



US 20090304722A1

(19) **United States**(12) **Patent Application Publication**
Theisen et al.(10) **Pub. No.: US 2009/0304722 A1**(43) **Pub. Date: Dec. 10, 2009**(54) **CHLAMYDIA TRACHOMATIS ANTIGENS
FOR VACCINE AND DIAGNOSTIC USE**(76) Inventors: **Michael Theisen**, Frederiksberg
(DK); **Anja Olsen**, Soborg (DK);
Robert Leah, Birkerød (DK);
Frank Follmann, Copenhagen
(DK); **Klaus Jensen**, Copenhagen
(DK); **Peter Andersen**, Bronshøj
(DK)

Correspondence Address:

KNOBBE MARTENS OLSON & BEAR LLP
2040 MAIN STREET, FOURTEENTH FLOOR
IRVINE, CA 92614 (US)(21) Appl. No.: **11/577,868**(22) PCT Filed: **Oct. 11, 2005**(86) PCT No.: **PCT/DK05/00651**§ 371 (c)(1),
(2), (4) Date:**Apr. 24, 2007**(30) **Foreign Application Priority Data**Oct. 25, 2004 (DK) PA 2004 01633
Jul. 19, 2005 (DK) PA 2005 01069**Publication Classification**(51) **Int. Cl.****A61K 39/118** (2006.01)
A61K 38/16 (2006.01)
A61K 31/7088 (2006.01)
C07K 14/00 (2006.01)
C07H 21/04 (2006.01)
C07K 16/00 (2006.01)
G01N 33/53 (2006.01)
A61P 31/04 (2006.01)(52) **U.S. Cl. 424/184.1; 514/12; 514/44 R; 530/350;**
536/23.1; 530/388.1; 530/389.1; 435/7.1(57) **ABSTRACT**

The present invention is related to antigens from *Chlamydia trachomatis* which are recognized by specific antibodies from individuals infected with *Chlamydia* or which can induce T cells from the same individuals to secrete gamma-interferon. The T cell reactive antigens are present in a whole-cell lysate and have apparent molecular weights of 5-12, 16-20, 25-35 and 58-74 kDa as determined by SDS-PAGE. The antigens of the invention are useful in vaccines but also as diagnostic compositions.

Figure 1

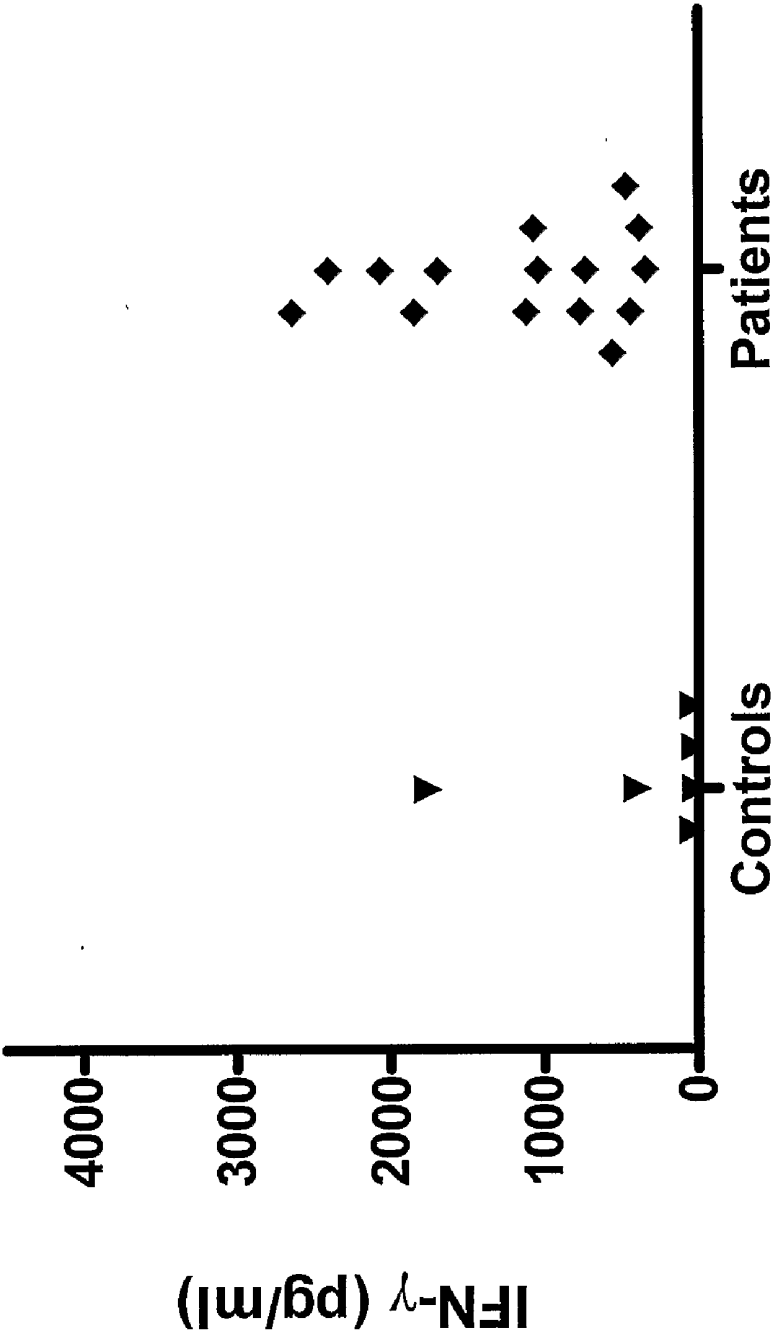


Figure 2

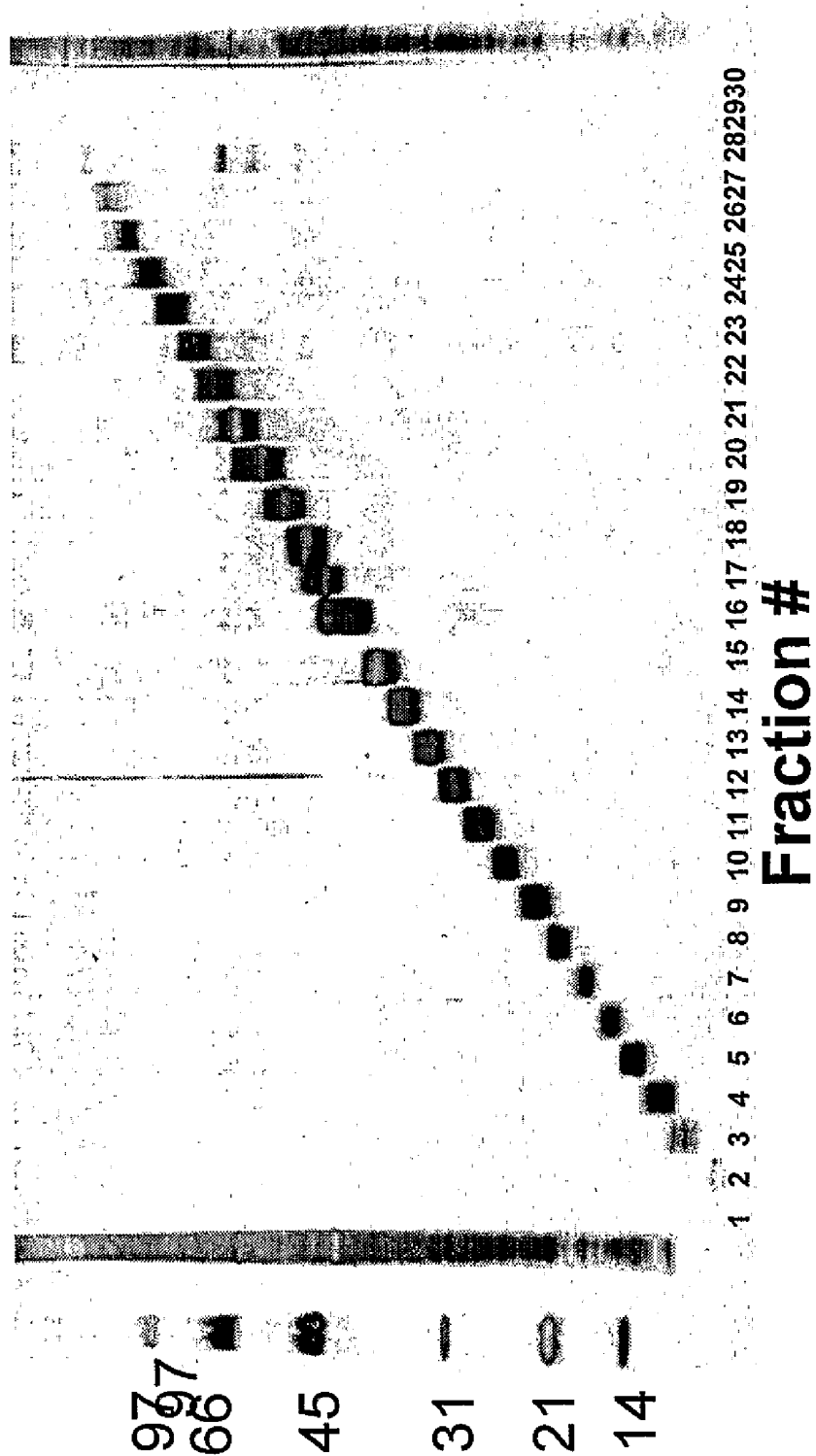


Figure 3



Figure 4

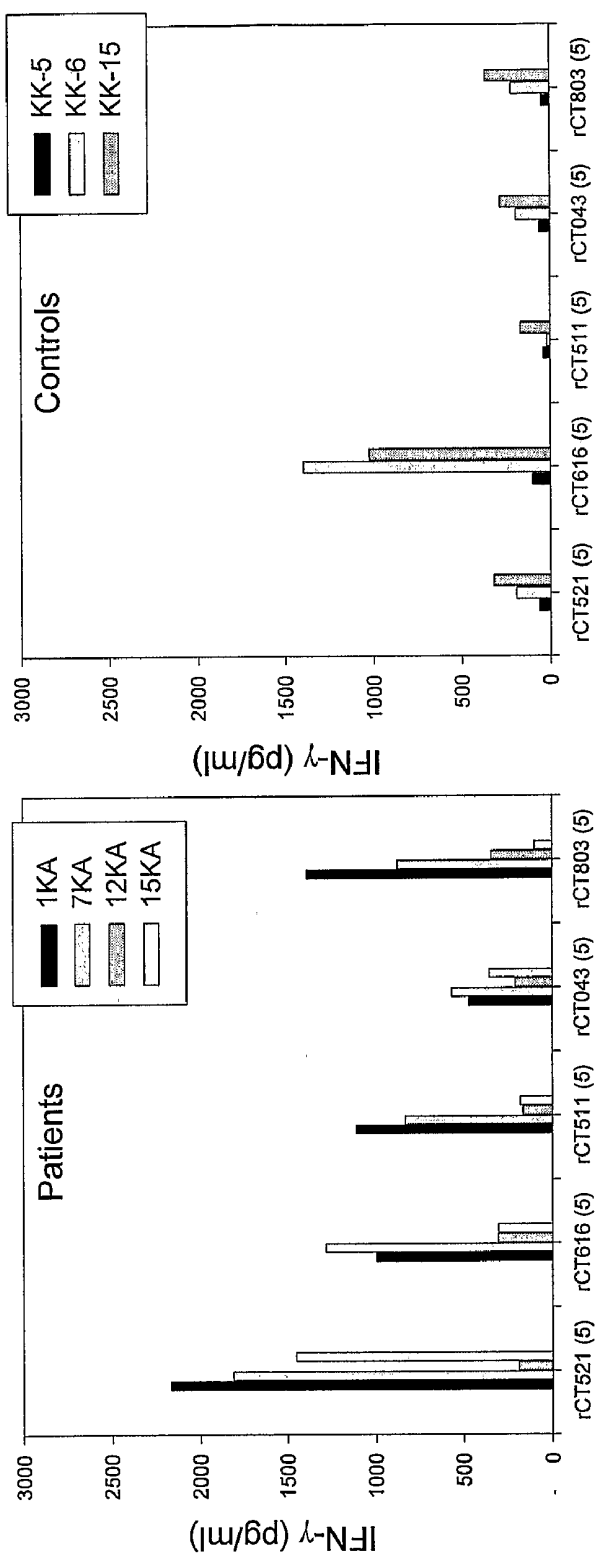


Figure 5

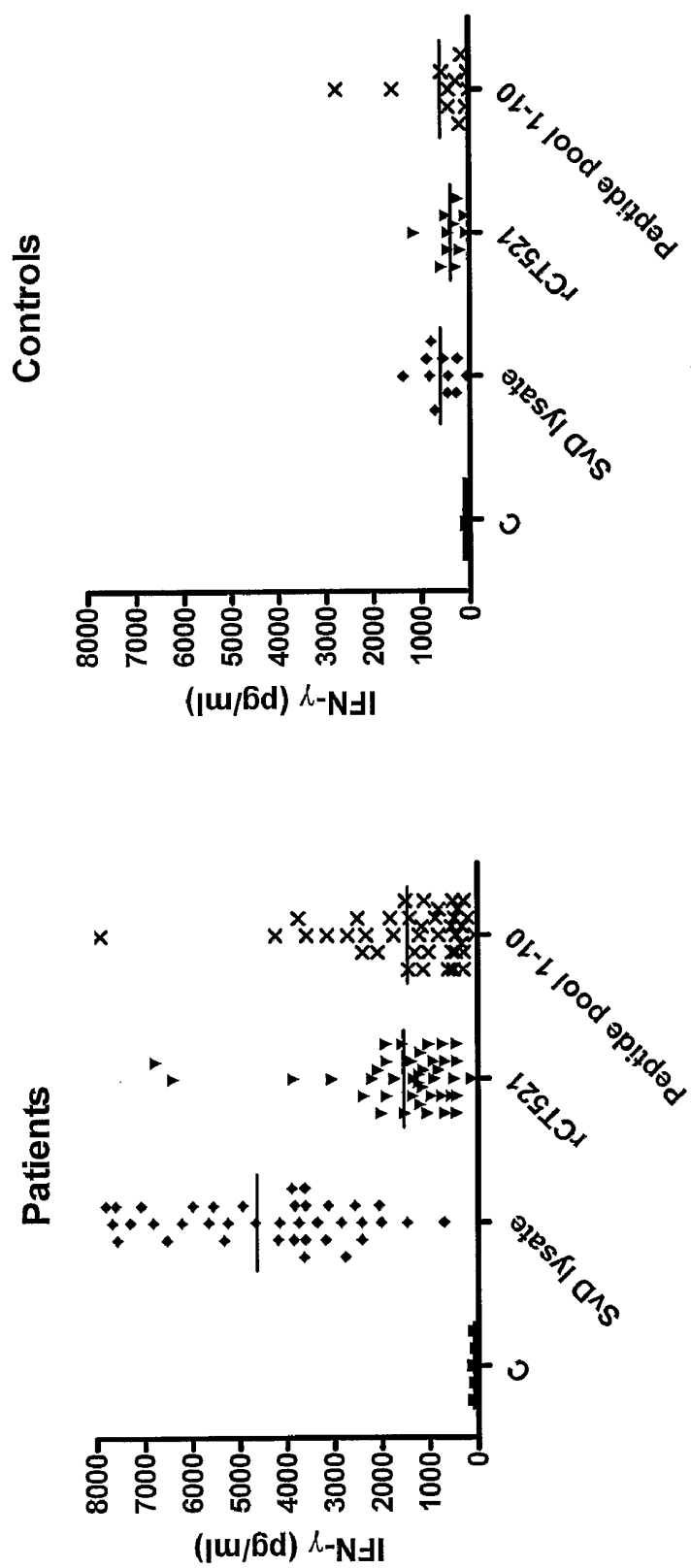


Figure 6

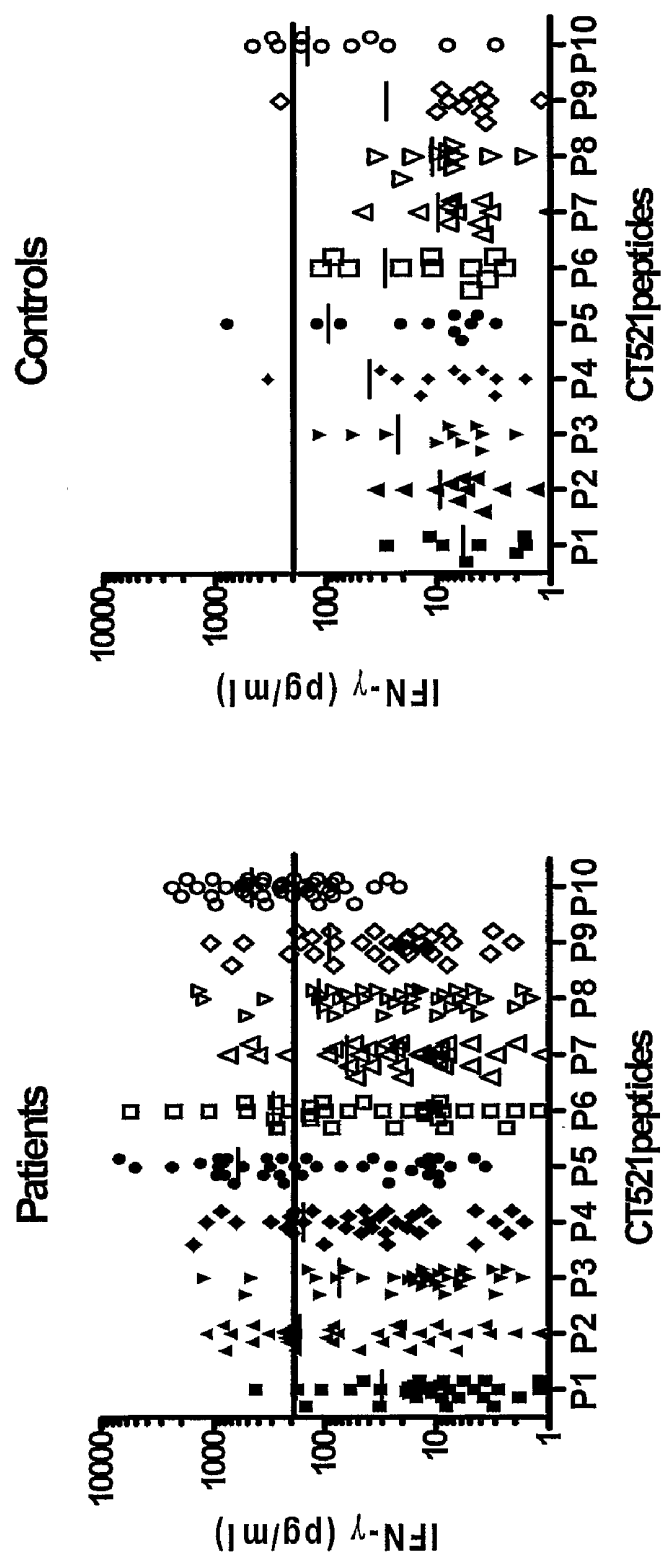


Figure 7

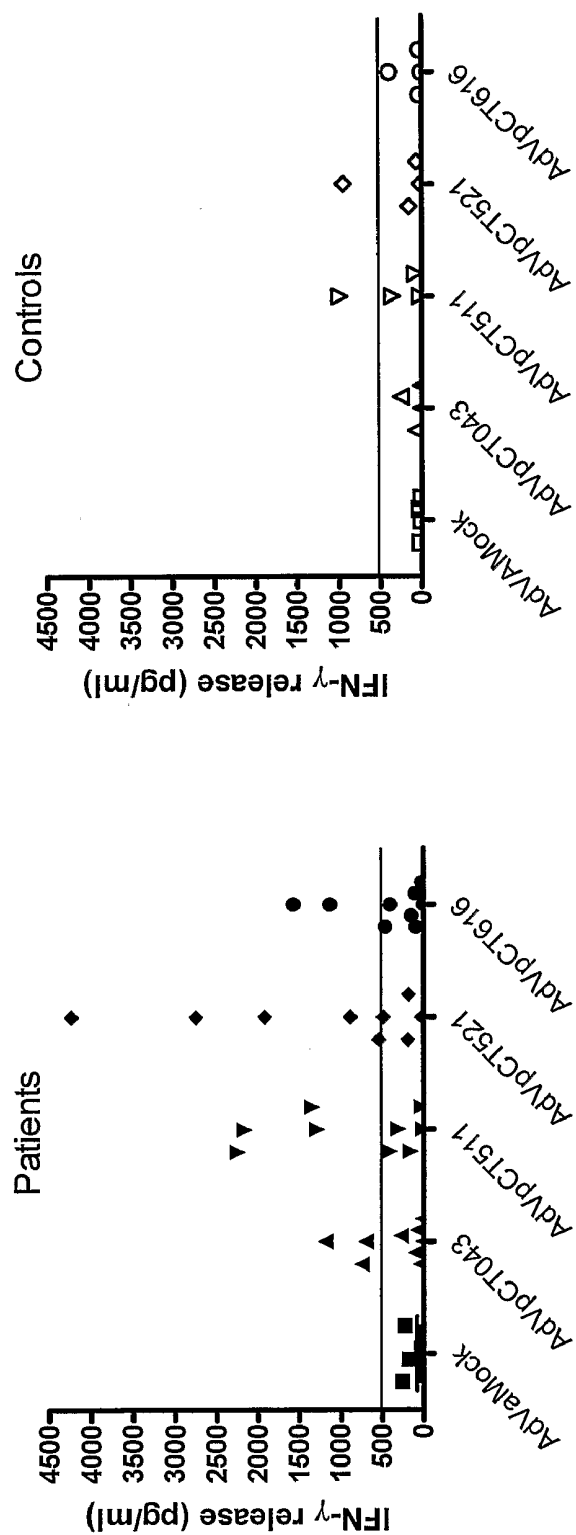
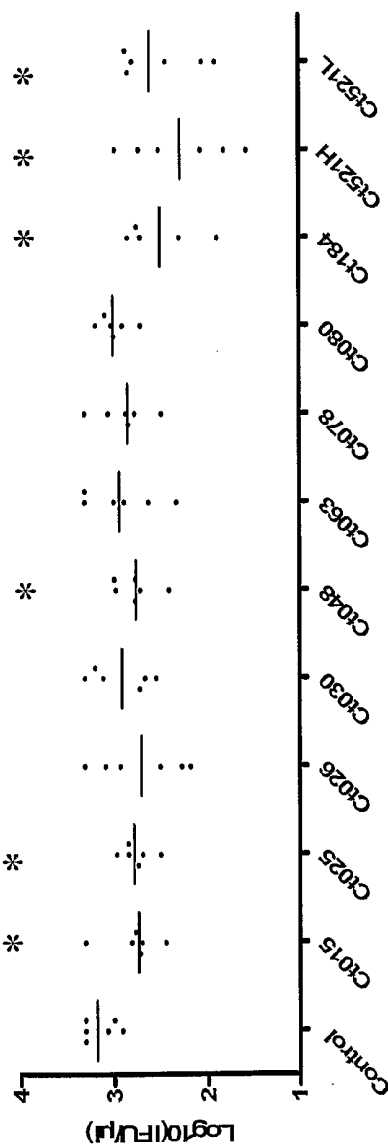


