga aaaaagaaaa 67200
ttcaggccag gccaggcctg gtggctcaca cctgtaatcc caacactttg ggaggctgaa 67260
gcgagacggt gccttagccc aggagtttga gaccagcctg agcaacatag cgagaccctg 67320
tctctataaa aaaaaatttt tttttggcca gacgcagtgg ctcacgcctg taatcccagc 67380
actttgggag gccgaggcag gtggatcacg aggtcaggag atggagacca tcctggctaa 67440
cacggtgaaa ccccatctct actaaaaaat acaaaaaatt aaccgggcgt ggtggcgggc 67500
gcctgtagtc ccagctactc gggaggctga ggcaggagaa tggcgtgaac ccgggaggcg 67560
gagcttgcag tgagccgaga ttgcgccact gcactccaga ctgggagaga gtgagactcc 67620
gtctcaaaaa aaaaaaaaaa aaaaaaaaat taattgtcag gtgtgctggc atgcagctgt 67680
agtcctagct actcgggagg ctgaggtaag aagatcgctt gagcccagga gttcaaggct 67740
gcagtaatag tgcctctcac tctaccctgg gtgacaatga gaccctctct caaaaagaaa 67800
gaaaaaaggg aaagaagaaa agaaagaaag aaagagaaga aaggaaggaa gaaagaaaga 67860
aaaagaaaag gaaggaagga agaagaaaaa aaaagaaaga aagaaaagag agagaagttc 67920
aaagaccaaa gggtcaggat cccaaaatag tttttatgtt ttatttattt atttacttat 67980
ttatttttga gacagtatgg ctctgtcgcc caggctggag tgcagtgatg cgattgcggc 68040
tcactgcagc ctccaaactg ggctcaggtg gccctcccac ctcagcctcc cgagtagctg 68100
ggaccacagg cgcgtgccac catgcccagc taatttttta attctttgta gagatgaggt 68160
ctctatatgc tgcccaggct ggtctcgagc tcctgggctt aagccatcca cccgcctggg 68220
cctcccaaag tgctgggatt acagaagtga gccaccgcgc ctaatcgggt ggtttgtttg 68280
tttattgacg gggtctcgct gctgcccagg ctggagtgcc agtggctgtt cacaggtgca 68340
gtcctggagc attgcatcag ctcttgggct ctagcgatcc tccagagtag ctgcagctgg 68400
gattccaggc gcgccaccgc gcggggctca gaatgggttt ttatattgag ggttatgctg 68460
ccacctagag gatatatgta gtaccgaact gtgtgcgcag ggaggctgag gttgcagtga 68520
gccaagatga tgccagggca ctccagcgtg ggtgacagag caagatttca tctcaaaaaa 68580
aaaaaaaaaa aaaaaaaaaa aagaattgaa agtaaggtct tgaagagata tttgtgcctg 68640
tatggtcata gcagtattaa ctttgaccca ctagctaaaa cacaaaagca acatgtgtct 68700
gtcagcaggt gaacggataa acaaaatgtg gtatatatgt acaattgaat attattcagc 68760
ctttaaaaag gaataaaagg ctggatgcgg gggctcacgc ctgtaatcct aacactttgg 68820
gagactgagg tgggtggatc acccgaggtt aggagtttga gaacagcctg gccaacatgg 68880
tgaaacttca tctctactaa aaatactaaa attagccggg catggtggca cttgtctgta 68940
atccaagcta ctggggaggc taaggcagga gaattgcttg aactcaggag ccggaggttg 69000
cagtgagcta agatggcacc actgcactcc agcctgggca acagagtgag actccatctc 69060
aaaacaaaca aacaaaaaat tattatttcc aaagaaacaa gaccctgggt ccatttccca 69120
gcccacacct gatgttgact cacaacacac agcctggttt gctatgagcc tgcttcattt 69180
aattgtcacc ttaacttcac atcaccctca agtcctggaa taactctttg ctgacctttg 69240
tgtgctgagc catctccatg tcgctcaacg tgcagtccct ctcactgcac tgagtcaata 69300
gccagacgtg gtctgactgc agggtcatcc ttggtggctt aggctgactc gggcatagca 69360
gggtgctctg agacctcacc gcatataggc tttgccccca ataaactcta tataatattc 69420
atattatgtg gtctgggtgt gtgtagcttt gcactgtctt ctcgtgacag tgccctcaac 69480
ctctttccca ggatttcctc ctctacctcc tcaagtccca ctgctctgca aagaccaaaa 69540
gctgcagagt cccagctccc tcctttacac cccacgacgc agcctcctct ctcagaaccc 69600
tttaaacaga gtcttttact gcagatccca agaacagcca cacccctctc tcccacccac 69660
tccagacaca cccaggtaat tatagcaccc agggtaacta tgtagatgga gtccctggaa 69720
catgtggata gtgccccctg ggagtatgca aaagcaacat tgctggcacc tgcagagaac 69780
agggtgacat ccaggaatca gagcatgggc ctctgggagg tagggatgtg gccaggcagg 69840
ctgccaaaaa ttggtagagc aaggccacag gatctttctg accttccttc caaacagagg 69900

ctcctgtact ggtgatccct gtgttgattg accactccct tcctgggggt cgtggtctct 69960
gtcccagttg cccggacttc tgtgagtgtc ctactgaggt ccttttcatg agaagcatgc 70020
tgtccttcca cctgctggga gcaagagtga caacttcaat actataatag cagtggcata 70080
cagagaagaa gaaagatgaa gtggcaagaa aaacaggctt ccaagcagga gtttttctat 70140
aaaaacaaaa acgtttacaa gcaaactttt tataaagggc tagatagtaa atattttagg 70200
ctttgagagc cacatagact tgtttgcagg gactcaatgt cgctattgta gtttgaaagc 70260
agccatcagg gttatgtaaa tgagtgagtc tgattttgtt tcagcaaaat tttatttacc 70320
aaaacagaca atgagtgggc tggatttggc ccatgatcct tagtttgcca actcctgctt 70380
tgggctcacc cagatctgat tttgaattct ggctctgcta ctggttagct gcaggagctt 70440
ggaaggctct ctgagcctgt ttcctcatct gtaaaattaa agcaataatt tctaacactc 70500
aagagtgtta cctcacgcct gtaatcccag cactttggag gctgaggcag gcggatcacc 70560
tgaggtcaga agttcaagac cagcgtggcc aacgtggcaa aaccctgtct ctactaaaaa 70620
atacaaaaag tagccgggca tggtggcgcg catctgtaat cccagctact tgggaggctg 70680
aggcagggat actgctagaa cctgggaggt ggagcgtgca gtgagtggag atcacacctc 70740
cacactccag cctggccgac agagcgagac tccatctcaa aaaaaaaaaa aaaaagagtg 70800
ttagaaggtt ttgagataat gaataaaaga tgccttgtgt atactaagta ttcaacaact 70860
gatagctgca ttggtctaat tataacagtt tagaagcgat tgagtcaaca aatgctggat 70920
ttgtcaggga ggacttccta tcaggaggta gatcttgggc tgagtcctga agcaaagata 70980
ggcattggat agaggagttg agagaacacc ctaggactgt tattattatt attcgacacg 71040
gagtctcttg ctctgtcacc caggctggag tgcagtggcg cgatctcggc tcactgcaac 71100
ctctgcctcc caggttcaag cgattctcct gcctcctaag tagctgagac tacaggtgtg 71160
tgccaccaca cccggctaat ttttatattt ttagtagaga cagagtttca ccatgttggc 71220
catgctggtc tcgaactcct gacttcaggt gatccacccg cctcagcctc ccaaagtgct 71280
ggaataacag atgtgagcca ccgcacccag cccagaacca tttttcaatc cttggctctg 71340
ccttttatta gctgcaagat ctcaggcaat ttatttaacc tctccaaaga ctcattttct 71400
cattcacaaa atgaggcaaa taataatatc tactatccca ggttgtcatg agaattaaat 71460
gcaacatgac atttaatgaa atgagaagtc ccttggacat taactggcta aagtatgtgc 71520
tcgacaagga tatcatttta ggtggatact tagcatctca gaactgatgc tcacaatgga 71580
atatcattga aacgcattaa aattcatttt aaatgattgt aggtagtgag gcaattgaaa 71640
gaagaagaca agaggactga ttataatgct tcaggctcac tagtctcctt ttaggaggga 71700
aaaacaattt caagttaaat tttaggctct agatttttac ccctgctgct cattagaatc 71760
acccagattg atgaaatcag agcccatctg aggctgtgtt tttcatctcc agaatgagag 71820
ctgttgtggg gattaagttt ttgaaaaagt acatctaaca ggtgatcgaa aatgatagtg 71880
atattattgc agtgatggtc attattgttg ttattattat actgaaagag gcttcagttt 71940
tctgatccat aaagtgaggg aattgcatga gaccattgct aagattcctt ctagctctgt 72000
ttttttgttt ttgtttttta gacagagtct ctgtcgccca ggctggagtg caatggcatg 72060
atcttggctc actgcaacct ccgcctcccg ggttcaaatg atcctcctgt ctcagcctcc 72120
gaagtagctg ggactacagg cacacaccac catgcccagc taacttttat atttttaata 72180
gaggtggggt ttcaccatat tggtcaggct ggtctcaaac tcctgacctc aggtgatcca 72240
cccgcctcgg cctcccaaca tgctgggatt acaggcatga gccactgtgc ccaacccctt 72300
ctagctttct tgatcactga ttctagggtt ctctgctgaa atatatttga gacatcctgg 72360
ataaaagatc atgcaagagc tcccaatatg gtattaataa ttgattctgg aggcttagct 72420
actcctgatg gattagacat gactcaactg cctctcttat gtgtacaaca caacaacaca 72480
accaagaaag gttattctgg cattccattt attcagttta tttacagccc ttacttccag 72540
cagcacgtta aagatatggc cagggccggg tgcagtggct caagtctgta atcccaggac 72600
tttgggaggc caaggtgggc ggatcacaag gtcaggagtt tgagaatctg gcaattcttc 72660
agacttagaa gcaaccagct cgataacaca gtcttgtgtg ggctctccct ctgtcctcc 72720
ctcgcttccc tcatttctca tccctgcccc tgagactgtg caccttcaca tagccctgcc 72780
atgagacctt catctcaggc tttgctttct ggggtaactg aggctaaaca ctgagtggcc 72840
ctaaaagagg attgggattt ggaagttaga ttattcacca gagaacagac tttgctgatg 72900
atcaggccca ggttgtaatt gttgaaaaaa agagaggatg catagtctta tctcatctcc 72960
tagtcaaagt caacaccatg ataaataaga gtcaaatcct gagatgtgaa ttggggacat 73020
ttgagtggtt aaccctgaga agcttgcacc ttcagacccc tcaatacccc tgctccccag 73080
agaaggctgg acattgacct cagcacaggc aggagccctg caagatgcca tttgtcctac 73140
taaagatgga cccctccact ctgtttctag gtaaataacc aaagtcaagt ctccacacag 73200
cctgagcaag aaagtcagag cctgctacag gagaaaatac cacactggcc aaaggattca 73260
ctagccctgg ccactgtgtg tgggaggaac cagggaatca tgtgtgggag tcaatgttga 73320
agctgttgga ctgggggtgg ggtggaatat aagcctggcc ctggggagtt tttcccgttt 73380
gagggccttt acccacaact caagatccag tgctatagca ggagatccca gagctagtcc 73440
taacagatgg tcaggattga acttggccta gagtaaaatg aggaggatag tgccagaact 73500

ttctcaacat actattgagg aagaggtcag aaggcttaag gaggtagtgt aactggaaag 73560
gggtcctgat ccagacccca ggagagggtt cttggacctt gcataagaaa gagttcgaga 73620
cgagtccacc cagtaaagtg aaagcaattt tattaaagaa gaaacagaaa aatggctact 73680
ccatagagca gcgacatggg ctgcttaact gagtgttctt atgattattt cttgattcta 73740
tgctaaacaa agggtggatt atttgtgagg tttccaggaa aggggcaggg atttcccaga 73800
actgatggat ccccccactt ttagaccata tagagtaact tcctgacgtt gccatggcgt 73860
ttgtaaactg tcatggccct ggagggaatg tcttttagca tgttaatgta ttataatgtg 73920
tataatgagc agtgaggacg gccagaggtc gctttcatca ccatcttggt tttggtgggt 73980
tttggccggc ttctttatca catcctgttt tatgagcagg gtctttatga cctataactt 74040
ctcctgccga cctcctatct cctcctgtga ctaagaatgc agcctagcag gtctcagcct 74100
cattttacca tggagtcgct ctgattccaa tgcctctgac agcaggaatg ttggaattga 74160
attactatgc aagacctgag aagccattgg aggacacagc cttcattagg acactggcat 74220
ctgtgacagg ctgggtggtg gtaattgtct gttggccagt gtggactgtg ggagatgcta 74280
ctactgtaag atatgacaag gtttctcttc aaacaggctg atccgcttct tattctctaa 74340
ttccaagtac cacccccgc ctttcttctc cttttccttc tttctgattt tactacatgc 74400
ccaggcatgc tacggcccca gctcacattc ctttccttat ttaaaaatgg actggggctg 74460
ggcgcggtgg ctcatgcctg taatcccagc actttgggag gccgaggcgg gcggatcatg 74520
aggtcaggag atcgagacca tcctggctaa cacggtgaaa ccccgtctct actaaaaatg 74580
caaaaacatt agccaggcgt ggttgcaggt gcctgcagtc ccagcggctc aggaggctga 74640
ggcaggagaa tggcgtgaac ctgggaggtg gaggttgcaa tgagccgaga ttgtgccact 74700
gcactccagc ctgggtgaca gagcgagact ccgtctcaaa aaaaaaaaaa aaaaaaaaaa 74760
tagctgggca tggtggcgcg tgcctgtaat accagctact ctggaggctg aggcaagaga 74820
atcgcttgaa cccagtaggc ggaagttgca gtgagccgag atcttgacac tgcactccag 74880
cctggtgaca gagtgagact ctgtctcaaa aaaaaaaaaa agaaaaaaaa agacagaaag 74940
aaagagcaca gacagagtca caggtatttg cagtaggaag ctgtcaggtt agagtgcacg 75000
gaaatagaaa gtatatttta cacttacagc acatcttcgt ttgattagcc acatttaaaa 75060
tactgaatag caacgtgtgg ctatttagta ttcactaaaa tcttggacag tgcaagtcta 75120
aagaatcctt gatccgtccg gcatggtggc tcacgccttt aatcccagca ctttgggagg 75180
ccaaggtgga aggatcactt aaggtcagga gttcgagacc agcctggcca acatggtgaa 75240
acctcgtctc tactaataat acaaaaaaaa ttagccgggc atggtggtgc atgcctgtaa 75300
tcccaggtac ttgggaggct gaggcaggag aatagcttga atccaggagg cgctgcagtg 75360
agccgagatc atgccatgcc actactgcac tccagcctgg gcaacagagt gagactgtct 75420
caaaaaaaaa aaaaaaattg ttgggcgtgg tggctcacgc ctgtaatccc agcactttgg 75480
gaggctgagg ggggtggatc acctgggttc tggagttcga gaccagcctg gccaacatgg 75540
tgaaacccca tctctactaa aaatacaaaa attagctggg cgtggtggtg ggcacctgaa 75600
atctcagcta ctcaggaggc tgaggcagga gaatttcttg aacccaggag gcagaggttg 75660
cagtgagcca agatcgcgcc tctgcactcc atcctgggtg gcagagcaag actatgtctc 75720
aaaaaaaaaa aaaaaaatac ttgattgtct ggacattctg cagaacatca tatggagaca 75780
ctatgttgac gacatcatgc tgattgtaag caagaaatgg caagtgttcc agaaacacag 75840
tcaagacaca tacatgccag aaggtgagat ataaactcta ctaagattca gtggcctgcc 75900
acactggtga catttttaaa cctgctagat gtttgtgtag aaaaggattt aaccttgccc 75960
aaagaggggt ctggcctttg tccccagcta ctggacataa tctctttaaa ctcttgaaat 76020
atcattcctg atagaagtat ttttgttttg actaggggcc ttgggccagc cagatagcaa 76080
caatgtgatc tgggttgggg gctttggatc aggtggcatc agtgtgacct cctgagtggc 76140
tagagactag aatcaaccac atgggcagac aacccagctt acatgatgga attccaataa 76200
agactttgga cacaagggct tgggtaagct ttcctggttg gcaatgctct atactgggaa 76260
acccattctg actccatagg gagaggacaa ctggatattc tcatttggta cctccctggg 76320
ctttgcccta tgcatttttc ccttgtctga ttattattat tattatgaga tggaatctcg 76380
ctctgtcacc caggctggag tgcagtggaa tgatctcaac tcactgcaac ctctgcctcc 76440
ccggttcaag cgattttcct gtctcggcct cccgagtagc tgggactaca gatgcatacc 76500
accacacccg gctaattttt ttgtattttt agtagagacg gggtttcacg ttagccagga 76560
tggtctcgat ctcctgacct catgttccgc ctgcctcggc ctctcaaagt gctaggaata 76620
catgtgtgag ccaccgcgcc cagccccctt ggctgattat taaagtgtat ccttgagctg 76680
tagtaaatta taaccgtgaa tataacagct tttagtgagt tttgtgagca cttctagcaa 76740
attatcaaac ctaaggatag ccttggggac ccctgaactt gcagttggtg tcagaaataa 76800
gggtgctcat gtgtgtacca tgccctctaa ttttgtagtt aattaacttt cacaacttta 76860
ttattaccgc ttacactcaa tgtttattca catttatcca cataccactt attctagtgc 76920
cttgcatcaa agactttcta tctcatgtac tttattctgc ttgaagtaaa tcctttagga 76980
tattcttttt ttttttaaa ctttgcacat acatactttt attttttatt tatttttaat 77040
tttgttattt ttgtgggtac gtagtagata tatgtattta tggagtacat gagatgtttt 77100

gatacaggca tgcaatgtga aataagcaca tcatggagaa tggggtatcc atcctctcaa 77160
gcaatttatc cttcaagtta caaacaatcc aattacactc tttaagttat tttaaaatgt 77220
acatttaatt ttgtattgac tagagtcact ctgttgtgct atcaaatata attttttttt 77280
tttttgagac agagtctcac tcagtggccc agactgaaag tgcagtggca caagctcggc 77340
tcacttcaat ctctgcctcc ctggttcaag cgaatctcct gcctcagcct cccacatagc 77400
tgggattaca ggcacacacc accatgccca gctaattttt atatttttt agtagagacg 77460
ggttttcgcc atgttggcca ggctggtctt gaactcctgg cctcaaatga tctgaccacc 77520
tcagcctccc aaagtgctag gattacaggc atgagccacc acacctggcc aaaatagaat 77580
attctttagt gaggtctgct ggtgacaatt ttttttcttt ttttgagact gagtctcgct 77640
gttgtcagct tgggctggag tgcaatagca cgatctcagc tcactgcaac ctccacctcc 77700
cggattccag caattctcct gcctcagcct cccaagtagc tgagagatta caggcaccca 77760
ccaccacacg cggctaattt ttgtattttt agtagaaatg ggggttcacc gtgttggcca 77820
ggctggtctc gaactcctga cctcaggtga tccacccacc ttggcctccc aaagtgctgg 77880
gattacaagc atgagccacc acgcacagcc aatttttcc gtttttgtct gaaatcttat 77940
tttgtgtcat ctttgaaata tatttttgat ggatataaaa ttgttggttg atagttatta 78000
tcattattat tattattttg agacagggtc tcactctgtt gcctatgctg gggtgtagta 78060
atgtgatctc ggttcactgc agacttgacc tcctagggct caggtgatct tcccacctca 78120
gcctccctag tagctgggac tacagatgca tgccaccata cccaactaat ttttctattt 78180
tttgtagaga tgaggctttg ccacatttcc caggctggtc tctaactcct gagctctagc 78240
aatccaccca ccttggcctt acaaagtgct gggccatgac tagccagcag ttacttttta 78300
tagcatattg aatatttaat atgaatcttc tggcatccac tgtaactgtt taaaaaatca 78360
gctgtttact tggcactctt ttttttttt ttttttttga gacagagtct tgccctgtcg 78420
cccaggctgg agtgcagtgg cgtgatcttg gctcactgca agctctgcct cccgggttca 78480
cgccattctc ctgcctcagc ctccggagta gctgggacta aaggcgcccg ccaccacgcc 78540
cggctgattt ttttgtattt ttcgtagagt tggggtttca ccgtgttagc caggatggtc 78600
tcgatctcct gacctcgtga tctgtccgcc tcggcctccc aaagtgctgg gattataggc 78660
gtgagccacc gcgcccagcc tctttttttt ttttttttag acggagtctt actctgtcat 78720
ctaggctggt gtacagtggc gtgatctcag ctcagtgcaa cctccacctc ctgcctcagc 78780
ctgccaaata gctgggatta caggtgcgta ccatcacgcc cggctaattt ttgtattttc 78840
agtagagatg gggtttcacc atgttagaca ggctggtctc gaactcctgg cctcaagtga 78900
tctgcctgcc ccagcctccc aaagattaca ggcatgagcc accgcacccg gccaagtagc 78960
actcctttga aggtaatctg cttcccctac ccctagcaat ttttaacaat ttttcttcat 79020
ttttatttcc tgaagttttg ttattaataa tctgtgtgca gatttctttg tatttctttt 79080
gtttgcagtt catagtgatt cttgaattag tgtgttggtt tctgttatca ccacaggaaa 79140
attgtcagcc gttagctttt caaatatttc cttgctaaat tctctcttct ccccttttcgg 79200
tacaattgat ttgattaaaa ctaaaaccag ggccgggtgc agtgactcat gcctgtaatc 79260
ccaacacttt gagaggctga ggcaggtgga tcacctaagc tcaggagttc aagaccagcc 79320
tggccaatat ggtgaaaccc cgtctctact aaaaatacaa aaattaccag gcatggtggc 79380
acacatttgt agtcaggagg ctgaggcagg agaattgctt gaatccagga ggtggaggtt 79440
gcagtgagct gagatcccac cactgcagtc tggcctgggc gacagagtga gatgagaatc 79500
tgtctcgaaa aaaaaagtta tgaatgtttg ataaactata tttgttagaa tgtttgttgt 79560
agaatactat tcattgattt ttaaacaatg ttagattaaa ccattcactg gatttgtgat 79620
aattaactta ctgattttac ctcactgatt tgttgtaatt aatacaactg gtataaaaag 79680
actgtgacga ggccgggcat ggtggctccc gcctataatc ccagcacttt gggaggctga 79740
ggcaggcgga tcacctgagg tcaggagttc aagaccagcc tgaccaacat ggtgaaaccc 79800
catctttact aaaaatacaa aattagccgg tcgtggtggt gcatgcctgt aatcccagct 79860
cttcgggagg ctgtggcagg agaatcactt gaacccggga ggtggaggtt gcagtgagcc 79920
gatatcgcgc cattgcactc cagcctgggc aacaagagcg aaactccgtc taaaaaaaaa 79980
aaagaaaaaa aacacataaa acaaaacaac actgtgacgg ttcccaaaaa ttaggagcat 80040
aattaaagga actcctgata aaaattaatt ttatcttaca tgtaaactaa aatgacttta 80100
tgaagttaat tcagaaatac aatgcagggt attagtttgc cacagctgcg tattcagcct 80160
aatgtaatat tcttgttatt tttaaattct tcttttaact ttactcatat gtggatcatc 80220
aaatttcaaa agattaaatg acaatactct tagcagcaag cttccctaag catataaaca 80280
ttttaatggg tgatgattca gaaggtaccc gaagaatatg tactgccaga tatcattcac 80340
ccccatatac ctgcccgaca gacatcccat tttgggaccc tggataaatg tgtgggtgga 80400
gagaaagata ggagaaagtg gtataagcaa atggctttgg agtctgattg acagcgattg 80460
aaatcctgtc tctacctctt aacagcctca tgatcctaca taagttaccc cgatcctcag 80520
ggccacatct gtaaattggg ggttgcgatg gcagccatct cacagggtct cttttcgggg 80580
aagggcagga attatggatt aagtgagcta gtaattgtaa agcacttaat acaaggaggg 80640
cgcataataa gtacttcata aataatgacg gccattatca tgactgaggt gtatgcagct 80700