Fig 8a

Vaccination trial (7 days post-challenge)



* p<0.05

Fig 8b

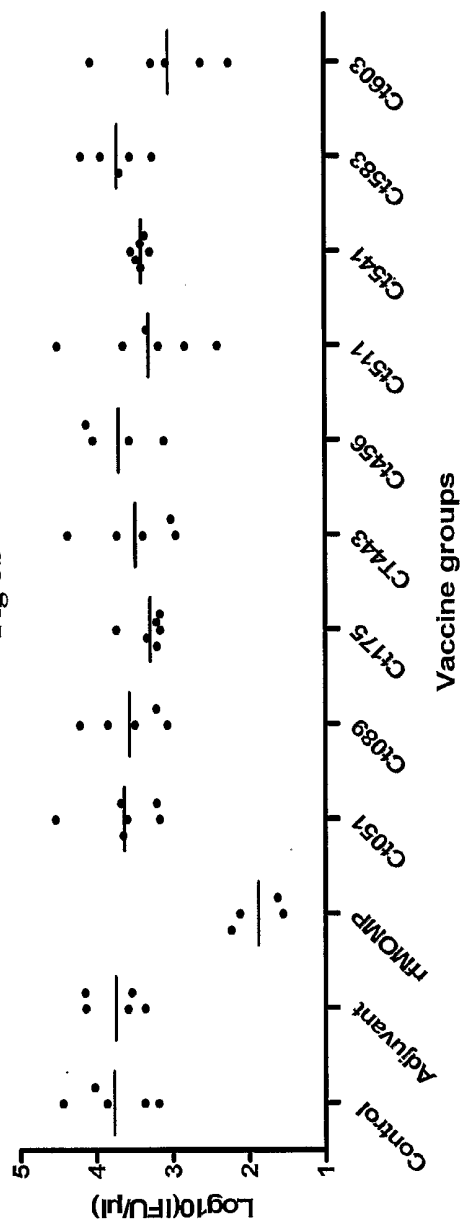


Fig 8c

Vaccination trial (14 days post-challenge)

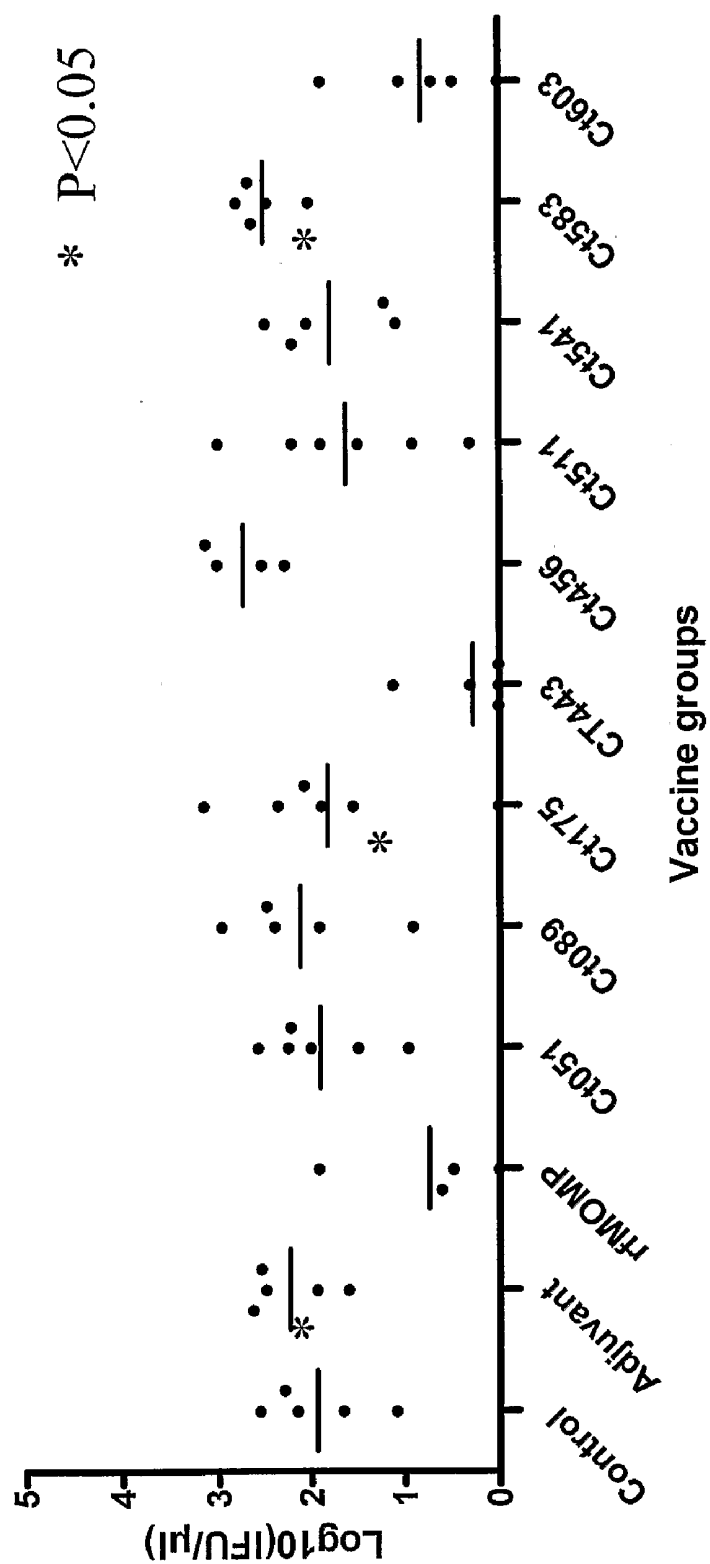


Fig 9 Hydrosalpinx ratio (49 days post challenge)