gtcggggatt acggcgactt cagaatttct ggtgggcagg gctcaaaggc agcaaatcac 80760
actggaagtc gaggtgaggc actgcttctg cacagactgc ttagctggag agaatgagga 80820
aggcttagag gagatttaga ggaacttaga gtcctccgcc tccaactctg tgggatctgc 80880
tcccgtgcca gagacattca ggggatttct cgcactctcc cctcccctac gtccctcccg 80940
ccccatccaa ctaaccacac aacacataca aaatagcccc tgcgaggttc tgcacgctgg 81000
aagggaacag gagaagggcg ctgcgctttc ttgctgatgc cctgtacttg ggcccctggt 81060
agacacagcc acttgtcccc tcagcctgca gagaaatccc acgtagaccg cgcccgggtc 81120
cttggcttca gccaatctcc ctttggtggg ggtgggatgc acgatccaag gttttattgg 81180
ctacagacag cggggtgtgg tccgccaaga acacagattg gctcccgagg gcatctcgga 81240
tccctggtgg ggcgccgctc agcctcccgg tgcaggcccg gccgaggcca ggaggaagcg 81300
gccagaccgc gtccattcgg cgccagctca ctccggacgt ccggagcctc tgccagcgct 81360
gcttccgtcc agtgcgcctg gacgcgctgt ccttaactgg agaaaggctt caccttgaaa 81420
tccaggcttc atccctagtt agcgtgtgac cttgagcagt tgactttatt tttcagtgcc 81480
tagttttcca gataccagga ctgactccaa ggactattac tcatctggag ggtttagcac 81540
agtaccgtcg catagtaaat ttccatgtca gttttggtta cctttcatgc acttgcaaac 81600
atgccatgct ctgaaacgaa ataggcacat ctttttttct ttttttttta aggagtcttc 81660
ctctcgccca ggctggagtg cagtggcgcg atcttggctc actgcaacct ccacctcccg 81720
tgttcgagat tctcctgcct cagcctcctg attagctggg actacaggca tgccacgacg 81780
cccagttaat ttttgtattt ttagtagaga cggggtttcg ccatcttggc caggctggtc 81840
taactcctga cctcaggtga tctgactgcc tcagcctctc aaagtgttgg gattacaggc 81900
ataagccact gcatctggcc agaaatgaaa taagtaaatc ttttaacctg ctctaacaat 81960
atagtgaaaa gaccatatta ttattagagc aggttaaggg atttgcctat ttcgggttct 82020
agttatagtc ttaaacttgg acattcttgt agaaagtaaa aagtttcctc ttcaaagttc 82080
cccttcttgt taaagaatac atcataagtg ttagaagtaa tagtttattt taaagactaa 82140
ctttcttcaa gcctccttgc tttgtgctaa taactctttg ttaagcccta tcctatgtaa 82200
ctgttggaca tgctcacagg cacgttccag ttcacagcct atgccccttc cttatttgga 82260
aatgttattg cttccttaaa cctttcggta agcaacttcc tctccttctt cgttcttcct 82320
tgcacttacc tatttagaaa gttttaggct attagcaaat cggctatcag tttaagagtg 82380
tgaggtcccg ctccagccaa tggatgcagg acatagcagt gaggacgacc caaatgcgta 82440
agggataaat atgtttgctt ttcctttgtt caggtgtgct ctcgacatcg ttccatctgc 82500
gattgagcac cctttctgca gaaagtaaag attgccttgc tggagatctt ttgtctccgt 82560
gctgactttt cttcgtggca ccgattatct atttctaaca attttggtat ttctaacatt 82620
ctgaacaatc ttgggctagt tgtctcttct gggcctgttt ccccatccgt cacatgataa 82680
acttcattgg tttaaaaacc ccagcgaaca tttattgagt tactattacc ttcctgccct 82740
ccccaacccc aaccccaggg agcagttaca acctcagccg ctgagcgcac tcgccgggtg 82800
ttaagaagca ccaaagacag ggaggcttga ttgattttgc tttgggagta gagggtcaga 82860
agattcacag gaaaatggca tttgagcaag gatgattcac tggagctagc ttttaaatac 82920
tggcgaggct tttatgttgc agtcccttac aaagttgagc attcgcaggg actgcactcc 82980
gaaataagcc cgcttcccct tttcattcgc taatgatcca gggagctgct ggttccgcat 83040
gcggcaggtt gtgccttttc ctaatcaggg ttctgcatcg cctcgaaccc gcaggccgtg 83100
gcgggttctc ctgaggaagc agggactggg gtgcagggtg aagctgctcg tgccggccag 83160
cgcctgtgag caaaactcaa acggaggagc aggaggggtc gagctggagc gtggcagggt 83220
tgaccctgcc ttttagaagg gcacaatttg aagggtaccc aggggccgga agccggggac 83280
ctaaggcccg ccccgttcca gctgctggga gggctcccgc cccagggagt tagttttgca 83340
gagactgggt ctgcagcgct ccaccggggg ccggcgacag acgccacaaa acagctgcag 83400
gaacggtggc tcgctccagg cacccagggc ccgggaaaga ggcgcgggta gcacgcgcgg 83460
gtcacgtggg cgatgcgggc gtgcgccccc gcacccgcgg gaggggggatg gggaaaaggg 83520
gcggggccgg cgcttgacct cccgtgaagc ctagcgcggg gaaggaccgg aactccgggc 83580
gggcggcttg ttgataatat ggcggctgga gctgcctggg catcccgagg aggcggtggg 83640
gcccactccc ggaagaaggg tccctttcg cgctagtgca gcggcccctc tggacccgga 83700
agtccgggcc ggttgctgaa tgaggggagc cgggccctcc ccgcgccagt ccccccgcac 83760
cctccgtccc gacccgggcc ccgccatgtc cttcttccgg cggaaaggta gctgaggggg 83820
cgccggcggg gagtcaggcc gggcctcagg ggcggcggtg gggcaggtgg gcctgcgagg 83880
gctttcccca aggcggcagc aaggccttca gcgagcctcg acctcggcgc agatgccccc 83940
tgagtgcctt gctctgctcc gggactcttc tgggagggag aaggtggcct tcttgcgcga 84000
ggtcagagga gtattgtcgc gctggttcag aagcgattgc taaagcccat agaagttcct 84060
gcctgtttgg ttaagaacag ttcttaggtg ggggttagtt tttttgtgtt tctttgagga 84120
ccgtggatca agatcaagga aatctcttta gaaccttatt atggaagtct gaagtttcca 84180
aatgttgagg gttttatgtc taaaagcaac acgtgaaaaa attgttttct tcacccagtg 84240
ctgtcttcca atttcctctt tgggggggagg ggtagttact gctgttacta aaataaaatt 84300

acttattgct aaagttcccc aacaggaaga ccactacttt tgatgacttt ggcaagtttg 84360
ctaactactg gaaccctaac ttacaaacga actacttaca tttttgattt ccagttgtat 84420
tacctgccca atgtttacgt agaaacagct taattttgat tctgggtaac gttgttgcac 84480
ttcattaaaa atacatatcc gaagtgagca agtatgggtc tgtggacagc agtgattttt 84540
cctgtcaatt cctgttgctt cagataaaat gtaccagaca gaggccgggc gcggtggctc 84600
acgcctgtaa tcccagcact ttgggaggct tggcgggtgg atcacctgag atcgggagtt 84660
caagaccagc ctgaccaaca tggagaaacc ccgtgtctac taaaaataca aaattagcca 84720
gggtggtggc gcatgcctgt aatgccagct acttgggagg ctgaagcagg agaatcgctt 84780
gaacctggga ggcggaggtt gcggtgagcc gagatagcac cattgcactc cagcctgggc 84840
aaaaagagcg aaactccgtc tcaaaaaaaa agtaccagac agaaatgggt tttgttttct 84900
ttttttgttt tgagacggag tttcgctctt gttgcccagg ctcgagtgca atggcgcgat 84960
ctcagtctcg gctcactgca acctctgtct cccaggttta atcgattctc ctgcctcagc 85020
ctcccaagta gctgggatta cccatgcccc accatgcccg gctaattttt gtatttttag 85080
tagaaacggg gcttcaccat gttaggctgg tcttgaaccc ctgacctcaa gtgggcctcc 85140
cacctcggcc tcccaaagtg ccaggattac aggcatgagc caccgcggcc agccagaaat 85200
gggttttgga aaaagcacta aacaaaatcg aacttggttt catatgacag ctctgctgct 85260
aactgtaaca ggggcagacc agttaaccta cttttctgtc ttctgtcagc tgagaattag 85320
atgattccca aaggcccatt gaactctgaa tgactttaaa tacttcttct taagtgggta 85380
cacggttttg gtaactgatg ccaggtgatg aatgcatgaa agtgcttaat gaatgaaacc 85440
ggtaaaatag taggaggaag ctttattggt aaggcagggg tatacctaat agctctctaa 85500
tttattggta ttgaagtggt taacttttgt ttttttaagg ggggaaaaca ttctaagaat 85560
aatgaggcaa actgcatatt gcacaagaga ctgttgtctc tattcaacaa atacctttg 85620
agtgtccaga gtctgccagg tgctgtgcta ggccctcacg attgagtagt gaaccagaga 85680
atgtccctgc acccatggag cttattgtct actggggtag acagataata aataagcaaa 85740
caaatcttct ctcttctccc tttcgctcca tgtaagtgtg tgtgtatagg tgtatactta 85800
caagttgagt aaagtgttat gaaagattaa gaggagaaat gcattttggt tagatgttag 85860
aggactcagc aggtgacctt gaaacttaga gctgaaggat cagtaggagg taactagaga 85920
ggccagggaa tcgcatgttc aaaggccagg aggcaagaaa gagcatggtg cccttcaaga 85980
gaggaaagaa ggctactgtg actggagcat agatgtaggc aagtgttggg tgattgagag 86040
ctctacgggc catggttagg ttttattcct aatgccgaga tgccaaacat ggtggttcat 86100
atctgtaatc ccagtatttt aggaggccga ggcaggaata tagcttgaac ccaggagttc 86160
aagaccagcc tgagcaacat gagacctgta caaaacattt aaaaaattgc tgggtatgat 86220
ggtgcacacc tgtggtccca gctactcagg aggctgaggc agaaggatca cttgagccta 86280
ggaggtggag gctacaatga gccatatttg agtcactaca ctccagcctg gatgacaaag 86340
tgagaccatg tgtcaaacaa aatacagaaa gaatattaat ttaaaatttt gaaagaggag 86400
tgatctgaac ttatatctta aaaagatcat tctagggcat ggtggctcat gcctgtaatc 86460
aagggctttg ggaggctgag acaggaggat cacctgaggc cagttcgaga tcaacctgta 86520
cagcatagag agactccatc tctacaaaaa gaaaaaataa atagctgggt gttgtgagtt 86580
attcaggagg ctgaagcaga aagatcactt gagcccagga gtttgaggct gcagtaagct 86640
atgatcccac cactgcaaca cagtgagatc ttgtctcaaa aaaaaaaaaa aatcattcta 86700
ggtgcttttt ggaggctgga tgtggtaaga gtagaagctg gagatggtcc tgttagggat 86760
tcgattcaga ctttaaatac catcaatgca ttgagtccca aatttacatc actacgttgg 86820
atccttgccc ctgaatccag actggtatat ccaactttag gttcagtttg tatctctacc 86880
tgaccaatat agaggtgtcc agtcttttgg cttccctagg ccacattgga agaagaattg 86940
tcttgagcca cacatagagt acactaacgc taacaatagc agatgagcta aaaaaaaatc 87000
gcaaaactta taatgtttta agaaagttta cgaatttgtg ttgggcacat tcagagccat 87060
cctgggccgc gggatggaca agcttaatcc agtagatacc ttcaacttac aatatctaaa 87120
attttatgcc agatttagtc attttaaacc tgctcatcag tttttctcaa gaagtagtat 87180
tttggctttt tttcttttct ttttttgag atggagtttc gctcttatcg ttcaagctgg 87240
agtgcagtgg cggatcttgg ctcactgcaa cctccgcctc ctgggttcaa gtgattctcc 87300
tgcctcagcc tcgcaagtag ctggaattac aggcatgcgc caccatgacc agctaatttt 87360
tggagacagg gtttcaccat gttggtcagg ctggttttgt actcctgacc tcaggtgatc 87420
tgcctgcctc ggcctcccaa aggctgggat tacaggcatg agccaccgct cccggctgca 87480
tttttggatt tttagttgct cagcccaaaa ctttagtaca tctttgaacc tcttctttcc 87540
tcctactcta tatctgatcc atcagcaaat ctgttaggtc tacctcacac atatcgaaat 87600
cctaccacgt ctcaccatct gtgacaatta acaccctggt ctaggcagtc atctctgtta 87660
agattgagtg gttaaggatg tcctctaagg agatgacatt caaatcttag cttaaatgtc 87720
aagagggagc tggttttata aagattgagg aggcagcatt attttgccat aggcttccat 87780
ttggtttcca ttccattctt gatacttatg gtatatattc aaaacaaatg cacagaaaca 87840
gacccaggta tattgggaat ttcggatata gagttcctag ttgggaaaag atagactgat 87900

ctgtaaatga tgctagttat ccatcatctg gcaaaaaata atttcctgcc tcctctcata 87960
tatctcagat caacagactt tttctgttaa gggccaaatc ataaatattt taggctttcc 88020
agaccatatg gtttctgtca cactctcctt tatccttgaa gccatagaca atatgtaaac 88080
aaatgggcat ggctgtgcta cgataaaact ttacttacaa aaactggtag tgggccagtt 88140
taggcatggc cagcactttg ggaggctaag gcagatggat cacttggggt caggagtttg 88200
agaccagcct ggccaacatg gtgaaaccct gtctctacta aaaatacaaa aaatagctgg 88260
gcatggtggt gggtgtctat aattccagct actctggagg ctaagacaca agaatcactt 88320
gaacccagga ggcagaggtt gcagtgagct gagatagcac cactgcactc cagccagggt 88380
gacggagtct taaagcaaaa caaaacaaaa ggtagtgggt tgtatttggc ccatgggctg 88440
tagtttgcca atccctgatg cagaaacaaa ttccaggtaa ataagagcct ggaatgttaa 88500
aaaaacaaaa cttgaagtca tgtagaagaa caggtagggg gaacaatcct gatctcagga 88560
taggaaggga tattgcttaa aataagacac aggaaaatat aatccatgtt gtgtaaattt 88620
gactacgtta aaacttaaaa ctttcgccaa gcgcggtggc tcacgcctgt aataccagta 88680
ctttgggagg ccgaggtgag cagatcacca ggtcaggaga ttgagaccat cctggctaac 88740
acggtgaaac cccgtctcta ctaaaaatac aaaacattag ccgggcgtgg tggcgggcgc 88800
ctgtagtccc agctacttgg gaggctgagg caggagaatg gcctgaaccc gggaggcgaa 88860
gcttgcagtg agctgagatc gcgccactgc actccagcct gggcgacaga gtgagattcc 88920
gtctcaaaaa aacaaaacaa aacaaagcaa aaaacctaaa actttcatac aataaagtat 88980
acctaagata cttctagaag agaagattta catccaggac gtgtatggaa tttctgcaag 89040
taataagtaa aagacaaggg acatgaagag gcagttcaca aaagaggaag ccaaaatgac 89100
caataaacat gaaaggatgt ttaacctcaa aggaaacaag gaaatgaatt aaaaacatca 89160
aatgccattt caaaactagt aagttggcaa aattaaaaat accaaggatg agaatatgaa 89220
gcatggctat atgagtgcat ggaatggtac agtcactttc attaaaaatg cacataattt 89280
gtttttatt tatttttttg agacagtcta tgtcgcccag gctagaatgc agtggcatga 89340
tctcggctca ccacaatctc tgcctcctgg gttcaagcaa ttctcctgcc tcagcctcct 89400
gagtagctgg gattacaggc acatgccaca acgcccggtt aagttttgta tttttagtag 89460
agacagggtt ttgccatgtt ggccaggctg gtctcgaact cctgacctca ggtgagctgc 89520
ttcccaaagt gctgggatta gaggcgtgag ccaatgctcc tggctgaaaa aaatgcacat 89580
aatttgttac ctagcaattc catgtctaga ggcttatcct agagaaattc ttgcttatat 89640
gcataggaag acgtgtacta gaatgttcac tagttgaatg tttaagtgaa aattaggaaa 89700
taaagtaaat gttcattaac aggaaaatga gtaaaggtat atttataaaa caattaagta 89760
gctaaaatga ataaactaga gctgcgtgaa tgaactagaa ctggttcaat agtcatgtca 89820
gattattgaa tgaatacagg tcagatatgt atagagtgtc atttgtgtaa ttaatttttt 89880
ttttttttt gagatggagt ctcactctgt tgcccaggct ggagtgcagt ggcgtgatct 89940
cagctcactg caacctccac ctcctgggtt aaagtgattc tcctgcctca gcctcccgag 90000
tagttgggat tacaggcatg caccaccatg cccagctcat tttcctattt ttagtggcca 90060
cagggtttca ccatgttggc caggctggtc ttgaactcct gacctcaagt gttccaccca 90120
acttggcctc ccaaagtgct aggattacag gcgtgagcca ccgtgctcag ccatttgcgt 90180
gatttttaaa gatgtgcaga ataatgccat taaaaaaaat acacatacat gtatatatat 90240
acacgtttgg ctgggtgtgg tggctcacac ctgtaatccc agcactttgg gaggctgagg 90300
caggaggatc acttgagccc aggtgtacaa gactagcctg ggcgagatag caagacccca 90360
tctcaacaac agaaaggata attaggtatg gtggcatgag aggatcactt gagcccagga 90420
gttcgagtgt tatcaggcca ctgcactcta gcctggacaa caaagcaaga ccgtgtctca 90480
aaaaaataaa aataaaaagt atttgtatgt ggtcatagtc aaaaaacgta catggaagga 90540
aaatgtcttt atttatttat ttatttttt ttttttaaga cagagtcttg ctctgtcacc 90600
caggctgggg tacagtggtg taatctcagc tcaccgcaat ctcggcctcc cgggttcaag 90660
cgattcttct gcctcagcct tctaagtagc tgggactaca ggtacccgcc accacaccct 90720
gctaattctt gtgttttcag tagagacagg gtttcaccat gttggcaagg ctggtctcga 90780
actcctgacc ttaagtgagc cacccgcctt ggcctcccaa agtcctggga ttacaggtgt 90840
gagccactgc gcttggccag gaaatatcta atttagtaag tatttatatc tgggaaagga 90900
agggtcaggt ggtgattcat aggaactcta aagtctatgt ataatactta gggggacaga 90960
aggaaataaa gcaaaatgct gatatttgat tgttgagttg tgtatatgtt agaagtataa 91020
cataggagat ctgattgata gtaggagaat gtttttaggt ggtaaaagtg gaaccgtggt 91080
ggtttgtttt ggcagtagaa tcagttggtc atagtttgta tgtggaaggt aataaacaga 91140
ccatgttaag gatgacttcc ggaattttgg tctgagtagt gggtggatga cagtgtcatt 91200
catgagggaa gatgaagact gaggtaggaa caggtttggg agaagatgac atgttccctt 91260
ttagacaagt ggaattatgg aagatggcag gtaggtggtt agctatatga atttgagata 91320
aaagatttag gatggagata taaatttagg agtaacagcg tatctatggt attgtaagcc 91380
ttaagaatgg gtaggatcag ccaggaaata cagatgtata tgcagaagag aggagtcaag 91440
gaagccaaga caagttaatg tttaaagtga gtgatgtagt ccatgggcag atgctgctga 91500

gagggctgca aacaccagtg accctacaac atttttaaat gtcgtcttcc tgacagcagt 91560
gatcagtacc tgcaacgatc ttatttattt ttttcatgtt agtctccaca cacttgaatg 91620
tagacttttt gaaggcaaaa tcattgcctt ttctgagctg ggagcatgtc tggcacatac 91680
caagcactca acagttgatg tattgacttc atccagatac tctgagggcg agttatttcc 91740
tgctactagc ctttcacctt tcaatgttta agagcacaaa tacagagatg ggcacgtttt 91800
ggcatttctt attttgataa ccttttcctg gtaagatttt ttaatgttga aaaaaaaaaa 91860
caagaaaaga gggttaaaaa tagtcttatg tcagatcctg tgatagaatt cacacttggc 91920
ttaagctgct gggcaccttc ctatcttgga tgtcatatta gcttatctac agcagaattt 91980
ttactgtttt atgtagtaag gaagcaatta tatgattatt ttacagacaa attattcttt 92040
atcttttatt tttttagacg gagtctctct ttgtctccca ggctggagta cagtgtcgcg 92100
atctcggctc actgcaacct ccgcctcctg ggttcaagca attctctgcc tcagcctccc 92160
aagtagctgg gcttacaggt gtccgccacc acacccagct cattgttttg tatttttagt 92220
agagatgggg tttcaccatg ttggccaggc tggtcttgag ctactgacct caggtgatcc 92280
acccgccttg gcatcccaaa gtgctggaat tacaggcgtg agccaccgtg cctggcccag 92340
acaaattatt atactctgag tgttagaggc ttaggatgtt ttcacttgat gctatgggag 92400
gaataagtaa taagatatga tacacaacca aagacctttc ttcactatgc ttctagtagc 92460
tagtactatg gatgacacat ggtaataata ttggttagca tttgtcctca atttactgtg 92520
ctagttactc ttctaagccc cttacaggta tatatttttt ttcatcaata atcctctaag 92580
gtagttttta ttattgacct aattttataa atcaagaaaa ttaagaccca gagaagtaag 92640
taacttgtcc aagatcacat ggcttataag tggtagagcc agaatttgac cccagatgtt 92700
gtgactacat tgtctctcca taagcaggtt caactctttt gactggatgc tgttccaagg 92760
tcacttcctt agagaagcct ttgctgacaa ctaccctcct gtgccctcct ccaaggctgt 92820
ccattgttct agaactttga atactcatct tagaataaag ctggtctaat ttttacagtg 92880
ttatagaatg gatctctgac tgcaaaagtt ggtcataatt atctttttat gttctagtga 92940
aaggcaaaga acaagagaag acctcagatg tgaagtccat taaaggtaag ttctgccctt 93000
ggcagtccac tgcattaaaa agtgatgtgc tttgcatttg tgagttcttt aatcctgtta 93060
tactctctct tttggcatta atcatttctg ccttatttta taattactta tgattttgat 93120
ttatttccct ctttaacctg tataatgctt taacatctag catataataa gtaggctttt 93180
ttttttttt ttttttgga gacggagtct tgctctgtta cccaggctgg agtgcagtgg 93240
cgcgatcttg gctcactgca agctctgtct cccgggttca caccattctc ctgcctcagc 93300
ctccccagca gctgggacta caggtgcacg gcgccacgcc tggctaattt tttgtatttt 93360
ttagtagaga cagagtttca ccatgttagc cagtatggtc tcgatctcct gaccttgtga 93420
tccgcccgcc tcggcctccc aaagtgctgg gattacaagc gtgagccacc gcacccggcc 93480
gtaagtaggc ttttttacc ttaattttat ttttttgaga tggagtcttg ctcttatccc 93540
caggctggag tgcagtggtg ccatctcggc tcactgcagc atccacctcc cgggttcaag 93600
cgattctcct gcctcagcct cccgagtagc tgggattaca ggtggccgcc accatgccca 93660
gctaattttt gtatttttag tagagacagg gtttcaccgt gttggccagg ccagtctcaa 93720
actcctgacc tcaagtgatc cactcgcctt ggcctcccaa agtcctggga ttacaggcgt 93780
gagccaccat gcctggccat aagtaggctt ttactgagcc ttgtgtgtat tggctatcct 93840
agtgattaca gtgaaccagt gcccttctta ttaatcacac atttaattgt tccctaaaag 93900
tgattagttc actttattta tttagtaaga caaaaaatga agaatactct taactgagca 93960
gtctgttaac tgtaggaaag cactgacact tataaggctt agttttctgt catttatcca 94020
gaagtatggt tgattacagt ttttactttt ttatttgaat gaacaacctt aatttaaaat 94080
atattttgtt tatttttttgt tgggatcgat acattgtcct tgtttataga ttagagcatg 94140
ctttttaaag atgctgtatt actcactgat tttatttgtc cagtgtacag agattgaagt 94200
gggaaaatta taatggaaat tgtttccata gtcattacat attaatttca tcaatttatt 94260
tccataaaat ctgtagattg ctacttattt agatttttcc ttcaaatgtt tttatgttgt 94320
attgcttgca ctgagtattt attctatatg ctcaatttgc tggagaagaa gactaattat 94380
aacttaggca agttgtaaaa ttagggaaaa aagtaaggta ccttacagcc tagtttactt 94440
atttcttatg taaagccagt tagattccac attagttcaa actgccttct ttgagcaaaa 94500
cttgattggc agtgataaag gcttaaagcc cttctcaagc agagacctgt aaagactaga 94560
tctgactgta gtagaaggaa ggaacttaga tgtttcaggc agtgagaaca ccagtcttcc 94620
actctaaact ttgccactaa cagtatgacc ttgggaagtt gtaactttct tcagattctt 94680
catttgttga atgggggat tggcctagct aatttctaaa tctctactgg gctaaaaaat 94740
tctgtgctta tactctgatt atgaagtaca taatctgtgc ttaacattca ctgacttatc 94800
cttaggataa tacagaagca gtacaagaaa cagcccctca agatgtttgc agtctggtta 94860
gaaagacaaa cttatacaca gaacagtagc aaatagacca aaataataat agctgccatt 94920
tatagaacac ttcttctgtt ctgggcatta gacaaaaact gactataacg gtgaacaaaa 94980
aagacttagg tcctgccctc attgaactta cagattagta ggggagagga acattaatca 95040
agtaattcca cagatggctt agcctagatt ggtagtgatg gaagtaaaga gatgtgaacg 95100

gacttgaaaa aaaattcgga ggcaaaatgg atagaagttt attattgatt aaatatgagg 951
tgtgagagag agggatattt aagattgata cctaccttct ggcttgccta acagaaccaa 952
aacaggaaat tatatgttca gttttgttat gttgggtggg aggtgctttt gagtcattca 952
tttatatatg ttatatatgt tattttatat gcatagtaat tttaaggtct gagttttaaa 953
ccaaaggtta gagagtgatt ttttagagtc tagcaaacct aagttgaaat cctgcctgtt 954
gaaatggctg tttactagct cattaaccta gggcaaagta ttcaacttgt tttcattttt 954
gtcttcatct ctaaaatgag gaaaatatgg tcttacaaga ttgtcctgag agatagatga 955
aataatatcc aaaaaaaaaa aaggtacata gagaaactcg tatagtgcct ggtatatagt 955
aggtcctcca ttggtagcta tcattatcta gttttaacat agccttcagt ttgttgaatt 956
agtcaaactg agtgaagcac tgcaaggaat tcagaggaat ttgagatcaa caaatgattt 957
ctgaagttta gggaagactt catggcaatg acacttacct tgtataaaag ttgaagaata 957
agaaagattt gaatgagaga ttctttctct tctccctacc agcccagctt cttatttgag 958
gatatattgg gcaaaggggc cttcagacaa gtagagggag atttttacag aaagattgag 958
atgaaggtat agaaggctgt aaagaccaga aaagagaatt gagacagagg aagcaggaag 959
ccactgtagg tttttgagca agatattgat gctgtaagta tggtgtttat gaaaggttag 960
tctggaagag atttgcagga tggagacccc ggaagttttt ttgttataat acagaaagac 960
ttgcactgag ggtgaggtgt taaaaataaa caggtaagta aatgtttaaa catcttgaag 961
gaaaagtcaa caaatcttgg caagtaaaca gataacagtg aaaaagaatg ggaccaagat 961
tttgagtttt ggagactggt ggattgaaca gacagggaaa ttgagaggag aatcagatga 962
tgatgtttta agttgatatt tagacagatt gtgcttgaga tggtaaagtc aatgtgggtg 963
ggaatgctta gtagcgagta atcagtgata caagaccaaa gcccaggtca aagacaagtc 963
acagatacag atcagggctt tttcatctgc tccacagagg tgtaccctag gagctgttgc 964
aaacagtcca tgtggagggt gtgagtaaga tgtttccctt gaatttgcca gaattacttt 964
tttgttgttg ttgttgtttt ttctgagaca gattctcgct ctgttgccca ggctggaggg 965
cagtggcgag atcgcgcagc tcactgcaac ctctgcctct cgggttcgag tgattctcct 966
gcctcagcct cccaagtagc tgggattaca ggcttgtgcc accaagccca gctaatttct 966
tttgtatttt tagtagagat ggggtttcac catgttggcc agactggtct cgaactcctg 967
gcctcgtgat ctgcctgcct cagcctccaa aagttctggg attacaggcg tgaaccactg 967
cacccggtcc cttgttaagt ttattttggt gggaagcaaa ggaggtttca gcttttaaaa 968
agtttgaaaa ttattgctct ggtaattaatt aaagatttga gagtaaatat gctttctagc 969
agaaagaata aaagaagaac agatagcctc aagaagggga gccaaagaag caggctatat 969
ctgacacact gggtgttgat aaatgggtat taaaagaatg agagcaatga gcagatagaa 970
gaggaaatta ggagagtata ataccatgga gaccaagaaa gatagactat caggaaggag 970
tggtaaaaat aagttactag ttctaagaga gatgttaaga gggaccgggg aaagccttgt 971
acaaatgagt tagtagcatt ttacattata tacatctaat taagaaacaa tgcgagagtc 972
tcaccattcc tatagactct tacttgtact tgtctgaaca cgaaaactgg cttttgttta 972
taaataagct aaaaattatt ttgctccaat ttctcatgaa aataaaaata aaccttcttt 973
taacattgaa aaaatagttt gaagacagtc actcttcatt ttgtaattcc cacaactatt 973
attgaatgac tgaaattatc tttattctga agccaaaggg gtgatactga tatttcttca 974
gactactaaa aatatatttt atgaattttt agtgtgcttt atctttttt gttttttttt 975
ttgagatgga gtttcactcc cgttgctcag gctggagggc agtggtgcaa tctcagctca 975
ctgcaacctt cgcctcccag attcaagcaa ttctcctgcc tcggtctccc aagtagctgg 976
gattacaggc acctgccccc acacccagct aatttttttgt atttttagta gagacagggt 976
ttcaccatgt tggtcaggct ggtcttgaac tcctgacctc aggtgatcca cccaccttgg 977
cctcccaaag tactgcgatt gcaggcatga gccaccatgc ctggcctgag gaatattttt 978
ctaggttccc cccaccccaa gcatttattc tgcaatttta gttttgttcc taaagcaagc 978
aaggtttaag gatttaaaaa taatccgtat tttagaatgc tttctggctt tgttacttttt 979
tatccacagt agaagttctc agagaatgat ctccctcttt taatttaact ttttggcaca 979
gtattttgag aattataaat aatattagaa tgttttctgg ctgggtgtgg tggctcatgc 980
ctgtaatcct ggctacttgg gaggctgagg caggagaatc acttgaacat gggaggcaga 981
ggttgcagtg agccgaggtc atgccactgc actccagcct gggtgacaga gcaagactct 981
gtctgggaaa aaaaaaaaaa aaaaaaagag tgttttcttt cctattttcc accacttgat 982
taagttactt ttcctcttaa gtatttttttg ctgagtatgc tgacttaaga gtaatgttac 982
aaaatttaat ttttaaagtt ctctgaaagc ccctttatga gagttttagg ctatcaaatt 983
gtgtttaatt cttaacaatt ttttgaaaaa ttatagcttc aatatccgta cattccccac 984
aaaaaagcac taaaaatcat gccttgctgg aggctgcagg accaagtcat gttgcaatca 984
atgccatttc tgccaacatg gactcctttt caagtagcag gacagccaca cttaagaagc 985
agccaagcca catggaggcc gctcattttg gtgacctggg taagtaacta tcatttttta 985
ttaacttgta ttagaaggat ttgagtacaa tatgtgaaac ttctgtcata ggatacagaa 986
ctatataatt ggaaagtgct ttggaaaaaa tgtatttaaa ataacagcta caagtataat 987

gagggctgca aacaccagtg accctacaac atttttaaat gtcgtcttcc tgacagcagt 91560
gatcagtacc tgcaacgatc ttatttattt ttttcatgtt agtctccaca cacttgaatg 91620
tagacttttt gaaggcaaaa tcattgcctt ttctgagctg ggagcatgtc tggcacatac 91680
caagcactca acagttgatg tattgacttc atccagatac tctgagggcg agttatttcc 91740
tgctactagc ctttcacctt tcaatgttta agagcacaaa tacagagatg ggcacgtttt 91800
ggcatttctt attttgataa ccttttcctg gtaagatttt ttaatgttga aaaaaaaaaa 91860
caagaaaaga gggttaaaaa tagtcttatg tcagatcctg tgatagaatt cacacttggc 91920
ttaagctgct gggcaccttc ctatcttgga tgtcatatta gcttatctac agcagaattt 91980
ttactgtttt atgtagtaag gaagcaatta tatgattatt ttacagacaa attattcttt 92040
atcttttatt tttttagacg gagtctctct ttgtctccca ggctggagta cagtgtcgcg 92100
atctcggctc actgcaacct ccgcctcctg ggttcaagca attctctgcc tcagcctccc 92160
aagtagctgg gcttacaggt gtccgccacc acacccagct cattgttttg tatttttagt 92220
agagatgggg tttcaccatg ttggccaggc tggtcttgag ctactgacct caggtgatcc 92280
acccgccttg gcatcccaaa gtgctggaat tacaggcgtg agccaccgtg cctggcccag 92340
acaaattatt atactctgag tgttagaggc ttaggatgtt ttcacttgat gctatgggag 92400
gaataagtaa taagatatga tacacaacca aagacctttc ttcactatgc ttctagtagc 92460
tagtactatg gatgacacat ggtaataata ttggttagca tttgtcctca atttactgtg 92520
ctagttactc ttctaagccc cttacaggta tatatttttt ttcatcaata atcctctaag 92580
gtagttttta ttattgacct aattttataa atcaagaaaa ttaagaccca gagaagtaag 92640
taacttgtcc aagatcacat ggcttataag tggtagagcc agaatttgac cccagatgtt 92700
gtgactacat tgtctctcca taagcaggtt caactctttt gactggatgc tgttccaagg 92760
tcacttcctt agagaagcct ttgctgacaa ctaccctcct gtgccctcct ccaaggctgt 92820
ccattgttct agaactttga atactcatct tagaataaag ctggtctaat ttttacagtg 92880
ttatagaatg gatctctgac tgcaaaagtt ggtcataatt atctttttat gttctagtga 92940
aaggcaaaga acaagagaag acctcagatg tgaagtccat taaaggtaag ttctgccctt 93000
ggcagtccac tgcattaaaa agtgatgtgc tttgcatttg tgagttcttt aatcctgtta 93060
tactctctct tttggcatta atcatttctg ccttatttta taattactta tgattttgat 93120
ttatttccct ctttaacctg tataatgctt taacatctag catataataa gtaggctttt 93180
ttttttttct ttttttgga gacggagtct tgctctgtta cccaggctgg agtgcagtgg 93240
cgcgatcttg gctcactgca agctctgtct cccgggttca caccattctc ctgcctcagc 93300
ctccccagca gctgggacta caggtgcacg gcgccacgcc tggctaattt tttgtatttt 93360
ttagtagaga cagagtttca ccatgttagc cagtatggtc tcgatctcct gaccttgtga 93420
tccgcccgcc tcggcctccc aaagtgctgg gattacaagc gtgagccacc gcacccggcc 93480
gtaagtaggc tttttttacc ttaattttat ttttttgaga tggagtcttg ctcttatccc 93540
caggctggag tgcagtggtg ccatctcggc tcactgcagc atccacctcc cgggttcaag 93600
cgattctcct gcctcagcct cccgagtagc tgggattaca ggtggccgcc accatgccca 93660
gctaattttt gtatttttag tagagacagg gtttcaccgt gttggccagg ccagtctcaa 93720
actcctgacc tcaagtgatc cactcgcctt ggcctcccaa agtcctggga ttacaggcgt 93780
gagccaccat gcctggccat aagtaggctt ttactgagcc ttgtgtgtat tggctatcct 93840
agtgattaca gtgaaccagt gcccttctta ttaatcacac atttaattgt tccctaaaag 93900
tgattagttc actttattta tttagtaaga caaaaaatga agaatactct taactgagca 93960
gtctgttaac tgtaggaaag cactgacact tataaggctt agttttctgt catttatcca 94020
gaagtatggt tgattacagt ttttactttt ttatttgaat gaacaacctt aatttaaaat 94080
atattttgtt tatttttttgt tgggatcgat acattgtcct tgtttataga ttagagcatg 94140
ctttttaaag atgctgtatt actcactgat tttatttgtc cagtgtacag agattgaagt 94200
gggaaaatta taatggaaat tgtttccata gtcattacat attaatttca tcaatttatt 94260
tccataaaat ctgtagattg ctacttattt agatttttcc ttcaaatgtt tttatgttgt 94320
attgcttgca ctgagtattt attctatatg ctcaatttgc tggagaagaa gactaattat 94380
aacttaggca agttgtaaaa ttagggaaaa aagtaaggta ccttacagcc tagtttactt 94440
atttcttatg taaagccagt tagattccac attagttcaa actgccttct ttgagcaaaa 94500
cttgattggc agtgataaag gcttaaagcc cttctcaagc agagacctgt aaagactaga 94560
tctgactgta gtagaaggaa ggaacttaga tgtttcaggc agtgagaaca ccagtcttcc 94620
actctaaact ttgccactaa cagtatgacc ttgggaagtt gtaactttct tcagattctt 94680
catttgttga atgggggat tggcctagct aatttctaaa tctctactgg gctaaaaaat 94740
tctgtgctta tactctgatt atgaagtaca taatctgtgc ttaacattca ctgacttatc 94800
cttaggataa tacagaagca gtacaagaaa cagcccctca agatgtttgc agtctggtta 94860
gaaagacaaa cttatacaca gaacagtagc aaatagacca aaataataat agctgccatt 94920
tatagaacac ttcttctgtt ctgggcatta gacaaaaact gactataacg gtgaacaaaa 94980
aagacttagg tcctgccctc attgaactta cagattagta ggggagagga acattaatca 95040
agtaattcca cagatggctt agcctagatt ggtagtgatg gaagtaaaga gatgtgaacg 95100

gacttgaaaa aaaattcgga ggcaaaatgg atagaagttt attattgatt aaatatgagg 95160
tgtgagagag agggatattt aagattgata cctaccttct ggcttgccta acagaaccaa 95220
aacaggaaat tatatgttca gttttgttat gttgggtggg aggtgctttt gagtcattca 95280
tttatatatg ttatatatgt tattttatat gcatagtaat tttaaggtct gagttttaaa 95340
ccaaaggtta gagagtgatt ttttagagtc tagcaaacct aagttgaaat cctgcctgtt 95400
gaaatggctg tttactagct cattaaccta gggcaaagta ttcaacttgt tttcattttt 95460
gtcttcatct ctaaaatgag gaaaatatgg tcttacaaga ttgtcctgag agatagatga 95520
aataatatcc aaaaaaaaaa aaggtacata gagaaactcg tatagtgcct ggtatatagt 95580
aggtcctcca ttggtagcta tcattatcta gttttaacat agccttcagt ttgttgaatt 95640
agtcaaactg agtgaagcac tgcaaggaat tcagaggaat ttgagatcaa caaatgattt 95700
ctgaagttta gggaagactt catggcaatg acacttacct tgtataaaag ttgaagaata 95760
agaaagattt gaatgagaga ttctttctct tctccctacc agcccagctt cttatttgag 95820
gatatattgg gcaaaggggc cttcagacaa gtagagggag atttttacag aaagattgag 95880
atgaaggtat agaaggctgt aaagaccaga aaagagaatt gagacagagg aagcaggaag 95940
ccactgtagg tttttgagca agatattgat gctgtaagta tggtgtttat gaaaggttag 96000
tctggaagag atttgcagga tggagacccc ggaagttttt ttgttataat acagaaagac 96060
ttgcactgag ggtgaggtgt taaaaataaa caggtaagta aatgtttaaa catcttgaag 96120
gaaaagtcaa caaatcttgg caagtaaaca gataacagtg aaaaagaatg ggaccaagat 96180
tttgagtttt ggagactggt ggattgaaca gacagggaaa ttgagaggag aatcagatga 96240
tgatgtttta agttgatatt tagacagatt gtgcttgaga tggtaaagtc aatgtgggtg 96300
ggaatgctta gtagcgagta atcagtgata caagaccaaa gcccaggtca aagacaagtc 96360
acagatacag atcagggctt tttcatctgc tccacagagg tgtaccctag gagctgttgc 96420
aaacagtcca tgtggagggt gtgagtaaga tgtttccctt gaatttgcca gaattacttt 96480
tttgttgttg ttgttgtttt ttctgagaca gattctcgct ctgttgccca ggctggaggg 96540
cagtggcgag atcgcgcagc tcactgcaac ctctgcctct cgggttcgag tgattctcct 96600
gcctcagcct cccaagtagc tgggattaca ggcttgtgcc accaagccca gctaatttct 96660
tttgtatttt tagtagagat ggggtttcac catgttggcc agactggtct cgaactcctg 96720
gcctcgtgat ctgcctgcct cagcctccaa aagttctggg attacaggcg tgaaccactg 96780
cacccggtcc cttgttaagt ttattttggt gggaagcaaa ggaggtttca gcttttaaaa 96840
agtttgaaaa ttattgctct ggtaattaatt aaagatttga gagtaaatat gctttctagc 96900
agaaagaata aaagaagaac agatagcctc aagaagggga gccaaagaag caggctatat 96960
ctgacacact gggtgttgat aaatgggtat taaaagaatg agagcaatga gcagatagaa 97020
gaggaaatta ggagagtata ataccatgga gaccaagaaa gatagactat caggaaggag 97080
tggtaaaaat aagttactag ttctaagaga gatgttaaga gggaccgggg aaagccttgt 97140
acaaatgagt tagtagcatt ttacattata tacatctaat taagaaacaa tgcgagagtc 97200
tcaccattcc tatagactct tacttgtact tgtctgaaca cgaaaactgg cttttgttta 97260
taaataagct aaaaattatt ttgctccaat ttctcatgaa aataaaaata aaccttcttt 97320
taacattgaa aaaatagttt gaagacagtc actcttcatt ttgtaattcc cacaactatt 97380
attgaatgac tgaaattatc tttattctga agccaaaggg gtgatactga tatttcttca 97440
gactactaaa aatatatttt atgaattttt agtgtgcttt atctttttt gttttttttt 97500
ttgagatgga gtttcactcc cgttgctcag gctggagggc agtggtgcaa tctcagctca 97560
ctgcaacctt cgcctcccag attcaagcaa ttctcctgcc tcggtctccc aagtagctgg 97620
gattacaggc acctgccccc acacccagct aatttttgt atttttagta gagacagggt 97680
ttcaccatgt tggtcaggct ggtcttgaac tcctgacctc aggtgatcca cccaccttgg 97740
cctcccaaag tactgcgatt gcaggcatga gccaccatgc ctggcctgag gaatattttt 97800
ctaggttccc cccaccccaa gcatttattc tgcaatttta gttttgttcc taaagcaagc 97860
aaggtttaag gatttaaaaa taatccgtat tttagaatgc tttctggctt tgttactttt 97920
tatccacagt agaagttctc agagaatgat ctccctcttt taatttaact ttttggcaca 97980
gtattttgag aattataaat aatattagaa tgttttctgg ctgggtgtgg tggctcatgc 98040
ctgtaatcct ggctacttgg gaggctgagg caggagaatc acttgaacat gggaggcaga 98100
ggttgcagtg agccgaggtc atgccactgc actccagcct gggtgacaga gcaagactct 98160
gtctgggaaa aaaaaaaaaa aaaaaaagag tgttttcttt cctattttcc accacttgat 98220
taagttactt ttcctcttaa gtatttttg ctgagtatgc tgacttaaga gtaatgttac 98280
aaaatttaat ttttaaagtt ctctgaaagc ccctttatga gagttttagg ctatcaaatt 98340
gtgtttaatt cttaacaatt ttttgaaaaa ttatagcttc aatatccgta cattccccac 98400
aaaaaagcac taaaaatcat gccttgctgg aggctgcagg accaagtcat gttgcaatca 98460
atgccatttc tgccaacatg gactcctttt caagtagcag gacagccaca cttaagaagc 98520
agccaagcca catggaggcc gctcattttg gtgacctggg taagtaacta tcatttttta 98580
ttaacttgta ttagaaggat ttgagtacaa tatgtgaaac ttctgtcata ggatacagaa 98640
ctatataatt ggaaagtgct ttggaaaaaa tgtatttaaa ataacagcta caagtataat 98700

gggtagctgt gttgtgttcc tgtaaatata gaatataaag catgcccagt agaaaaacaa 98760
gcatttccag aagaaatata tctgatcact aaatataaat atatgaaaaa gatgtctcac 98820
tttattactg agggaagtgc aaattaaaat aatcagttaa tgttctccta acacattagc 98880
atatttttta aagtttgaca atttgaatgt cagtgaagat gcagggaaat acccctccta 98940
tttagtgata atataatctg gtgaagactc tttggaaagc aatttggaaa tcagtataaa 99000
atatgcatgt catttaggcc actctttcta agacctagcc ctcagatatg ctcattcata 99060
tgtgcaggtg tgtatgtgtg tgtgtgtgtg tgtgtgtgtg tgtatatgta tgtatgtatg 99120
tatgtatgta tgtatgttga aggctattca ttatagtatt gtttgtgata gcaaaaaatt 99180
atggacaaca tataaatatc tgttatagggg aaataaccaa attgtggtat acgcatgctc 99240
tggagtataa tatagccatt tgtttctatt tatttatttt cttgagacag ggttttactc 99300
tgttgcccag gctggagtgc agtggtatga tcatggttca ctgcagcctt cacctcctgg 99360
gcacaagcca ttctctcgcc tcagcctcca gagttactag gactgcaggc atgtgtcacc 99420
acacccagat aatttttaa ttttttgtag agacagggtc tcactatgtt gcctaagctg 99480
gtctcaaact cctggcctca agcaattctc ccacacaggc ctcccaaagt gctgggatta 99540
ccaacgtgaa ccaccacacc tggttcagtg tagccattta gaaatctaaa aaagacgtgg 99600
gaaaatgtct aaggcatgtt taaatgtgag aaaagcaagt cacagtatgc atggtaaaat 99660
ccgttatatt aaaataagtt cttccaaaac aaaaacatat gcaggagacc tttatttgt 99720
cagtatttct tacccaaatt tctgcactta gaaaattgca tgtcatgttg tcataagttg 99780
aaaaaaagat ccatgaacca atggacttct aataaaatca gtcctgcttt tgacatctct 99840
ctctactttt gtgtatattc aaaccagagt gtcaatgtgt ttgtggggca cacttagcaa 99900
taatacatag cagacaaaat gcatatagct cagagagtaa aattgtaagt tttgctagat 99960
cactcataaa ttgctgatga gaatttaaaa tggtgcagat gctctggaaa acaggcagtt 100020
tctttctttc ttttttttt tctttttgag acagggtctc actctgttgc gcaggctgga 100080
gtacagtggc gtgattacaa ctcactgcag cctcaccctc ctcaggttca ggtgatcctc 100140
cctcagtctc ctgagtagct gggactatag gcatgcacca ccacgcctgg ctaatttttg 100200
tatttttttt ttttttttt gtagagacgg ggtttcgcca tgtttcccag gctggtctca 100260
aactcctgga atcaagcgat ccacttgcgt aggcctccca aagtgctggg attacgggcg 100320
tgagctactg tgcctggcct aggcagtttg tttgtttgtt tgtttgtttg tttatttatt 100380
tgtagacgga gtctcacagg ctggagtgca gtggcccaat ttttggctca ctgcaacctc 100440
cgcctcccag gttcaagcta ttctcctgcc tcagcctcct gagtagctgg gatgacaggt 100500
gcctgccata atgcctggct gatttttgta tatttagtag atatggggtt tcaccatgtt 100560
ggtcaggctg gttttgaact cctgacctca ggtgatcagc ccgcctcggc ctcccaaagt 100620
gctgggatta caggcatgag ccgtcatccc tggctggtgg tttcttatga cgtgaaacat 100680
gcaattacca tatgacctag cagttgcact ctgtatttat cccagataaa tgaaaactta 100740
ccttccaata aaaacctgtg cacaaatgtt catagcagct taatattgaa aaactggatg 100800
ttcttcagca ggtgaatgaa ctggttcatt cataccatgg aataccattc agcaataaaa 100860
aggaacaaac tgttgataca tttaaccacc tggatgaata tcaagggaat tatgctgtca 100920
gacaaaaacc agtccctaaa gactacatat agtatgattc cgtttggata atattcttga 100980
aatagagaaa ttaagagaaa tgaaaagatt agtgtttgcc agatgttaga gacagggagg 101040
tgagaggggt aagtgggtgt agttataaaa gtgcaacatg agggatcttt gtgatgttga 101100
agttgtatct tggcagtgga tgcagaaatc tcaatgtgat aaaattacaa agaactaaaa 101160
acaagaatga gtatagataa aactggggaa atctgaacaa gttagagtgt tgtatcactg 101220
tcagtatctt agagtgatat tgtactatag ctttgcaaga tgttaccatg ggagaaacta 101280
aagtgtacaa gggatctcta ggtattatta ttttttaga gatggggttt cactatgttc 101340
cccaggccgg tcttgaactc ctgggctcta gtgatccgcc tgccccagcc tcctaaagta 101400
ctggaattac aggcgtgagc gaccatgcct ggccctttca gtattgtatc ttagaacttc 101460
atgtgaatct agcattatct catagaattt aattaaaaga aattgtaaac ctcacagaag 101520
atcagaattt cctcaagttt gtgatgttga caaagatgaa ctagttgaca ctgacagtaa 101580
gactgaggat gaagacacga cgtgcttcaa aaaaatgatt tgaatatcaa tggattaaga 101640
agaactcttt tgacaaattg atgaaaccct cagtcagttt tataagaatg cccatcttta 101700
tgatcatgct atgaaagcca atttttaaaa aaatttttg tctttcctaa caattagctt 101760
gtggttataa tttaaattta gttaaatata agataaatga ttttttatta agtttagttt 101820
cattttcaa ggtacgatct caaagctact ctttaaccta ctatgaatga ataatgctga 101880
gttcataaca tctttgtaga tatatccaca attttccctc aggataagtg cctacaagtg 101940
gaattactgg actgaaaata atgcagtttg ctaagacttt gctatctgtt cctgaatgct 102000
cctccaaaaa ggttttgcca gtttacatcc tcatgaccag cgaatgagag tgttgcctat 102060
tttcctgtgc ccttgttact gcttaataat ttttgaaaaa aatctaattt gacagacaaa 102120
aatgcatttt atgttaattt gcttttctgg gatttttaat gaggttgagt atagttttta 102180
atatttttat tggccccttt ggaactagta tcataagttt tttttcttaa gaatttatgt 102240
agtctgggct gggcgcagtg gctcacgcct gcaatcccag cactttggga ggccgaggtg 102300