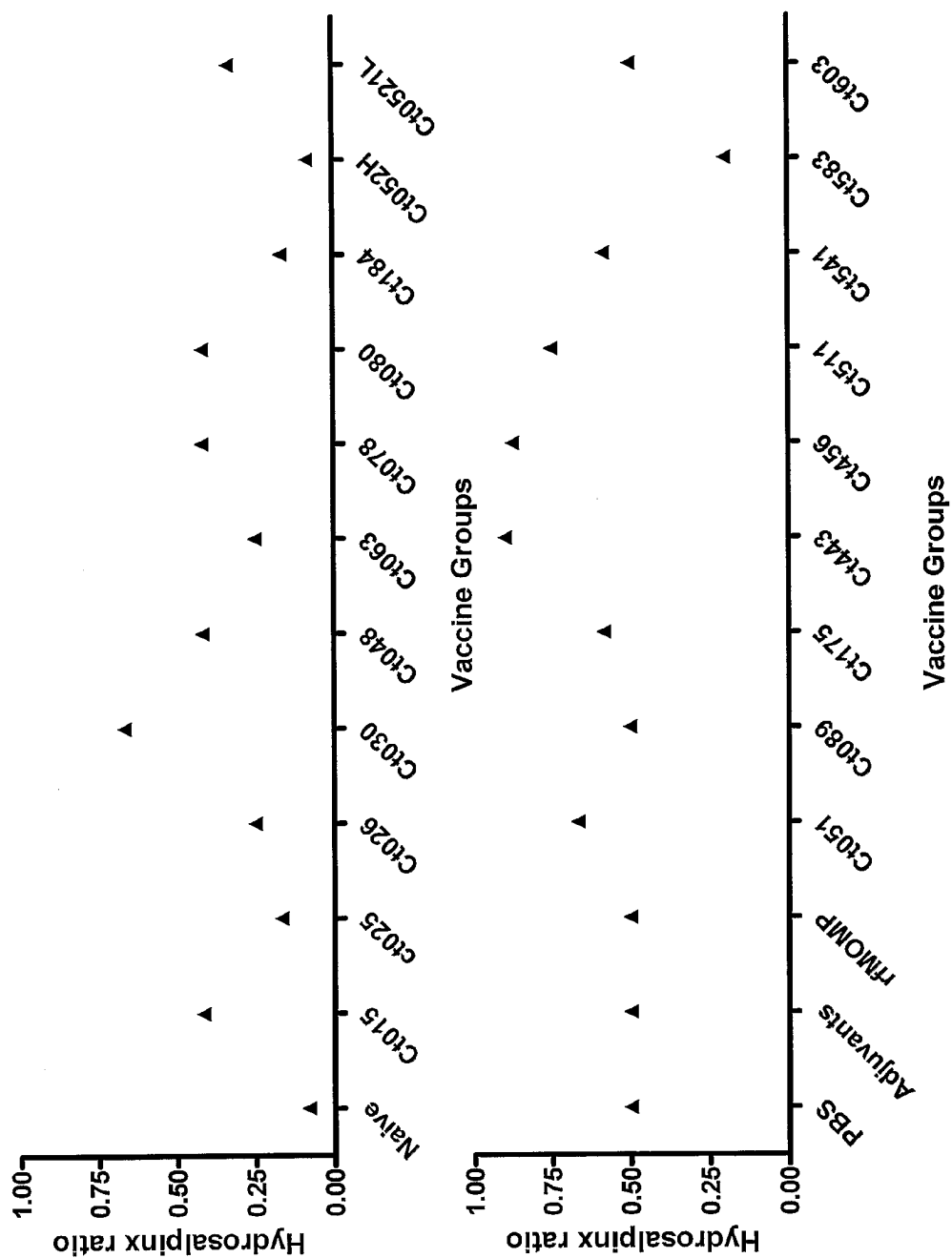


Figure 10a

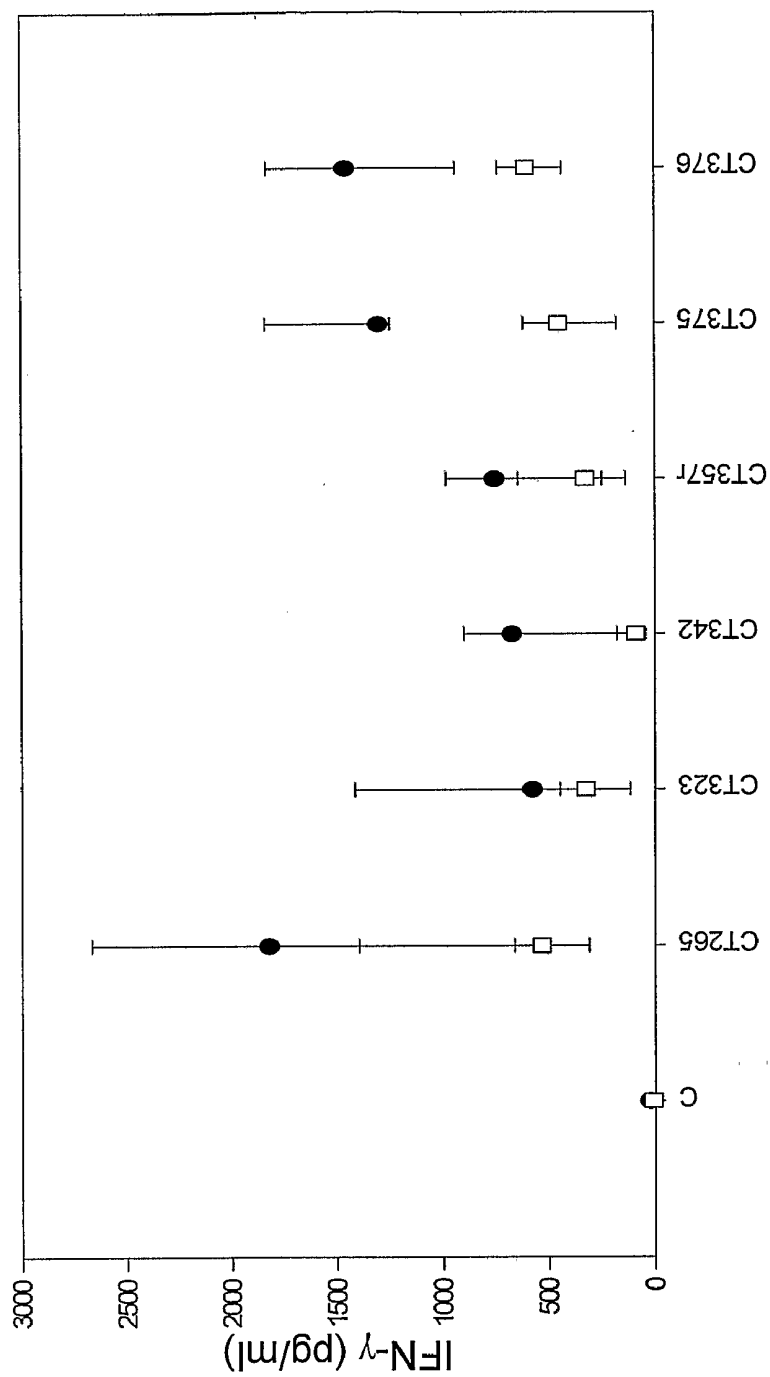


Figure 10b

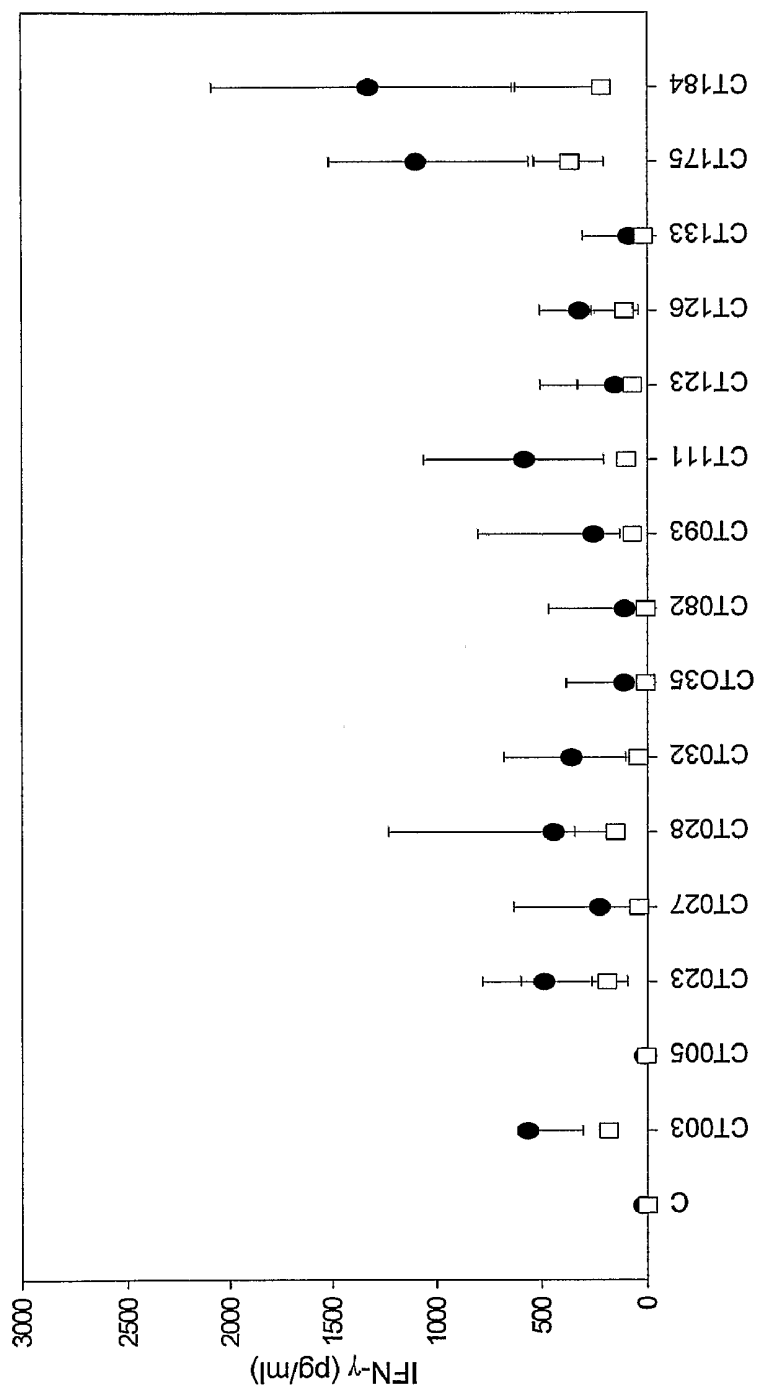


Figure 10c

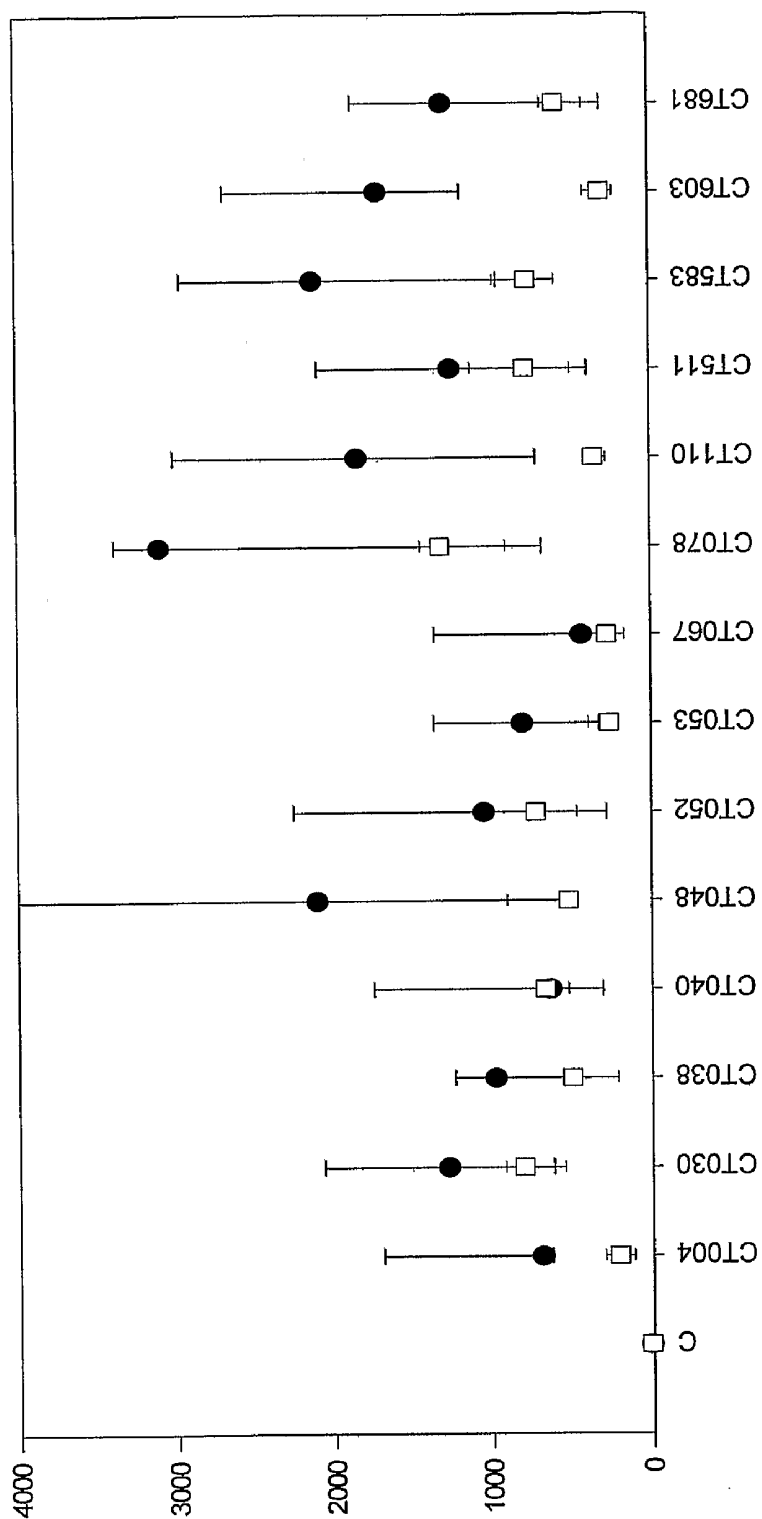
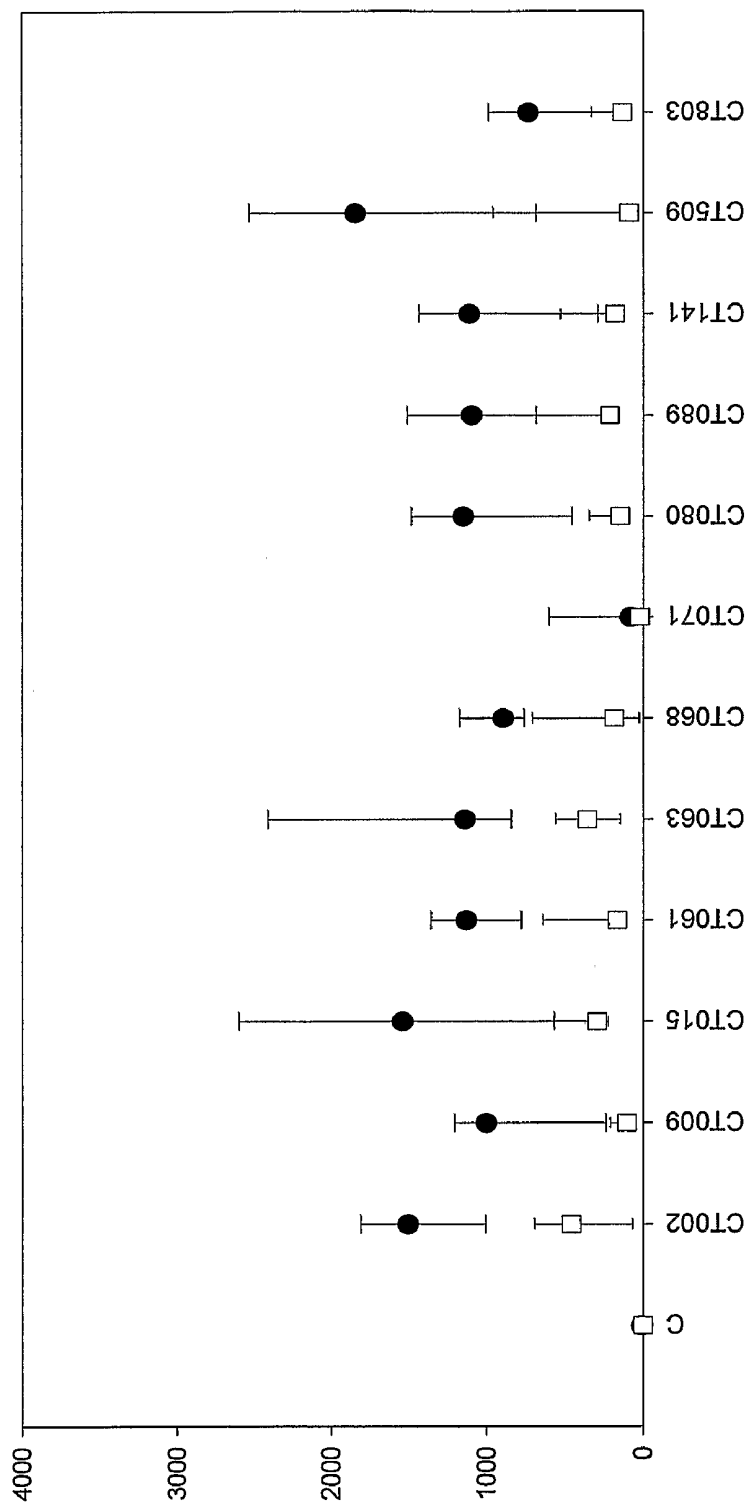


Figure 10d



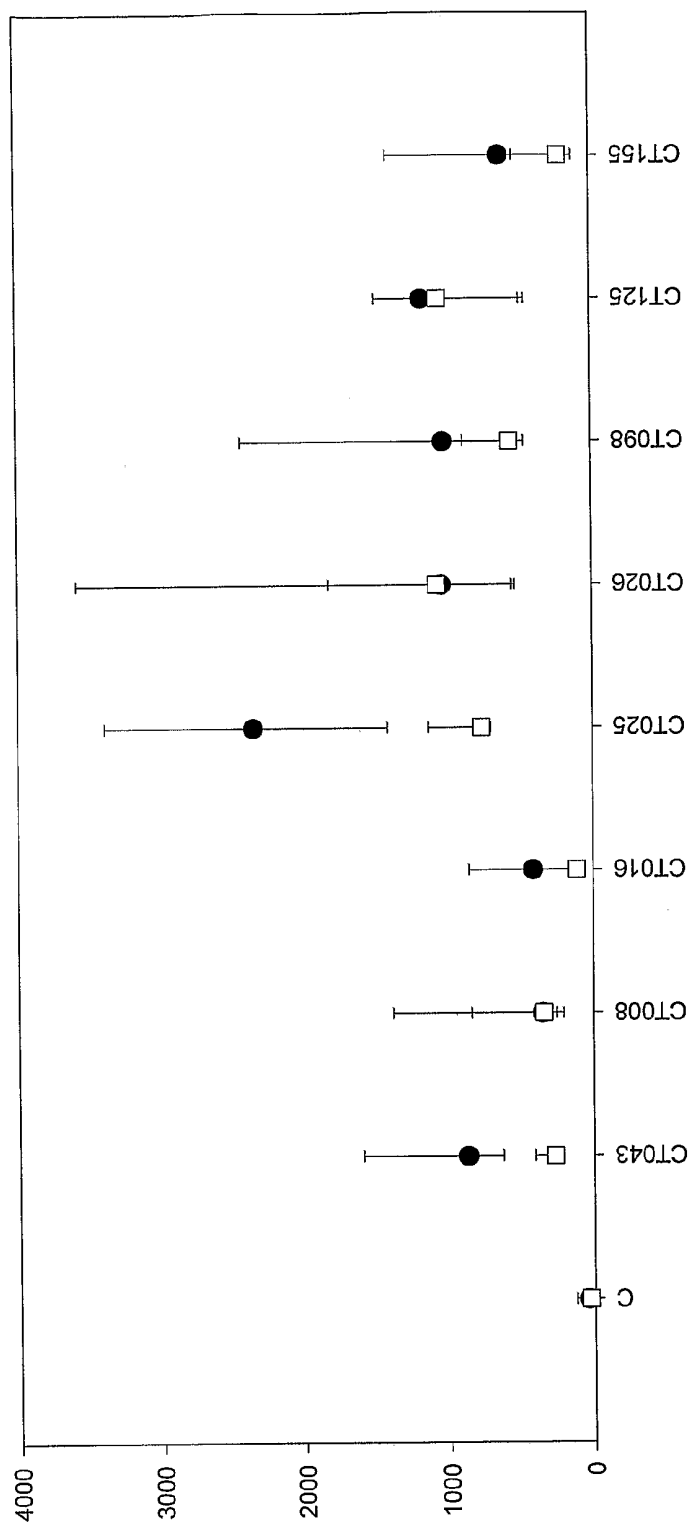


Figure 10e

Figure 10f

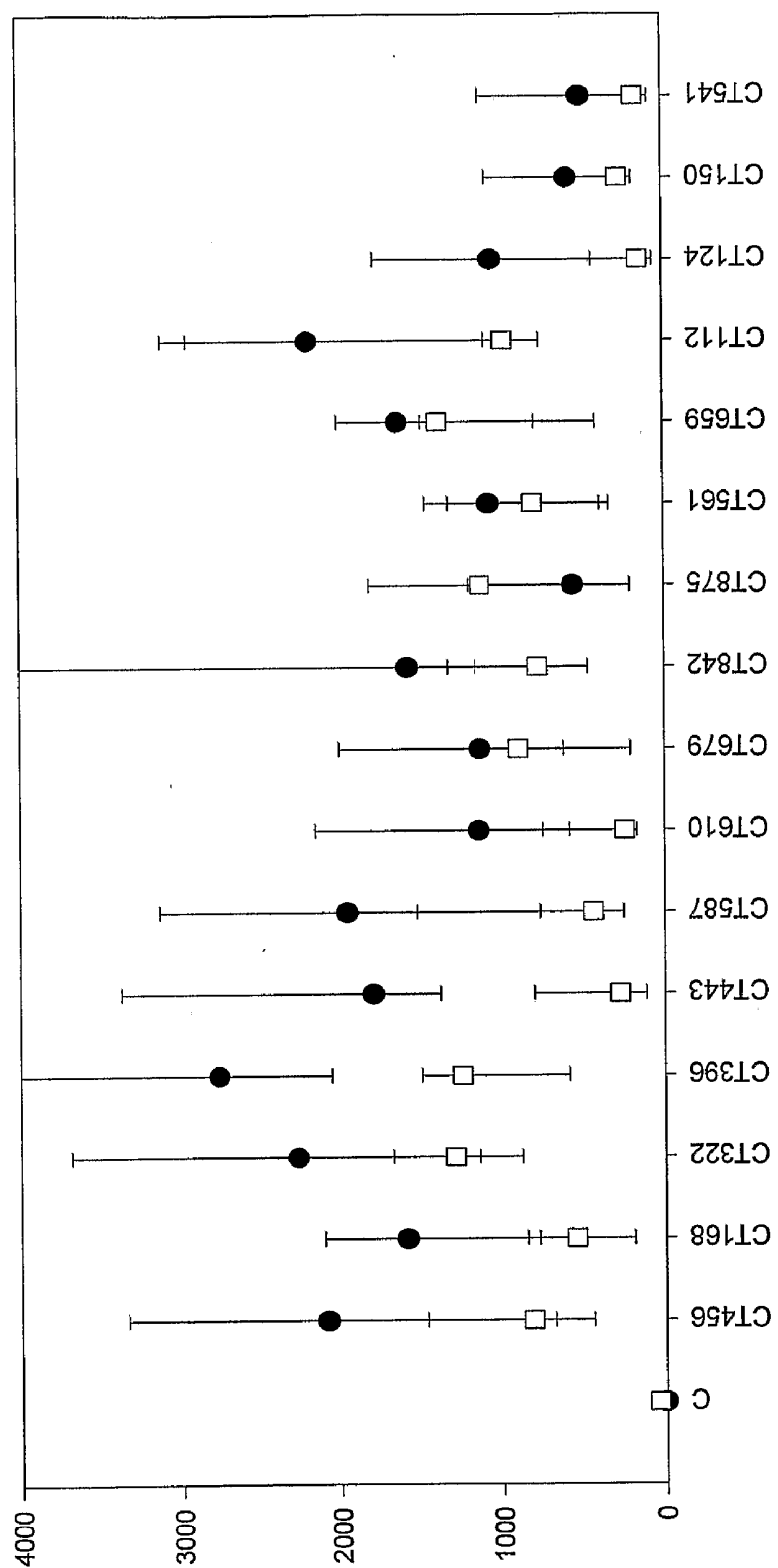


Figure 10g

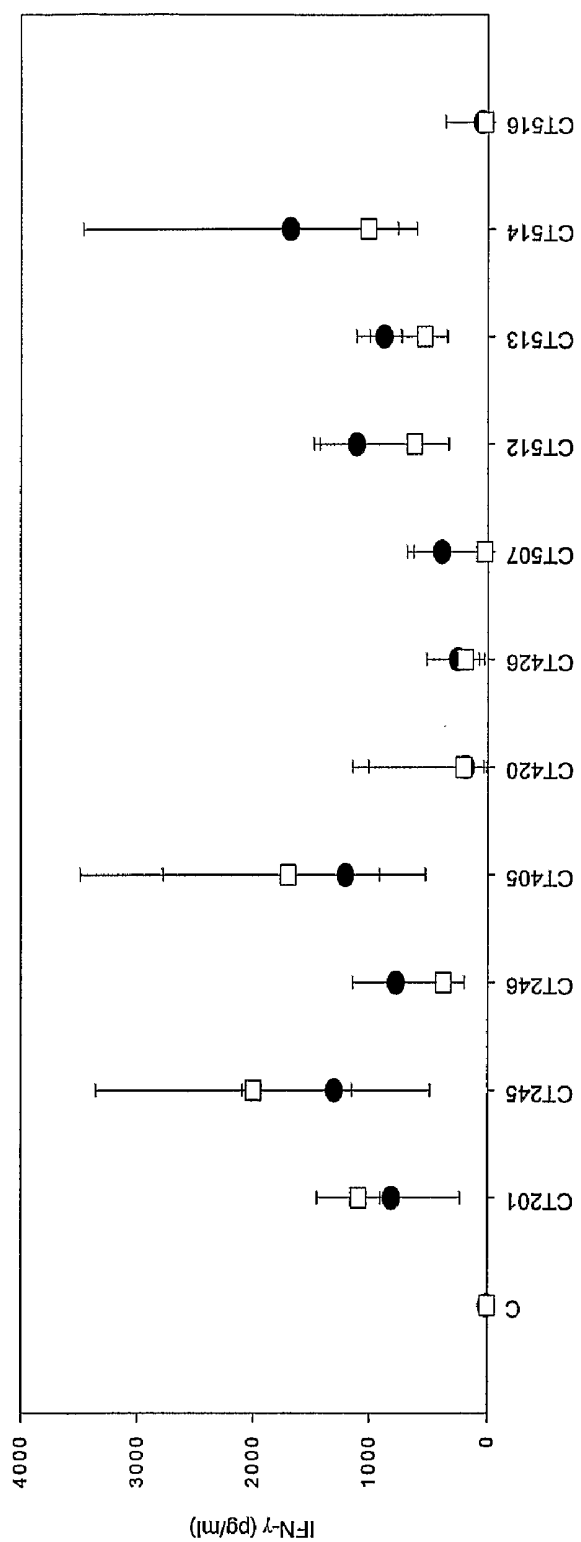


Figure 10h

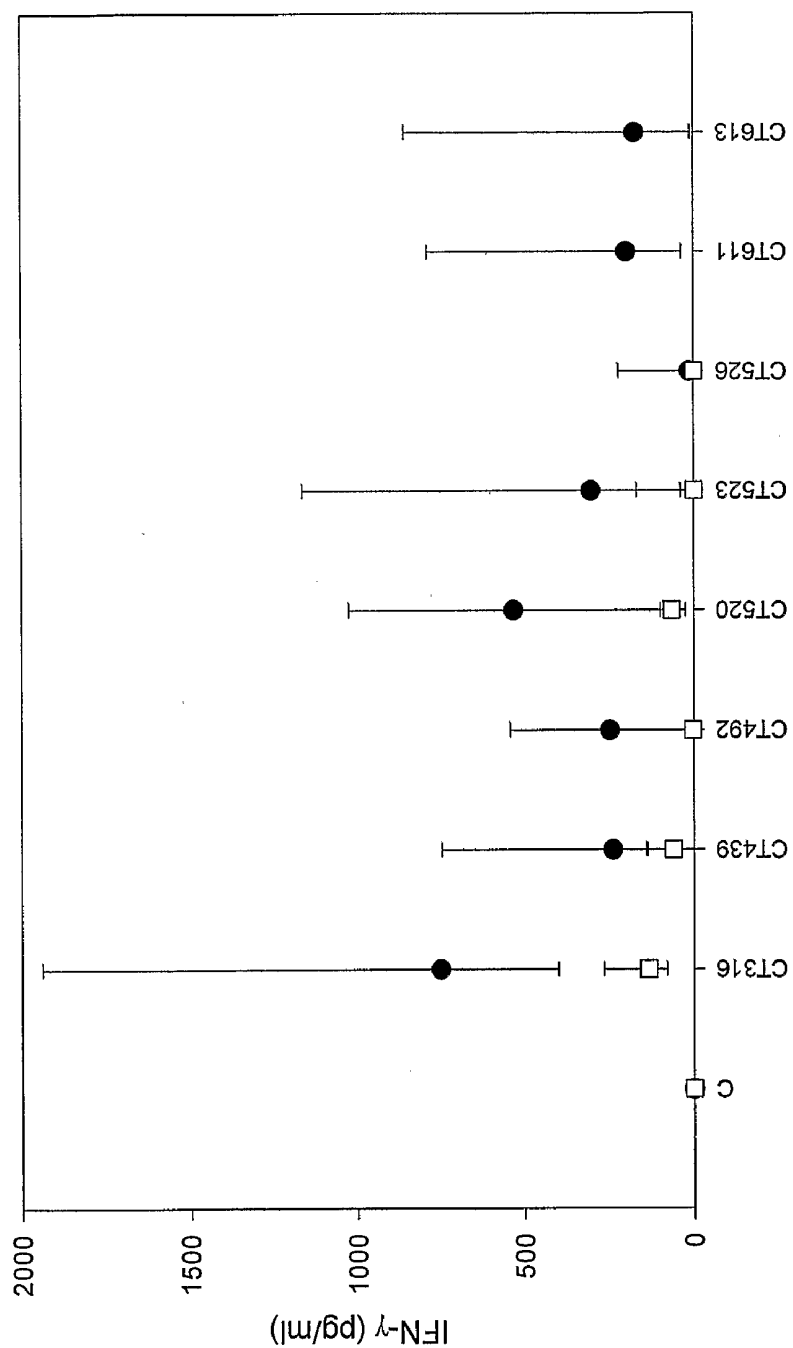


Figure 10i

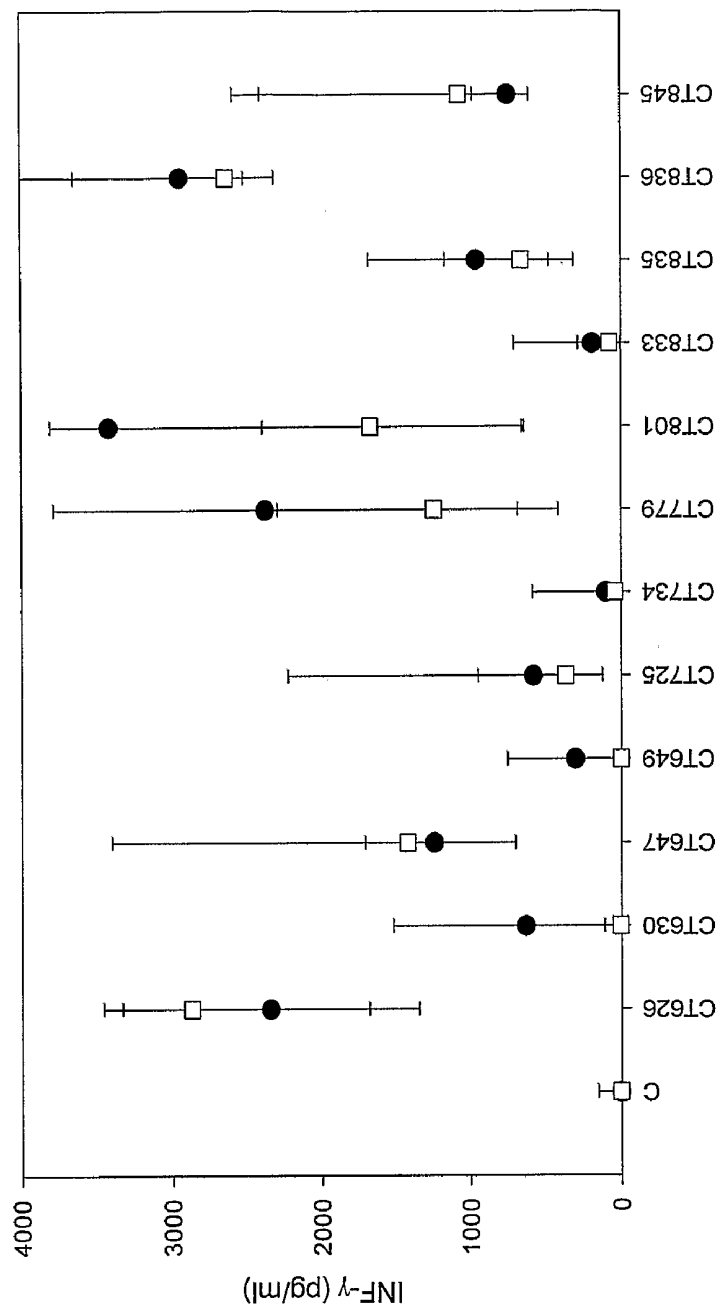


Figure 11

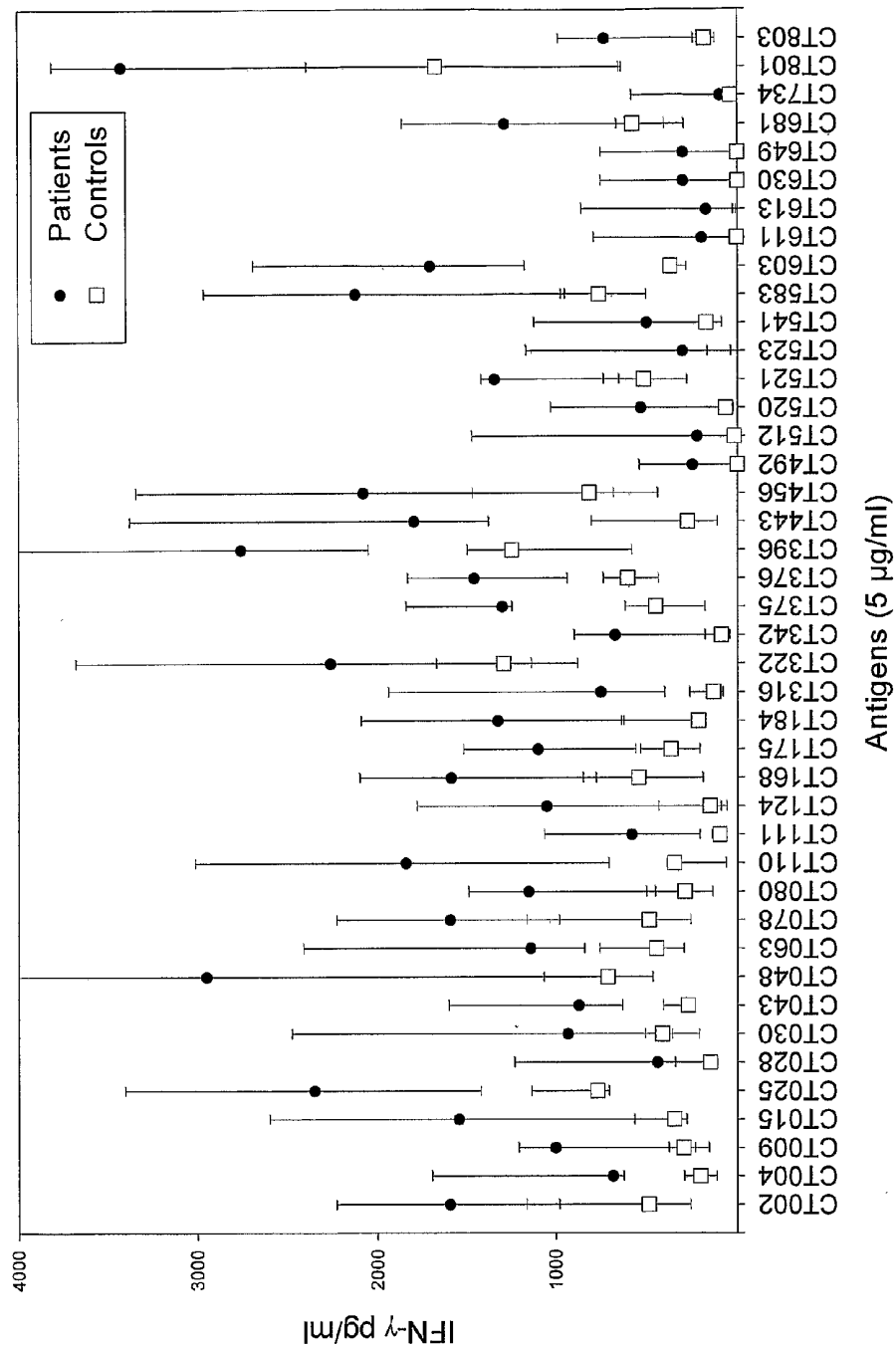


Figure 12

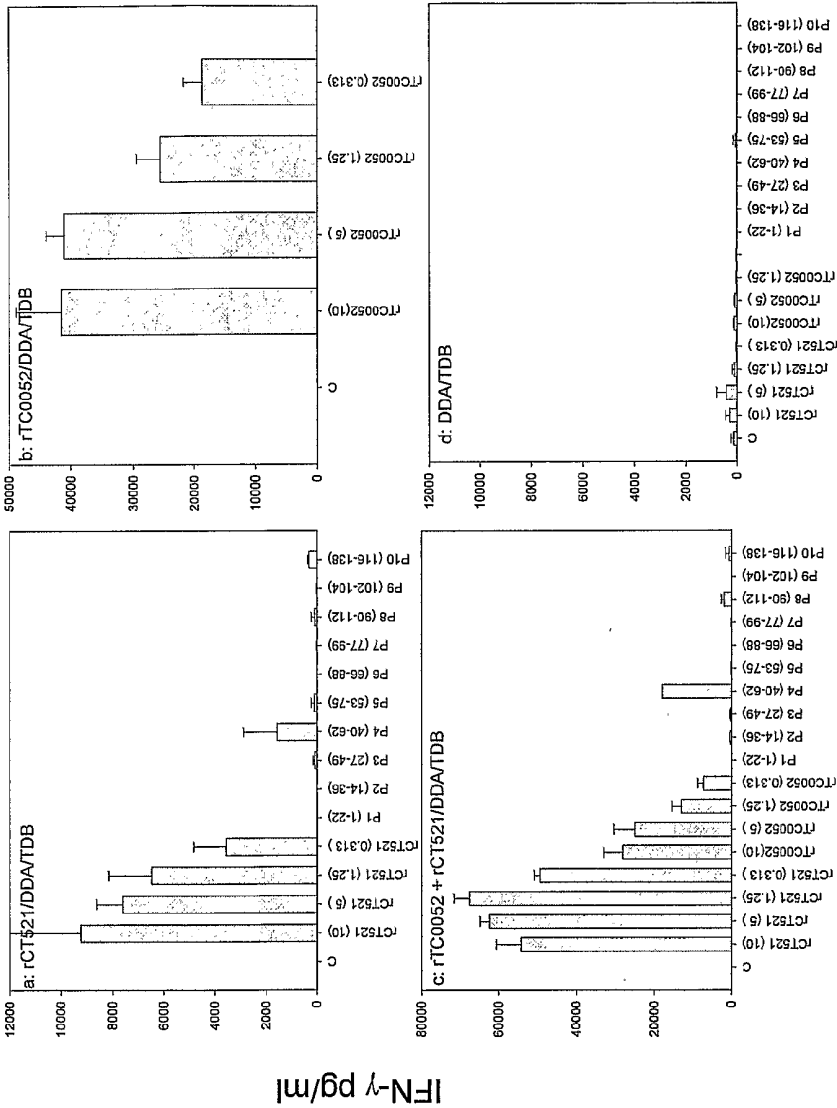


Figure 13

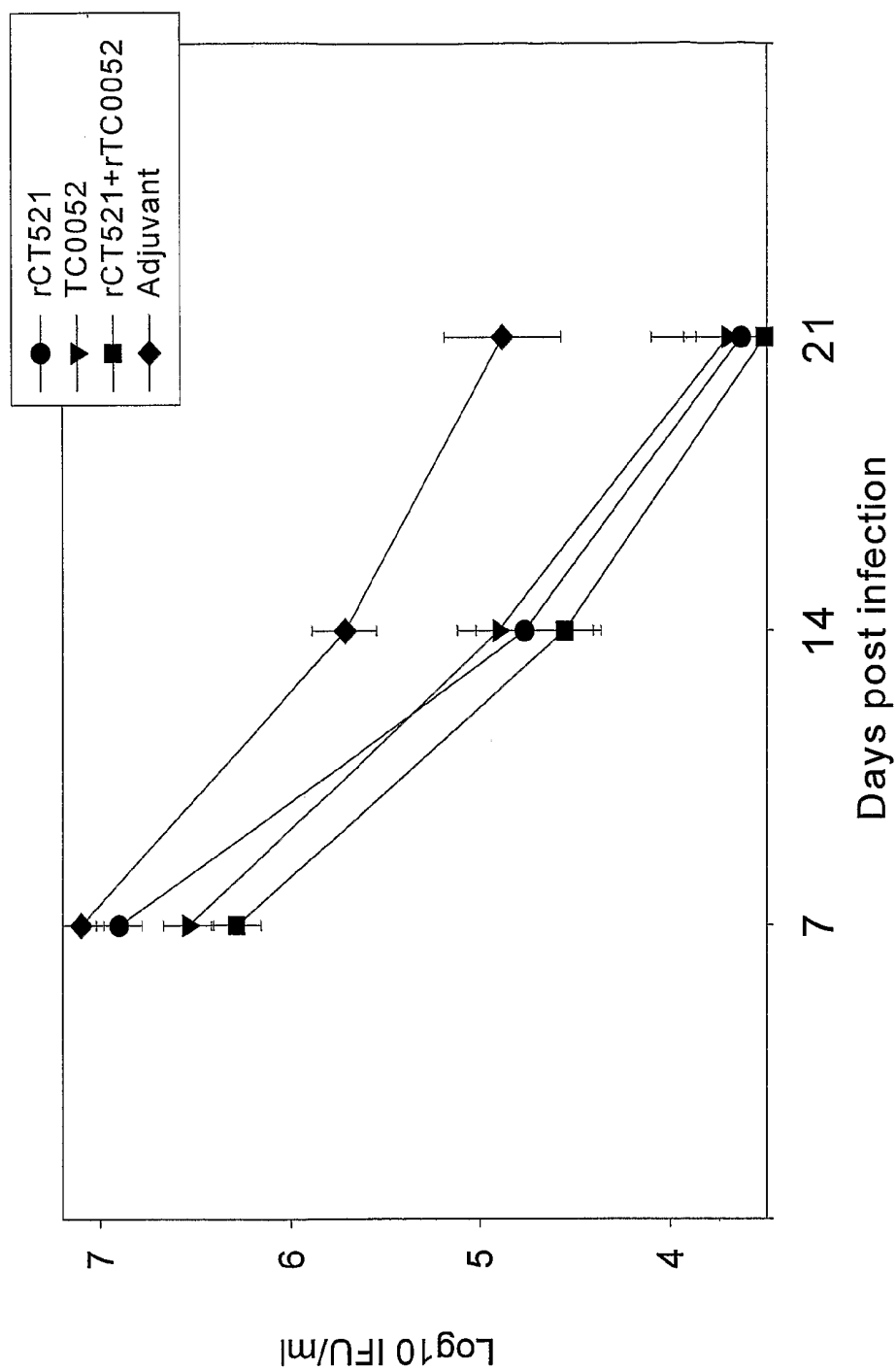
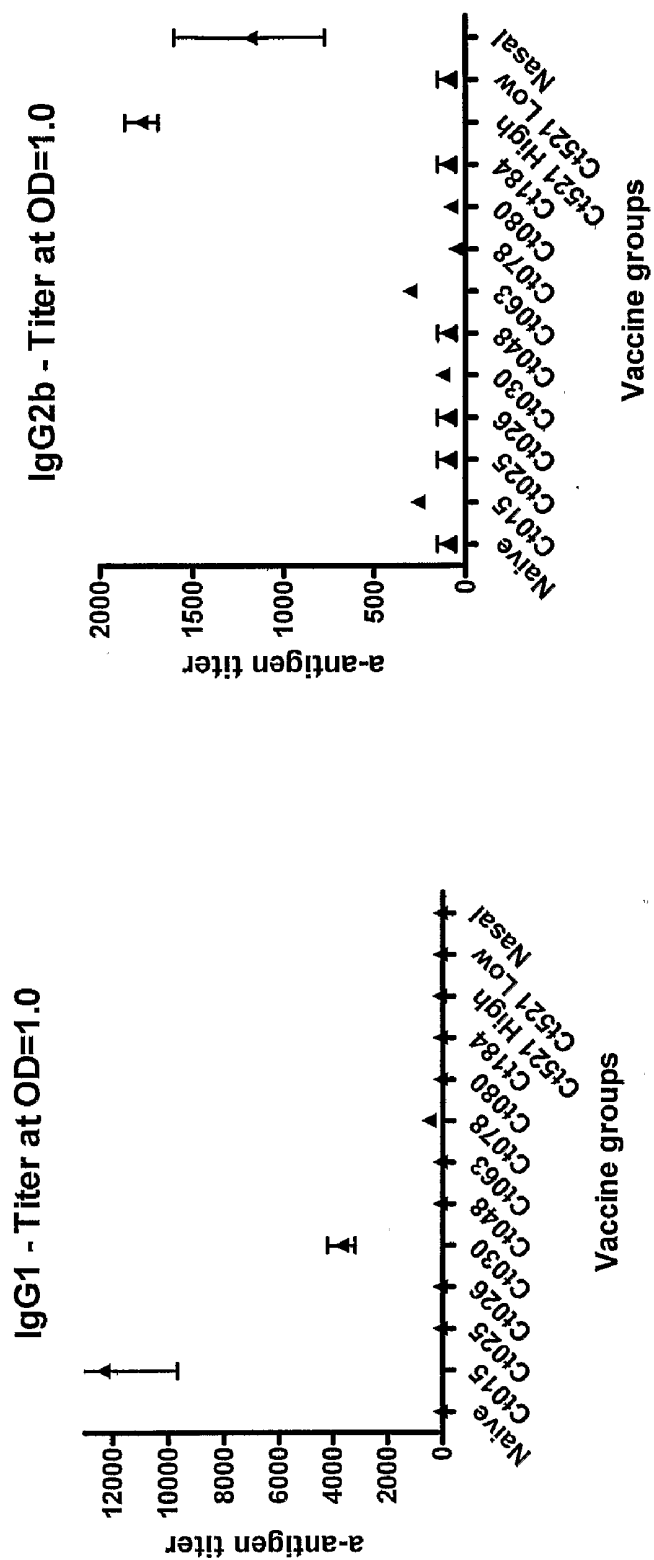
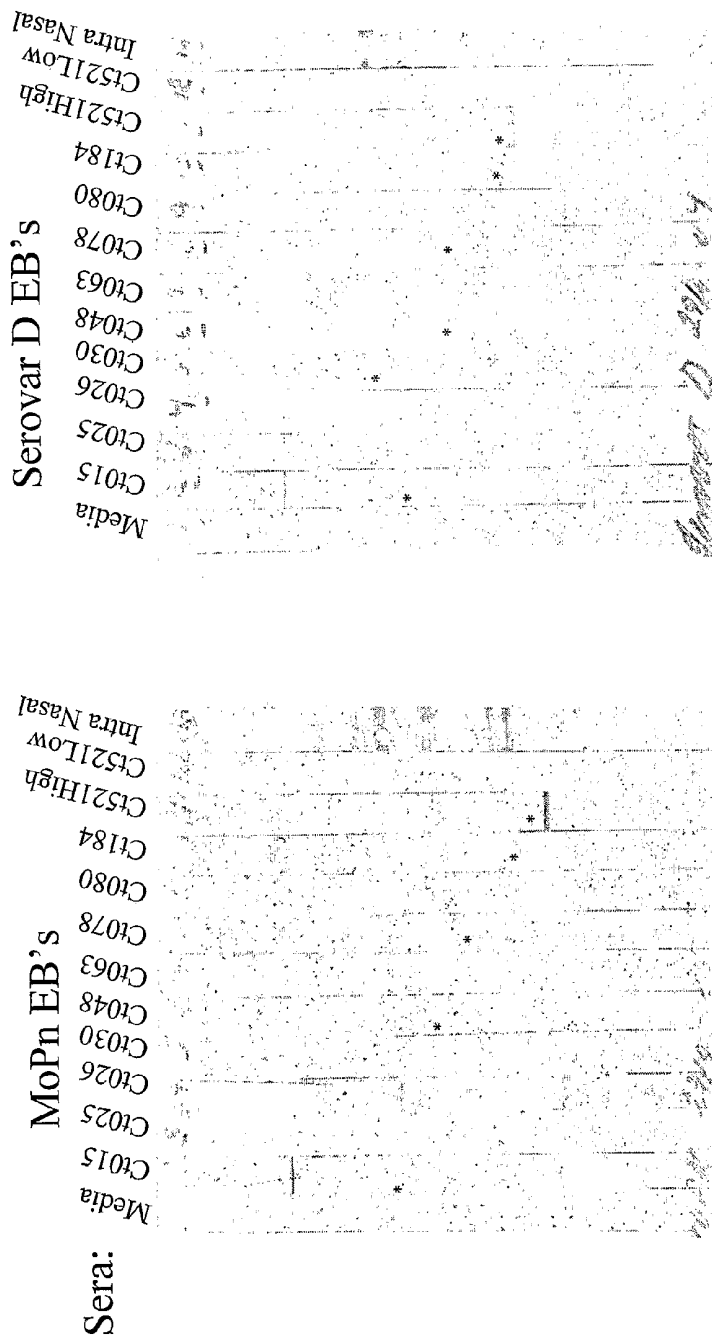


Fig. 14



Serum reactivity against whole Chlamydia EB



Positive sera:

- Ct150
- Ct048
- Ct078
- Ct184
- Ct521High

Positive sera:

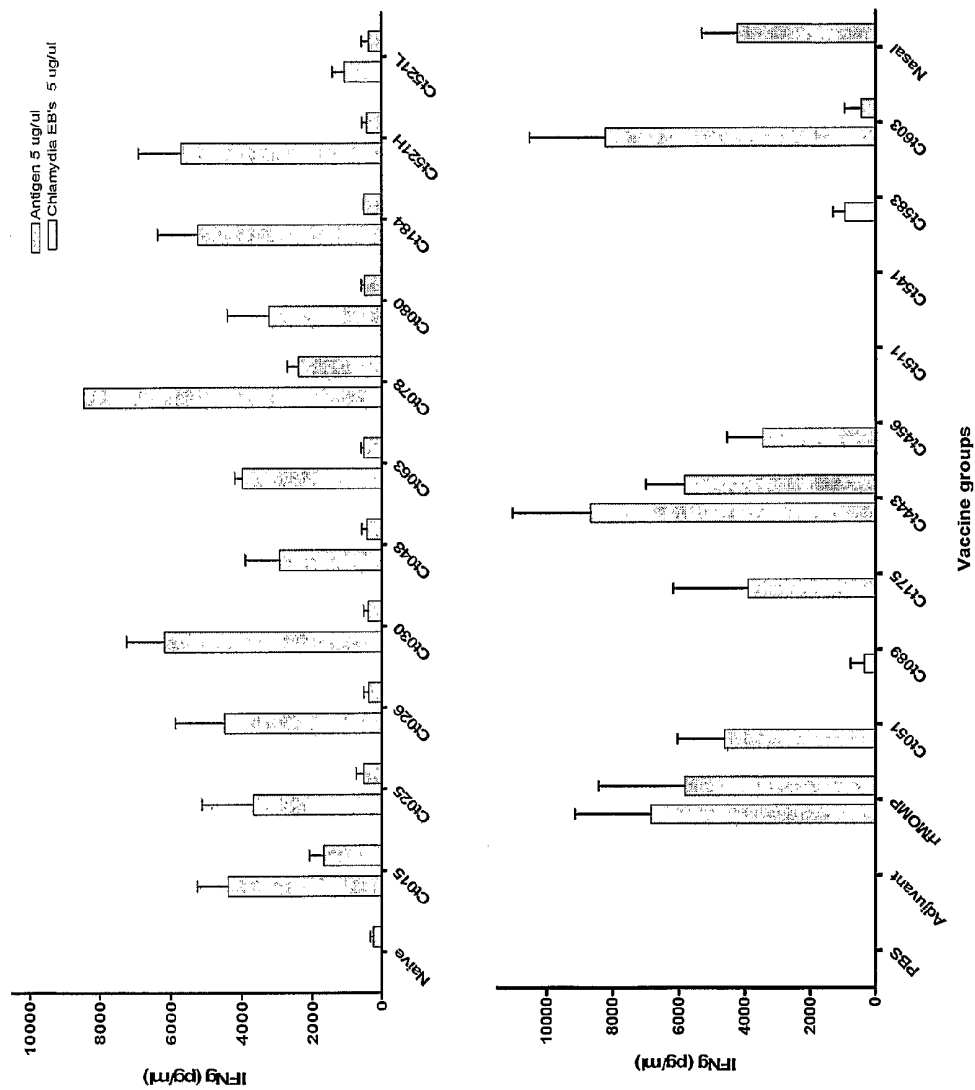
- Ct050
- Ct030
- Ct048
- Ct078
- Ct184
- Ct521High

* Bands with correct size

Fig. 15

Fig. 16

IFN γ - 3 wks postvacc - restimulated splenocytes



CHLAMYDIA TRACHOMATIS ANTIGENS FOR VACCINE AND DIAGNOSTIC USE

FIELD OF INVENTION

[0001] The present invention discloses the use of immunogenic polypeptides and immunogenic compositions based on polypeptides and nucleic acid derived from *C. trachomatis* as vaccine and diagnostic agents.

GENERAL BACKGROUND

[0002] Chlamydial species cause a wide range of diseases in both animals and humans. Of particular concern is *C. trachomatis*, an obligatory intracellular bacterium, which infects and multiplies in epithelial cells. It is the most frequent cause of sexually transmitted disease (STD) in developed countries and it is the most common cause of ocular disease in developing countries (Schachter, Moncada et al. 1988). There is an estimated 92 million individuals who carry the infection globally (WHO, 1999).

[0003] The duration of untreated *Chlamydia* STD is prolonged, and complete clearance is often not reached within the first 12 months. The protective immunity induced during the infection is thought to be serovariant-specific and short-lived, thus allowing frequent re-infections (Katz, Batteiger et al. 1987). These circumstances, the prolonged course of infection and the possible re-infections may lead to the development of serious sequelae, including pelvic inflammatory disease, infertility and ectopic pregnancies (Brunham 1999).

[0004] The infection is effectively controlled by antibiotic therapy; however the high prevalence of asymptomatic cases suggests that sustainable *Chlamydia* control can only be envisaged if an effective *Chlamydia* vaccine is developed. While much effort has been devoted to a vaccine against *Chlamydia* infections over the last few decades, so far no vaccine has been developed.