ggtggattgc cgaaggtcag gagtttgaga ccatcctgac caacatggtg aaaccgaatc 102360
tctactaaaa gtacaaaaac tagctcagcg tggtggcggg tgcctgtaat cccagctact 102420
taggaggctg agtcaagaga atcgcttgaa cccgggaggt ggaggttggt tgcattgagc 102480
cgagatcgcg ccattgctct ccagcctagg caacaagagt gaaaagtctc aaaaaaaaaa 102540
aaaaaaaaaa aaaaaagaat ttacatggtc tgaattgcca ttaaaagaga tatgagaatt 102600
attgagtaac aaataacttt ttaataattt aggcaagttt tggacgattg tactttgttt 102660
agaaaccaaa agcatagtat ttgtagtttt tttatttact ttagttgcta ggaagtaaac 102720
tttattcaag gtctctggta ccagttgttg ctaaaagtga ttgactaatc tgtcaatctg 102780
aaattatttg ttgctgaact gctaattctt ttgcttctat cttttaggca gatcttgtct 102840
ggactaccag actcaagaga ccaaatcaag cctttctaag accettgaac aagtcttgca 102900
cgacactatt gtcctccctt acttcattca attcatggaa cttcggcgaa tggagcattt 102960
ggtgaaattt tggttagagg ctgaaagttt tcattcaaca acttggtcgc gaataagagc 103020
acacagtcta aacacagtga agcagagctc actggctgag cctgtctctc catctaaaaa 103080
gcatgaaact acagcgtctt ttttaactga ttctcttgat aagagattgg aggattctgg 103140
ctcagcacag ttgtttatga ctcattcaga aggaattgac ctgaataata gaactaacag 103200
cactcagaat cacttgctgc tttcccagga atgtgacagt gcccattctc tccgtcttga 103260
aatggccaga gcaggaactc accaagtttc catggaaacc caagaatctt cctctacact 103320
tacagtagcc agtagaaata gtcccgcttc tccactaaaa gaattgtcag gaaaactaat 103380
gaaaagtgag tatgtgattt tcttgtgtgt acatatgtgt ctcactttct ttttttaatt 103440
tactaagcag aacttcagat gaggaataaa atgattggaa tatttttttt ctcctctaac 103500
tacttgtaaa tttgggagaa tttggagagt gtagtagagt cagatcagtg tatggaaaag 103560
gagcaggagt gactggacct tctaagaagt gtgttatcag aattagtaaa tgaagggtca 103620
aatgtcctac ttttcccctc cactgatttt gacatcaaac cattatccac atagccttat 103680
ttcctccctc ggtcttaatt ttattaatat tttactgcac tttgcagata aaatttttaa 103740
aaaattttta aaaattgcca ataagtgaca tttattaagt tcagtgctta gtgtatattt 103800
ggattttatt tattagtcac aagacctttg tgcaggtagt aggcatgatt atctttttt 103860
ttttgagatg gagtcttgct ctgtcgccca ggctggagtg caatggcgcg gtctcggctc 103920
actgcaacct ccgggttcat gccattctcc tgcctcagcc tcccaaatag ctgggactac 103980
aggcgcctgc caccacaccc ggctaatttt tttgtatttt tagtagagac ggggtttcac 104040
catgttcgcc aggatggtct cgatctcctg actttgtgat ccgcctgcct cggcctccca 104100
aagtgctggg attacaggca tgagccaccg cgcccggact gattatctta tttacacatg 104160
agaaaaccag ggcttagaaa ggttaggtaa cttcctctag gttgtacagt aaatgtggac 104220
ctagaagcat tttgacaaga gcacctgttt ttttttcttc tctattagtt tagaaattat 104280
atactcttaa ttatcacctg ggattttgat tagacagcct tcatgttctt tttcatctta 104340
aatgttcttt gtgtcttaaa gggctaagtg atttcttcag atcttttagt tcactcattc 104400
tcagtgaact aaaatgaggt ctaatctgct actgaatcaa gttttcagca tgttatttcc 104460
ttcctccctc cctccctcct tccttccctc aaccaggctc ccgaggagct gggattacag 104520
gcgcccgcca ccactcctgg ctaattttta tattttagta gagacggggt ttcaccatgt 104580
tggtcaggct gatcttgaac tcctgacctc aagtgaccca cctgcctcgg cctcccaaag 104640
tgctgggatt acaggcatga atcaccacac ctgacggcat gttattttca tcgcaaagtt 104700
actgtaagct gggagaagtg gcacacactt gtactcccag ctactcagga agcttaaggt 104760
gagaagattg cttgagccca ggagttttga gaccaacctg ggcaacacag caagacccca 104820
gctcaaacaa agaaaaaaag ttattgaatt ttttatttct atggatcatt ttttgtagtt 104880
tcttattcct ttcacccttc attcccactt ttgatcccat cttttattta tttagtttta 104940
ttaaatgtat atttgtctga taattctgct atctacagtt ttttgtggac ctgactcagc 105000
atttctttgt ttcttcggat tcagactgtt ggtggcttgt gattttagtg atttttggcc 105060
gtgaacatgt ttcttggact tttgtctgtg ggaattctct gtgtactctg tataaattaa 105120
gttacttcag gtgttttgca ttttcttttg ccatgcacct ggggcctggg tcactaccct 105180
tctggtacca cttaaaactg aatttttgtc ttgggtgctc gtactgatcc tgtatgagta 105240
caggtttata cttactgtag aaatatggtg tttgattatg gggtattgtc ccagatggtg 105300
ctggagtatt aatatgctct ctgttaaact taatgtgttg tccctgtaaa actccaaaat 105360
tctgaattcc agaatactac tggccccaaa tgtttaagat aagggcactg cctgtatttg 105420
tttctgcctc ccactatttt ccttagttta acacaaactc acctttttaa aaaacatttt 105480
gagagaattc agtattggga agagtttcta acctgtttct ggaaatggaa gtccaaagtc 105540
tgtttctgta attgtttttt ttttgagatg gagtctcact ctgtcaccca ggctggagtg 105600
caatgacgta ctctcagctc actgcaacct ccacctcccg ggttcaagcg attctcttgc 105660
ctcagccccc tgagtagctg ggattacagg tgcccaccac catgcctggc tgatttttgt 105720
atttttagaa gagatggggt ttcgccatgt tggccaggct ggtcttgaac tcctgacttt 105780
gtgatctgcc cacctcagcc tcccaaagtg ctaggattat gtttctgtaa ttgtaataca 105840
tttattgttt ttagaaactg tctttgcttt agtggtaatt ttcaataaaa atagaaatag 105900

cagtggagtt attaaaagag cattagttac atttttccct ttttcattat cttcaaatat 105960
tatatatagt aagtttgacc tttttaaaat gtatacttgt atcagtttta acacatacat 106020
agattcctgt aactgtcacc actataaggg taaagaacag ttagttcctt caccttttgaa 106080
gtcaagcccc acctctatcc caacacttgg caaccgctga tctttctccg tctcaatagc 106140
tttgcctttt ctctttttttt ttcttatttt tttttttgag acagcgtctt gctctgtcgc 106200
ccgagctgga gtgcagtgag gcaatctcgg ctcactgcaa cctccgcctc ctgggttcaa 106260
gcagttctcc tgccttagcc tccctagtag ctgggattat aggcacgcac caccacaccc 106320
ggctgatttt tttgtatttt tagtagaaat ggggtttcac catgttggcc aggctggtct 106380
caaactcttg acctcaagtg atccacctgc ctcggcctcc caaagtgctg ggattacagg 106440
cgtgagccac tgtgcccaat caggactttt ttttttaaa tttacattca acttgtcatt 106500
tttttcttgt atggattgtg ccttcagagt cacacctaag agccctttgc ctaagcaaag 106560
gtcatgaaga ttttctcata tgtttccttt taaaagtatt gtggttggcc aggtgccatg 106620
gcttatgcct gtaatctcag cactttgaga agctgaggtg ggcagattac gaggtcagga 106680
gatcgagacc atcctggcta atgcggtgaa accccatctc tactaaaaat acaaaaaaaa 106740
aaaaaaatta gccgggcgtg gtggcgggca cctgtagtcc cagctacttg agaggttgag 106800
gcaggagaat agtgtgaacc cgggaggtgg agcttgcagt gagccgagat cgcgccactg 106860
cactccagcc tgggcaacac agtgagactc catctcaaaa aaaaaaaaaa agtattatgg 106920
ttttacactt tacgtttaga tatatatctt ttttgagtta atgtcgtata agtatgaggg 106980
ttacgtcaga ttttttgttt tttgtttatt tttacatatg gatgtctagt tgttctaata 107040
ccatttgttg aaaagacaac ctttactcca ttgaattgcc tttgtacttt tgccatattt 107100
gtctaggcct gtttttggac tccttttttct gtttcatgat gtgtgtgtct attcctttgt 107160
taataccaca tggtcttaat tactgtatag taagtcttaa aattgggtaa tgctggcctt 107220
ataaaacgaa ttgggaagtt tttattttta ctcttatttc cattttctag aagagattgt 107280
gtagaattgg tgtcatttct tctttagata tttggttgaa ttgggaagtg atgccatctg 107340
ggcctagggt tttgtttttt gtgtgtgaga cagagtctca cttctgtcac ccaggttgga 107400
gtgcagtggt gagatcttgg cttactgcaa cctctgcctc ccaggttcaa gttatcctcc 107460
tgcctcagcc tcccaaatag ctgggattac aagcgtgtgc caccatgccc gactaatttt 107520
tgtattttta atgcagacag ggtttcacca tgttagccaa gctggtctcg aacttgtgac 107580
ctcaagtgat tagcccacct tggcctccca aagtgttagg attatagatg tgagccaccg 107640
tgcctggcag gggcctaggg ttttcttttt cagagtattt taaactatga attcagatta 107700
tttaatagat ataggactat ttaagttatc tgtttcttct tgagtgaatt tttactgtag 107760
tttatggcct ttgagtaatt aattgtattg aattgtcaaa tttatgagcg tgtaattatt 107820
tatagcattt cgggtttgta gtggtatccc tcttttattc ctggtgttgg caattgtgtc 107880
ttgtttttct ttgtcagatt gtatagggat ttattagtct tttcaaagaa ctagcttttg 107940
ttttgatttt tctgttgttt tgttttcaat tttattgatt ttctgctctt tattatttct 108000
tttctattat ttctgcttgc tttgggttta ttttactctt tttttttttct ccaagttgct 108060
taaagtagaa acttagattt ctggtttgag acctttcttt tctaagataa gcatttaata 108120
ctgtaaattt ccttctaacc actgctttag ttacaccccc acaaattctg gtattttgaa 108180
ctgagcacaa atgaaatgtt ctaatttccc ttgaatctta ttcttttacc aatgaattat 108240
ttagaaatat gttatttagt ttgcaagcaa ttggagactt ttttcctgtt atttttctac 108300
catttatttc tcatttcatt atattatggt cagagaatat attttgaatg atttcattta 108360
ttaattttta aaaataacat taaaaaattt tttaaaatgt gaatatacca catacagtat 108420
aaagattgta cattctgttt ttggacagtt ttctataaat gtcaagttga tttagttggt 108480
taatgatggt gttcagtttt tctttattct tgctgatact ttgtatgcag ttatatcact 108540
ttattactca gaagagtgtt gaactttcca actacaattt ttttttccaa ttttactttc 108600
agctctatct ggttttgctt catgtatttt gaggctctgt tgttaggtgt gtacacattc 108660
aggatgatat cttctgggtg aattgcctgt tttatcatta tgtaattccc tctttatggt 108720
aattttcctt gttctaagat cagaaatatc tgttgtccaa tttatataga cactgcagct 108780
ttcatttgat tagtgcttgc atggcatatc tttttccatt tttttacttt tgatctacct 108840
ttataattct atttaaaggg ggcttcttgt aggcagcata tagttgggta gtgttattta 108900
tttatttatt tatttattta tttatttatt tattgagaca gagttttgct cttgttgccc 108960
aagctggagt gcagtggtgc aatcctggct taccacaacc tccacctcct gggttgcagt 109020
gattctcctg cctcagcctc ccaagtagct gggattacag gcacgcgcac catgcctggc 109080
tgatttttttg tatttttagt agaaacggat tttcaccatg ttagccaggc tcgtcttgaa 109140
ctcctgacct caggtgatcc acctgctttg gcctcccaaa gtgctgggat tacaggcgtg 109200
agccactgca cccggctgag tcatgttatt tttaatcttt tctcacaata cagggttttt 109260
gttggtaaat ttaattattt taatataaat tttagtataa ttatttacat taaatgtaac 109320
tgttgcactg gggtatttat aatgtgtaaa tataattatt ggtattaata taattatatt 109380
actcataata atattaatat ctttggattt agattaccag tttagtatat gtttttctgt 109440
ttctccctct ttgatttccc ctttttttgct ttttttttttt ttttaattct tatttttttt 109500

tagtatttgt tgatcattct tgggtgtttc ttggagaggg ggatttggca gggtcatagg 109560
acaatagttg agggaaggtc agcagataaa catgtgaaca aggtctctgg ttttcctaga 109620
cagaggaccc tgcggccttc tgcagtgttt gtgtccctgg gtacttgaga ttagggagtg 109680
gtgatgactc ttaacgagca tgctgccttc aagcatctgt ttaacaaagc acatcttgca 109740
ccacccttaa tccatttaac cctgagtggt aatagcacat gtttcagaga gcagggggtt 109800
gggggtaagg ttatagatta acagcatccc aaggcagaag aatttttctt agtacagaac 109860
aaaatggagt ctcccatgtc tacttctttc tacacagaca cagtaacaat ctgatctctc 109920
tttcttttcc ccacatttcc ccctttttcta ttcgacaaaa ctgccatcgt catcatggcc 109980
cgttctcaat gagctgttgg gtacacctcc cagacggggt ggcagctggg cagaggggct 110040
cctcacttcc cagatggggc agccgggcag aggcgccccc cacctcccag acggggcagt 110100
ggccgggcgg aggcgccccc cacctccctc ccggatgggg cggctggccg ggcgggggct 110160
gacccccccac ctccctcccg gacggggcgg ctggccgggc gggggctgac cccccacctc 110220
cctcccagat ggggcggctg gccgggcggg ggctgccccc cacctccctc ccggacgggg 110280
cggctgccgg gctgaggggc tcctcacttc gcagaccggg cggctgccgg gcggaggggc 110340
tcctcacttc tcagacgggg cggccgggca gagacgctcc tcacctccca gatggggtgg 110400
cggtcgggca gagacactcc tcagttccca gacggggtcg cggccgggca gaggcgctcc 110460
tcccatccca gacggggcgg cggggcagag gtggtcccca catctcagac gatgggctgc 110520
cgggcagaga cactcctcac ttcctagacg ggatggcagc cgggaagagg tgctcctcac 110580
ttcccagacg gggcggccgg tcagaggggc tcctcacatc ccagacgatg ggcggctagg 110640
cagagacgct cctcacttcc cggacggggt ggcggccggg cagaggctgc aatctcggca 110700
ctttgggagg ccaaggcagg cggctgggaa gtggaggttg tagggagctg agatcacgcc 110760
actgcactcc agcctgggca acattgagca ttgagtgagc gagactccgt ctgcaatcct 110820
ggcacctcgg gaggccgagg caggcagatc actcgcggtc aggagctgga gaccagcccg 110880
gccaacacag cgaaaccccg tctccaccaa aaaatgcaaa aaccagtcag gtgtggcggc 110940
gtgcgcctgc aatcccaggc actctgcagg ctgaggcagg agaatcaggc agggaggttg 111000
cagtgagccg agatggcggc agtacagtcc agcctcggct ttcacaactt tggtggcatc 111060
agagggagac cggggagagg gagagggaga cgagggagag ccccttttt gctttctttt 111120
ggattatttg aatttttcct taaatttatt tatcttactt atttatttat ttttttgagt 111180
gattctcctg ccacagctcc caagtagctg ggactgcagg catgtgccac tacacccagc 111240
taatttttt gtatttttag tagagacagg gtttcaccat attggccagg ctggtcttga 111300
actcttgacc tcaagtgatc cacctgcctc ggcctcccaa agtgctggga ttacaggcgt 111360
gagccaccat gccctgcctt tttctagaat ttatatattg agttcttgat tgtatctttt 111420
tatgtaggct ttttagtggc ttctctagga attacaatat acatactttt cacagtgtac 111480
tcacatttaa tattttgtaa cttcaagtgg aatgtagaaa acttaaccac cataaaaata 111540
gaactaggga tgaggttaaa aaagagagag aaaagaaatg taataaagat ttaataacac 111600
cgttttttt ttttttctc ttttttttt gagacagagt ctctctttct gttaccaggc 111660
tggagtgcag tggcgtgatc ttggctcact gcaacctccg cctcctgggt tcaagtgttt 111720
ctcctgcctc agcctactga gtagctggga ttacaggtgc gcgccaccat gcccagctaa 111780
tttttgtatt tttagtagag acggtttcac tgtgttggcc aggatggtct cgatttcttg 111840
accttgtgat tcgctctcct cagcctccca aagtgctggg attacaggcg tgagccaccg 111900
cgcccggcta agtctttaaa tatttttttg acattgcact ttttctcttt tccttctagg 111960
attttagtaa cccaaatgtt agttttgtta ttgtttggca ggttcctgag gctttcctta 112020
cttctttaaa ttttttttc ctgttgttca gcttcgaaaa tttctattca tctgtcttca 112080
aattcactgg ttctttcccg ttatttccat tctgttattg agtctttgta gtgaatttta 112140
aattttgttt attatgtttt ttagttctaa aattttcttt ttttgtgtat gtcttatact 112200
ttgctcctga aactcttatt tgtttcagga gtgatcttat ttcttagagc atggttttag 112260
tagctactta aaatttgttt tatcatccca gcatatgtgt cctcttgatt gtcttttctc 112320
ttgtgagata atgggatttt ctggttcttt atatgacaat taattttgga ttgtatcttg 112380
gacagtttga cttacgttac atgattctga atcttgttta aatcctgtgg aaaatattga 112440
agtttttgct ttaacaagca gttgacctag ttaggttcag tccacaaatt ctaagcagca 112500
ttctgtcggc tctggttcca tcatcagttc agttttgtat cttatctgct tatgtgcctt 112560
tctgtgtcca gtctgggacc tggccaatgg tcaggtccca aagcctttgt acacttttag 112620
aagcagggcc atgcacaccc agctcacgag tggccccggg agtgcacata caactcgacg 112680
ttttcatggg ctccttcttt tctgtgatgt ccctgacacg ttctgccttc taagaacctc 112740
cctttatccc tttcctgttg tctggctaga aagtcagggc tttagattcc ctatacttca 112800
gcacacttcc tgtagctatg tcaacctctg tggccacgac ttcttcttct tgggactgca 112860
gtttctcttg tcagaaagta ggattcttgg agctgctgtc attgctgctg tggctgctct 112920
gatgctgcct gggagtcgaa ggagagaaag gaacaaaaca aaacaaccca ggggatttcc 112980
tccactctct ttgatccgtg agagcccccct ttcctgttcc tcagaccaga aatagagggc 113040
ctgtcttgga acttcttctt tgtgcatctg gtgtgcagtt tcagcttttg agtccaggcc 113100

aggaggtgct ggacaaactt gtcaggagta cggaggtact gcaagttctg attacttttc 113160
tcagtccacc tgcttccaag tccttggatg catttgtcca ttgttttgag ttgcattcca 113220
tgggagagac agaagagtgt gcttatttca tcttgacata cttattagga tttcatatca 113280
aatcaacgga tgatattctc tatattaatt tgctgttttc cctttagcaa gcacattagg 113340
aaaataacac tttaacaccc gcctttggtg gtttctgtca taattattaa tacttgactt 113400
ttttttttt tttgagacgg agtctcactc tgtcctttga ggcattgtcc ccataaactt 113460
ttggtaaagc atcaataatt ttatctttca tccacacaag cttcaccata aatttgatgt 113520
ttattcttcc attttagcag aattcatgtt gctccaatag gggctgtctt caaactgatg 113580
ttttctcctt cttagtgcct cagagtagat cctgttcaga tacgttataa caggttaata 113640
tgagtttatt ttggtgtaaa agtactttga aattcatgca tagtttttc atcatatgca 113700
ttttccatag ctttgaacac ccccatgtaa ctctcctctt ccacaaacca aacaatgaaa 113760
aagcaccttt gtgatggaag tttattttgc aataggaact cacagtgatc taagccctgc 113820
tattcatgaa tataattcat tactggagtc caagttgctt tttggttttt gaagttctct 113880
tcttcccttg caggtataga acaagatgca gtgaatactt ttaccaaata tatatctcca 113940
gatgctgcta aaccaatacc aattacagaa gcaatgagaa atgacatcat aggtaagcag 114000
tgcttgaaac tatggcaaaa aaaaaatgac aaaaaatgca cagaactgac aatttttcgtt 114060
attgactaag ataatttttt cttaacatgg aatttagcag ttcccttcct aatttgtttt 114120
ctgagtattt tttatatcgg attatagctc actttaaaag tttctcggct gcattcggtg 114180
cgagggtctt tgcctgggcc agatgggctg cagtgtagcg ggtgctcagg cctgcccgct 114240
gctgagcagc cgggccggcg ggcggctacg ctaaccggca cagaccaccg gatggactgg 114300
ccggcagccc cgcaccagtg cacgaagtgg gcgggacaga aacttctggg gttggaagtc 114360
cagtgaggct aaaagccggt accaaagtct ctaggcatca gggctgcagc ccaagagtct 114420
cacgaccagt gggcaactgg atggccagac aggtgtctca gtggtggcct ctccgtctca 114480
gggcttcatc ccacttctca gtgggcctga cgtccctggg caccctggat gtctacctgc 114540
attagccaga gccatcacat ggcctgtgac ttgccttttt ttgccagttg attgtgccac 114600
acacagtgtc atttctgtgt catttggcac agctggaggt gcaaggagga gggcagcctc 114660
atgtccagtc ccagtttcac gtaactttat tcttctgaat aaagacaatt tgctaacctt 114720
aaaaaaaaaa aaaaaaaaaa agtttttctt atatgttgga cccaaattct taggctttaa 114780
cctgaataac aatgacagca agatcaataa atagtacaca tttattaaac actcactgtg 114840
tcccagacaa tattccaagc acttttatg gatagactca ttttaacttc taaagaactt 114900
tgtgggataa atacagttat tttatagatg aagaaactga agcacagaga agttaagtgc 114960
tttgtccagg gtaacagctc agatatggca gagtcaggat ttgaaactag accctcacat 115020
accttaactg ctgtgctgtg gcagtgtttt tcatactgta ggttgggacc agccttctct 115080
tatgccctca ccccctgcca aaaaaaaaaa aaaaaaaaaa aaatatatat atatatatat 115140
atatatatat atatatatat aatatatata tatataaaat atatatatat ataaaatata 115200
tgtattagta tatatgcata tatagtatat attatatatt agtatatata ctaatatata 115260
atatacatat tagtgtgtgt atatatatat atactagaat aaaaaaatca aagtatctca 115320
gagtagtaag gacaaacatt tcagaaaaat gttttcatta tatatacatg tatgtatgtg 115380
tatgctgatt caacaaatat atttcttata ggttatagca aaatagtttg aaagctttta 115440
ctgtgtttta tcaggaagac cttaggtgaa cgtatattca cagataaaag aggttattta 115500
ttcattcaat aaatattaca ttctcataag tcctaatatt atgtattttt attcttcaaa 115560
aaagttagta tttgtgattt atgaaataag acatgttctt gcacttttag cagatctgtc 115620
ccgatgttgg gcttctttaa tccttagtgt gggtgctttg cactcactca ctgctgggga 115680
cagcaagacc cctgttagtc tcagctgtgt ttcttaaatt ggcccactgt accttccagt 115740
tagctattct ggggtccatg tcatgttggc tccattttcc ttttctttct cccacacaga 115800
tacctataac ggctataaca taggcctggt ggctgttggt ggcttatccc tatctgcttg 115860
tatttaaggg gtactgtttc actgagtttt gctgacagat gttgtcatga gatttgaggt 115920
tttctgtgtt gttgctctat ttttatgtgg gaatttgcta ctatcatcat ccctagacca 115980
gcttttccta gtaatacaac agggatgttc tgactgatta gagtttgcct gtttgaagaa 116040
ttggttggct agtgattttt ttttgagggg agtctgtacc agttaatagc ctgactggcg 116100
tgtggataaa aaggaagcag tttcaagtca aataaaacac ttaaaatgaa accacactgc 116160
aactctcttt cttttactta agcttaatca aattaatgat gatgtaatcc catgaaggaa 116220
aagtcttctg aaggatcaag ttgataacat tttgtgatca aagaatttga gaaaacctct 116280
atcccagtgt ctatcattat atattttagg atgttaatta cctgtgtggc tttaggcaag 116340
tcatttttcc tccttgagcc ccattcttaa tcctgtccaa attatttgtc tcctcttgca 116400
gttggactat tttaatatag ctgtccttca agtgagtttt gttcaaagga gccttcactt 116460
tagctcttac tgtgtaccca ctttgcatag tcttgtttta aatgtaatcc ttggattttt 116520
ggtgttgcta actaattact gtttttatgt gaggatttag agtgatccag aatctatact 116580
tgcactacct ccttcatctt ccacaaatgt ttgaagtggt agaattttta aaaactttga 116640
aggtacagct gacagaattt gctgatggtt tggaagtgag tggtatgaga gggaaaaaaa 116700