[0005] This makes the development of a vaccine against *Chlamydia* an urgent matter. Many attempts to define protective chlamydial substances have been made, however, the demonstration of a specific long-term protective immune response has not yet been achieved. Over the last several decades much effort has been devoted into developing a vaccine against *Chlamydia* infections however, so far no vaccine has been developed. Some of the first efforts were focused on controlling trachoma, and whole viable or inactivated organisms were used as the antigen to immunize humans and monkeys (Wang, Grayston et al. 1967; Grayston and Wang 1978). Children vaccinated with an inactivated whole-cell vaccine initially resulted in protection but the protection was serovar specific and short-lived (Grayston and Wang 1978). Furthermore, reinfection of partially protected individuals resulted in clinical disease that was more severe than the disease occurring in non-vaccinated controls (Grayston and Wang 1978). The fact that the initial trials with inactivated whole organisms resulted in some cases of what appeared to be a hypersensitivity reaction prompted attempts to develop subunit vaccines.

[0006] *C. trachomatis* holds, as well as secretes, several proteins of potential relevance for the generation of a chlamydia vaccine. For a number of years, the search for candidate molecules has primarily focused on proteins associated with the surface of the infectious form the Elementary Body (EB). Despite the characterization of a large number of such proteins only a few of these have been demonstrated to elicit

partial protection as subunit vaccines in animal models. The first immunogenic molecule described was the major outer membrane protein (MOMP), and this molecule has therefore been studied in great detail as a candidate vaccine. However, many attempts to immunize different animals with MOMP extracted from *C. trachomatis* or recombinant preparations gave variable results (Su, Parnell et al. 1995; Pal, Barnhart et al. 1999; Zhang, Yang et al. 1999; Pal, Theodor et al. 2001; Shaw, Grund et al. 2002). The reason for the relative ineffectiveness of MOMP as a vaccine is not known, but may result from inadequate adjuvants or delivery systems or from use of MOMP immunogens that do not mimic the native structure of the protein (Pal, Theodor et al. 2001).

[0007] More recently, several other immunogenic molecules have been identified (Hassell, Reynolds et al. 1993; Kubo and Stephens 2000; LaVerda, Albanese et al. 2000; Fling, Sutherland et al. 2001; Goodall, Yeo et al. 2001; Starnbach, Loomis et al. 2003). Immunity to *C. trachomatis* is characterized by some basic features; specifically sensitized T lymphocytes mediates protection (Su and Caldwell 1995; Morrison, Su et al. 2000; Morrison and Caldwell 2002), and the most important mediator molecule seems to be interferon gamma (IFN γ) (Morrison and Caldwell 2002). Additionally antibodies of the IgG, IgM, and IgA isotypes may also play a role (Cotter, Meng et al. 1995). In 1995 Tripples et al. (Tripples and McClarty 1995) isolated the gene for the CTP synthetase and Gu et al. (Gu, Wenman et al. 1995) cloned the region surrounding the gene for the alpha subunit of RNA polymerase. This region also contains genes for the proteins SecY, S13, S11, and L17, which are equivalent to *Escherichia coli* and *Bacillus subtilis* proteins. In 1997, the gene for elongation factor Ts was isolated (Zhang, Tao et al. 1997).

[0008] In 1998 Stevens et al published the complete genome sequence of *C. trachomatis* and predicted the presence of approximately 875 open reading frames. Among others, nucleotide sequences comprising CT442, CT460, CT509, CT579, CT587, CT713, CT812, or CT681 (MOMP) are described, and putative protein sequences for the above sequences are suggested. However importantly, this sequence information cannot be used to predict if the DNA is transcribed and translated into proteins in vivo.

[0009] More importantly, it is not possible on the basis of the sequences, to predict whether a given sequence will encode an immunogenic or an inactive protein. WO9928475 describes the complete genome sequence of *C. trachomatis* but has no evidence in support of any immunogenic effect whatsoever. Correspondingly WO9927105 describes the complete genome sequence of *C. pneumoniae*.

[0010] The only way to determine if a protein is recognized by the immune system during or after an infection with *C. trachomatis* is to produce the given protein and test it in an appropriate assay as described herein and possibly determine the fragment or epitope that has an immunogenic effect.

SUMMARY OF THE INVENTION

[0011] The invention is related to prevention, treatment and detection of infections caused by *Chlamydia* species (*C. trachomatis* ssp and *C. pneumoniae*) by the use of a polypeptide comprising a *C. trachomatis* antigen or an immunogenic portion or other variant thereof, or by the use of a DNA sequence encoding a *C. trachomatis* antigen or an immunogenic portion or other variant thereof.

DETAILED DISCLOSURE OF THE INVENTION

[0012] The present invention discloses the use of the *Chlamydia* antigens (polypeptides or nucleic acids) ct043,

ct511, ct521, ct616, ct803, ct067, ct679, ct583, ct603, ct026, ct093, ct357, ct659, ct111, ct509, ct587, ct023, ct025, ct078, ct082, ct118, ct174, ct003, ct005, ct027, ct032, ct008, ct016, ct028, ct035, ct141, ct643, ct414, ct874, ct456, ct681, ct123, ct125, ct126, ct133, ct150, ct175, ct376, ct083, ct089, ct155, ct168, ct175, ct184, ct124, ct082, ct336, ct342, ct842, ct323, ct080, ct084, ct110, ct119, ct541, ct443, ct795, ct396, ct283, ct051, ct002, ct009, ct015, ct030, ct048, ct061, ct063, ct068, ct071, ct051, ct080, ct115, ct119, ct678, ct561, ct538, ct582, ct875, ct322, ct112, ct315, ct610, ct147, ct228, ct232, ct614, ct098, ct265, ct375, ct004, ct038, ct040, ct052, ct053, ct201, ct245, ct246, ct405, ct420, ct426, ct507, ct512, ct513, ct514, ct516, ct316, ct439, ct492, ct520, ct523, ct526, ct611, ct613, ct626, ct630, ct647, ct649, ct725, ct734, ct779, ct801, ct833, ct835, ct836, ct845 or fragments (immunogenic portion, e.g. a T-cell or B-cell epitope) or homologs hereof for preparation of a pharmaceutical composition for preventing, treating or diagnosing infections caused by a bacteria from the *Chlamydia* species.

[0013] The invention also discloses the use of specific peptide fragments e.g. CT541-PF1 (aa pos. 111-243), CT443-PF1 (aa pos. 214-291), CT795-PF1 (aa pos. 1-163), CT396-PF1 (aa pos. 170-318), CT842-PF1 (aa pos. 433-515), CT283-PF1 (aa pos. 477-577), CT874-PF1 (aa pos. 330-426), CT051-PF1 (aa pos. 38-177), CT141-PF1 (aa pos. 17-126), CT643-PF1 (aa pos. 769-841), CT681-PF1 (aa pos. 156-391), CT681-PF2 (aa pos. 199-329), CT681-PF3 (aa pos. 294-349), CT414-PF1 (aa pos. 605-722), CT414-PF2 (aa pos. 463-530), CT456-PF1 (aa pos. 695-840), CT456-PF2 (aa pos. 137-229), CT456-PF3 (aa pos. 243-321), CT456-PF4 (aa pos. 209-291), CT456-PF5 (aa pos. 175-279), CT456-PF6 (aa pos. 567-730), CT456-PF7 (aa pos. 210-540), CT456-PF8 (aa pos. 190-279), CT521-PF1 (aa pos. 14-36), CT521-PF2 (aa pos. 40-62), CT521-PF3 (aa pos. 52-75), CT521-PF4 (aa pos. 66-88), CT521-PF5 (aa pos. 116-138), CT504-PF1 or the nucleic acid encoding these peptide fragments, for preparation of a pharmaceutical composition for preventing, treating or diagnosing infections caused by a bacteria from the *Chlamydia* species.

[0014] The present invention also discloses a pharmaceutical composition in the form of a vaccine or a diagnostic agent

[0015] The polypeptide used for preparation of the pharmaceutical composition can be lipidated to allow a self-adjuncting effect or fused to a fusion partner where the fusion partner can be another polypeptide derived from *C. trachomatis*, including, but not limited to, one or more polypeptide fragments derived from CT812, CT579, CT587, Cap, CT713, CT442 or MOMP or at least one T-cell or B-cell epitope of any of the above mentioned. The invention also pertains to a fusion polypeptide comprising mutual fusions of two or more of the polypeptides (or immunogenic portions thereof) of the invention.

[0016] The vaccine disclosed by the invention can be used for preventing or treating an infection of the *Chlamydia* species, e.g. *C. trachomatis*.

[0017] The diagnostic agent disclosed by the invention (above mentioned antigen or an antibody against it) can be used for diagnosis of an infection of the *Chlamydia* species, e.g. *C. trachomatis*.

[0018] The diagnostic methods disclosed are based on cell mediated immunity, serology or a simple skin test. Diagnosis by cell mediated immunity of previous or ongoing infection with a bacterium from the *Chlamydia* species, comprises contacting a sample, e.g. a blood sample comprising mono-

nuclear cells (e.g. T-lymphocytes), with the diagnostic reagent in order to detect a positive reaction, e.g. proliferation of the cells or release of cytokines such as IFN γ . Diagnosis by serology of previous or ongoing infection with a bacterium from the *Chlamydia* species said method comprising contacting a sample, e.g. a blood sample, with an antibody against the antigen in order to detect a positive reaction in case of infection or by contacting the antigen with a bodily fluid of the subject and when detecting binding of an antibody to said polypeptide, said binding being an indication that said subject is infected by a bacterium from the *Chlamydia* species. A skin test comprises intradermally injecting or applying to the skin, e.g. by a patch, the diagnostic reagent, a positive skin response at the location of injection or applying being indicative of an infection with a bacterium from the *Chlamydia* species.

[0019] The present invention also discloses a method for immunizing against an infection of a bacterium from the *Chlamydia* species, comprising administering the above mentioned vaccine of the invention to a mammal.

DEFINITIONS

Polypeptides

[0020] The word "polypeptide" in the present invention should have its usual meaning. That is an amino acid chain of any length, including a full-length protein, oligopeptides, short peptides and fragments thereof, wherein the amino acid residues are linked by covalent peptide bonds.

[0021] The polypeptide may be chemically modified by being glycosylated, by being lipidated (e.g. by chemical lipidation with palmitoyloxy succinimide as described by Mowat et al. 1991 or with dodecanoyl chloride as described by Lustig et al. 1976), by comprising prosthetic groups, or by containing additional amino acids such as e.g. a his-tag or a signal peptide.

[0022] Each polypeptide may thus be characterised by specific amino acids and be encoded by specific nucleic acid sequences. It will be understood that such sequences include analogues and variants produced by recombinant or synthetic methods wherein such polypeptide sequences have been modified by substitution, insertion, addition or deletion of one or more amino acid residues in the recombinant polypeptide and still be immunogenic in any of the biological assays described herein. Substitutions are preferably "conservative". These are defined according to the following table. Amino acids in the same block in the second column and preferably in the same line in the third column may be substituted for each other. The amino acids in the third column are indicated in one-letter code.

ALIPHATIC	Non-polar	GAP ILV
	Polar-uncharged	CSTM NQ
	Polar-charged	DE KR
AROMATIC		HFVY

[0023] A preferred polypeptide within the present invention is an immunogenic antigen from *C. trachomatis*. Such antigen can for example be derived from the *C. trachomatis* cell and/or *C. trachomatis* culture filtrate. Thus, a polypeptide

comprising an immunogenic portion of one of the above antigens may consist entirely of the immunogenic portion, or may contain additional sequences. The additional sequences may be derived from the native *C. trachomatis* antigen or be heterologous and such sequences may, but need not, be immunogenic.

[0024] Each polypeptide is encoded by a specific nucleic acid sequence. It will be understood that such sequences include analogues and variants hereof wherein such nucleic acid sequences have been modified by substitution, insertion, addition or deletion of one or more nucleic acid. Substitutions are preferably silent substitutions in the codon usage which will not lead to any change in the amino acid sequence, but may be introduced to enhance the expression of the protein.

[0025] In the present context the term “substantially pure polypeptide fragment” means a polypeptide preparation which contains at most 5% by weight of other polypeptide material with which it is natively associated (lower percentages of other polypeptide material are preferred, e.g. at most 4%, at most 3%, at most 2%, at most 1%, and at most ½%). It is preferred that the substantially pure polypeptide is at least 96% pure, i.e. that the polypeptide constitutes at least 96% by weight of total polypeptide material present in the preparation, and higher percentages are preferred, such as at least 97%, at least 98%, at least 99%, at least 99.5%, at least 99.5%, and at least 99.75%. It is especially preferred that the polypeptide fragment is in “essentially pure form”, i.e. that the polypeptide fragment is essentially free of any other antigen with which it is natively associated, i.e. free of any other antigen from bacteria belonging to the *Chlamydia* species. This can be accomplished by preparing the polypeptide fragment by means of recombinant methods in a non-chlamydia host cell as will be described in detail below, or by synthesizing the polypeptide fragment by the well-known methods of solid or liquid phase peptide synthesis, e.g. by the method described by Merrifield or variations thereof.

[0026] By the term “*Chlamydia* species” is understood a bacterium capable of causing the *Chlamydia* infection in an animal or in a human being. Examples are *C. trachomatis*, *C. pneumoniae* and *C. muridarum*.

[0027] The Major Outer Membrane Protein (MOMP) of *C. trachomatis*, is expressed during all phases of the developmental life cycle of *C. trachomatis* and constitute approximately 60% of the total protein content of the chlamydia outer membrane. MOMP can be divided into conserved domains interrupted by four highly variable domains (VD1-4) (Stephens, Wagar et al. 1988). In general T cell epitopes are located in the conserved regions (Ortiz, Demick et al. 1996) whereas the human antibody response is primarily directed against the variable domains. Based on the reactivity of specific mono clonal antibodies and detailed sequence analysis of the variable regions *C. trachomatis* can be divided into 15 different serovariants and of these serovariants A, B, Ba and C causes Trachoma, D-K causes sexually transmitted disease (STD), L1-L3 causes Lymphogranuloma venereum, and MoPn (*C. muridarum*) infects mice.

[0028] By “a *Chlamydia* patient” is understood an individual with culture or PCR proven infection with *Chlamydia* spp. Culture, microscopy and PCR diagnosis of *Chlamydia* are well known by any person skilled in the art.

[0029] By the term “delayed type hypersensitivity reaction” (DTH) is understood a T-cell mediated inflammatory response elicited after the injection of a polypeptide into, or

application to, the skin, said inflammatory response appearing 72-96 hours after the polypeptide injection or application.

[0030] By the term “IFN γ ” is understood interferon-gamma. The measurement of IFN γ is used as an indication of an immunological response.

[0031] By the terms “nucleic acid fragment” and “nucleic acid sequence” are understood any nucleic acid molecule including DNA, RNA, LNA (locked nucleic acids), PNA, RNA, dsRNA and RNA-DNA-hybrids. Also included are nucleic acid molecules comprising non-naturally occurring nucleosides. The term includes nucleic acid molecules of any length e.g. from 10 to 10000 nucleotides, depending on the use. When the nucleic acid molecule is for use as a pharmaceutical, e.g. in DNA therapy, or for use in a method for producing a polypeptide according to the invention, a molecule encoding at least one epitope is preferably used, having a length from about 18 to about 1000 nucleotides, the molecule being optionally inserted into a vector. When the nucleic acid molecule is used as a probe, as a primer or in antisense therapy, a molecule having a length of 10-100 is preferably used. According to the invention, other molecule lengths can be used, for instance a molecule having at least 12, 15, 21, 24, 27, 30, 33, 36, 39, 42, 50, 60, 70, 80, 90, 100, 200, 300, 400, 500 or 1000 nucleotides (or nucleotide derivatives), or a molecule having at most 10000, 5000, 4000, 3000, 2000, 1000, 700, 500, 400, 300, 200, 100, 50, 40, 30 or 20 nucleotides (or nucleotide derivatives).

[0032] The term “stringent” when used in conjunction with hybridization conditions is as defined in the art, i.e. the hybridization is performed at a temperature not more than 15-20° C. under the melting point T_m , cf. Sambrook et al, 1989, pages 11.45-11.49. Preferably, the conditions are “highly stringent”, i.e. 5-10° C. under the melting point T_m .

[0033] Throughout this specification, unless the context requires otherwise, the word “comprise”, or variations thereof such as “comprises” or “comprising”, will be understood to imply the inclusion of a stated element or integer or group of elements or integers but not the exclusion of any other element or integer or group of elements or integers.

Sequence Identity

[0034] The term “sequence identity” indicates a quantitative measure of the degree of homology between two amino acid sequences of equal length or between two nucleotide sequences of equal length. The two sequences to be compared must be aligned to best possible fit possible with the insertion of gaps or alternatively, truncation at the ends of the protein sequences. The sequence identity can be calculated as

$$\frac{(N_{ref} - N_{dif})100}{N_{ref}}$$

wherein N_{dif} is the total number of non-identical residues in the two sequences when aligned and wherein N_{ref} is the number of residues in one of the sequences. Hence, the DNA sequence AGTCAGTC will have a sequence identity of 75% with the sequence AATCAATC ($N_{dif}=2$ and $N_{ref}=8$). A gap is counted as non-identity of the specific residue(s), i.e. the DNA sequence AGTGTC will have a sequence identity of 75% with the DNA sequence AGTCAGTC ($N_{dif}=2$ and $N_{ref}=8$). Sequence identity can alternatively be calculated by the BLAST program e.g. the BLASTP program (Pearson and

Lipman 1988) (www.ncbi.nlm.nih.gov/cgi-bin/BLAST). In one aspect of the invention, alignment is performed with the sequence alignment method ClustalW with default parameters as described by Thompson J., et al 1994, available at <http://www2.ebi.ac.uk/clustalw/>.

[0035] A preferred minimum percentage of sequence identity is at least 80%, such as at least 85%, at least 90%, at least 91%, at least 92%, at least 93%, at least 94%, at least 95%, at least 96%, at least 97%, at least 98%, at least 99%, and at least 99.5%.

Immunogenic Portion

[0036] In a preferred embodiment of the invention, the polypeptide comprises an immunogenic portion of the polypeptide, such as an epitope for a B-cell or T-cell.

The immunogenic portion of a polypeptide is a part of the polypeptide, which elicits an immune response in an animal or a human being, and/or in a biological sample determined by any of the biological assays described herein. The immunogenic portion of a polypeptide may be a T-cell epitope or a B-cell epitope. Immunogenic portions can be related to one or a few relatively small parts of the polypeptide, they can be scattered throughout the polypeptide sequence or be situated in specific parts of the polypeptide. For a few polypeptides epitopes have even been demonstrated to be scattered throughout the polypeptide covering the full sequence (Ravn, Demissie et al. 1999).

In order to identify relevant T-cell epitopes which are recognised during an immune response, it is possible to use a "brute force" method: Since T-cell epitopes are linear, deletion mutants of the polypeptide will, if constructed systematically, reveal what regions of the polypeptide are essential in immune recognition, e.g. by subjecting these deletion mutants e.g. to the IFN γ assay described herein. Another method utilises overlapping oligopeptides for the detection of MHC class II epitopes, preferably synthetic, having a length of e.g. 20 amino acid residues derived from the polypeptide. These peptides can be tested in biological assays (e.g. the IFN γ assay as described herein) and some of these will give a positive response (and thereby be immunogenic) as evidence for the presence of a T cell epitope in the peptide. For the detection of MHC class I epitopes it is possible to predict peptides that will bind (Stryhn, Pedersen et al. 1996) and hereafter produce these peptides synthetic and test them in relevant biological assays e.g. the IFN γ assay as described herein. The peptides preferably having a length of e.g. 8 to 11 amino acid residues derived from the polypeptide. B-cell epitopes can be determined by analysing the B cell recognition to overlapping peptides covering the polypeptide of interest as e.g. described in Harboe et al (Harboe, Oettinger et al. 1996).

[0037] Although the minimum length of a T-cell epitope has been shown to be at least 6 amino acids, it is normal that such epitopes are constituted of longer stretches of amino acids. Hence, it is preferred that the polypeptide fragment of the invention has a length of at least 7 amino acid residues, such as at least 8, at least 9, at least 10, at least 12, at least 14, at least 16, at least 18, at least 20, at least 22, at least 24, and at least 30 amino acid residues. Hence, in important embodiments of the inventive method, it is preferred that the polypeptide fragment has a length of at most 50 amino acid residues, such as at most 40, 35, 30, 25, and 20 amino acid residues. It is expected that the peptides having a length of between 10 and 20 amino acid residues will prove to be most efficient as

MCH class II epitopes and therefore especially preferred lengths of the polypeptide fragment used in the inventive method are 18, such as 15, 14, 13, 12 and even 11 amino acid residues. It is expected that the peptides having a length of between 7 and 12 amino acid residues will prove to be most efficient as MCH class I epitopes and therefore especially preferred lengths of the polypeptide fragment used in the inventive method are 11, such as 10, 9, 8 and even 7 amino acid residues.

[0038] Immunogenic portions of polypeptides may be recognised by a broad part (high frequency) or by a minor part (low frequency) of the genetically heterogenic human population. In addition some immunogenic portions induce high immunological responses (dominant), whereas others induce lower, but still significant, responses (subdominant). High frequency > low frequency can be related to the immunogenic portion binding to widely distributed MHC molecules (HLA type) or even by multiple MHC molecules (Kilgus, Jardetzky et al. 1991) (Sinigaglia, Guttinger et al. 1988).

[0039] In the context of providing candidate molecules for a new vaccine against *Chlamydia* infection, the subdominant epitopes are however as relevant as are the dominant epitopes since it has been shown that such epitopes can induce protection regardless of being subdominant.

Variants

[0040] A common feature of the polypeptides of the invention is their capability to induce an immunological response as illustrated in the examples. It is understood that a variant of a polypeptide of the invention produced by substitution, insertion, addition or deletion is also immunogenic determined by any of the assays described herein.

Immune Individual

[0041] An immune individual is defined as a person or an animal, which has cleared or controlled an infection with chlamydia.

Immunogenic

[0042] An immunogenic polypeptide is defined as a polypeptide that induces an immune response in a biological sample or an individual currently or previously infected with a chlamydia. The immune response may be monitored by one of the following methods:

[0043] An in vitro cellular response is determined by release of a relevant cytokine such as IFN γ , from lymphocytes withdrawn from an animal or human being currently or previously infected with chlamydia, or by detection of proliferation of these T cells. The induction being performed by the addition of the polypeptide or the immunogenic portion to a suspension comprising from 1×10^5 cells to 3×10^5 cells per well. The cells being isolated from either the blood, the spleen, the liver or the lung and the addition of the polypeptide or the immunogenic portion resulting in a concentration of not more than 20 μ g per ml suspension and the stimulation being performed from two to five days. For monitoring cell proliferation the cells are pulsed with radioactive labeled Thymidine and after 16-22 hours of incubation detecting the proliferation by liquid scintillation counting. A positive response being a response more than background plus two standard deviations. The release of IFN γ can be determined by the ELISA method, which is well known

to a person skilled in the art. A positive response being a response more than background plus two standard deviations. Other cytokines than IFN γ could be relevant when monitoring the immunological response to the polypeptide, such as IL-12, TNF- α , IL-4, IL-5, IL-10, IL-6, TGF- β . Another and more sensitive method for determining the presence of a cytokine (e.g. IFN γ) is the ELISPOT method where the cells isolated from either the blood, the spleen, the liver or the lung are diluted to a concentration of preferable of 1 to 4 $\times 10^6$ cells/ml and incubated for 18-22 hrs in the presence of the polypeptide or the immunogenic portion resulting in a concentration of not more than 20 μ g per ml. The cell suspensions are hereafter diluted to 1 to 2 $\times 10^6$ /ml and transferred to Maxisorp plates coated with anti-IFN γ and incubated for preferably 4 to 16 hours. The IFN γ producing cells are determined by the use of labelled secondary anti-IFN γ antibody and a relevant substrate giving rise to spots, which can be enumerated using a dissection microscope. It is also a possibility to determine the presence of mRNA coding for the relevant cytokine by the use of the PCR technique. Usually one or more cytokines will be measured utilizing for example the PCR, ELISPOT or ELISA. It will be appreciated by a person skilled in the art that a significant increase or decrease in the amount of any of these cytokines induced by a specific polypeptide can be used in evaluation of the immunological activity of the polypeptide.

[0044] An in vitro cellular response may also be determined by the use of T cell lines derived from an immune individual or a *C. trachomatis* infected person where the T cell lines have been driven with either live chlamydia or extracts from the bacterial cell for 10 to 20 days with the addition of IL-2. The induction being performed by addition of not more than 20 μ g polypeptide per ml suspension to the T cell lines containing from 1 $\times 10^5$ cells to 3 $\times 10^5$ cells per well and incubation being performed from two to six days. The induction of IFN γ or release of another relevant cytokine is detected by ELISA. The stimulation of T cells can also be monitored by detecting cell proliferation using radioactively labeled Thymidine as described above. For both assays a positive response being a response more than background plus two standard deviations.

[0045] An in vivo cellular response which may be determined as a positive DTH response after intradermal injection or local application patch of at most 100 μ g of the polypeptide or the immunogenic portion to an individual who is clinically or subclinically infected with chlamydia, a positive response having a diameter of at least 5 mm 72-96 hours after the injection or application.

[0046] An in vitro humoral response is determined by a specific antibody response in an immune or infected individual. The presence of antibodies may be determined by an ELISA technique or a Western blot where the polypeptide or the immunogenic portion is absorbed to either a nitrocellulose membrane or a polystyrene surface. The serum is preferably diluted in PBS from 1:10 to 1:100 and added to the absorbed polypeptide and the incubation being performed from 1 to 12 hours. By the use of labeled secondary antibodies the presence of specific antibodies can be determined by measuring the OD e.g. by ELISA where a positive response is a response of more than background plus two standard deviations or alternatively a visual response in a Western blot.

[0047] Another relevant parameter is measurement of the protection in animal models induced after vaccination with the polypeptide in an adjuvant or after DNA vaccination. Suitable animal models include primates, guinea pigs or mice, which are challenged with an infection of chlamydia. Readout for induced protection could be decrease of the bacterial load in target organs compared to non-vaccinated animals, prolonged survival times compared to non-vaccinated animals and diminished weight loss compared to non-vaccinated animals.

Preparation Methods

[0048] In general, *C. trachomatis* antigens, and DNA sequences encoding such antigens, may be prepared using any one of a variety of procedures.

[0049] They may be purified as native proteins from the *C. trachomatis* cell by procedures such as those described above. Immunogenic antigens may also be produced recombinantly using a DNA sequence encoding the antigen, which has been inserted into an expression vector and expressed in an appropriate host. Examples of host cells are *E. coli*. The polypeptides or immunogenic portion hereof can also be produced synthetically having fewer than about 100 amino acids, and generally fewer than 50 amino acids and may be generated using techniques well known to those ordinarily skilled in the art, such as commercially available solid-phase techniques where amino acids are sequentially added to a growing amino acid chain.

[0050] In the construction and preparation of plasmid DNA encoding the polypeptide as defined for DNA vaccination a host strain such as *E. coli* can be used. Plasmid DNA can then be prepared from overnight cultures of the host strain carrying the plasmid of interest, and purified using e.g. the Qiagen Giga-Plasmid column kit (Qiagen, Santa Clarita, Calif., USA) including an endotoxin removal step. It is essential that plasmid DNA used for DNA vaccination is endotoxin free.

Fusion Proteins

[0051] The immunogenic polypeptides may also be produced as fusion proteins, by which methods superior characteristics of the polypeptide of the invention can be achieved. For instance, fusion partners that facilitate export of the polypeptide when produced recombinantly, fusion partners that facilitate purification of the polypeptide, and fusion partners which enhance the immunogenicity of the polypeptide fragment of the invention are all interesting possibilities. Therefore, the invention also pertains to a fusion polypeptide comprising at least one polypeptide or immunogenic portion defined above and at least one fusion partner. The fusion partner can, in order to enhance immunogenicity, be another polypeptide derived from *C. trachomatis*, such as a polypeptide fragment derived from *Chlamydia* species, such as CT812, CT579, CT587 (Goodall, Yeo et al. 2001), Cap (Fling, Sutherland et al. 2001), CT713 (Kubo and Stephens 2000), CT442 (Starnbach, Loomis et al. 2003), or MOMP (Stephens, Wagar et al. 1988) or at least one T-cell epitope or B cell epitope of any of the above mentioned. The invention also pertains to a fusion polypeptide comprising mutual fusions of two or more of the polypeptides (or immunogenic portions thereof) of the invention.

[0052] Other fusion partners, which could enhance the immunogenicity of the product, are lymphokines such as IFN γ , IL-2 and IL-12. In order to facilitate expression and/or

purification, the fusion partner can e.g. be a bacterial fimbrial protein, e.g. the pilus components pilin and papA; protein A; the ZZ-peptide (ZZ-fusions are marketed by Pharmacia in Sweden); the maltose binding protein; glutathione S-transferase; β -galactosidase; or poly-histidine. Fusion proteins can be produced recombinantly in a host cell, which could be *E. coli*, and it is a possibility to induce a linker region between the different fusion partners.

[0053] Other interesting fusion partners are polypeptides, which are lipidated so that the immunogenic polypeptide is presented in a suitable manner to the immune system. This effect is e.g. known from vaccines based on the *Borrelia burgdorferi* OspA polypeptide as described in e.g. WO 96/40718 A or vaccines based on the *Pseudomonas aeruginosa* OprI lipoprotein (Cote-Sierra, Jongert et al. 1998). Another possibility is N-terminal fusion of a known signal sequence and an N-terminal cysteine to the immunogenic polypeptide. Such a fusion results in lipidation of the immunogenic polypeptide at the N-terminal cysteine, when produced in a suitable production host.

Pharmaceutical Composition

[0054] A pharmaceutical composition is defined as any vaccine (both therapeutic and prophylactic) or any diagnostic reagent as described in the following.

Vaccine, Protein

[0055] Another part of the invention pertains to a vaccine composition comprising a polypeptide (or at least one immunogenic portion thereof) or fusion polypeptide according to the invention. In order to ensure optimum performance of such a vaccine composition it is preferred that it comprises an immunologically and pharmaceutically acceptable carrier, vehicle or adjuvant.

[0056] An effective vaccine, wherein a polypeptide of the invention is recognized by the animal, will in an animal model be able to decrease bacterial load in target organs, prolong survival times and/or diminish weight loss after challenge with virulent *Chlamydia*, compared to non-vaccinated animals

[0057] Suitable carriers are selected from the group consisting of a polymer to which the polypeptide(s) is/are bound by hydrophobic non-covalent interaction, such as a plastic, e.g. polystyrene, or a polymer to which the polypeptide(s) is/are covalently bound, such as a polysaccharide, or a polypeptide, e.g. bovine serum albumin, ovalbumin or key-hole limpet haemocyanin. Suitable vehicles are selected from the group consisting of a diluent and a suspending agent. The adjuvant is preferably selected from the group consisting of dimethyldioctadecylammonium bromide (DDA), Quil A, poly I:C, aluminium hydroxide, Freund's incomplete adjuvant, IFN γ , IL-2, IL-12, monophosphoryl lipid A (MPL), Trehalose Dimycolate (TDM), Trehalose Dibehenate (TDB) and muramyl dipeptide (MDP).

[0058] Preparation of Vaccines which Contain Peptide Sequences as Active Ingredients is Generally well understood in the art, as exemplified by U.S. Pat. Nos. 4,608,251; 4,601,903; 4,599,231 and 4,599,230, all incorporated herein by reference.

[0059] Other methods of achieving adjuvant effect for the vaccine include use of agents such as aluminum hydroxide or phosphate (alum), synthetic polymers of sugars (Carbopol), aggregation of the protein in the vaccine by heat treatment,

aggregation by reactivating with pepsin treated (Fab) antibodies to albumin, mixture with bacterial cells such as *C. parvum* or endotoxins or lipopolysaccharide components of gram-negative bacteria, emulsion in physiologically acceptable oil vehicles such as mannide mono-oleate (Aracel A) or emulsion with 20 percent solution of a perfluorocarbon (Fluosol-DA) used as a block substitute may also be employed. Other possibilities involve the use of immune modulating substances such as cytokines or synthetic IFN γ inducers such as poly I:C in combination with the above-mentioned adjuvants.

[0060] Another interesting possibility for achieving adjuvant effect is to employ the technique described in (Gosselin, Wardwell et al. 1992) (which is hereby incorporated by reference herein). In brief, a relevant antigen such as an antigen of the present invention can be conjugated to an antibody (or antigen binding antibody fragment) against the Fc γ receptors on monocytes/macrophages.

[0061] The vaccines are administered in a manner compatible with the dosage formulation, and in such amount as will be therapeutically effective and immunogenic. The quantity to be administered depends on the subject to be treated, including, e.g., the capacity of the individual's immune system to mount an immune response, and the degree of protection desired. Suitable dosage ranges are of the order of several hundred micrograms active ingredient per vaccination with a preferred range from about 0.1 μ g to 1000 μ g, such as in the range from about 1 μ g to 300 μ g, and especially in the range from about 10 μ g to 50 μ g. Suitable regimens for initial administration and booster shots are also variable but are typified by an initial administration followed by subsequent inoculations or other administrations.

[0062] The manner of application may be varied widely. Any of the conventional methods for administration of a vaccine are applicable. These are believed to include oral application on a solid physiologically acceptable base or in a physiologically acceptable dispersion, parenterally, by injection or the like. The dosage of the vaccine will depend on the route of administration and will vary according to the age of the person to be vaccinated and, to a lesser degree, the size of the person to be vaccinated.

[0063] The vaccines are conventionally administered parenterally, by injection, for example, either subcutaneously or intramuscularly. Additional formulations which are suitable for other modes of administration include suppositories and, in some cases, oral formulations. For suppositories, traditional binders and carriers may include, for example, polyalkalene glycols or triglycerides; such suppositories may be formed from mixtures containing the active ingredient in the range of 0.5% to 10%, preferably 1-2%. Oral formulations include such normally employed excipients as, for example, pharmaceutical grades of mannitol, lactose, starch, magnesium stearate, sodium saccharine, cellulose, magnesium carbonate, and the like. These compositions take the form of solutions, suspensions, tablets, pills, capsules, sustained release formulations or powders and advantageously contain 10-95% of active ingredient, preferably 25-70%.

[0064] In many instances, it will be necessary to have multiple administrations of the vaccine. Especially, vaccines can be administered to prevent an infection with chlamydia and/or to treat established chlamydia infection. When administered to prevent an infection, the vaccine is given prophylactically, before definitive clinical signs or symptoms of an infection are present.

[0065] Due to genetic variation, different individuals may react with immune responses of varying strength to the same polypeptide. Therefore, the vaccine according to the invention may comprise several different polypeptides in order to increase the immune response. The vaccine may comprise two or more polypeptides or immunogenic portions, where all of the polypeptides are as defined above, or some but not all of the peptides may be derived from one or more of the other chlamydia serovariants. In the latter example, the polypeptides not necessarily fulfilling the criteria set forth above for polypeptides may either act due to their own immunogenicity or merely act as adjuvants.

[0066] The vaccine may comprise 1-20, such as 2-20 or even 3-20 different polypeptides or fusion polypeptides, such as 3-10 different polypeptides or fusion polypeptides.

[0067] The invention also pertains to a method for immunizing an animal, including a human being, against *Chlamydia* infection caused by a *Chlamydia* species, comprising administering to the animal the polypeptide of the invention, or a vaccine composition of the invention as described above, or a living vaccine described above.

[0068] The invention also pertains to a method for producing an immunologic composition according to the invention, the method comprising preparing, synthesising or isolating a polypeptide according to the invention, and solubilizing or dispersing the polypeptide in a medium for a vaccine, and optionally adding other *C. trachomatis* antigens and/or a carrier, vehicle and/or adjuvant substance.

Vaccine DNA.

[0069] The nucleic acid fragments of the invention may be used for effecting in vivo expression of antigens, i.e. the nucleic acid fragments may be used in so-called DNA vaccines as reviewed in (Ulmer, Donnelly et al. 1993), which is included by reference.

[0070] Hence, the invention also relates to a vaccine comprising a nucleic acid fragment according to the invention, the vaccine effecting in vivo expression of antigen by an animal, including a human being, to whom the vaccine has been administered, the amount of expressed antigen being effective to confer substantially increased resistance to infections caused by virulent chlamydia in an animal, including a human being.

[0071] The efficacy of such a DNA vaccine can possibly be enhanced by administering the gene encoding the expression product together with a DNA fragment encoding a polypeptide which has the capability of modulating an immune response.

Live Recombinant Vaccines

[0072] One possibility for effectively activating a cellular immune response for a vaccine can be achieved by expressing the relevant antigen in a vaccine in a non-pathogenic micro-organism or virus. Well-known examples of such microorganisms are *Mycobacterium bovis* BCG, *Salmonella* and *Pseudomona* and examples of viruses are Vaccinia Virus and Adenovirus.

[0073] Another possibility is to integrate the DNA encoding the polypeptide according to the invention in an attenuated virus such as the vaccinia virus or Adenovirus (Rolph and Ramshaw 1997). The recombinant vaccinia virus is able to replicate within the cytoplasm of the infected host cell and

the polypeptide of interest can therefore induce an immune response, which is envisioned to induce protection against *Chlamydia*.

Therapeutic Vaccine.

[0074] The invention also relates to the use of a polypeptide or nucleic acid of the invention for use as therapeutic vaccines as have been described in the literature exemplified by D. Lowry (Lowry et al 1999). Antigens with therapeutic properties may be identified based on their ability to diminish the severity of *C. trachomatis* infection in experimental animals or prevent reactivation of previous infection, when administered as a vaccine. The composition used for therapeutic vaccines can be prepared as described above for vaccines.

Diagnostic Protein

[0075] The invention also relates to a method of diagnosing *Chlamydia* infection caused by a chlamydia in an animal, including a human being, comprising intradermally injecting, in the animal, a polypeptide according to the invention, a positive skin response at the location of injection being indicative of the animal having a *Chlamydia* infection, and a negative skin response at the location of injection being indicative of the animal not having an infection.

[0076] When diagnosis of previous or ongoing infection with virulent chlamydia is the aim, a blood sample comprising mononuclear cells (i.e. T-lymphocytes) from a patient could be contacted with a sample of one or more polypeptides of the invention. This contacting can be performed in vitro and a positive reaction could e.g. be proliferation of the T-cells or release of cytokines such as IFN γ into the extracellular phase. It is also conceivable to contact a serum sample from a subject with a polypeptide of the invention, the demonstration of a binding between antibodies in the serum sample and the polypeptide being indicative of previous or ongoing infection.

[0077] The invention therefore also relates to an in vitro method for diagnosing ongoing or previous sensitisation in an animal or a human being with a *Chlamydia* species, the method comprising providing a blood sample from the animal or human being, and contacting the sample from the animal with the polypeptide of the invention, a significant release into the extracellular phase of at least one cytokine by mononuclear cells in the blood sample being indicative of the animal being sensitised. A positive response being a response more than release from a blood sample derived from a patient without the chlamydia diagnosis plus two standard deviations. The invention also relates to the in vitro method for diagnosing ongoing or previous sensitisation in an animal or a human being with *chlamydia*, the method comprising providing a blood sample from the animal or human being, and by contacting the sample from the animal with the polypeptide of the invention demonstrating the presence of antibodies recognizing the polypeptide of the invention in the serum sample. The immunogenic composition used for diagnosing may comprise 1-20, such as 2-20 or even 3-20 different polypeptides or fusion polypeptides, such as 3-10 different polypeptides or fusion polypeptides.

Diagnostic DNA

[0078] The nucleic acid probes encoding the polypeptide of the invention can be used in a variety of diagnostic assays for detecting the presence of pathogenic organisms in a given

sample. A method of determining the presence of chlamydial nucleic acids in an animal, including a human being, or in a sample, comprising administering a nucleic acid fragment of the invention to the animal or incubating the sample with the nucleic acid fragment of the invention or a nucleic acid fragment complementary thereto, and detecting the presence of hybridised nucleic acids resulting from the incubation (by using the hybridisation assays which are well-known in the art), is also included in the invention. Such a method of diagnosing *Chlamydia* infection might involve the use of a composition comprising at least a part of a nucleotide sequence as defined above and detecting the presence of nucleotide sequences in a sample from the animal or human being to be tested which hybridise with the nucleic acid fragment (or a complementary fragment) by the use of PCR technique.

Antibodies

[0079] A monoclonal or polyclonal antibody, which is specifically reacting with a polypeptide of the invention in an immuno assay, or a specific binding fragment of said antibody, is also a part of the invention. The antibodies can be produced by methods known to the person skilled in the art. Polyclonal antibodies can be raised in a mammal, for example, by one or more injections of a polypeptide according to the present invention and, if desired, an adjuvant. The monoclonal antibodies according to the present invention may, for example, be produced by the hybridoma method first described by Kohler and Milstein (1975), or may be produced by recombinant DNA methods such as described in U.S. Pat. No. 4,816,567. The monoclonal antibodies may also be isolated from phage libraries generated using the techniques described by (McCafferty, Griffiths et al. 1990), for example. Methods for producing antibodies are described in the literature, e.g. in U.S. Pat. No. 6,136,958.

[0080] A sample of a potentially infected organ may be contacted with such an antibody recognizing a polypeptide of the invention. The demonstration of the reaction by means of methods well known in the art between the sample and the antibody will be indicative of an ongoing infection. It is of course also a possibility to demonstrate the presence of anti-chlamydial antibodies in serum by contacting a serum sample from a subject with at least one of the polypeptide fragments of the invention and using well-known methods for visualising the reaction between the antibody and antigen.

[0081] In diagnostics, an antibody, a nucleic acid fragment and/or a polypeptide of the invention can be used either alone, or as a constituent in a composition. Such compositions are known in the art, and comprise compositions in which the antibody, the nucleic acid fragment or the polypeptide of the invention is coupled, preferably covalently, to at least one other molecule, e.g. a label (e.g. radioactive or fluorescent) or a carrier molecule.

[0082] The present invention discloses antigenic components of *C. trachomatis* which have:

- [0083]** 1) the capacity to stimulate T cells from patients with a urogenital *Chlamydia* infection to secrete INF γ , or
- [0084]** 2) the capacity to stimulate T cells from patients with a urogenital *Chlamydia* infection to secrete cytokines which inhibit *Chlamydia* growth in vitro, or
- [0085]** 3) is recognized by serum IgG, and/or IgM, and/or IgA, antibodies from patients with a urogenital chlamydia infection, or

[0086] 4) is recognized by T cells and/or antibodies from mice experimentally infected with *Chlamydia muridarum* and/or *C. trachomatis*, or

[0087] 5) is able by administration to induce an immune response in mice which recognize the *C. trachomatis* bacterial antigen, or

[0088] 6) is able by vaccination to provide at least partial immunity against an experimental challenge infection with *Chlamydia muridarum* and/or *C. trachomatis*.