ggaataaagc atgactgcat tttttgtttg tttgtttgtt tgtttttgag acggagtctc 116760
actctcgcca ggctggagtg cagtggcgtg atcttggctc acggcaacct ccgcctcctg 116820
ggttcaagcg attcccctgc ctcagcctcc caagtagctg ggactacagg cgctcgccac 116880
cacgcctggc taatttttt ttttgtattt tagtagaaac ggggtttcac cgtgttggcc 116940
aggatggtct ccatctcctg acctcatgat ctactcacct tggcctccca aagtgctgag 117000
gttacaggca tatatataag catataaagt gtgttatagc atacaaacag gtatatatat 117060
aaacatgcag tccacacagc tgataggaat gaggcagtag tgaaggagaa gttgatgtag 117120
gagaggggac agttgttaca ggaaagaagt ctggaggcag aagggatgaa ttccagtgct 117180
cacatagaag attgcttaga tgggagcaag gacaatttat ctagagtcac aggaaagaat 117240
gcagtacacg ggtagagatg caggtgagtt gaaagatgtg agagatgatg gaaataattt 117300
tctgattgct tctatattct caaggaagca ggaagcaaag tcctcagcaa agagaataga 117360
agaggtgtta aatatttgag aaaggagatg tactgtagaa aaaaaaaaaa ctcagtttct 117420
ccttctgaac tctcacaaaa cagaaccctt ccatgactct agttgtgtgg ggtttttttcc 117480
ctgtcagcta ccaattctgc agatgattgt tcagtgaaca ccaactgggt gtcctctaag 117540
tcagttcagt tctcacactg tttacctgga gatagcatca gatcccacag attgaggact 117600
ctgtcccaca agactgcctc cacttcagat gccagtctca agtacaagtt gtggcctgtg 117660
cttctgactg accttctata aattggagtt cccacagtcc cctccttggg ttcaataaat 117720
ttgctagagc agctctcaga actcagggaa atgctttaca tatatttacc catttattat 117780
aaaggatatt acaaaggata cagattgaac aggcagatgg aagagatgca tgggcaaggt 117840
atgggagagg ggcacagagc ttccatgcac tctccaggtc atgccaccct ccaagaacct 117900
ctacagattt agctattcag aagccccccct ccccattctg tccttttggg ttttttgtgg 117960
agacttcatt atataggcat gattgatcat tggctattgg tgatcagctc aaccttcagc 118020
cccctcatcc cgggaggttg gtgggtaggg ctgaaagtcc caaacgtgta attctgcctt 118080
ggtctttctg gtgattagcc ctcatcctaa agctctttag aggccacagc cacaagtcat 118140
ctcattagcc ttcaaaagaa tccagagatt ccatgaattt taggcgctgt atgctaagaa 118200
actggctaaa ggccagttgc aatgtctcag gcctgtaatc ccagcacttt gggaggctga 118260
ggcaggagga tcgtttcagg ccatgagatc aaaaccagcc tggtcaacat agtgagaccc 118320
ccttacaaaa aatttaaaaa ttggccaggc gtaatagctc ttgtctgtag tctcagctac 118380
tcagaaggct gaggatcact gagccctgga gttgaaggca gcagtgagcc atgatcgtgc 118440
cactgactcc ggcttgggtg acaaagtgag accttgtctc agaagaaaaa ggaaaaaaaa 118500
aaaactgggc aaagactaaa taacatattt cacagtatca cagatttgta ttgtctagga 118560
aagtgaatgt aaacagacca ggacactagt atgatccctt ggtttcatga aggtcccact 118620
aaagtcatga acacaaagtg agactaggca tcatgttata tggtttttcc agccatgttt 118680
aacagctagc taaatagcta attgtttcgc tgcagtttat tttagcagtt ccttatttta 118740
gcacatttca tgttttaaaa tttctaccaa taacatttta ataaactttt ttacagataa 118800
cttcacaaat ccataatttt ttaagttaca atcccagaaa tagaattgct cattgaaagg 118860
gtatgttcat ttttaaagtt atgctagaaa ctgccaaatt gccttcagaa aaaggtgttt 118920
gtatccccac taacactagt gttagttttc ttgtgccctt gctcaagtat acatattatt 118980
aaaaacaatg ttgggccagt ttactagata aaaggtgtag tgcctcctta ttctaatcta 119040
tttgattact agtgagtatg tatgtctttt cacgttggtc attttatgtt tgttcctttg 119100
tggattgtca tgtcctttgc tcatttttct tttggaacat ttcttagtag tttataagag 119160
ctcttggtat tttaatgata gtaacctttt aactgtcatg catgctgcaa atctttttttc 119220
tgtttgtttg cctttgtatt ttgtttttgg agggtttcta tgtataggaa ttaaatttta 119280
tgttgttaaa tcttttgatt tctgcttttg catatgtact tcaaaagact ttctatttta 119340
agatcaagtg ttacctgtat tttcttttag ttctatttaa aacctcttaa tttatatgcc 119400
tgtgctgtta actcccaagt tgattcacaa gtgtgtatac atagtttgaa tttagtggca 119460
atttaattat ttacaacttc ttttgcagca aggatttgtg gagaagatgg acaggtggat 119520
cccaactgtt tcgttttggc acagtccata gtctttagtg caatggagca agagtaagtt 119580
agttcatatt ttcacattgt gcatcctagg gaatttgggt tcattgttag gaatgggctt 119640
cactcagcta aaaacaaagt atttttgaga atttaaatat tttggatatt tacaagatca 119700
tataaagcat actctatctt ggttaacagt ttcttttaaa tataaattat gtgaactctt 119760
aaaatttttca ttttcatttt caatgttaat atttcctaag ttaaaataat ttgtttttag 119820
ttctgaaata atttggggag tgattgagtc tgtagtgatt atgactatta gaattggttt 119880
atttatttaa ataatgcatg tcttcagatg gctctcctaa tttgttagtt aggctttaag 119940
ctaaatggat gctatataac taaatccaca tagatttgtt gaaatggctc cagaggtttt 120000
ttagatttat tactgctatg tgcccttaaa aaaaatctat tcattctttc acttaacatt 120060
tatcagaaga gtgctctgtg taagacgtgg ttaggcatag tgccagtctt gaaggaagtt 120120
acagcctaat aaaagacata gggcatgttg tttggttact gtaatatgaa gtggcatgtg 120180
ttaaatgtca ggggagaact acaaagtcat aaaaaggtgg gagagattac atacaggtaa 120240
aggaatcagg aatgacacca tggggagtaa ggtagtgttg acctaggcct ttaagataca 120300

atagggacag tatggaaaga gtatattttt cccacttaaa ctctttcctt ggtcgttccc 120360
tcaaattttc ccttttgtcc atgtgcaggc actttagtga gtttctgcga agtcaccatt 120420
tctgtaaata ccagattgaa gtgctgacca gtggaactgt ttacctggct gacattctct 120480
tctgtgagtc agccctcttt tatttctctg aggtaaagtc tgcatttctt ttcacactct 120540
attcgagcat tccagcctct aactatcaat gctggggccc tgtctatagg aaataacaca 120600
gaagagccaa gtcatttcca aaaagatgta tcattgtttc aagttgtttc tgatggcaag 120660
agtaatttaa taatatatta gagagaacat gaaaattcaa tgtattaaat aactctaatt 120720
ttgagaaacc taattaaact actgcatgta agagagtgca tgtttttaat tatttggagc 120780
tattttaaaa ccacagaatt tgaaacttgc ttccagtgca taaattgcag accagacttc 120840
agaagagaaa aaaagtagta aatttttct tatgctcatc atttttactt tagtcacttg 120900
ataggattgc ccagtgaaga agcatttgca acagacaatg agtatattaa tctttttgag 120960
gcatacagtt tagtataatg ctctttgtta ggcttcaaca agtgaaatta ttttgttgga 121020
aagcaaatga ctattaagta gaaagaggat tcccagtctc acaaagcagt aatttagaca 121080
ctcgattctg cctctttaca agaatacagg tactcagttg atttgttttc tcactccctt 121140
tctttgctat aagtttaaat caacaatttg tttaggttaa tatgtcctca tggaatggtg 121200
gaaatgatca gatataaaat atttggtttg gttagtttac tctttatatg tttgctggca 121260
aggaaccaca aatccagttt agtataattt ttactctagt tcactaaaag tttgcatcca 121320
gctgtgtagg tagtgtttgt ttcttgttaa ctttttttte gtctaaaaga atactttaaa 121380
acttttcaat ctcaaatgac tgtaacttgc tgacaggtgt taacagaaga agtagatctt 121440
tttgtttttt gcttatgacc tgtattttaa tatttgagct tatagattag agattgtgag 121500
agaaatctgt ttatagtctt attttccctt gtgtattttt tcttcctagt acatggaaaa 121560
agaggatgca gtgaatatct tacaattctg gttggcagca gataacttcc agtctcagct 121620
tgctgccaaa aagggccaat atgatggaca ggaggcacag aatgatgcca tgattttata 121680
tgacaagtga gttatattga tagatggatt cagcagatac ttattgaaca tttgatatgt 121740
tttgtggaaa taaagatgaa taaactcagt ctctgttgtc aaggagctca caggaggcag 121800
cataaaagct gcttttatat ggtgtttgta aagctttggg ggttcttaga acaaaagttt 121860
ctgctgggaa aggggaggtg tatgtggggt aaacaggatg gcaatggtgg tgttcaagga 121920
gtgtttccca gaagagagat tttgtttgga tcccaaagaa agaagggaat tttgctaccc 121980
agagaaggca gaaaacaaca ttctaggcaa aggcattggc ccagaagcca tggaaacgta 122040
ggggaaagtg gcactttcaa gaaacttgag tttagataat caaaggagtg gggaataaat 122100
atgaggatgc tggtactaat tggaatagat tgtaagggac cttgaatgcc tatttatggg 122160
tatattatac tttctgtata aatctgctca ggcacgttgt taattagttt tttattagtt 122220
ttcactgaaa atgagaggat ggaaacatca tacagtaaac aaaattgaaa atatctggtc 122280
aggcagatga tgagcttgtg gccagctctg taacgtatgg tattcttttc atttaacttt 122340
tcttactctg taaaaaaagt aattcgtggt cgggcacggt ggctcactcc tgtaatcaca 122400
acactttgag aggcagaggc aggtgaatcg cttgagccca ggaatttgag accagcctgg 122460
gcaacatggc aaaacccgcc tttactaaaa atacaaaaat tagctgagcg tgatggcgtg 122520
cgcctgttgt cctagctact taggggcctg aggcagaagg atcacctgag ccttgggagg 122580
tcgaggctgc agtgagctgt gatccactgt actccaccct gggcagggca gtagagtgag 122640
accctgtctc caaaaaaaaa aaaaacaaca aaggtaattt gttatttgta tccttaagca 122700
aatgctaaag gggtaacttg gggatagaga aaagtccaca gatgttaggg tttgaagaca 122760
ctaatagtat ctaggccagt ggttcctgaa cattagtctg tgggctcttg ctgggctgtc 122820
tgcataggaa tcacctgaga gcttattaaa aataggtttt caggctggtt gcggtggctc 122880
acgcctataa tcccagcact ttgggaggct gaggcaggcg gattacttga ggtcaggcgt 122940
tcaagaccag cctggccaac atggtaaaac cccgtctcta ctaaaaatac aagaattagc 123000
caggcatgat ggcacacacc tgtaatccca gctactcagg aggctgagga aggagaattg 123060
ctcgagcccg ggaggtggag gttgcagtga gcggagatca tgccactgca ctccaggctg 123120
gctgacagag ggagactctg tctcagaaaa aaaaaaaaaa ataggttttc agtctgggta 123180
ccggtggctc acacctgtaa tcccagcact ttgggaggcc aaggcaggca gatcacttga 123240
ggtcaggagt ttgagaactg cctggccaac atagtgaaac cttgtctcta ctagaaacta 123300
caaaaaatta actgggcatt ttgacgggtg cctataatcc cagctactag ggaggctgag 123360
gcaggagaat tgcttgaacc cgggaggcag aggactgcat ctcaaaaaaa aaaaaaaaaa 123420
aaaggtttcc agtcccctg tctcagaaat tctgattctg caggtttgag gtgtgaccag 123480
gaatctttat ttttagaaga cataccagat aattctgata aatagccagt ttagggatgt 123540
agtctaattt tcctattttg caagtaagga aaataaggcc cagagaggta atgattttct 123600
caaagtcaca gaacaagtta gtggcagaat ttggactgga atgcagttct taatgttctg 123660
tccagtgttt attctggtac agtatgtttg tagaaggtat tacgtaagaa acattgttat 123720
atagatgttg agataggaag agtttacatt tagaaatttg gtctaaaatg cctgaacatt 123780
caagtcgtgg aggagtattg accaacttac tcaatacaac ataggagatt cacattttgt 123840
tacaaaaatg ctgatttaaa aggagagttt tctttttttt cttctttttt atttttgag 123900

atggagtctt gctctgtcac ccaggctaga gtgcagtgac acgatctcag ctcactgcaa 123960
cctccacctc ctgggttcaa gcggttctcc tgcctcagcc tcctgagtag ctgggattac 124020
aggtgggggc caccacgccc agctaatttt tgtattttta gtagagacag ggtttcacca 124080
tgttggccag gccggtcttg aactcctgac ctcaagtgat ccacccacca ctgcctccca 124140
aagtgctggg attataggcg tgagccactg tgcccagcct gcttgttttt gtatcatata 124200
tatgcatcat cataatcatg cattatcaac ctttgtattt ctgtcaggac atagaaacca 124260
ttagagtgct tggaagagag cctttttttt tttctcgcat ttaatgcttt ttttggtatt 124320
catttcataa tcagcttacc aaaacattac ctgcattata ccccatcaag gtagaaatct 124380
ttgtgttatc aatattggtt actccctttc cacaccgagt catcagtaag tcctgttcta 124440
tccaaatagg tcatatgcat ctagctcacc cctcagtgct gttttgtttt gaatttgtac 124500
atgtttactc ctgatgcctt gtagttatga tgatgtgttc ttatttttatt ctgtgcatac 124560
aagttctcag ctcgcttttt agggaaaatg accatgtctt cctttcctat aaattccttt 124620
ctatctatca agtcctcaac agagaatagg tacccataaa tatgtgattg ttagtttctt 124680
tgcctcagtt gtagtctgat ccttacagct tttaaacaac agtagagttc accgtcaaga 124740
actaaggatg gttggcaggc agatagaaag gtagcaagtt gacccaacta tctctgggga 124800
agtgggaaca aagaaaggtt acatcagcac tgtcatcaca tagctctata gttctaggcc 124860
tgcaggctca atcaagtagc cttgtataag attctctgga ggaggtgctg aaagttgctt 124920
atacttgcta tggaatttga ttttacttcg gatatctttt taccataggt acttctccct 124980
ccaagccaca catcctcttg gatttgatga tgttgtacga ttagaaattg aatccaatat 125040
ctgcagggaa ggtgggccac tccccaactg tttcacaact ccattacgtc aggcctggac 125100
aaccatggag aaggtaaccc agaacttcaa acgtatcaaa ctacaagaag ttttattggt 125160
agaactcata aaatataagg tgggaaaacc aagcagaata gcacagtgga aattgaagca 125220
gtccagcaaa gtgattaaga gcagaggcct tgagtctggc ctggtatgta cagtcacgtg 125280
ccacataaca ttttagtcaa cagtggactg cgtgtacgat ggtcctgtac gattataatg 125340
gatcaaagct ggtagtgcaa taataacaaa agttagaaaa aataaatttt aataagtaaa 125400
aaagaaaaaa gaaaaactaa aaagataaaa gaataaccaa gaacaaaaca aaaaaaatta 125460
taatggagct gaaaaatctc tgttgcctca tatttactgt actatacttt taatcattat 125520
tttagagtgc tccttctact tactaagaaa acagttaact gtaaaacagc ttcagacagg 125580
tccttcagga ggtttccaga aggaggcatt gttatcaaag gagatgacgg ctccatgcgt 125640
gttactgccc ctgaagacct tccagtggga caagatgtgg aggtgaaaga aagtgttatt 125700
gatgatcctg accctgtgta ggcttaggct aatgtgggtg tttgtcttag tttttaacaa 125760
acaaatttaa aaagaaaaaa aaaattaaaa atagaaaaaa gcttataaaa taaggatata 125820
atgaaaatat ttttgtacag ctgtatatgt ttgtgtttta agctgttatg acaacagagt 125880
caaaaagcta aaaaaagtaa aacagttaaa aagttacagt aagctaattt attattaaag 125940
aaaaaaattt taaataaatt tagtgtagcc taagtgtaca gtgtaagtct acagtagtgt 126000
acaataatgt gctaggcctt cacattcact taccactcac tcgctgactc acccagagca 126060
acttccagtc ttgcaagctc cattcatggt aagtgcccta tacagatgta ccatttttta 126120
tcttttatac tgtatttta ctgtgccttt tctgtatttg tgtttaaata cacaaattct 126180
taccattgca atagtggcct acgatattca ttatagtaac atgtgataca ggtttgtagc 126240
ccaaaagcaa taggttgtac catatagcca aggggtgtag taggccatac catctaggtt 126300
tgtataagta cactctgtga tgttagcaca atggcaagca gcctaacgga aattctgttt 126360
attgattgat tgattgattg attgattgag acagagtttc actccattgt ccaggctgga 126420
gtgcagttgc acagtcttgg cacactgcaa cttctgcctc ccaggttcaa ccaattatcc 126480
tgcctcatcc tcccaagtag ctgggattac aggcaggcac caccatacct ggctaatttt 126540
tgtattttag tagagacagg gtttcaccat tttggccagg ctgttctcga actcctgacc 126600
ttaagtgatc tgcctgcttt ggcctccgaa agtgctggga ttacaggcat gagctaccat 126660
gcctgggcag taactgaaat tctctaatgc cattttcctt atctgtaaag tgacgataat 126720
atgcacgttt acctcaaagt tactttgatg attaaagtaa ggtaatgtat ataaaataca 126780
tattaacata gtacctgaca catggtaagc atcaaaaaat gttaactact tttattacta 126840
ttattattac gtatttttaa ataattagag agcagtatca aaaattagct gggcgtagtg 126900
gcatgcacct atagttccag ctactcagga ggctgaagct ggaggattgc atgagcctgg 126960
gaattaaagg ctgcagtgag ccgtgttcat gcccctgcac tccagccttg gtgacagagc 127020
aagaccctgt cttgaacaat taaagaaggc attatgccgc aacgttagct tagaaatgat 127080
ccacatatat caccagtaac tgtcaacagg attggaaccc tagttttggg tattatgatc 127140
acaaggtatt attaatagct tattaataat aaagcgttgg ctaggcacgg cgactcacat 127200
ctgtaatccc agcactttgg gaggccgagg tgggtggatc acctgaggtc aggagtttga 127260
gaccagcctg accaacatgg agaaacccca tctctactaa aaatacaaaa ttagccgggc 127320
gtggtggtgc atgcctgtaa tcccagctac ttaggaggct gaggcaggaa aatctcttga 127380
acccgggagg cagaggttgc agtgagctga gatcgcacca ttgcactcca gcctgggcaa 127440
caagagcaaa actccgtctc aaaaatataa ttataataaa taaataaaag taaagtattg 127500

atgtttgtga atgatttatt cttctaatga actagaggag atttttccag gaatttcaga 127560
gccagtgagg ttatgttgct tgtatgtgtc atgtgtatcc aggtgaaaaa acttaattaa 127620
acgctattat ataataccat acataaaaac tgaattttag gaatactgaa gaatgacata 127680
tagaagtcaa atcattaaat agctagtagt aaacagaata gagtgtcagc tgttacccaa 127740
tgatgataat attttcacga ttaaaattaa acctttttctg attttaaagg aaaagttcag 127800
atctgtatca tataaagaat gtaaattttc agggtaataa aattaaaatg cagagagaaa 127860
aatgcaaaaa tagttcttac tagatgtgtg tatgtaagga acttagacta attttaagaa 127920
cactgtcaag accctggtag ttaggtagga aaaaagacat gaatgattca ttcaacaaaa 127980
actttgagta tttctgtgct agatggtagt gttacagtgg taaacaaaat aaatgtgttt 128040
ctgctatcct ggagcttagt ctacaaaaaa ggtacatatt ggccgggcac ggtggctcac 128100
gcctgtaatc ctagcacttt ggaagatcga ggcgggtgga tcacctgagg tcaggagttc 128160
aagaccagct tggccaacat ggcgaaaccc cgtctctact aaaaatacaa aaattaactg 128220
ggtgtggtgg cggacacctg taatcccagc tactcgggag gctgaggcag gagaatcact 128280
tgaacctggg agacagaggt tccagtgagt cgagatcatg ccactgcatt ccagcccggg 128340
ggacaaaagc gaaaatacgt ctcaaaaaaa caaaaacaaa caacaaaggc acgtattaaa 128400
tacgaacata aatatttaca aattatactg aataagttct catgtttatt atttgcttgt 128460
ccagttacaa acttttcctt cgtagaatta gaaatataaa taataaacat gagaactcat 128520
tcagtataat taataattat taaatgtaaa taaaaacatc tatgtacaat taggcattta 128580
tttaagaatt atttgaaaaa aaaacaatgt ggaaacagat attttgatat attgctagtg 128640
attgaaattg ataatgttct tttgaagagt aaagtgacca tatatattaa agttaaaatt 128700
taactcagca atcacacgcc tggtgagtta tcttaaggaa atcagtttga aagtaaaatc 128760
aatatatgca caaagacttt aacatttatc ataaaccaga aaaatcgagt ttcaaattat 128820
atcctatgga ctattttctg ctaaaaagta ttaatatcaa ctttatgtaa tactttcgtg 128880
acaaatattt tgggggagaa aacccaacaa aattacatgc attgtaattt ttttttttt 128940
ttttttttta gacagtcttg ctccagcgtc caggctggag tgcagtggtg caatctcggc 129000
tcactgcaac ctccatctcc caggttcaag caattctcct gcctcaggcc tcccgagtag 129060
ctgggattac aggcgctcac caccatgcct agctaatttt tatagttttt agtagagatg 129120
gggtttcatc atgttggcca ggctggtctt gaactcctgg tctcaagtga tccgtctgcc 129180
tcggcctcct agagtgctga gattacaggt gtaagccact gcacccagcc ttatgcatta 129240
taatttttaat ttgtaaactg tacaaaggga taatacttgt agtacaacaa gaagtaaaaa 129300
catttgttat aggtagttaa catttgtaac cagtagaatt ataggtaaaa tttatttatt 129360
taaaacagtt ttagttggat ttgatttcaa ctttaaaata atgcttttca tctctatcag 129420
gtctttttgc ctggcttttt gtccagcaat ctttattata aatatttgaa tgatctcatc 129480
cattcggttc gaggagatga atttctgggc gggaacgtgt cgctgactgc tcctggctct 129540
gttggccctc ctgatgagtc tcacccaggg agttctgaca gctctgcgtc tcaggtattg 129600
actgattgcg tctgccatta gggagaaaag catacacatc ctttccttca catcccagta 129660
acagatccta ttatttgtaa attttaagtt gtggaaaaaa aagataaaag ccaggcacag 129720
tggcctgtgc ctgtaatccc agcactttgg gaggctgcgg tgggcggatc acacgaggtc 129780
aggaattcga gaccagcctg gccgacatgg tgaaacccca tctctactaa aaatacaaaa 129840
attagccggg catggtggca ggcacctgta atcctagcta cttgggaggc tgaggcagga 129900
gaatcgcttg aacccaggag gcagaggttg caatgaacca aaatcacgcc actgcactcc 129960
agcctgggtg acaaagtgag actgtgtctc aaaaaaaaaa aaaaaagaga gaaataaaat 130020
tagcctactt actatcttct aatcaaagca tttgtggtaa cttaaaatat actgtattgt 130080
aaagtatcat gctgtttcat ttaggccatt attctatttg aatctgtggc tgtttctctt 130140
aataaatcaa gtaatatgga atatattcat agcctctgaa gagctcttta tgtaagtatt 130200
tatttaggat actttttgta aaataagtga atgaattctt aggtctcctt tttttttctt 130260
ttcttgagac agggtctcct cgctgcaacc tggaaattct gggctcaaat aatccaccca 130320
ccacagcctc ctgaatagct gggactagag gcatgcacca ccacgcctgg ctaatttgaa 130380
attttttttt ggccaggcat gatggttcac gcctgtaatc ccagcacttt gggagaccga 130440
ggcaggcaga tcacgaggtc gggagatgga gaccagcctg gccaacgtgg tgaaaccccg 130500
tctctactaa aaatacaaaa attagctggt tatggtggct catgcctgta atcccagcta 130560
cttgggaggc tgaggcagga gaatggcttc aaccagggag tcggaggttg cagtgagccg 130620
agatcacgcc actgcactcc tgcatggtga cagagtgaga ctccatctca aaaaaaattt 130680
ttttttaaa tgatggagtc ttgctgtgtt gctcaggctg gtcttgaacc cctgacctca 130740
aatgccgcct gcttcagcct aagtttcttt ttttttgta aagagacagg gtcttgctat 130800
gttggccagg gtagtctcaa actcctggct tcaagcagtc ctcccacctt ggcctctcaa 130860
agtgctggga ttacaggcgt gaaccactac ctataatgtt gtgtttcact caaggccttt 130920
tgatttcgtt ttgcattacc gtgccacatt gtgcatttcc ttgacctttt ttgggttttt 130980
tggagtgctt tcatatgtta aaccatacct gattctcctc aaaatcacac aaagtagaat 131040
atcctaagac aagaaatcta aggaggcata aagaagttaa ctggttttat taaactcaca 131100