[0089] Firstly, in order to identify the molecular targets of protective T cells among proteins from *C. trachomatis*, a protein lysate of *C. trachomatis* serovar D (strain UW-3/Cx, ATCC No: VR-885) was fractionated by the multi-elution technique (Andersen and Heron 1993). This technique separates proteins in a complex protein mixture according to their molecular weight into narrow fractions which are then used to stimulate Peripheral Blood Mononuclear Cells (PBMCs) in vitro. After several days of incubation the release of INF γ is monitored by ELISA (FIG. 1). The responses of *Chlamydia* patients were compared to the responses of normal blood donors with no previous diagnosis of *Chlamydia* infection. This comparison allows identification of *C. trachomatis* proteins which have the capacity to trigger effector T cells to release INF γ during the first phases of the human infection. Using this approach it was demonstrated that the targets for these protective T cells are proteins or fragments of proteins with apparent molecular weights of 5-12, 16-20, 25-35 and 58-74 kDa (FIGS. 2 and 3). The precise identity of bacterial proteins within each stimulatory region was determined by mass spectrometry.

[0090] To further identify and characterise the stimulating antigens, each specific *C. trachomatis* antigens may be a) purified antigens from *C. trachomatis* extracts as exemplified in Example 1, b) antigens produced and purified from *E. coli* as exemplified in Example 1, c) overlapping synthetic peptides as exemplified in Example 1, or d) transduction of target patient PBMC directly with recombinant Adenovirus constructs as exemplified by Example 5. This method enabled the identification of single antigens and peptides derived thereof within each stimulatory region with exceedingly stimulating capacity measured by the release of INF γ as exemplified in FIG. 4.

[0091] Secondly, a directed expression-library was constructed by amplifying full-length *C. trachomatis* genes by polymerase chain reaction (PCR) using gene-specific oligonucleotides containing a Kozak sequence in the 5'-primer and a stop codon in the 3'-primer. Genomic DNA from *C. trachomatis* serovar D was used as template for the PCR reactions and a newly developed UNIX program was used for automated primer design including primer position within the gene of interest and Tm. Amplicons were first inserted by recombination into the Gateway "entry vector" (Invitrogen) and then transferred by recombination into the pDEST17 expression vector (Invitrogen), which contains a His $_6$ -tag and the same recombination sequences as the entry vector. Individual clones were screened for the expression of *C. trachomatis* antigens by the colony blot method (French and Maul 1986) using a pool of human serum samples with high levels of *C. trachomatis* specific IgG, IgM, or IgA antibodies. The nitrocellulose filters used for the colony lift had been pre-soaked in 1% arabinose solution in order to induce transcription originating for the plasmid encoded promoter prior to cell lysis. Positive clones which bind to serum IgG, IgM, or IgA antibodies from chlamydia patients were

selected for further analysis by western blotting using the same pool of serum samples as used for the initial screening. This method led to the identification of clones encoding immunoreactive *C. trachomatis* proteins of vaccine and diagnostic relevance.

[0092] Thirdly, a genomic expression library was constructed in *E. coli* phage lambda gt11 (λ gt11). High-molecular-weight chromosomal DNA of *C. trachomatis* serovar D was extracted from elementary bodies in a lysis buffer containing SDS (1%) and Proteinase K (10 μ g/ml) followed by phenol extraction and ethanol precipitation. DNA was partially degraded by sonication and DNA fragments of 0.2-0.8 kb in size were ligated into λ gt11. The ligation mixture was packaged in vitro and the recombinant phages were plated on *E. coli* Y1090r- yielding a genomic expression library containing approximately 3.4×10^5 primary lambda phages. This primary library was amplified to resulting in a genome random expression library with 6.7×10^9 PFU/ml. In a first experiment, this library was screened by a plaque-lift method using the same pool of human serum samples as used above for the screening of the full-length expression library. Eighty-eight immuno reactive plaques binding to *C. trachomatis*-specific IgG, IgM, or IgA antibodies were identified. These plaques were pooled into eight pools (two pools of IgA reactive plaques, five pools of IgG reactive plaques and one pool of IgM reactive plaques) and rescreened with the same serum-pool (primary antibody) as used in the initial screening. Individual sero reactive phage plaques were isolated and the sequences of the DNA inserts of individually sero reactive phages were determined. This method identified a several clones encoding specific *C. trachomatis* immunoreactive peptides of vaccine and diagnostic relevance. Lastly, animal models of the disease have been established in small rodent in order to identify antigens which are recognized by the murine immunesystem during an experimental *Chlamydia* infection or provides at least partial immunity against a challenge infection. Different *chlamydia* species exhibit a high degree of specificity towards their natural host. Thus, *C. trachomatis* serovar D used in the different screening strategies described above is a human pathogen, which does not cause pathological changes in mice as normally associated with the human infection. On the other hand, mice can be experimentally infected with the closely related *Chlamydia muridarum* MoPn strain, and several researchers have previously demonstrated induction of partial immunity against experimental MoPn infection. A genital infection model has therefore been established and validated in C57 mice. The protective efficacy of different antigens was studied in this model by evaluating 1) bacterial counts by cervical swaps, 2) pathological changes in the genital tract, and 3) cellular in vitro assays for immune reactive cells.

TABLE 1

<i>Chlamydia</i> antigens		
<i>Chlamydia</i> antigen	Protein sequence	DNA sequence
CT043	SEQ ID NO. 1	SEQ ID NO. 2
CT511	SEQ ID NO. 3	SEQ ID NO. 4
CT521	SEQ ID NO. 5	SEQ ID NO. 6
CT616	SEQ ID NO. 7	SEQ ID NO. 8
CT803	SEQ ID NO. 9	SEQ ID NO. 10
CT067	SEQ ID NO. 11	SEQ ID NO. 12
CT679	SEQ ID NO. 13	SEQ ID NO. 14
CT583	SEQ ID NO. 15	SEQ ID NO. 16

TABLE 1-continued

<i>Chlamydia</i> antigens		
<i>Chlamydia</i> antigen	Protein sequence	DNA sequence
CT603	SEQ ID NO. 17	SEQ ID NO. 18
CT026	SEQ ID NO. 19	SEQ ID NO. 20
CT093	SEQ ID NO. 21	SEQ ID NO. 22
CT357	SEQ ID NO. 23	SEQ ID NO. 24
CT659	SEQ ID NO. 25	SEQ ID NO. 26
CT111	SEQ ID NO. 27	SEQ ID NO. 28
CT509	SEQ ID NO. 29	SEQ ID NO. 30
CT587	SEQ ID NO. 31	SEQ ID NO. 32
CT023	SEQ ID NO. 33	SEQ ID NO. 34
CT025	SEQ ID NO. 35	SEQ ID NO. 36
CT078	SEQ ID NO. 37	SEQ ID NO. 38
CT082	SEQ ID NO. 39	SEQ ID NO. 40
CT118	SEQ ID NO. 41	SEQ ID NO. 42
CT174	SEQ ID NO. 43	SEQ ID NO. 44
CT003	SEQ ID NO. 45	SEQ ID NO. 46
CT005	SEQ ID NO. 47	SEQ ID NO. 48
CT027	SEQ ID NO. 49	SEQ ID NO. 50
CT032	SEQ ID NO. 51	SEQ ID NO. 52
CT008	SEQ ID NO. 53	SEQ ID NO. 54
CT016	SEQ ID NO. 55	SEQ ID NO. 56
CT028	SEQ ID NO. 57	SEQ ID NO. 58
CT035	SEQ ID NO. 59	SEQ ID NO. 60
CT141	SEQ ID NO. 61	SEQ ID NO. 62
CT643	SEQ ID NO. 63	SEQ ID NO. 64
CT414	SEQ ID NO. 65	SEQ ID NO. 66
CT874	SEQ ID NO. 67	SEQ ID NO. 68
CT456	SEQ ID NO. 69	SEQ ID NO. 70
CT681	SEQ ID NO. 71	SEQ ID NO. 72
CT123	SEQ ID NO. 73	SEQ ID NO. 74
CT125	SEQ ID NO. 75	SEQ ID NO. 76
CT126	SEQ ID NO. 77	SEQ ID NO. 78
CT133	SEQ ID NO. 79	SEQ ID NO. 80
CT150	SEQ ID NO. 81	SEQ ID NO. 82
CT175	SEQ ID NO. 83	SEQ ID NO. 84
CT376	SEQ ID NO. 85	SEQ ID NO. 86
CT083	SEQ ID NO. 87	SEQ ID NO. 88
CT089	SEQ ID NO. 89	SEQ ID NO. 90
CT155	SEQ ID NO. 91	SEQ ID NO. 92
CT168	SEQ ID NO. 93	SEQ ID NO. 94
CT184	SEQ ID NO. 95	SEQ ID NO. 96
CT124	SEQ ID NO. 97	SEQ ID NO. 98
CT336	SEQ ID NO. 99	SEQ ID NO. 100
CT342	SEQ ID NO. 101	SEQ ID NO. 102
CT842	SEQ ID NO. 103	SEQ ID NO. 104
CT323	SEQ ID NO. 105	SEQ ID NO. 106
CT080	SEQ ID NO. 107	SEQ ID NO. 108
CT084	SEQ ID NO. 109	SEQ ID NO. 110
CT110	SEQ ID NO. 111	SEQ ID NO. 112
CT119	SEQ ID NO. 113	SEQ ID NO. 114
CT541	SEQ ID NO. 115	SEQ ID NO. 116
CT443	SEQ ID NO. 117	SEQ ID NO. 118
CT795	SEQ ID NO. 119	SEQ ID NO. 120
CT396	SEQ ID NO. 121	SEQ ID NO. 122
CT283	SEQ ID NO. 123	SEQ ID NO. 124
CT051	SEQ ID NO. 125	SEQ ID NO. 126
CT002	SEQ ID NO. 185	SEQ ID NO. 186
CT009	SEQ ID NO. 187	SEQ ID NO. 188
CT015	SEQ ID NO. 189	SEQ ID NO. 190
CT030	SEQ ID NO. 191	SEQ ID NO. 192
CT048	SEQ ID NO. 193	SEQ ID NO. 194
CT061	SEQ ID NO. 195	SEQ ID NO. 196
CT063	SEQ ID NO. 197	SEQ ID NO. 198
CT068	SEQ ID NO. 199	SEQ ID NO. 200
CT071	SEQ ID NO. 201	SEQ ID NO. 202
CT115	SEQ ID NO. 203	SEQ ID NO. 204
CT678	SEQ ID NO. 205	SEQ ID NO. 206
CT561	SEQ ID NO. 207	SEQ ID NO. 208
CT538	SEQ ID NO. 209	SEQ ID NO. 210
CT582	SEQ ID NO. 211	SEQ ID NO. 212
CT875	SEQ ID NO. 213	SEQ ID NO. 214
CT322	SEQ ID NO. 215	SEQ ID NO. 216
CT112	SEQ ID NO. 217	SEQ ID NO. 218

TABLE 1-continued

<u>Chlamydia antigens</u>		
<i>Chlamydia</i> antigen	Protein sequence	DNA sequence
CT315	SEQ ID NO. 219	SEQ ID NO. 220
CT610	SEQ ID NO. 221	SEQ ID NO. 222
CT147	SEQ ID NO. 223	SEQ ID NO. 224
CT228	SEQ ID NO. 225	SEQ ID NO. 226
CT232	SEQ ID NO. 227	SEQ ID NO. 228
CT614	SEQ ID NO. 229	SEQ ID NO. 230
CT098	SEQ ID NO. 231	SEQ ID NO. 232
CT265	SEQ ID NO. 233	SEQ ID NO. 234
CT375	SEQ ID NO. 235	SEQ ID NO. 236
CT004	SEQ ID NO. 237	SEQ ID NO. 238
CT038	SEQ ID NO. 239	SEQ ID NO. 240
CT040	SEQ ID NO. 241	SEQ ID NO. 242
CT052	SEQ ID NO. 243	SEQ ID NO. 244
CT053	SEQ ID NO. 245	SEQ ID NO. 246
CT201	SEQ ID NO. 247	SEQ ID NO. 248
CT245	SEQ ID NO. 249	SEQ ID NO. 250
CT246	SEQ ID NO. 251	SEQ ID NO. 252
CT405	SEQ ID NO. 253	SEQ ID NO. 254
CT420	SEQ ID NO. 255	SEQ ID NO. 256
CT426	SEQ ID NO. 257	SEQ ID NO. 258
CT507	SEQ ID NO. 259	SEQ ID NO. 260
CT512	SEQ ID NO. 261	SEQ ID NO. 262
CT513	SEQ ID NO. 263	SEQ ID NO. 264
CT514	SEQ ID NO. 265	SEQ ID NO. 266
CT516	SEQ ID NO. 267	SEQ ID NO. 268
CT316	SEQ ID NO. 269	SEQ ID NO. 270
CT439	SEQ ID NO. 271	SEQ ID NO. 272
CT492	SEQ ID NO. 273	SEQ ID NO. 274
CT520	SEQ ID NO. 275	SEQ ID NO. 276
CT523	SEQ ID NO. 277	SEQ ID NO. 278
CT526	SEQ ID NO. 279	SEQ ID NO. 280
CT611	SEQ ID NO. 281	SEQ ID NO. 282
CT613	SEQ ID NO. 283	SEQ ID NO. 284
CT626	SEQ ID NO. 285	SEQ ID NO. 286
CT630	SEQ ID NO. 287	SEQ ID NO. 288
CT647	SEQ ID NO. 289	SEQ ID NO. 290
CT649	SEQ ID NO. 291	SEQ ID NO. 292
CT725	SEQ ID NO. 293	SEQ ID NO. 294
CT734	SEQ ID NO. 295	SEQ ID NO. 296
CT779	SEQ ID NO. 297	SEQ ID NO. 298
CT801	SEQ ID NO. 299	SEQ ID NO. 300
CT833	SEQ ID NO. 301	SEQ ID NO. 302
CT835	SEQ ID NO. 303	SEQ ID NO. 304
CT836	SEQ ID NO. 305	SEQ ID NO. 306
CT845	SEQ ID NO. 307	SEQ ID NO. 308

TABLE 2

<u>Chlamydia antigenic fragments</u>		
Peptide fragment	Amino acid sequence	DNA sequence
CT541-PF1 (aa pos. 111-243)	SEQ ID NO. 127	SEQ ID NO. 128
CT443-PF1 (aa pos. 214-291)	SEQ ID NO. 129	SEQ ID NO. 130
CT795-PF1 (aa pos. 1-163)	SEQ ID NO. 131	SEQ ID NO. 132
CT396-PF1 (aa pos. 170-318)	SEQ ID NO. 133	SEQ ID NO. 134
CT842-PF1 (aa pos. 433-515)	SEQ ID NO. 135	SEQ ID NO. 136
CT283-PF1 (aa pos. 477-577)	SEQ ID NO. 137	SEQ ID NO. 138
CT874-PF1 (aa pos. 330-426)	SEQ ID NO. 139	SEQ ID NO. 140
CT051-PF1 (aa pos. 38-177)	SEQ ID NO. 141	SEQ ID NO. 142
CT141-PF1 (aa pos. 17-126)	SEQ ID NO. 143	SEQ ID NO. 144
CT643-PF1 (aa pos. 769-841)	SEQ ID NO. 145	SEQ ID NO. 146
CT681-PF1 (aa pos. 156-391)	SEQ ID NO. 147	SEQ ID NO. 148
CT681-PF2 (aa pos. 199-329)	SEQ ID NO. 149	SEQ ID NO. 150
CT681-PF3 (aa pos. 294-349)	SEQ ID NO. 151	SEQ ID NO. 152
CT414-PF1 (aa pos. 605-722)	SEQ ID NO. 153	SEQ ID NO. 154
CT414-PF2 (aa pos. 463-530)	SEQ ID NO. 155	SEQ ID NO. 156
CT456-PF1 (aa pos. 695-840)	SEQ ID NO. 157	SEQ ID NO. 158
CT456-PF2 (aa pos. 137-229)	SEQ ID NO. 159	SEQ ID NO. 160

TABLE 2-continued

<u>Chlamydia antigenic fragments</u>		
Peptide fragment	Amino acid sequence	DNA sequence
CT456-PF3 (aa pos. 243-321)	SEQ ID NO. 161	SEQ ID NO. 162
CT456-PF4 (aa pos. 209-291)	SEQ ID NO. 163	SEQ ID NO. 164
CT456-PF5 (aa pos. 175-279)	SEQ ID NO. 165	SEQ ID NO. 166
CT456-PF6 (aa pos. 567-730)	SEQ ID NO. 167	SEQ ID NO. 168
CT456-PF7 (aa pos. 210-540)	SEQ ID NO. 169	SEQ ID NO. 170
CT456-PF8 (aa pos. 190-279)	SEQ ID NO. 171	SEQ ID NO. 172
CT521-PF1 (aa pos. 14-36)	SEQ ID NO. 173	SEQ ID NO. 174
CT521-PF2 (aa pos. 40-62)	SEQ ID NO. 175	SEQ ID NO. 176
CT521-PF3 (aa pos. 52-75)	SEQ ID NO. 177	SEQ ID NO. 178
CT521-PF4 (aa pos. 66-88)	SEQ ID NO. 179	SEQ ID NO. 180
CT521-PF5 (aa pos. 116-138)	SEQ ID NO. 181	SEQ ID NO. 182
CT504-PF1 (reverse)	SEQ ID NO. 183	SEQ ID NO. 184

FIGURE LEGENDS

[0093] FIG. 1

[0094] Cellular reactivity to a *C. trachomatis* serovar D lysate. IFN γ responses of PBMC's isolated from 6 control donors and 15 patients. PBMC's were stimulated with 5 μ g/ml of a *C. Trachomatis* lysate and IFN γ release was determined 5 days later in the supernatants.

[0095] FIG. 2

[0096] Protein fractions of *C. trachomatis* serovar D. A lysate from the bacteria was separated into narrow-molecular fractions by the multielution technique. The fractions were analysed by SDS-PAGE and silver staining. The migration of molecular weight markers is shown at the right (lane 1) in kilodaltons. The lysate is shown in the third and last lanes.

[0097] FIG. 3

[0098] Human T cell recognition of *C. trachomatis* serovar D protein fractions. PBMC's isolated from 8 *Chlamydia* patients (responding to the whole lysate >1000 pg/ml) and 6 control donors were stimulated with 2 μ g/ml of the individual fractions. The release of IFN γ were measured in the supernatants 5 days later. Short line indicates the mean IFN γ release.

[0099] FIG. 4

[0100] T cell responses to recombinant proteins in 4 patients and 3 controls. PBMC's were stimulated with 5 μ g/ml of rCT521, rCT511, rCT616, rCT043 and rCT803. Values shown means of IFN γ for triplicate cultures.

[0101] FIG. 5

[0102] The recognition of rCT521 in 41 chlamydia patients (all responding to a *C. trachomatis* serovar D lysate with more than 1500 pg/ml of IFN γ), and 11 control donors responding with less than 1500 pg/ml of IFN γ to the lysate. PBMC's were stimulated with rCT521 (5 μ g/ml) and a pool of overlapping CT521 peptides (10 μ g/ml each) and the level of IFN γ were measured in the supernatants. C: Control wells without antigen. Short Lines indicate the mean IFN γ (pg/ml).

[0103] FIG. 6

[0104] IFN γ release stimulated with CT521 peptides (10 μ g/ml). Short lines indicate the mean IFN γ release for each peptide. Cut off is set to 200 pg/ml IFN γ (line).

[0105] FIG. 7

[0106] IFN γ release by PBMC transduced with different recombinant Adenovirus encoding *C. trachomatis* antigens. Patient PBMC were transduced with indicated Adenovirus at a multiplicity of infection of 1, and IFN γ release was determined at day two. AdVaMock indicates activity of a transduced Adenovirus without insert.

- [0107] FIG. 8
 [0108] Inclusion Forming Units at PID7 and PID14
 [0109] FIG. 9
 [0110] Hydrosalpinx scores at PID49
 [0111] FIG. 10
 [0112] T cell responses to *C. Trachomatis* proteins (FIG. 10a-10i). The proteins were tested in 10 patients (●) and 5 controls (□). C, cell cultures without antigen. Values shown are median and 75 and 25% percentiles.
 [0113] FIG. 11
 [0114] T cell responses to *C. Trachomatis* proteins where 5 or more patients responds with a level of IFN- γ above all controls. The proteins were tested in 10 patients (●) and 5 controls (□). C, cell cultures without antigen. Values shown are median and 75 and 25% percentiles.
 [0115] FIG. 12
 [0116] Antigen specific responses by blood lymphocytes 1 week after the last immunization. The IFN- γ response were measured in cell cultures pooled from 10 animals. Each bar represents the means of triplicate values $\pm$ standard deviation.
 [0117] FIG. 13
 [0118] Inclusion forming units 7, 14 and 21 days post infection in C3H/HeN mice. The values are shown as log 10 IFU/ml. All values represents the mean of 10 animals $\pm$ Standard error of the mean.
 [0119] FIG. 14.
 [0120] Serum reactivity against immunogen measured by ELISA measured as dilution at OD=1.0. Each point represents a mean of 4 animals $\pm$ standard error of the mean.
 [0121] FIG. 15:
 [0122] Specific serum reactivity against whole elementary bodies lysates from either *Chlamydia muridarum* (MoPn EB's) or *Chlamydia trachomatis* (Serovar D EB's). Positives are marked by a red dot. Positives are bands with size in agreement with theoretical size.
 [0123] FIG. 16
 [0124] Antigen specific responses by splenocytes 3 weeks after the last immunization. The IFN- γ response were measured in cell cultures from 4 individual animals. Each bar represents the means of triplicate values $\pm$ standard deviation.