cagtaaatga tagagccaga aatattcccc ttctagtgtt cttcaccatc agcttaatgt 131160
agcataataa ttttctaatt actgttgaca aataaataac cctttgaatt ttcaatactg 131220
ggccttggat aaatttttcct aatttgtaag agagtattat cgtattgcca tttacaaagc 131280
tctcctgagt atctttttct tctgttaagt ttacctagga gataaactgc tgagtatggt 131340
tgccattttg gttttttgat ataggttaga atgtcttggt ttttttttt ttttttttg 131400
gtttttgttg ttgtcattgt ttgagacagc atcttgctct gtcgcccagg ctggagtgca 131460
atggcacgat cgtggctcac tgcaacctcc acctcccggg ttcaagcaat tctcctgcct 131520
cagcttcctg agtagctggg attacaggca tgtgcaacca cacctggcta atttttgtgt 131580
ttttagtaga gaaggggttt caccatgttg gtcaggctgg tattgaactg ctgacctcat 131640
gatccacctg cctcggcctc ccaaagtgct gggattgcag gcatgagcca ctgcacctgg 131700
ctgaatgtct tgtttttgat taggcactta agaaaggcct aggtactaac cataaaatat 131760
atttttatac cttttgttga tactatatat atagaaaact gcacttatca taaccttaga 131820
caccttgaag aatgttcaca agcagaacta acccatgtga cccagcatcc agatcaaaaa 131880
cagcattatc agcccctcta gaagccctct tgggcccctt ccattcactg tccttcttgt 131940
caccagggta gctactatcc tgacttttga tggcatagat tagcattacc tgttcttgtc 132000
attttataaa taaaaccata ctgtgtattc ttttcttgta cagctttatt gtgctaattc 132060
acatttacat catacaattc agtggttttt atatggtcac agagttaggt aaccattacc 132120
acatcgattt tagaacattt ttttcactcc agatagaaac ccccttttact taaactccaa 132180
atcccccact ccaccagccc taggcagcca ctagtctact ttttatctct atagagacaa 132240
tagatttgct tattctggac atttcataaa catggaaccg tatattatgt ggtcttttgt 132300
tgccaactgt ctttcactta gcatcatgtg ttcaaaagag catcatgtta tccatgtttg 132360
gcatgtatca gaattttatt cctcattatg gccaaatatc ccattgcaag gatttatgac 132420
attttatttg aattgtaccc tcctttctgc catttatcaa taatgctact gtgaccattt 132480
gtgtacaagt ttttgtgtgg atacaggttt tctttttgtt tttaaatttg aggtggagtc 132540
ttgctctgtc gcccaggctg gagtgcagtg gcacaatctc ggctcactgc aacctctgtc 132600
tcctgggttc aagcagttct cctgcctcag cctcccgagt atctgggact ataggcacgc 132660
accaccacgc ccagctaatt ttttagtaga gatggggttt caccatgttg gccagtctgg 132720
tctcgaactc ttgacctcaa gtgatccacc catctcggcc tcccaaagtg ctgggattac 132780
aggggtgagc cactatgccc ggctgtggtt ttcatttctt ttgttgtata tacataggag 132840
tagaattgct gagtcaagag gtaactctta aacttattga aaaactgcca gattgttttc 132900
cgaaaaggct gcaccatttt gcaatcccac cagcagtgta tgagttttac agcttctcca 132960
catttcattg gaacttatta tctgtttggc tgtttttaaa aatgatagtc attccaataa 133020
gttctacttc agtgtggttt ttgcacttct ctgatgagta atgatgttga gcatcttttc 133080
atttgcttat tggcctttgt tctagctttg gaaaaatgtt tattcaaatc ctttggccat 133140
ttttattttt atttttattt atttattttt ttttgagacc aagtctcact ctgtcagcca 133200
ggctggagta caatggtgtg gtctcagctc actgcaacct ccgcctcctg tgttcaagtg 133260
attctcctgc ctcagcctcc cgagtagctg ggattacatt tcaggcacct gccagcatgc 133320
cgggctgatt tttgtatttt tactagtgac agggtttcac catgttagcc aggctggtca 133380
caaactcctg acctcaggtg atctgcctgc ctaggcttcc caaagtgctg ggattacagg 133440
cgtgagccat tgggcccagc ctagattttc ttttttcttt ttttttttga gaaggagtct 133500
tgctcttgtt gcccaggctg gagtgcaatg gcacaatctt ggctcactgc aacctctgcc 133560
tcctgggttc aagcgatttt cctgcctcag cctccccagt agctgggatt acaggtgcct 133620
accaccacac ccagctaact tttgtatttt ttttagagac agggtttcac catgttggcc 133680
aggctggtct caactcctga cctcaggtga tccacctgcc ttggcctccc gaagtgctgg 133740
gattaccggc atgagctacc aggcccagcc aattttctca ttatattgcc caggctggtc 133800
tcaaactcct gggttcaagt gatcctcctg ccttggcctc ccaaagtgtg gggagtacag 133860
gcgtgagcca ccttgctcag ccccttgcc catttttaaa ttagattgcc tttttatatt 133920
gagtttcagg agtcctttat atattctaga taaatgtccc ttatcaaatt atattatttc 133980
caggtatttt cttcattctg tgagttgtct ttcctctacc ttttaaaaaa ggtgggtttt 134040
tgtttgtttg tttgtttgtt tttttaagat aaggtctcat tctgctgccc aggctggagt 134100
gcagtggcac aatcacagct cactgccacc tcaacttcct gggccgaagt gatcctctta 134160
cttcagcctc ctgaatagct agggccatag atacacacta tcacacccag cttttttttt 134220
ctgtttgtag agacagatct tactgtgttg cccaagttgg tctcaaactc taggctcaaa 134280
gtgattctcc cacctctgcc tcccagagtg ctgggattac aggtgtgagc cacacgcaac 134340
ctgtcttttc actattaata gtgtcttcct gcttcagcct cccgagtagc tgggattaca 134400
ggcacccacc accatgcctg gctaatttttt ttgcattttt agtagagaca gtgtttcacc 134460
atgttcaccc ggctggtctt gaactcctga cctcaggtga ttcacctgcc atggcctccc 134520
aaagtgctgg gattacaggc gtgagccact gcacccggcc aaaatattgc cttcttaaca 134580
gtattgtctt ctaatttgtg aacatggatg tatcttcatg tatttatgtg ttctttcatt 134640
tcagcagaat tttgtagttt tcagagtaga agcctttcac ctccttgggt catttattcc 134700

tatgttttaa gttctttttcg attccattat aaatagaatt gttttcttaa tttcattttc 134760
agattgtttg atgagagagc atagaaatac aagtgatttt tacatgttga tcttgcaact 134820
tcaactttga taaatctgat tgttagctct aatagttttc ttgtggattc tttaggattt 134880
tcaatatata agatcatgtc atttatggat agagatagtt ttttttctgg ctagaactta 134940
cagagcaatg atgagtagaa gtggcagaag caaaaatctt tgtcttgttt cctatctgac 135000
agggaaagct ttcagtttca tcatttaata tgatgttagg tgtgggtttt caataaatgc 135060
ctttttttcag attcaggaat ttccctatca ttcctgattt tttaaggctt ttttttttt 135120
ttaaatcatg aaagggtgtt gaatattgtc atgttctttc tgtatcagta taaatgatcc 135180
tatggatttt gggttttatt ctgttgatgt gaaatattaa ttgattttca gatgttaaac 135240
caaccttgca tacctgagat gaatctcact tggtcatggt gtataatctt ttcaatatgc 135300
tgctggattc catttactgg tattttgttg aagattttgt atctgaacgc ttaagataac 135360
atttacactc tatcagaaat gaattgacca taaatgtgag agtgtatttg tgggttcttg 135420
attctcttcc attccaaaga tagacataca tccgtctgta tgtctgtctt tatgccagta 135480
ccatactctc ttgattacta ttgctttgta ataagttttg aaatcagaaa gtataaatga 135540
gattttggta tctgagtaac agtcctcata gaattagttg ggaaatattc cctctttatt 135600
ctggtccctc tttctttttt gtttaactgt gtatcttgga gattgttcct tctcaacaca 135660
tgagagccgc tttccctacc ctcccacccc tgctatagag aggtctataa gtgtctgttc 135720
aattatttta tttacttaac ctattactta gtcggggaca ttaagcttgt ttatgtcttt 135780
tattttaaac aatgctgcag tgaataatct tgtatataag tcattttcca tcaatataag 135840
tctctctgta actgaatttt tagaagtgga atttctaggt caacctatgg ctctgtattt 135900
cacaaaaata ccaattctgg tttttcttgt ggaggtgggg agtaggaggt agaatgctgg 135960
aggagaactt gctgtactca gctggctagt cattttagaa aggtttcctt agcttctttt 136020
tgtcatatgg cctcaccaag aatcaaaaac attcctattt accctgtaaa catggggctt 136080
tactacccaa gatacatatt tctggatgta tgacagcttt tcatattgaa gaaataatgc 136140
tgtgagtaca gcacatttgt tggaacttag gtcgttaaga atgtcttata aattcataca 136200
ttatacattt tattttattt tatttttag tttttgatac agagtcttcc tctgtcgccc 136260
aggccagcgt gcagtggtac aatcttggct cactgcgacc tccatctcct gggctcaagt 136320
gattctcatg tctcagcctc cagagtagct atggttacag gcatgcacca ccatgcccgg 136380
ctaatttttt tatttttagt agaaactggg tttcaccata ttgaccatgc tggcctcgaa 136440
ctcttggcct caagtgatcg gcctgcctca gcctcccaaa gtgctgggat ccttgtattg 136500
ggtaaaagat gaatattgag ggctgcatgg tggctcatac ctgtaatccc agcactttct 136560
gagactgagg tgggaggagt cctggagccc aggagggtga ggctgcagtg agttgtgatc 136620
gcgccattgc acttcaacct aggaattata ggcttcagtc actgtgcccg gcatgtacat 136680
tttaatattg tgctttcctc ttttagctat agtatgaggt tacatttcag agtcattgtt 136740
gttaagcatc ttaatagtga tgaggttgag tgaaagttac ttctatttca aacactgaag 136800
aaaatttttgt acaaatctgt cacattccaa gcccaggact gattgtttca tatacttcta 136860
attttacaat ttctattgta gtccagtgtg aaaaaagcca gtattaaaat actgaaaaat 136920
tttgatgaag cgataattgt ggatgcggca agtctggatc cagaatcttt atatcaacgg 136980
acatatgccg ggtaagctta gctcatgcct agaattttta caagtgtaaa taactttgca 137040
tcttttaaat tttttaatta aattttacat ttttttctaa tctattatta tatgcccaga 137100
actttcactt agagtgtgca gtataatgtg gtggttaagt ataaaggctc tggagtgact 137160
tcctgggttt taatcttggc tctgccattt attggcagcc gctaacctct tggtatctca 137220
gtttcttcat ctgtaaaatg agaataataa agtgaaaaga tgccaacatc atttactctg 137280
ggctgcataa ctgatacttg gaaaaagtat tcctttgagt ttaagaatta agttggttat 137340
tcattttagc ttgtaataaa aagatagtga ttcataggat atgccactta ctgaaattta 137400
ccacagatcc aatcataaaa tcactttctc ttccctaaag atagcttgat taacatgtaa 137460
aggtgtgtaa aggcttgatt acactaccct gatccgtacc ccagttccca gcagcaccat 137520
gaaaaaggga tttcaacata tttaattact ttcagtagaa agtaacagtg gtaggccagg 137580
cgcagtggct cacacctgta atcccagcac tttgggaggc cgaggtgggc ggatcacgag 137640
gtcaggagat tgagaccatc ctggctaaca cgatgaaacc ccgtctctac taaaaataca 137700
aaaaattagc cgggcatggt ggcaggcacc tgtagtccca gctacttggg aggctgagac 137760
aggagaatgg cgtgagcccg ggaggcggag cttgcagtga gcttagattg tgccactgca 137820
ctccagcctg cgcagtggag cgagactctt gtctcaaaaa aaaagaaagt aacagtggta 137880
ttgggagact gaggagccta gaaagtactt gaaggaagta aaaggtttgt ttgaccacat 137940
tgtatttgga aagccagctt tttcagctgt gtcagctttg tgtagtgatt tttagttctt 138000
cttttagaaa ataacggaca aggccgggca cggtggctca cgcctgtaat cccaccactt 138060
tgggaggccg agacgggcgg attacctgat ctcaggagtt cgagaccagc ctgggcaaca 138120
tggtgaaacc ccgtctctac taaaatacaa aaagttagcc gggcgtggtg gcgtgtgcct 138180
gtagtcccag ctactccgga ggctgaggca ggagaattgc ttgaacccgg gaggcggagg 138240
ttgcagtgag ccaagatcac accattgcac tgcagcctgc gcgacagagt aagactctgt 138300

ctcaaaaaat aataataaaa taaaaaagaa tggacagtaa acctaaatga gttcattccc 138360
aaagatgatg ttattcttaa gggatggttc atttatttaa gaccttacat aaagtctatc 138420
aattgcgtga tttttcactt ctgtaattgt gtgtatgtat aatgtaaata tatatgtttt 138480
tgttttgttt tggtttttttg agacggagtc tcgctctgtt gctcaggctg gaatgcagtg 138540
gtgcaatctc agctctctgc aacctctgtc tcccaggttc aagcgtttct tctgcctcat 138600
cctcccaagt agctgggact acaggcacgt gccaccacgc ccggctaatt ttttgtattt 138660
ttagtagaga tggggtttca ccgtgttagc caggatggtc tcaatctcct gacctcgtga 138720
tccacccgcc ttggcttccc aaagtgttgc tattacaggc atgagccacc acacccagca 138780
tgtatttttt aaatgtataa aatgaagcag aaaagagaaa tgataatttt tcttcatctt 138840
gaaagattat cttcaccagg cgcagtggct cacacttgta atcccagcac tttgggaggc 138900
ctcggcaggc ggctcacttg agttcgaaac cagcctggcc gacatggtga aactccgtct 138960
ctactaaaaa taaataaata aagatggttt taatatatgt tttagtttta tgattttagc 139020
atcttttctga aatttttctc aaggcaagta aatttgtatc agttggtata ttggtaccca 139080
tctatgaaat aacttattag gaagatatct ctaaaataag atcactttgc ctaaaataaa 139140
ctgatatatt gatgttcaca gaatttttct tttaaccgac ttgataaatg cattattctt 139200
gacgtcaagt gatccacctt cctcagcctc ccaaagtgct gggattacac acatgagcca 139260
ccgcacctgg cattattctt ataaaaggtt aaatttctag ttaagtttaa tgtcctcttt 139320
gttcatgtac cattgcttat tttcttccct tcctactcac agtaatcatt cttatggtat 139380
gcacttttgt ttgcttattt ttatgtaatt gatattacgc tccattctgt acgttgtact 139440
ttcattcaca gtgagttttg gacattccta tgttcatcta tacagactta cttcatttta 139500
actacactgt agtattccgt atgtaatatt tactataact catcactgta gcagagcatc 139560
tcatagtgta tgtattactg ttttgccatt ttggtatcaa tgagtattta agtcatttgc 139620
agtttttccc tcttataccc agtattacag aggatctctt tttatatgct tctttgtacc 139680
aagaggcaga ttaaaaaatt tttttttgaa aaaatttttg aaaaaaaatg aaatgaagtc 139740
tcactatgtt gcccaggctg gtctcaaact cctaggctca agcaatcctt ccatcttggc 139800
ctcccaaagt gctggggtta caggcatgag ccaccatgcc tggcctacat tttaaatttt 139860
gatagctctt acaatttact ttgtaaagta tctgcatcat tttatgttct caccagtctt 139920
taataagaat acttcatact tttggctgga cacagtggct cacgcctgta atcccagcac 139980
tttgggaggc cgaggcgggc agatcaagag atcgagacca ccctggccaa tatggtgaaa 140040
ccctgtctct actaaaaata caaaaattag ctgggcgtgg tggcgcaccc gtagtcccag 140100
ctactcgaga ggctgagaca ggagaatcac ttgaacccgg gaggtggagg ttgcagtgaa 140160
cttagatcac accactgcac tccagcctag caacagagtg agactctgtc tcaaaaaaaa 140220
aaaagaatac ttcagactta attttttttc cagtcttaag tgtttgctaa tgagattgag 140280
tttcttttgg tatgtctctt gattgttcag gtttttttctt ttatgaattg actgttcatc 140340
tctttttcac attatttctg ttgggtgatt ttattagtga cttgttaaaa ttctgtatat 140400
tttttcagca tgacacttca ttattcaaaa aaaaaaaaag attctctatg tttctcgata 140460
ctaatcattg gttggtaata ccttaaaaat aagaccctta ctgtattttt tgctttttt 140520
ttttttttt ttttttttt tttgagatag agtcttgctc tgttgcccag gctggagtgc 140580
aatggtatga tctcggctct cagctcactg caactgcaac ctctacctcc ctgtttcaag 140640
caattctcct gccttagcct cccaagtagc tgggattaca ggcatccacc accacaccca 140700
gctaattttt gtatttttag tagagacagg gtttcaccat gttggccagg ctggtctcaa 140760
actactggcc tcaagtgatc cgcctgcctc ggcatcccaa agtactggga ttacaggcat 140820
gagccacagt gcctagccac tttttgcttt ttaactttgt tttatagtac tatagtttta 140880
gtataaacag atgtatgtat acacacaact atggctttat aatatgtttc agtcattgtt 140940
agagcaaggc ctacctttg ggtgcttctt ttacaaaatt gtcttggcta ttcttgtgcc 141000
ttttttctta tttgtgaatt ttagaattgt gaattacctg ttgactcacc atgttttgta 141060
aactgaggat tttgaatgga attgcactca attaaagatt atcttgcttt ctgtgcagca 141120
atgttttatt tcaaataatc cctactttaa attacttagg atagctataa attgtgtttc 141180
tggctttcta gatttagatg aaacgcttta aattgattgt tttctcctaa atttaaaact 141240
gattgttaga agttaaagtc ttctgttcat tcttatttag gaagatgaca tttggaagag 141300
tcagtgactt ggggcaattc atccgagaat ctgagcctga acctgatgta aggaaatcaa 141360
aaggtttgtg gtgtttttat acttcatatt aagcctttac tcacattagt gattgactgt 141420
aagtcaaaga ccacttaagg tttaaactgt ttattttgta aagtaaccac tgtatctttc 141480
accttgtgtt tatagtcaga agtaagtaca agggcttcct gtagtcacat ctttatgcaa 141540
tctcctctga atcaaaagtt agtgaacttg ctttgccact ccagaaggca catgaatatg 141600
aaaaagcatt gtctattttc ttatttaatg gcaaaatacc cgacctaagt tggacttaat 141660
gtttgagacc gtttatttta ttaaattata ttttttctct tttctttttt ttttttgaga 141720
cagttcttgc tctgtcaccc agaccggagt gcagtggtct gaccgcacct cactgcaacc 141780
tctgcttcct aggttcaagc gattttcctg cctcatcctc ctgagtagct gggactacaa 141840
gtgcgcacca ccacacctgg ctaatttttg tatttttagc agagatgagg tttcaccacg 141900

ttggctaggc tggtctcata ctcctgacct caagcaatcc atccgccttg gcttcccaaa 141960
gtgctgggat tacaagtgtg agccaccatg cctggcctta ttaaattatt tttattaaat 142020
ttcctcaaga ttgatgaaag taatgaaata taaaagtaat gaaatatatg tggaaaatag 142080
actggattaa gaaaatgtgg cacatataca ccatggatac tatgcagcca taaaaaagga 142140
tgagttcatg tcctttgtag ggacatggat gaagctggaa accatcattc tgagcaaact 142200
gtctcaagga tagaaaacca aacaccgcat gctctcactc ataggtggga attgaacaat 142260
gagaacactt ggacacaggg tggggaacat cacacgctgg ggcctgtcgt ggggtggggg 142320
gctgggggag gaatagcatt aggagatata cctaatataa atgacgagtt aatgggtgca 142380
gcacaccaac atggtacatg tatacatatg taacaaagct gcacgttgtg cacatgtacc 142440
ctagaactta aagtataata aatttaaaaa aaataaatat atgtggaaaa tattaatagg 142500
tcaaaattca aattgttcat ttaatcagaa gagtagttta gtcaaatcca agggttagac 142560
aacagaaatc ttttttgtca agtgcattct ttgtgactga tttcattttc ttcctggttt 142620
acacaggaag atttcagaaa caaatgtgga tccgtgacag atggtatcta gaagttttta 142680
gtttggttga attgacagta ttttattgag taaaagatac taatttttgt aagaagaaaa 142740
attcaatttt gataagtatg tttaagatta agagctattg gccaggcgct gtggctcatg 142800
cctgtaatcc tagcactttg ggaagctgga gcaggtgggt cacgaggtca agagattgag 142860
accatcctgg ccaacatggt gaaaccctgt ctctactaaa ttagccaggc gtggtggcac 142920
atgcctgtgc acccgcctcc gggtttaagc gatcctactg cctcaggctc ctgagtagct 142980
gggattacag gcgccatggc taatttttgc atttttagta gagacagggt ttcactacat 143040
tggccaggct ggtctggtct caaactcctg acctcaggtg atctgcccgc cttagcctcc 143100
caaagtgctg ggattacagg catgattcac catgtctggc catttatctt attttctttt 143160
ttttttttt ttttgtttga gacggagtct tgctgtgtcg cccagagctg gagtgcaatg 143220
gtgcgatctc agctcactgc aacctctgcc tcctgggttc aagcaattct cctgcctcag 143280
tcttccaagt agctgggatt acaggcgcgt gccaccacat ctagctaatt tttgtatttt 143340
tagtagagac agggtttcac catgttggcc aggctggtct cggaactcct gacctcgtaa 143400
tctgcccacc tcggcctccc aaagtgctga gattacaagt gtgagccact gtgcccagcc 143460
atcttatttt ctttcttttt ttttgtcggg tgggaggggg acagagtcta gctctgtcgc 143520
caggcttggc tcactgcaac ctctgccccc caggttctag caattattct gcctcagcct 143580
cccaagtagc tgggattata ggcacctgcc accacgcctg gctaattttt tgttattttt 143640
agtagagatg gggttttgct atgttgacca tgctggcctc aagtgatccg cccaccttgg 143700
cctcccaaag tactgggctt acaggcgtga gcttgtattg ggtaaaagaa caatattggg 143760
ggctgcatgg tggttcatac ctgtaatctg agcactttgt gagactgaga tggaaggagt 143820
gttggagccc aggagggtga ggctgcggct gcagtgaatt gtgatcacgc cattgcactt 143880
ccacctaggt aatggagcaa gaccatgtct ctaaaaaaca aaacacaatt tttttaagga 143940
atactgggaa gaggtcagtg gtggttttag aacagaggaa gtgccagatg acctttgtga 144000
ggcattggcc aggaagaact ctacagtgtc tttaggtagc ttctgtccat aaggataatg 144060
gggtctcctc cccagtatta atagaaaatc tctgagctgt tttttttgt ttgtttgttt 144120
tgttttttt tcctgagatg gagtctctct ctgtcggcca ggctggagtg ctgtggcgcg 144180
atcttggctc actgcaagct ctgcctccca ggttcacacc attctcctgc ctcagcctcc 144240
caagtagctg ggactacagg tgtccaccac cacgcccagc taatttttg ttatttttag 144300
tagagatggg gtttcaccat gtcagccagg atggtctcga tctcctgacc tcgtgatccg 144360
ctcgcctctg ccttgcaaag tgctggagtt acaggcgtga gccaccgtgc ctggcctggt 144420
ttttttgttg ttgttattta tttatttatt tatttatttt ttgagacaga ctctcgctct 144480
gtcgcccggg ctggagtgta gtggcacgat gtcggctcac tgcaagctct gcctgccagg 144540
ttcaagccat tctcctgcct cagcctcctg agtagcaggg accacaggcg ctcgccacca 144600
cgcccggcta attttttgta tttttagaag agacggggtt tcaccgcatt agccaggatg 144660
gtctcgatct cctgatgtcg tgatccgccc acctcggcct cccaaagtgc tgggattaca 144720
ggtgtgagcc accgtgcctg gcctgatttt tttttttttt taatctggtc tcatacctct 144780
gacagctcat gaagaagtgc tcctgcttca tatgtatatg tgttagcata gtgttaacat 144840
agcataggtg ttcggtgttt gcagtttctg tttgttttat atgaattaag gtgtattatg 144900
agcagttgaa gatatatagg aaatttttc ccaaaccact atctctgctc gttctattca 144960
ttcagtctgt ttatgttatt ccttcattca ttcattttat agaacagtgg agtgcctact 145020
gtatgcatct attgttctgg gtcctgggga agaaaacaaa gttcctgctt tcatggaact 145080
tacattatat tggcggagac agtaacagac aaacaaatgt agcctgtgta catgtgttac 145140
atgaaaagca gggtaggggg ctgggagaga gtagtaggga gtgctatttt cgaggtggtt 145200
gtcaggaaag gcctcactga ggaggtggca ttttgagtag acctgagcgc agcgggggcg 145260
taagcccagg cagcatgtgg aggaagagtg ttcttggtga aaggaacaag gatagaggcc 145320
cgaagctaga gagctcagca tgatcaagga acagcaagcc ccgtgtggct ggaatggagt 145380
gagcaaagga atgagcagta gaaggtgagt gagttgggag gtcaccagag accatggcaa 145440
ggacttgaaa gtgtcaggga cacattggaa gttggagcag ggaaatgatg ggatttatgt 145500

ttttatgttt agtgttttta agggattgct ctatcagcta tttggaaaat 145560
gcttcaagaa gagaagcaga gaaacaacat tcttgccata gtcatagtct 145620
tgatggtggt gtggattagg ctggtagtgg aagaccagtc cagttcgggt 145680
ggtagaggca aaaagattat atttctacca gcaagcccat ctatgaagtt 145740
ttaatttaat tgagacatgc ccacataaac taataaatag gaatttctgc 145800
aacacccctg tatatcctgg ttcttctttt agttgtccag atgtctcttt 145860
ttttttggtg gtgtaggagc ctagagattg aatttattca cccaaaaggc 145920
ttactatgtg ccaggcacta tgctgaatgc caaggatgta aataagaggg 145980
gtctgtttta ctccagcttg gttccttttt aatgaccctg acttgttaag 146040
atcctacaga atgtttaatc ttctgtactt tcctggttgt gttatttagc 146100
ttccttgaca tttcttgtaa actggaagtt acacctatag tcttgatgat 146160
cattttagat tagaacacat catgtgttgt atatggtgtt tttgaaagcc 146220
ttggtctgta cattaaaatg ttgcctgaat ggatacacat aaaatttaac 146280
ttagagatga gaagaaagag gtgcctttta cttttcaata taccttttcc 146340
gaactttctt gccctatgca tacgttattg cttaatcatc cacctcatct 146400
ggctttctgt tgcatttgga atgaaatcta gcctctttgc tgttacctgt 146460
tgctggcctc tatcacctta ctttgaacca ctcctttcat ggactgagct 146520
tatcttttat tcttttgctg aagtttcttc actttgagtg cctctgcagt 146580
tggctgtggc aagccctgcc atggctttca tgcaaggatg gttcctcctt 146640
tattatctct tcagagaggg accttcccaa ctccgatgat ctaaaatcct 146700
cactcactac cacttctttc ttttcttttc cttttatctt ttttttttt 146760
gagatagggt cttgctctgt tgcccaggct ggaatcacga ctcactgcag 146820
ttgggctcaa atgatcctct cacctcagcc tctcgagtag ctggaactgc 146880
caccatactt ggcttattat tttacttttt gtagagacag ggtttcacca 146940
caagctcctg ccgcaagcaa tccacatctc tcagcctccc aaagtattgg 147000
gtgagccact actcctggcc tattttctta ttcactgtct aaaattatct 147060
tttacatact tgtttatagc ttatttctca gctggacatg gtgcctcaca 147120
caatactttg ggaggctggg ttggagaatt ggttgagccc aggacttcaa 147180
ggcaacaaag tgagaccctg tctataaaaa attgtttaaa aattagctgg 147240
acatgcctgt ggtcccagct acttgggagg cagaggtggg agaatcgctt 147300
ggttgaggcg acggtgagcc atgattgtgc cactgcactc tagcctagtg 147360
accatgtgtc taaaaagtaa ataaaaatag tttctctttc atgactagaa 147420
atgtgggcag ggagtttgtc tatactattt ggcactatat ttcctgattc 147480
cctagcacat ggtaagtact ccttaaatat ttattgactg aattatttaa 147540
tttcatttgg gattatctga gtggtaagat tacggattat atttatgtaa 147600
ttttttaaac ttggttgccc tttgccacac tgacatagac actaagtttt 147660
ttacttccga ggatactcac agaggccatt ctcttctcaa tccccaaata 147720
cttagcactt tcaagctaat gcaattctta gatgatgtat ctgtgtatat 147780
ctctacaaat gtagaaattg aagtctgggc acagtggctc tcacctgtaa 147840
ctgggaggcc aaggcgagcg gatcactgag gacaagagtt aagaccagcc 147900
ggtaaagcct tgcctctatt aaaaatacaa caattagggc cgggcgtggt 147960
cataatccca gcacgttggg aggccaaggc aggcagatca cgaggtcagg 148020
catcctggct aacacagtga aaccccatct ctactaaaaa tacaaaaaat 148080
cggtggcacg cgcttgtagt cccagctatc gggaggctga ggcaggtgaa 148140
ccgggaggcg gaggttgcaa tgagctgaga ttgcaccgct gaactccagc 148200
gagggagact ctgtctcaaa aaaaaaaaaa aaaaacaatt agccaggcgt 148260
acgagtacct gtaatcccag ctactaggga ggctgaggga ggagaatcac 148320
gaggtggagt ttgcagcggg ctgataatgc accactacat tccagcctgg 148380
gagactctgt cttaaaaaaa aaaaaaagaa agaaagaaat tgaggaatgt 148440
gtctgtgatt tgttaggaat cacacagcag gttagtagca actacagggc 148500
aataccacct tgacaatggt ttgtttacag ttcggctccc cttcctctgc 148560
ctccttattg agggcagctg gaaagaattt tcatcattta ctagcctata 148620
gagttttgaa accttgataa tagagcacag aggaaaagac tgagttttct 148680
cagtcttgct ctatggccca ggctggagtg cagtgacacc atctcagctg 148740
ctgcctccca ggttcaagca attctgcctc agcctctcga gtagctgaga 148800
gtgtcaccac gcccagctaa ttttctgttt ttgtttcgtt ttgttttttt 148860
gtcttgctct gtcacccagg ctggagtgca gtggtgcgat gttggctcac 148920
gtctcctggg ttcaagcaat tcttctgcct cagcctcccc agtagctggg 148980
cgtgccacca tccctagttc atttttgtat gtttagtaga gatggggttt 149040
accaggctgg tctcgaactc ctgatctcag gtgatctact cgtctcagtt 149100

tcccaaagtg ctgggattat tggcacacgc ctatttttgt atttttagta gagacggggt 149160
ttcaccatgt tggttagact ggtctcaaac ttctgacctc aagtgatttg cccgccccag 149220
cctcccaaag tgctgggatt acaggcgtga gccaccgtgc ccagccaaga ttgagttttg 149280
aaaagagcct tctgagatta tgagaagggc aagcaagata acttaagaag ttacattaaa 149340
atcatctaag agacagtgta acaagaagga attgtaaaat gatgttatga gcacgtgccc 149400
aatgtagtgg caatcccttg tgcttcgata cattggtggg agacaaaact gtacttaaat 149460
tgataaatcc cttacatgtc attttaagga gcttagactg actcccatca tgtagacatc 149520
agagatttct ttttttttt ttttttttt ttttttttt tttgtgacag agttttgctc 149580
ttgttgccga ggctggagtg caatggcgtg atctcggctc accacaacct ccacctccca 149640
ggttcaagca attctcctgc ctcagcctcc cgagtagctg ggattacagc catgcaccac 149700
cacgcctggc taattttgta tttttagtag agacggggtt tctccatgtt gtggctggtc 149760
tcgaactcct gacctcaggt gatcctcccg cctcagccac ccaaagttct gaaattacag 149820
gcgtgagcca ccgcgcccag cccagagatt tctaaacaga gttctaacca gatgcttttc 149880
cctgtcagta gaatgagaat gaattggagg tgggagagac tggcatgagg gacaccagtc 149940
agccagtgga attagctggt aatgttgata ggagaagaaa aagattcaaa gttaggtagt 150000
ggtagcaaga attagaggga aggtcggatt tatgatatgt ccaaggttga attctaaggt 150060
gaaatttggt ggcagatttc atgtgtaaat tgggaaggta gattgagttt ttttaacatg 150120
ggttttctaa catgtcaata gagtgactct gcaggggggc ctgacgagag aacagtgcat 150180
ggggtgattc aacagccagt tgagccttca tgcagagcat ttaacactgt gactctgtag 150240
actctggttg gcagtaaaat ttcattaaac caatatttaa acccttaggt aataataaaa 150300
attgagggaa aaggatccag gttttgtatt ttttatgaat tcagttattg aattaaacag 150360
gaccttgcct caagaaataa tctaccaaca attaacttgt tttaaagcaa agttaggaag 150420
tgagcatgtt caaattatta aataaaaaag taagctgtgt atttcattca tagaaataga 150480
ggctggccta cttcggatga ttctcagcat gtgattacag atgtgggctt atacatccta 150540
gggagttaag gcgtactctg gcttggatag agtagagctc tttgaaactc ttctctcacc 150600
cagctagttt atatagacta gagaactaga atgtagcagc atactctgtc ttagaagccc 150660
ttttatatag gagctggtct ggaaggtttg aaaacataac aaatgtgttg gtgtctccca 150720
atgtattgct agattcttac ccaagagcat tatcctggtt agggtttggt ttggttttgt 150780
tttgtttttt aatgtttgcc acaaactaac actagatgtt agttctttca tcaagtgagg 150840
agagtagaag aaaagtccag aactctgaaa caccttttca aaagttttc aagccatgat 150900
gtttgcaagt taaatgctct gttatgtaag caatataatc agtttttatt aatgtaacat 150960
tccttagtgt tttggggtat cacacaaaaa agaatatcca tatctggaag caacagcttt 151020
taaataagag cattgtggtg gtggtggtga tagtggtttt ttttttttt tttgagttgg 151080
agtctcgctc tgttgcccag gttggagtgc agtggcacga tctcagctcg cttcaacctc 151140
tgctcccagg ttcaagcaat tcttctgcct cagcctcctg agtagctggg attataggca 151200
cctgctacca tgcctggctg atttttatta ttttagtaga gacaggtttc accatgttgg 151260
ccaggctggt cttgaactct taacctcagg tgaatcaccc acctcggcct cccaaagtgc 151320
tggaattaca ggcatgaacc accatggcca gccaaataag agcattttta atgtaaaatt 151380
atgcatgaaa tgtacattca attttgtctt tgtttactag gatccatgtt ctcacaagct 151440
atgaagaaat gggtgcaagg aaatactgat gaggtaaatc ctacctttag gataaaaaga 151500
tttctgttta taagtgccac cctcatgtaa gtgaggttta aaattttcct tttctttagg 151560
tcccatgttt aagcagcatg gcacatttat gttctcttac ccagaatgta ccaagaaagg 151620
gtggtccctt cttaacatct aacaattgcc tggtagtagc agtgaaggta tcttcagtca 151680
gaggctagga ccactgaagg atatacatgc attcaagttt ccatcagcca gcaggcatca 151740
gtaatcagtg tgtagatcaa aagctcaaat gtttccttcc ccactggcag ttttacttca 151800
agtagtggag gcttgctttt ttaatagtta attaagtaca ttgagagatg ggaggtgaaa 151860
aaaggaaaat gttttatttt gaccatctaa tatgaaagta gttcggtgtt aggtatccag 151920
tagttgacac tggaagacag ggaatgacat gttaatattc atagccagag ggtggcccag 151980
gtttttcgt acatgggaat gaaattctta tccaaataag tagaaattat gtgcgtaagc 152040
catttgttaa gagcactgag tatgtgcatc tcgatccatc taatgaataa ccattatcac 152100
cagtttaaat tattttcttt aggcccagga agagctagct tggaagattg ctaaaatgat 152160
agtcagtgac attatgcagc aggctcagta tgatcaaccg ttagagaaat ctacaaaggt 152220
aaggatgact tcgttttgtg taaactaaaa agtattattt tccaggtgta aaaataaaaa 152280
agaacataag gggtttcttt gcctttgaag gattaactgc tgtggggatt accttcttat 152340
cataagcaac tagaaaattg acaaactaaa tgaaacaact gtttgcatat attggacaat 152400
gggcaataca gggaaaccat ggaaaccaaa cagagcccag tagtcttgct gaacgaaaga 152460
gttaaatatc aaagttcagg ccaggtgcag tggctcacgc ctgtaatccc agcactttgg 152520
gaggccaagg cgggtgaatc acttgaggtc aggagttcaa gaccagcctg gccaacatgg 152580
tgaaaccctg tcttagccgg gtgtggtggc aggcacctgt aatcccaact atttgggagg 152640
ctgaggcagg agaatcgctt gaaccaggga ggcggaggtt gcagtgagcc gagatcacac 152700

cactgcactc cagcctgggc gacgagcgaa accccatttc aaaaaaaaaa tcaaagttca 152760
gagagctcaa tttgagtaga agttgtagga taaggtagca gaaaagagga agctgcccag 152820
aaagaaagcc gtagagatat ttagagagat tcccatggat ccttggccta ggagtgatct 152880
gtatatgtgt ggggtgaaaa cgcatgtgtc caggtagaga acccccccaga aattagtagg 152940
ctgaatgatt gctggaacat agggctaaga aaagttcatg gccagaagga tctggccaga 153000
gtagagagac ttagtaatac acaaggcatt gggtagtgtc ttcacagagg ttatgcctta 153060
ctactgaaga taaattagtc ctagagtaca agcacctgaa ccaagtttca aagcaaattt 153120
ttaaagggtc aaattaccta acaactgcat gccaaaacaa aggcctaacc ctctttacag 153180
taacacaaca aaattcagca cttcacagtg taaagttaga atgtctgacg tccaggctgg 153240
gcgcagtggc tcatgcctgt aatcccagca ctttgggagg ccgaggcagg tagatgacct 153300
gaggtcagga gttcaagacc agcctggcta acatggtgca accccgtctc tattaaaaat 153360
acaaaaactt agccaggcat ggtggccggc acctgtgatc ccggctactt gggaggctga 153420
ggcaggagaa ttgcctgaac ccaggaggtg aaggttgcag tgagccgaga tcgcaccact 153480
gcactctggt ctgggcaaaa agagcaaaac tcaggctcaa aaaaaaaaaa gaatgtctga 153540
cgtcaatcac aaattaccaa gcatgacatg aagttgacct ataaccagga gaaaactcaa 153600
tctatagaaa cagacccaga tgtgagaaag atgatgaatt tagcagacaa agaccatcaa 153660
gtggctattt taaatattaa aaatatgttc aagtggccag gtgcagtggc tcatgcctgt 153720
aatcccagca ctttgggagg ccaaggtggg taggagttca agaccagctt ggccaatatg 153780
gtgaaacccc ttctctacta aaaatacaaa aaaattagct gggcatggtg gcaggtgcct 153840
atagtcccag ctatatggga ggctgaggca caagaatcac ttgaacccgg gaggtggagg 153900
ttgaggttgc agtaagccga gattgtgcca cttgtactcc agcctggaca acagagtgag 153960
actctgtctc aaaaaaaaaa aaaaaaaagt taaagaaaac aagagtataa tgagaaaaat 154020
gcaaaatagt tttaaaagaa ccaaatggaa tttcttaaaa taaaaaatac cagaaatggg 154080
ggccgggcgt ggtagctcac gtctataatc ccagcacttt gtgggggctg aggcaggcag 154140
atcacctgag atcggtagtt caaggccagc ctgaccaaca tggagaaacc tcatctctac 154200
taaaaataca aaattagctg ggcgtggtgg cgcattgcct gtaatcccag ctacttggga 154260
ggctgaggca ggagaattgc ttgaacccgg gaggcagagg ttgcggtgag ctgagattgc 154320
accagtgcac tccagcttgg gccacaagag tgaaactccg tctcaaaaaa aaaacaaaaa 154380
aaaacagtag actcgaagaa ctagctgagt ttttctttac tttaggcagt aagtgtgacc 154440
ttttgcaggt gactacttta gttcctcatg tcctcattag tagatcagag aaattcgaca 154500
ccaaaacccc aaaagaaaaa ccccttctaa tcctcattcc atgattttat gaatgcatga 154560
agtcctaggc ctgcgaagga atactcattc tctttatcct gtgttgatac ctctctgctt 154620
caacctccaa ctcgacattt gcctatagga tgtacttgga cattcagcat aaactacctc 154680
acaccattac tgaattgctt catgtgcaca tgtcccatgc cacaataccg gggaccttgt 154740
cttccgtgat atttgtccgc agtgctgtga ctacaggagg gagtcagtga atgtctgcat 154800
gtgtgtcttt accatccctc ttgaatatgc tctagggtta attcctagaa gtagaattac 154860
tctattgaaa attggcaata tttttcattc taatatctat tgccaacatg ggaaagcaag 154920
tctggatgcc agtccttgtt atatgcccct tgggtaagtt acgtaacctc tttaagcttc 154980
tgttcactca tattttaaca aggaaaatta caatatttta cctcacaaaa ttgtagtcag 155040
cttctggctg tcttaaactc tggtatatag taaacactaa gtgttggtgt ccatccttaa 155100
tttgtaataa taggtcactt gttagagaaa tgcaccttac cattttcttt tcttttcttt 155160
tttcagttat gactcaaaac ttgagataaa ggaaatctgc ttgtgaaaaa taagagaact 155220
tttttccctt ggttggattc ttcaacacag ccaatgaaaa cagcactata tttctgatct 155280
gtcactgttg tttccaggag agaatgggag acaatcctag acttccacca taatgcagtt 155340
acctgtaggc ataattgatg cacatgatgt tcacacagtg agagtcttaa agatacaaaa 155400
tggtattgtt tacattacta gaaaattatt agttttccaa tggcaataac ccatttatga 155460
gagtgtttta gcctactgga atagacaggg accacatcct ctgggaagca gataagcata 155520
gaactgatac ttgatgcaca ctcgtagtgg taactcatcc ctaatcagca ttgtaaagca 155580
ggtgccagag gtggtttgct ttgtccttcc aaagcaggtg agtcagcccc accgagagcc 155640
aggcagcttt gagtggcagc gtggtgctag cagcttcagc ggaacagggt gagagttaat 155700
tatgcagtct tcttgacagc ggcattaatt tggaaggaaa ctgacaagtc atgggtcaag 155760
tttcagtgac ttcctccttc ctctgatggc agtatatagt tttcacattt taattcctcc 155820
tcctgagatg cactatactt aaaaccattc tctcccctgc taacagaagg gtgtgaatct 155880
ggtttacttt gagcattagg atttgcccct ttggaattct gcactccagt tacttaactt 155940
tcccttcaga atacatgtgg aaagaaagaa agaaatagcg atgactccac ttttgccccct 156000
gtggcacctt gaacaaagca gttcttccca aattatactt ttttttttt taaataaggt 156060
gagcaggatg actggggaga gagaaacatt tgactttgac tgcctccccc attctttgct 156120
gtgagctgga aagtgtgcag ttggtcgtct ttcttctcct ttctttagga tagtaagaga 156180
ctcactcact gcacttctgc tcagttggct tctgcatcgg gatcacacag ccatcagcag 156240
gactgcccag ttggtgagca cactccattg accacgcggc gccagcgctt cctcaatgca 156300

catgattgag aggaaagaaa gttctcttag atgttactgc ttttgctcag actttgcaaa 156360
aaaaaaaata tatatatata tgtataaata tataattatt aatcactttt gtccttgaga 156420
aagtcttgaa tgaacagaga atttattcca ttgcaatatt tgattgtata gaggcacact 156480
gtttcatcga cagaagaagc aaaaaggctt tgtgtaagtt tttggtacta tgtaccacct 156540
ctgttattct tttaaagctg aagtattcat gtacttaaac catattatat ttaattgtgt 156600
ttgattttaa aatatatata tatgaattct atttaaaatt gtgtcaactt tctgctttca 156660
gggcatttat ggctcttctg ttgaaatata ttgatctttc caaatatttt catttgcttt 156720
ctaaaaaccc agaacatgag ccactactgg actttgcctt gtgtttgaag tgtatggcat 156780
aaacccaagg tttttattag tcatctatgc tgtgattaat tcattttgtt cttttaacaa 156840
aatatttcca tccacttcac attgcttcaa tctttaacag aaaagcaata taaaggttat 156900
agaataaaat gtggttttgg gcaactcttg ctgcctctgc atgttttgga ataacaattt 156960
ctacaagact ctaggctgtt taaactagtg ctttcagtta agataaattc taatcatttc 157020
tttgtatata cattttgtgc ttctgagcta gagatgccaa gtagttgtaa actgcttata 157080
aagagaatag cagcaaattt gagactcggc tacttttttc tgccccacct gctttgagac 157140
acagaagcgg agtgtggccc gaaattatta gccagattta atatttgatc taaagtaggt 157200
ccttgtactc attttaaagt tggaatttga ttcctccaac attgagcacc caccatgttc 157260
caggctctgt gcattgtgcc cacaaaataa gattccctgg tggagttttt atgggttcaa 157320
ataatcagtt gaacaccctt catctttatc atgttgttga cattgacaca aattgtttaa 157380
aaagaaaaga tattagagag aaagtggtac ctttgtaact tgatgtgtct tcatcattcg 157440
gtaagatttg atgaaagtaa aaagcaaatg tcagccaaat ccagtgaaca gcaataaaac 157500
agggagtaac tttttataac tttttctact tggatttcaa cattcagtag agcttttcga 157560
aatgtaagta gtttacagta ctggaggttt gactagttca gtaggaattt ggaggggaag 157620
gtcattctga attgtaacaa agtacaaact tctttgctgt tttatttaag tactgagagc 157680
taagcacctg atgaagtgac tgacctctct ccagtgacag tgtttgggta cctgcctgac 157740
ttcaggagtg gggtttatgt ttctacacag tgacctttc tctcgccctc tcctccctct 157800
tgcccacaca ccagttgatt ggacctgggt tgaactcctg atccagacag gcccaagaca 157860
gttcttaatg ttaagaattt tggggccggg cacggtggct catgcctgta attgcaacac 157920
tttgggaggc cgagacaggc ggatcacttg aggtcagggg ttcgaggcca gcctggccaa 157980
catggtgaaa ccctgtcttt actaaaaata caaaaattag ctgggcatgg tggcgcacgc 158040
ctgtaatccc agctacgtgg gtggctgaga caggggaatc gcttgaacct ggaggcggag 158100
gttgtgcaat gagccgagac cgtgtcactg cattccagcc tgggtgacag agggagactc 158160
tgtctccaaa aataaaaata agaaaaagaa ttttgggcta ggtgcagtgg ctcacgcctg 158220
taattacagc attttggaag gcccaagatg ggcagatcac ttgaggacag gagttcgaga 158280
ccagcctgga caacatggtg aaactccatc tctactaaaa agacaaaagt tagccagatg 158340
tggtgatggg cacctataat cctagctcct cgggaggctg gggcaggaga atcacttgaa 158400
cccaggaagc agagattgca gtgagccaag atcacatctc tgcactccag cctgggcaac 158460
agagcaagac tctgtctcaa aaaaaaaaga atttggccag gcgcagtggt tcacgcctgt 158520
aatcccagca ctttgggagg ccaaggcagg cagatcacga ggtcaggaga tcgagattgt 158580
cctggctaac atggtgaaac cctgtctcta ctaaaaatac aaaacattag ccgggtgtgg 158640
tggtgggcac ctgtagtccc agctactagg gaggctgagg cagaggaagg atgtgaaccc 158700
aggaggcgga gcttgcagta agccaagatc gtgccactgc actacagtct gggcgacaga 158760
gtgagactcc gtctcaaaaa aaaaaagaat tttggccggg tgcggtggca catgcctgta 158820
gtcccagcac tttgggagac caaagtgggc ggattacctg aggtcaggag ttcaagacca 158880
gtccggccaa tatggcgaaa ccctgtctct tactaaaaaa aatacaaaaa ttagccaggt 158940
gtggtggcgg gcacctgggg aggctgaggc agggagaaat gcttgaaccg gggaggcaga 159000
ggttgcagta agccaagatc gtgccactgc actccagagc aagactcttt ctcaaaaaaa 159060
aaaaaaaaag aattttgcat ggggaaggag agatactgtt caccatctgg aatggtgctt 159120
ggatgtggca cttacaaaat caggagccag cactgcatgg acaaacagaa gcatgtgggc 159180
ctgagatagc aggtaccttg ataaccctga agacatcctt ggtttctgca tctattcctg 159240
catccttgca ttggactaca ttaatctgtc agttatcctt ataatgattt ttgatttttt 159300
ttttttgaga tggagtttcg ctcttgttgc ccaggctgga gtgcaatggc acgatctcgg 159360
ctcaccacaa cctccacctc ccaggttcaa gtgattctgc tgcctcagcc tcctgagtaa 159420
ctgggattac aggcatgcgc caccacacct ggctaatttt gtatttttag tagagacggg 159480
gtttctccat gttggtcagg ctggtctcga actcccaacc tcaggtgatc accctgtctc 159540
ggcctcccaa agtgctggga ttacaggcgt aagccatggt acccggtctg ttttttgatt 159600
ttttgaaacc agtctgaagt gagtttttt aattacgtga aaggagtttg gctaaaatac 159660
tgccatactg ccctaatgcc taatgattat gtattctcag catgtctgca aagtactgct 159720
gatttctgga gaataatttt tctttagtaa acttcactta agtcgtcatg tgtattctct 159780
caaaatggta tcctaaccta atggagctaa aagacacccc ttgtttttat aacaagcagt 159840
tactgaggcc caggaagggg agaagtccct ggcttgtgag atgatcacca ttagaactca 159900

```
ggcctgggcc agtgcctttt catgcttctc agatccttcc aaagaataat gaagattata  159960
accgctttta gcaattgtaa taaacccaga aatagaaagc tttttggtta gagtactggt  160020
agaagtttgg cgggagagat aatttttaca aaatttgtaa atacctgcca attctatata  160080
ctaggcaagg tctctggcct tgtaaaaccc ctcaaggtta caactttggt ggcccacact  160140
aatagttacc cactgaggcc ctctccgggt gaacattgag cactagagga agcccctctg  160200
cttgggcagg actgggcgtg gtgcagagta ggagcggtga tactgtggat tctgggcagg  160260
tggagatggc cagtgatgtc caataaagga cactggaggg agcagtgtga gtaaaggccc  160320
tgagggcatt catgttcagg gagggttgct gcccactggc ttgcttggca cacaggagag  160380
tgggtattcc tgccttagta actttatgta aacaagtatt tcctcagtct gttcctctca  160440
aactgcctgc tctggcacat tcagaatgtc acagaactca cctggatgca ttcagcccct  160500
tgcctaaagg tgacagtgca tctccttccc caccccaccc ctcataccac tgaagcacct  160560
gtcagactgg cccagtctgt gggcaaggag cctagagagg gcttagtttc agcttgaaag  160620
gagctgggat ttaccaagaa gcaaatgaga gacgaggatt gcaacaactg tgccatttcc  160680
ccagcttcag ctgactcctg tatattgact gtgccttcag actcatccgt aagtgacccc  160740
aggctggcct ctcccacatc acagtaagaa ttccacacac catacaactt ggaaagaggc  160800
tccagctgaa ggaagcccca cacttctttc aagtttttct tagtcttctc ttcttggcaa  160860
agagtacctt ttgtttcttc taattatgta actattggtt tagtaaatat tcacccattc  160920
agtcaccctg taagtggcag gcactgttta cagggacaca ggaaggaata aaaacttgca  160980
ggcaccttgg agcttgcatt ctattgaaga ggtaatggaa gttgggatag cagctaaact  161040
atgctggtat tggccaggcg cagtggctca cacctgtaat cccagcactt tggaggccaa  161100
ggtgggcaga tcatgaagtc aggagatcga gaccatcctg gctaacatgg tgaaaccccg  161160
tctctactaa aagtaaaaaa aaaaattagc caggtgtggt ggcgggcgcc tgtagtccca  161220
gctacttggg aggctgaggc aggagaatgg tgtgaaccca ggaggcgaag attgcagtga  161280
gccgagatgg caccactgca ctccagcctg ggtgacagag cgagactctg tctcagaaaa  161340
aaaaaatatg ctggtagttt tgattcaaga tggcctttgg agcccatgat ttaggtctcg  161400
tacccaccaa ggtctactgg aaaacatcag gctctcctgc tatagaccca tagggagagc  161460
tgcagccgag agggggagct gaagagaagt gccccttctg tgtcctgtca gcctcatcct  161520
tccgcaagga ccagttgctg tgccactcca ttcacttgct gcaagactgg aggtttttcc  161580
tcaggtgttg agcacctggt ttacaagatg tcagcatctt gatgcctgag accatcaagg  161640
caagtctctg aacagggctt accttagagt aaggcttaga agaggccgta aagtcagtct  161700
cagctccgtg gctctgcaga gctttgggac atgtgaattc ttaaaaacaa gactattgta  161760
cagttactat atgcatgcag tataaaatta taaccttgga aaatcctagc tagctgttga  161820
gctaattcca taaagtaatc agctcctgag ttctgcagtg gtaataataa tcagcataat  161880
gagtaaacac tgtgtgtgcc aggcagcgtc tcatttgatc cttgtgataa tcttgtaagt  161940
actgattttc tcccttcttt aaacaaagtt ttttttttt ttttagagag ggtctcacta  162000
tgttgcccag gctagtcttg aattc                                       162025

<210> 37
<211> 1350
<212> DNA
<213> Homo Sapien

<220>
<221> CDS
<222> (213)...(920)

<300>
<308> GenBank AJ242973
<309> 1999-10-26

<400> 37
gcggccgcgt cgacgtgaca gccggtacgc ccgggtttgg gcaacctcga ttacgggcgg     60
cctccaggcc cgccagcagc gccccgcgcc gcccgcccgc gcccctgccg ccccccggtt    120
ccggccgcgg accccactct ctgccgttcc ggctgcggct ccgctgccgg tagcgccgtc    180
ccccgggacc acccttcggc tggcgccctc cc atg ctc tcg gcc acc cgg agg      233
                                    Met Leu Ser Ala Thr Arg Arg
                                     1               5

gct tgc cag ctc ctc ctc ctc cac agc ctc ttt ccc gtc ccg agg atg      281
Ala Cys Gln Leu Leu Leu Leu His Ser Leu Phe Pro Val Pro Arg Met
```

```
         10                  15                  20

ggc aac tcg gcc tcg aac atc gtc agc ccc cag gag gcc ttg ccg ggc      329
Gly Asn Ser Ala Ser Asn Ile Val Ser Pro Gln Glu Ala Leu Pro Gly
     25                  30                  35

cgg aag gaa cag acc cct gta gcg gcc aaa cat cat gtc aat ggc aac      377
Arg Lys Glu Gln Thr Pro Val Ala Ala Lys His His Val Asn Gly Asn
 40                  45                  50                  55

aga aca gtc gaa cct ttc cca gag gga aca cag atg gct gta ttt gga      425
Arg Thr Val Glu Pro Phe Pro Glu Gly Thr Gln Met Ala Val Phe Gly
                 60                  65                  70

atg gga tgt ttc tgg gga gct gaa agg aaa ttc tgg gtc ttg aaa gga      473
Met Gly Cys Phe Trp Gly Ala Glu Arg Lys Phe Trp Val Leu Lys Gly
             75                  80                  85

gtg tat tca act caa gtt ggt ttt gca gga ggc tat act tca aat cct      521
Val Tyr Ser Thr Gln Val Gly Phe Ala Gly Gly Tyr Thr Ser Asn Pro
         90                  95                  100

act tat aaa gaa gtc tgc tca gaa aaa act ggc cat gca gaa gtc gtc      569
Thr Tyr Lys Glu Val Cys Ser Glu Lys Thr Gly His Ala Glu Val Val
    105                 110                 115

cga gtg gtg tac cag cca gaa cac atg agt ttt gag gaa ctg ctc aag      617
Arg Val Val Tyr Gln Pro Glu His Met Ser Phe Glu Glu Leu Leu Lys
120                 125                 130                 135

gtc ttc tgg gag aat cac gac ccg acc caa ggt atg cgc cag ggg aac      665
Val Phe Trp Glu Asn His Asp Pro Thr Gln Gly Met Arg Gln Gly Asn
                140                 145                 150

gac cat ggc act cag tac cgc tcg gcc atc tac ccg acc tct gcc aag      713
Asp His Gly Thr Gln Tyr Arg Ser Ala Ile Tyr Pro Thr Ser Ala Lys
            155                 160                 165

caa atg gag gca gcc ctg agc tcc aaa gag aac tac caa aag gtt ctt      761
Gln Met Glu Ala Ala Leu Ser Ser Lys Glu Asn Tyr Gln Lys Val Leu
        170                 175                 180

tca gag cac ggc ttc ggc ccc atc act acc gac atc cgg gag gga cag      809
Ser Glu His Gly Phe Gly Pro Ile Thr Thr Asp Ile Arg Glu Gly Gln
    185                 190                 195

act ttc tac tat gcg gaa gac tac cac cag cag tac ctg agc aag aac      857
Thr Phe Tyr Tyr Ala Glu Asp Tyr His Gln Gln Tyr Leu Ser Lys Asn
200                 205                 210                 215

ccc aat ggc tac tgc ggc ctt ggg ggc acc ggc gtg tcc tgc cca gtg      905
Pro Asn Gly Tyr Cys Gly Leu Gly Gly Thr Gly Val Ser Cys Pro Val
                220                 225                 230

ggt att aaa aaa taa ttgctcccca catggtgggc ctttgaggtt ccagtaaaaa      960
Gly Ile Lys Lys  *
            235

tgctttcaac aaattgggca atgcttgtgt gattcacaat cgtggcattt aaagtgcaca   1020
aagtacaaag gaatttatac agattgggtt taccgaagta taatctatag gaggcgcgat   1080
```

ggcaagttga taaaatgtga cttatctcct aataagttat ggtgggagtg gagctgtgcg 1140
gtttcctgtg tcttctgggg tctgagtgaa gatagcaggg atgctgtgtt caccttctt 1200
ggtagaagct aaggtgtgag ctgggaggtt gctggacagg atgggggacc ccagaagtcc 1260
tttatctgtg ctctctgccc gccagtgcct tacaatttgc aaacgtgtat agcctcagtg 1320
actcattcgc tgaaatcctt cgctttacca 1350

<210> 38
<211> 235
<212> PRT
<213> Homo Sapien

<400> 38
Met Leu Ser Ala Thr Arg Arg Ala Cys Gln Leu Leu Leu Leu His Ser
1 5 10 15
Leu Phe Pro Val Pro Arg Met Gly Asn Ser Ala Ser Asn Ile Val Ser
20 25 30
Pro Gln Glu Ala Leu Pro Gly Arg Lys Glu Gln Thr Pro Val Ala Ala
35 40 45
Lys His His Val Asn Gly Asn Arg Thr Val Glu Pro Phe Pro Glu Gly
50 55 60
Thr Gln Met Ala Val Phe Gly Met Gly Cys Phe Trp Gly Ala Glu Arg
65 70 75 80
Lys Phe Trp Val Leu Lys Gly Val Tyr Ser Thr Gln Val Gly Phe Ala
85 90 95
Gly Gly Tyr Thr Ser Asn Pro Thr Tyr Lys Glu Val Cys Ser Glu Lys
100 105 110
Thr Gly His Ala Glu Val Val Arg Val Val Tyr Gln Pro Glu His Met
115 120 125
Ser Phe Glu Glu Leu Leu Lys Val Phe Trp Glu Asn His Asp Pro Thr
130 135 140
Gln Gly Met Arg Gln Gly Asn Asp His Gly Thr Gln Tyr Arg Ser Ala
145 150 155 160
Ile Tyr Pro Thr Ser Ala Lys Gln Met Glu Ala Ala Leu Ser Ser Lys
165 170 175
Glu Asn Tyr Gln Lys Val Leu Ser Glu His Gly Phe Gly Pro Ile Thr
180 185 190
Thr Asp Ile Arg Glu Gly Gln Thr Phe Tyr Tyr Ala Glu Asp Tyr His
195 200 205
Gln Gln Tyr Leu Ser Lys Asn Pro Asn Gly Tyr Cys Gly Leu Gly Gly
210 215 220
Thr Gly Val Ser Cys Pro Val Gly Ile Lys Lys
225 230 235

<210> 39
<211> 481
<212> DNA
<213> Homo Sapien

<300>
<308> GenBank AW195104
<309> 1999-11-29

<400> 39
ggcattattg gactgtaggt ttttattaaa acaaacattt ctcatagctc taagcaaagc 60
attagaattc atcaagcgga ctcacatctt ttctctgcac agagaggggc tgaaaaggga 120
gagaaagtcc cttatgtatg tctagatttg gtaaagcgaa ggatttcagc gaatgagtca 180
ctgaggctat acacgtttgc aaattgtaag gcactggcgg gcagagagca cagataaagg 240
acttctgggg tcccccatcc tgtccagcaa cctcccagct cacaccttag cttctaccaa 300
gaagggtgaa cacagcatcc ctgctatctt cactcagacc ccagaaaacc cagggaaacc 360
cgacagctcc actcccacca taacttatta ggagataagt cacattttat caacttgcca 420

tcgcgcctcc tatagattat acttcggtaa acccaatctg tataaattcc tttgtacttt 480
g 481

<210> 40
<211> 390
<212> DNA
<213> Homo Sapien

<300>
<308> GenBank AW874187
<309> 2000-05-22

<400> 40
tttttttttat tggactgtag gtttttatta aaacaaacat ttctcatagc tctaagcaaa 60
gcattagaat tcatcaagcg gactcacatc ttttctctgc acagagaggg ctgaaaaggg 120
agagaaagcc ccttatgtat gtctagattt ggtaaagcga aggatttcag cgaatgagtc 180
actgaggcta tacacgtttg caaattgtaa ggcactggcg ggcagagagc acagataaag 240
gacttttggg ggtcccccat tcctgtccag caacctccca gctcacacct tagcttctac 300
caagaagggg tgaacacagc atccctgcta tcttcactca gacccccaga agacacagga 360
aaccgcacag ctccactccc accataactt 390

<210> 41
<211> 43
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide Primer

<400> 41
agcggataac aatttcacac agggagctag cttggaagat tgc 43

<210> 42
<211> 22
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide Primer

<400> 42
gtccaatata tgcaaacagt tg 22

<210> 43
<211> 23
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide Primer

<400> 43
agcggataac aatttcacac agg 23

<210> 44
<211> 18
<212> DNA
<213> Artificial Sequence

<220>

<223> Oligonucleotide Primer

<400> 44
actgagcctg ctgcataa 18

<210> 45
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide Primer

<400> 45
tctcaatcat gtgcattgag g 21

<210> 46
<211> 43
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide Primer

<400> 46
agcggataac aatttcacac agggatcaca cagccatcag cag 43

<210> 47
<211> 23
<212> DNA
<213> oligonucleotide primer

<400> 47
agcggataac aatttcacac agg 23

<210> 48
<211> 18
<212> DNA
<213> Oligonucleotide primer

<400> 48
ctggcgccac gtggtcaa 18

<210> 49
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide Primer

<400> 49
tttctctgca cagagagggc 20

<210> 50
<211> 44
<212> DNA
<213> Artificial Sequence

<220>

<223> Oligonucleotide Primer

<400> 50
agcggataac aatttcacac agggctgaaa tccttcgctt tacc 44

<210> 51
<211> 23
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide Primer

<400> 51
agcggataac aatttcacac agg 23

<210> 52
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide Primer

<400> 52
ctgaaaaggg agagaaag 18

<210> 53
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide Primer

<400> 53
tcccaaagtg ctggaattac 20

<210> 54
<211> 22
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide Primer

<400> 54
gtccaatata tgcaaacagt tg 22

<210> 55
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide Primer

<400> 55
cccacagcag ttaatccttc 20

<210> 56
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide primer

<400> 56
gcgctcctgt cggtgcca 18

<210> 57
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide primer

<400> 57
gcctgactgg tggggccc 18

<210> 58
<211> 15
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide primer

<400> 58
catgcatgca cggtc 15

<210> 59
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide primer

<400> 59
cagagagtac ccctcgaccg tgcatgcatg 30

<210> 60
<211> 15
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide primer

<400> 60
catgcatgca cggtt 15

<210> 61
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide primer

<400> 61
gtacgtacgt gccaactccc catgagagac 30

<210> 62
<211> 14
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide primer

<400> 62
catgcatgca cggt 14

<210> 63
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide primer

<400> 63
gcctgactgg tggggccc 18

<210> 64
<211> 26
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide primer

<400> 64
gtgctgcagg tgtaaacttg taccag 26

<210> 65
<211> 28
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide primer

<400> 65
cacggatccg gtagcagcgg tagagttg 28

<210> 66
<211> 19
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide primer

<400> 66
actgggcatg tggagacag 19

<210> 67
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide primer

<400> 67
gcactttctt gccatgag 18

<210> 68
<211> 14
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide primer

<400> 68
tcagtcacga cgtt 14

<210> 69
<211> 14
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide primer

<400> 69
cggataacaa tttc 14

<210> 70
<211> 37
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide primer

<400> 70
caatttcatc gctggatgca atctgggcta tgagatc 37

<210> 71
<211> 37
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide primer

<400> 71
caatttcaca cagcggatgc ttcttttggc tctgact 37

<210> 72
<211> 40
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide primer

<400> 72
tcagtcacga cgttggatgc caataaaagt gactctcagc 40

<210> 73
<211> 37
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide primer

<400> 73
cggataacaa tttcggatgc actgggagca ttgaggc 37

<210> 74
<211> 38
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide primer

<400> 74
tcagtcacga cgttggatga gcagatccct ggacaggc 38

<210> 75
<211> 38
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide primer

<400> 75
cggataacaa tttcggatgg acaaaatacc tgtattcc 38

<210> 76
<211> 36
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide primer

<400> 76
tcagtcacga cgttggatgc agagcagctc cgagtc 36

<210> 77
<211> 32
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide primer

<400> 77
cagcggtgat cattggatgc aggaagctct gg 32

<210> 78
<211> 38
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide primer

<400> 78
tcagtcacga cgttggatgc ccacatgcca cccactac 38

<210> 79
<211> 35
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide primer

<400> 79
cggataacaa tttcggatgc ccgtcaggta ccacg 35

<210> 80
<211> 37
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide primer

<400> 80
tcagtcacga cgttggatgc ccacagtgga gcttcag 37

<210> 81
<211> 22
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide primer

<400> 81
gctcatacct tgcaggatga cg 22

<210> 82
<211> 36
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide primer

<400> 82
tcagtcacga cgttggatga ccagctgttc gtgttc 36

<210> 83
<211> 34
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide primer

<400> 83
tacatggagt tcggggatgc acacggcgac tctc 34

<210> 84
<211> 40
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide primer

<400> 84
tcagtcacga cgttggatgg ggaagagcag agatatacgt 40

<210> 85
<211> 29
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide primer

<400> 85
gaggggctga tccaggatgg gtgctccac 29

<210> 86
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide primer

<400> 86
tgaagcactt gaaggatgag ggtgtctgcg 30

<210> 87
<211> 38
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide primer

<400> 87
cggataacaa tttcggatgc tgcgtgatga tgaaatcg 38

<210> 88
<211> 26
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide primer

<400> 88
gatgaagctc ccaggatgcc agaggc 26

<210> 89
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide primer

<400> 89
gccgccggtg taggatgctg ctggtgc 27

<210> 90
<211> 31
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide Template

<400> 90
cgcagggttt cctcgtcgca ctgggcatgt g 31

<210> 91
<211> 43
<212> DNA
<213> Artificial Sequence

<220>
<223> Biotinylatd primer

<400> 91
tgcttatccc tgtagctacc ctgtcttggc cttgcagatc caa 43

<210> 92
<211> 42
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide primer

<400> 92
agcggataac aatttcacac aggccatcac accgcggtac tg 42

<210> 93
<211> 44
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide primer

<400> 93
cccagtcacg acgttgtaaa acgtcttggc cttgcagatc caag 44

<210> 94
<211> 42
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide primer

<400> 94
agcggataac aatttcacac aggccatcac accgcggtac tg 42

<210> 95
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide primer

<400> 95
ctccagctgg gcaggagtgc 20

<210> 96
<211> 17
<212> DNA
<213> Artificial Sequence

<220>
<223> Oligonucleotide primer

<400> 96
cacttcagtc gctccct 17

<210> 97
<211> 23
<212> DNA
<213> Artificial Sequence

<220>
<223> Biotinylated primer

<400> 97
cccagtcacg acgttgtaaa acg 23

<210> 98
<211> 100
<212> DNA
<213> Homo sapien

<400> 98
cctttgagaa agggctctgc ttgagttgta gaaagaaccg ctgcaacaat ctgggctatg 60
agatcaataa agtcagagcc aaaagaagca gcaaaatgta 100

<210> 99
<211> 100
<212> DNA
<213> Homo sapien

<400> 99
cctttgagaa agggctctgc ttgagttgta gaaagaaccg ctgcaacaat ctgggctatg 60
agatcagtaa agtcagagcc aaaagaagca gcaaaatgta 100

<210> 100
<211> 100
<212> DNA

<213> Homo sapien

<400> 100
gaattatttt tgtgtttcta aaactatggt tcccaataaa agtgactctc agcgagcctc 60
aatgctccca gtgctattca tgggcagctc tctgggctca 100

<210> 101
<211> 100
<212> DNA
<213> Homo sapien

<400> 101
gaattatttt tgtgtttcta aaactatggt tcccaataaa agtgactctc agcaagcctc 60
aatgctccca gtgctattca tgggcagctc tctgggctca 100

<210> 102
<211> 84
<212> DNA
<213> Homo sapien

<400> 102
taataggact acttctaatc tgtaagagca gatccctgga caggcgagga atacaggtat 60
tttgtccttg aagtaacctt tcag 84

<210> 103
<211> 84
<212> DNA
<213> Homo sapien

<400> 103
taataggact acttctaatc tgtaagagca gatccctgga caggcaagga atacaggtat 60
tttgtccttg aagtaacctt tcag 84

<210> 104
<211> 100
<212> DNA
<213> Homo sapien

<400> 104
ctcaccatgg gcatttgatt gcagagcagc tccgagtccg tccagagctt cctgcagtca 60
atgatcaccg ctgtgggcat ccctgaggtc atgtctcgta 100

<210> 105
<211> 100
<212> DNA
<213> Homo sapien

<400> 105
ctcaccatgg gcatttgatt gcagagcagc tccgagtcca tccagagctt cctgcagtca 60
atgatcaccg ctgtgggcat ccctgaggtc atgtctcgta 100

<210> 106
<211> 100
<212> DNA
<213> Homo sapien

<400> 106
agcaaggact cctgcaaggg ggacagtgga ggcccacatg ccacccacta ccagggcacg 60
tggtacctga cgggcatcgt cagctggggc cagggctgcg 100

<210> 107
<211> 100
<212> DNA
<213> Homo sapien

<400> 107
agcaaggact cctgcaaggg ggacagtgga ggcccacatg ccacccacta ccggggcacg 60
tggtacctga cgggcatcgt cagctggggc cagggctgcg 100

<210> 108
<211> 100
<212> DNA
<213> Hom sapien

<400> 108
caataactct aatgcagcgg aagatgacct gcccacagtg gagcttcagg gcgtggtgcc 60
ccggggcgtc aacctgcaag gtatgagcat acccccccttc 100

<210> 109
<211> 100
<212> DNA
<213> Homo sapien

<400> 109
caataactct aatgcagcgg aagatgacct gcccacagtg gagcttcagg gcttggtgcc 60
ccggggcgtc aacctgcaag gtatgagcat acccccccttc 100

<210> 110
<211> 100
<212> DNA
<213> Homo sapien

<400> 110
ttgaagcttt gggctacgtg gatgaccagc tgttcgtgtt ctatgatcat gagagtcgcc 60
gtgtggagcc ccgaactcca tgggtttcca gtagaatttc 100

<210> 111
<211> 100
<212> DNA
<213> Homo sapien

<400> 111
ttgaagcttt gggctacgtg gatgaccagc tgttcgtgtt ctatgatgat gagagtcgcc 60
gtgtggagcc ccgaactcca tgggtttcca gtagaatttc 100

<210> 112
<211> 100
<212> DNA
<213> Homo sapien

<400> 112
ggataacctt ggctgtaccc cctggggaag agcagagata tacgtgccag gtggagcacc 60
caggcctgga tcagcccctc attgtgatct gggagccctc 100

<210> 113
<211> 100
<212> DNA
<213> Homo sapien

<400> 113

ggataacctt ggctgtaccc cctggggaag agcagagata tacgtaccag gtggagcacc 60
caggcctgga tcagcccctc attgtgatct gggagccctc 100

<210> 114
<211> 80
<212> DNA
<213> Homo sapien

<400> 114
tgaagcactt gaaggagaag gtgtctgcgg gagccgattt catcatcacg cagcttttct 60
ttgaggctga cacattcttc 80

<210> 115
<211> 80
<212> DNA
<213> Homo sapien

<400> 115
tgaagcactt gaaggagaag gtgtctgcgg gagtcgattt catcatcacg cagcttttct 60
ttgaggctga cacattcttc 80

<210> 116
<211> 80
<212> DNA
<213> Homo sapien

<400> 116
tccagatgaa gctcccagaa tgccagaggc tgctccccgc gtggcccctg caccagcagc 60
tcctacaccg gcggcccctg 80

<210> 117
<211> 80
<212> DNA
<213> Homo sapien

<400> 117
tccagatgaa gctcccagaa tgccagaggc tgctcccccc gtggcccctg caccagcagc 60
tcctacaccg gcggcccctg 80

<210> 118
<211> 48
<212> DNA
<213> Artificial Sequence

<220>
<223> Hair pin structure

<400> 118
cagagagtac ccctcaaccg tgcatgcatg aaacatgcat gcacggtt 48

专利名称(译)	用于生成用于鉴定多态性遗传标记的数据库和数据库的方法		
公开(公告)号	EP1261932A2	公开(公告)日	2002-12-04
申请号	EP2000972148	申请日	2000-10-13
[标]申请(专利权)人(译)	塞昆纳姆股份有限公司		
申请(专利权)人(译)	SEQUENOM INC.		
当前申请(专利权)人(译)	SEQUENOM INC.		
[标]发明人	BRAUN ANDREAS KOSTER HUBERT VAN DEN BOOM DIRK PING YIP RODI CHARLIE HE LIYAN CHIU NORMAN JURINKE CHRISTIAN		
发明人	BRAUN, ANDREAS KÖSTER, HUBERT VAN DEN BOOM, DIRK PING, YIP RODI, CHARLIE HE, LIYAN CHIU, NORMAN JURINKE, CHRISTIAN		
IPC分类号	G01N27/62 C12M1/00 C12N15/09 C12Q1/00 C12Q1/34 C12Q1/44 C12Q1/48 C12Q1/68 G01N27/64 G01N33/48 G01N33/483 G01N33/50 G01N33/53 G01N33/566 G06F17/30 G06F19/18 G06F19/22 G06F19/28 G06Q50/00 G06F19/00		
CPC分类号	C12Q1/6827 G16B20/00 G16B30/00 G16B50/00 C12Q2563/167 C12Q2523/125		
优先权	60/217658 2000-07-10 US 09/663968 2000-09-19 US 60/159176 1999-10-13 US 60/217251 2000-07-10 US		
其他公开文献	EP1261932B1		
外部链接	Espacenet		

摘要(译)

提供了用于从健康人供体创建基因组样品数据库的方法和方法，使用该数据库鉴定多态遗传标记和其他标记与疾病和病症相关的方法。