EXAMPLES

Example 1

Identification of Human T Cell Antigens of *C. Trachomatis* Serovar D Introduction

[0125] We have analysed the human T cell responses to *C. trachomatis* proteins using narrow molecular weight fractions derived from complex protein mixtures separated by SDS-PAGE followed by electroelution. This technique enable direct analysis of the immune response and making comparison of stimulatory protein fractions possible. This has led to the identification of a number of stimulatory protein fractions and identification of T cell targets. Further evaluation of these T cell targets have been done using recombinant technologies and overlapping peptides spanning the entire sequence of the protein.

Materials and Methods

Microorganism and Cultivation

[0126] *C. Trachomatis* serovar D (strain UW-3/Cx) was propagated in Hela 229 cells (ATCC, Rockville, Md., USA). The cells were cultivated in passage medium RPMI 1640 (Gibco BRL, Grand Island, N.Y., USA) containing 5% fetal

calf serum (Gibco BRL; heat inactivated), 1% v/v Hepes, 1% v/v L-glutamine, 1% v/v pyruvate and 10 μ g/ml gentamycin. [0127] Semiconfluent monolayers of Hela 229 cells in 175 cm² flasks were pre-treated for 15 minutes at RT with DEAE-dextran (45 μ g/ml in HBSS) and infected with one inclusion forming unit per cell of *C. trachomatis* serovar D in 3 ml HBSS. The flasks were incubated on a plate rocker for 2 h at 37° C. After 2 h 50 ml passage medium RPMI 1640 supplemented with 5% glucose and 1 μ g/ml cycloheximid were added pr. flask and the cells were further incubated for 72 h in an atmosphere of 5% CO₂ in humidified air.

Harvesting of *C. Trachomatis*

[0128] Chlamydiae were harvested 72 h post infection. The cells were dislodged from the flasks with a cell scraper and centrifuged 30 minutes at 35,000 g and 4° C. The pellets were resuspended in 5 ml HBSS per flask, sonicated on ice and centrifuged at 500 g and 4° C. for 15 minutes. The supernatant was collected and saved on ice and the pellet was resuspended to same volume as before and sonication and centrifugation were repeated. The two supernatants were pooled and centrifuged 30 minutes at 30000 g and 4° C. and the pellet resuspended with a needle and syringe in a SPG buffer (3 ml/T175). After a brief sonication the suspension was gently layered over a 30% Diatrizoate solution (50 g Meglumine diatrizoate, 7.7 g Sodium diatrizoate in 76 ml H₂O) and centrifuged at 40,000 g for 30 min. After centrifugation the pellet were resuspended in SPG buffer and stored at -70° C.

Preparation of *C. Trachomatis* Lysate for Fractionation

[0129] A quantity of 6-8 mg of *C. trachomatis* was centrifuged 30000 g for 30 minutes and the pellet was resuspended 1:1 in WFI and samplebuffer/DTT and boiled for 5 minutes. After 2x12 sec. of sonication the suspension was centrifuged 30000 g for 30 minutes. The supernatant was stored at -70° C. until use.

Fractionation of *C. trachomatis* lysate *C. trachomatis* lysate was fractionated as described by Andersen and Heron (1993). Briefly, *C. trachomatis* lysate in a quantity of around 6-8 mg of protein was separated by SDS-page (10 to 20% gel) overnight (11-cm-wide center well, 0.75-mm gel). Gels preequilibrated in elution buffer (ammonia Caps buffer pH 10.2) were transferred to a Multi-Eluter and electroeluted for 20 min. The protein fractions were aspirated and analysed by separation on SDS 10-20% polyacrylamide gels followed by silver staining (Blum and Gross 1987). The protein concentration in the fractions was estimated by the Micro BCA method (Pierce, Oud-beijerland, The Netherlands). 0.5 ml of all fractions were stabilized by 0.5% human AB serum and kept frozen at -70° C. until use. The rest was stored at -70° C. without serum in order to be used for mass spectrometry analysis

Mass Spectrometry Analysis

[0130] Samples for peptide mass mapping were cut out of a silver stained SDS-PAGE gel. The band was washed, dried, reduced and alkylated with iodoacetamide before being digested overnight by modified trypsin essentially as described by Shevchenko et al, 1998.

Donors

[0131] Patients diagnosed with *Chlamydia* at Bispebjerg hospital, Denmark were asked to participate in the study and

to give a blood sample before initiation of antibiotic therapy. Control subjects with no records of *Chlamydia* infections were also asked to participate in the study. Samples from individual patients were annotated with a unique identifiable annotation by assigning a running number, either M or K for male or female, and optionally A, B, C . . . for 1st, 2nd, 3rd, . . . sample collected from the particular patient. In all cases, the A sample were collected before any treatment was initiated. For example, 12 MB denotes the second sample taken from the male patient number 12. Control samples were annotated KK-xx.

Lymphocyte Preparation and Cell Culture

[0132] Peripheral blood mononuclear cells (PBMC's) were separated from whole blood by lymphoprep (Nycomed A/S, Oslo, Norway) density gradient centrifugation and frozen in liquid nitrogen until use. PBMC were thawed and resuspended in RPMI 1640, supplemented with 1% penicillin/streptomycin, 1% nonessential amino acids, 1% glutamine (Gibco), 1% pyrovat, 1% heepes and 10% human AB Serum (local blood bank, Rigshospitalet, Copenhagen). The viability and number of cells were determined by Nigrosin staining. The cells were cultured in triplicates in round-bottom microtiter plates (Nunc, Roskilde, Denmark) at 1.25×10^5 cells/well in a total volume of 100 μ l. On the basis of initial dose-response studies, antigens were added in the following concentrations: SvD lysate: 2 μ g/ml, SvD fractions 2 μ g/ml, rCT521 5 μ g/ml, CT521 overlapping peptides 10 μ g/ml. Phytohemagglutinin (PHA, 2 μ g/ml) was used as a positive control an cell cultures without antigen were included as a negative control. After 5 days of incubation at 37°C. in humidified air (5% CO₂ and 95% air), the supernatants were harvested.

IFN γ Assay

[0133] The amount of IFN γ in the supernatants were determined by ELISA with commercially available antibodies (Endogen) and used according to the manufacturer's instructions. Recombinant IFN γ was used as a standard (Endogen).

Overlapping Peptides

[0134] 10 synthetic 22-23 mer peptides (9-12 aa overlap) covering the complete primary sequence of CT521 were synthesized by solid phase methods (Schafer-N).

Production of *C. Trachomatis* Antigens in *E. Coli*.

[0135] The CT genes encoding antigens identified by mass-spectrometry were cloned inframe with the NH₂-terminal (His)₆ sequence of the pDEST17 vector according to the Gateway Cloning Technology Manual (Invitrogen). For production of the recombinant *C. trachomatis* antigens, the plasmid vectors were cloned in the BL21-AI *E. coli* strain (Invitrogen) facilitating high-level recombinant protein production in the presence of arabinose.

Mini-Scale Purification of Recombinant *C. Trachomatis* Antigens.

[0136] Bacterial cell pellets were suspended in 10 mM Imidazole, 20 mM NaH₂PO₄, 500 mM NaCl, 8M Urea, subjected to cell disruption by BeadBeater according to manufacturer's instructions (BioSpec Products, Inc.), following incubation with gentle shaking at room temperature for 1 h. The cleared supernatant was applied on a HisTrap column

(Pharmacia Biotech), washed and eluted with 0.5M Imidazole, 20 mM NaH₂PO₄, 500 mM NaCl, 8M Urea. The eluted sample was separated by electrophoresis on a preparative SDS-PAGE. The recombinant polypeptide of interest was identified by Coomassie-Blue stain, cut out and electro eluted from the gel piece using the Model 422 Electro-Eluter according to Instruction manual (BioRad). The electro eluted recombinant antigen was precipitated in 80%-95% Acetone (Aldrich HPLC grade), washed in 95% Ethanol, and resuspended in a minimal volumen of 10 mM Imidazole, 20 mM NaH₂PO₄, 500 mM NaCl, 8M Urea. The sample was finally dialysed to 50 mM Tris pH 7.5; 150 mM NaCl, 40% glycerol and stored at -20°C.

Results:

[0137] T cell Response to a *Chlamydia* Lysate

[0138] *Chlamydia* patients were screened for their T cell recognition of a *C. Trachomatis* serovar D lysate harvested 72 h post infection of Hela cells. The lysate represents a mixture of all the components of the bacteria and cover the whole antigen repertoire of the bacteria. This preparation was used to stimulate PBMCs from 15 *Chlamydia* patients and 6 control donors (FIG. 1). The response to the lysate was associated with a pronounced level of IFN γ (>1000 pg/ml) in 8 out of 15 patients. Only one control donor responded to the lysate with more than 1000 pg/ml of IFN γ .

Chlamydia Patients Recognize Multiple Antigens

[0139] The specificity of the T cell response was investigated by stimulating PBMCs with protein fractions obtained by the multielution technique. The technique was used on the lysate and resulted in narrow fractions with a minimal overlap between neighbouring fractions (FIG. 2). The numbers of polypeptides in each fraction are estimated to be 10 to 30. Such a panel of fractions was used to screen the antigen recognition patterns of the 8 patients responding to the whole lysate and the 6 control donors (FIG. 3). The cellular response to the fractions showed that the response was directed to multiple antigens. Peak production of IFN γ was however observed in the molecular mass regions 5-12, 16-20, 25-35 and 58-74 KDa.

Recognition of Recombinant Proteins by *Chlamydia* Patients

[0140] An SDS page was run with fraction 7 and the neighbouring fractions 6 and 8 covering the molecular mass region 16-20 (FIG. 2), the gel was silverstained and the areas containing the fractions were cut out of the gel, placed in Milli Q water and sent to mass-spectrometry for protein identification. Six hits were identified: CT521, CT043, CT511, CT616, CT315 and CT803. Further more fraction 10, 11, 12, 13, 14 and 15 covering the molecular mass region 25-35 were sent to mass-spectrometry. Ten hits were identified: CT603, CT678, CT561, CT610, CT538, CT582, CT583, CT679, CT067, CT681. Fraction 22 covering the molecular mass region 58-74 was sent to mass-spectrometry. Three hits were identified CT875, CT110, CT112. Finally a fraction 18 was sent to mass spectrometry and 2 hits were identified: CT587 and CT322.

[0141] The recombinant proteins, rCT043, rCT511, rCT521, rCT616, rCT803, were purified from *E. coli* and the immunological activities of the 5 *C. trachomatis* proteins were investigated in 4 patients 1KA, 15KA, 7KA and 12KA (FIG. 4). rCT521 was the most promising antigen out of the 4

tested. Three out of 4 patients (1KA, 7KA and 15KA) responded strongly (>1000 pg/ml) to rCT521 compared to the control donors. rCT803, rCT511 and rCT616 induced high levels of IFN γ in two (1KA, 7KA) out of four patients whereas rCT043 induced low levels of IFN γ in all patients. The recombinant proteins CT043, CT511, CT603, CT561, CT610, CT583, CT679, CT067, CT681 CT875, CT110, CT112 CT587 and CT322 were produced in E-coli and tested for T cell recognition in 10 patient and 5 controls (Example 8)

CT521 Recognition by *Chlamydia* Patients

[0142] The recognition of CT521 by *Chlamydia* infected patients were tested in a larger panel of donors. A total of 41 chlamydia patients all responding to a *Chlamydia* lysate with more than 1500 pg/ml of IFN γ were tested for recognition of CT521. In addition 11 control donors responding with less than 1500 pg/ml of IFN γ to the lysate were included (FIG. 5). Patients could be divided into CT521 positive and CT521 negative on the basis of IFN γ responses exceeding 500 pg/ml. 34 out of the 41 patients were CT521 positive (82.9%) whereas only two out of 11 controls responded to CT521 (18.2%). These results demonstrate that CT521 is frequently recognized by *Chlamydia* patients responding to the whole *Chlamydia* lysate.

Fine Specificity of the T Cell Response to CT521 Mapped by Synthetic Peptides

[0143] The fine specificity of the T cell responses to CT521 was mapped by screening a panel of overlapping peptides covering the complete CT521 sequence. The peptides were synthesized as 22-23 mers with 9-12 amino acid overlap and were used to stimulate PBMC from 41 *Chlamydia* patients and 11 controls (FIG. 6). Even though the response was highly heterogeneous certain hierarchy existed with certain regions being strong targets for the response. Epitopes present in the N-terminal part of the protein (aa14 to aa36), the central part (aa40 to aa88), and in the C-terminal part (aa116 to aa138) of the protein were more strongly or more frequently recognized than the others.

Example 2

Directed Library Strategy (Screening for Antibody Targets)

Introduction

[0144] A High Throughput approach was taken to test for serum reactive antigens in the *C. trachomatis* serovar D genome. A full length library was constructed of the first 200 Open Reading Frames (ORFs). This library was designed to express the antigens recombinantly in *Escherichia coli*. For screening of this library, we used a pool of serum from 5 high responding patients which were selected based on their reactivity towards a whole *C. trachomatis* Elementary Body (EB) extract by Western blot analysis.

Materials and Methods

Construction of Full Length Library

[0145] The genome of *C. trachomatis* serovar D is publicly available and the primary annotation was used as defined by Stephens et. al. (Stephens, Kalman et al. 1998). Genes Ct001 to Ct200 was selected for cloning. 5', and 3' primers for amplification of the specific genes was designed by a "in

house" software. The full length sequences of the 200 specific *C. trachomatis* genes were cloned into the Entry Vector, pDONR 201 (Invitrogen), which enable to clone the genes of interest into different destination vectors of the Gateway cloning system (Invitrogen). The pDEST17 destination vector was used for expression of the recombinant *C. trachomatis* protein in *E. coli* with a 6 $\times$ Histidine affinity tag. The bacterial host was BL21-AITM for production of the recombinant *C. trachomatis* proteins by induction with arabinose.

Expression

[0146] 2*96 Deep Well plates containing 1 ml cultures of were grown over night at 37° C. The culture was diluted to OD₆₀₀=0.1 and incubated at 37° C. with shaking (180 rpm) until OD₆₀₀=0.5 was reached then the culture was induced by adding L-arabinose to a final concentration of 0.2%. After 4 hours of induction the cultures were put on ice and the bacterial pellet was collected by centrifugation (3,000 g/20 min.). Pellets were kept in the fridge until results from the colony blot was obtained.

Patient Serum

[0147] Serum from five positive *C. trachomatis* patients, 3KA, 11KA, 12KA, 13KA, and 17KA, was selected for preparing a patient serum pool to be used in the library screening. These patient sera were selected by their specific and high reactivity against *C. trachomatis* serovar D elementary body extract in Western blot analyses using alkaline phosphatase conjugated rabbit anti-human -IgA, -IgG, and -IgM, respectively, as secondary detection marker (DakoCytomation, Denmark).

[0148] The patient serum pool (diluted 10 times) was pre-treated with total *E. coli* protein extract at 2 mg/ml for 3 h at room temperature. The working patient pool serum was 1:200 in 10 mM Tris-HCl, pH 8, 150 mM NaCl, 0.05% Tween20 (TBST).

Colony Blot

[0149] Screening of the full length *E. coli* expression library was basically performed according to French et al. (1986). Bacterial cultures (1 ml) encoding the C001-Ct200 and selected genes throughout the genome were grown over night at 37° C. in two 96 Deep Well plates. Using a (6 $\times$ 8) gripper tool, the bacterial cultures were transferred to Petri dishes containing LB-agar (containing 10 ug/ml ampicillin). The colonies were left over night at 30° C. The colonies were replicated onto a nitrocellulose membrane presoaked in 1% L-arabinose and transferred to new LB-agar plates (with 100 ug/ml ampicillin and 0.2% L-arabinose) with the colony side down. The plates were incubated at 37° C. for 4 hours and finally the membranes were transferred to an empty Petri dish with colony side up for 15 min over a filter paper presoaked in chloroform, thereby exposing the bacteria to chloroform vapor. The membranes were incubated over night in lysis buffer containing lysozyme and DNase. After repeated washing steps the membranes were incubated with primary antibody (working patient pool serum) for 2 hours at room temperature. The membranes were washed repeatedly (4 times with excess 1 $\times$ TBST) before incubating in secondary antibody for 1 h. The second antibody was either:

[0150] A. Rabbit anti human IgG (DO336) DakoCytomation

[0151] B. Rabbit anti human IgA (DO338) DakoCytomation

- [0152] C. Rabbit anti human IgM (DO337) DakoCytomation
 [0153] or
 [0154] D. A pool of Rabbit anti human IgG (DO336) and Rabbit anti human IgA (DO338)
 [0155] All conjugated to alkaline phosphatase.
 [0156] After a second washing in 1×TBST, the membranes were developed by BCIP/NBT substrate (Sigma Fast).
 [0157] Positive clones were selected in all categories (IgG, IgA and IgM).

Western Blot of Clones Positive in Colony Blot

[0158] Bacterial pellets from the 1 ml cultures were resuspended in 200 µl SDS-PAGE sample buffer and heated to 95° C. for 5 min, electrophoresed by SDS-PAGE and transferred to nitrocellulose by standard Western blotting method. The membranes were incubated with the same patient serum pool and a pool of the secondary antibodies (A-C) as described above. As a control for protein induction a replicate membrane was incubated with anti Penta-His antibody and processed according to the manufacturer's instructions (Qiagen). Two colonies that did not react in the colony blot were included as controls.

Results:

[0159] The identity of the CT antigens recognized by patient serum in the bacterial colony screening approach is:

Antigen	IgG	IgA	IgM	Western Blot
Ct080		+		++
Ct084			+++	+
Ct089	++			++
Ct110	+++	++		+
Ct115	++	++		+
Ct118	++			+
Ct119	++			+++
Ct125		+	++	++
Ct147		+		++
Ct155	+++	+++		-
Ct168		+		+
Ct174		++		++
Ct184		+		++
Ct228		+		++
Ct232	+			+
Ct614		+		+
Ct795	+++	+++		+++

where +, ++, +++, and -, indicate relative "visual intensity of reactivity" when analysed on colony blot or by Western blot.

Example 3

Random Library Strategy

Introduction

[0160] In order to screen for serum reactive antigen in the *C. trachomatis* serovar D genome, a random expression library was constructed in the expression vector %gt11. This library was designed to express randomly *C. trachomatis* peptide fragments of 100-400 amino acid residues fused inframe with the β-galactosidase. The library was screened with serum from patients which were selected based on their

reactivity towards a whole *C. trachomatis* Elementary Body (EB) extract by Western blot analysis.

Materials and Methods

[0161] Isolation of High Molecular Weight *C. trachomatis* Serovar D Genomic DNA.

[0162] A crude *C. trachomatis* serovar D elementary body preparation containing $\sim 8.6 \times 10^9$ IFU (infectious units) was further purified by 44-54% Diatrizoate solution step density gradient ultracentrifugation at 40,000×g for 60 min. The elementary bodies banded at the 54% interface were collected, diluted in 10 volumes SPG buffer (250 mM Sucrose; 10 mM Na₂HPO₄; 5 mM L-Glutamic acid), and precipitated by centrifugation at 30,000×g for 30 min. The elementary body pellet was resuspended in 5 ml TENS buffer (50 mM Tris pH 9; 100 mM EDTA; 200 mM NaCl; 1% SDS) and incubated with 100 µg/ml Proteinase K at 37° C. for 60 min. The sample was diluted once in TENS buffer and the nucleic acids were purified by phenol/chloroform extraction and ethanol precipitation (Maniatis et al., 1987). RNA was removed by treatment with 25 U/ml RNaseT1 and RNaseA cocktail (Stratagene) at 37° C. for 60 min followed by another phenol/chloroform extraction and ethanol precipitation. The *C. trachomatis* serovar D genomic DNA preparation was resuspended in TE at 0.4 µg/ul and an aliquot was tested by agarose gel electrophoresis and shown to contain high molecular weight DNA >>50 kb.

Construction of Whole-*C. Trachomatis*-Genome Random Expression Library.

[0163] The generation of random *C. trachomatis* genomic DNA fragments by sonication was performed by placing a microcentrifuge tube containing 50 µg of DNA in 175 µl TM buffer (10 mM Tris pH8; 10 mM MgCl₂) into an ice-water bath placed in Soniprep150 sonicator (MSE). The microtip (1/8" Ø) was placed ~2 mm below the sample surface and sonication was performed continuously for 80 min at 15 microns amplitude. Under these conditions the genomic DNA was randomly fractionated to fragment size ranges of 0.05 to 1 kb when analysed by agarose gel electrophoresis. During the subsequent preparation of the sonicated CT genomic DNA phenol/chloroform extraction and ethanol precipitation steps are included when appropriate. End-repair and phosphorylation of 10 µg sonicated DNA fragments were performed in a combined incubation with T4 DNA polymerase, Klenow DNA polymerase and T4 polynucleotide kinase. Furthermore, the random fragmented CT genome DNA was subjected to EcoRI Methylase treatment prior to linker ligation with 50-fold molar excess phosphorylated EcoRI linker (12-mer, BioLabs). The DNA was treated with EcoRI and the final DNA preparation was size fractionated on a 6% acrylamide gel and fragments of 0.2-0.8 kb in size were eluted from the gel piece by incubation in 500 µl GES buffer (0.5M NH₄ Acetate; 10 mM MgAcetate; 0.1 mM EDTA; 0.1% SDS) at 42° C. over night. The cleared supernatant was ethanol precipitated twice, and the final pellet was resuspended in 10 µl TE. The DNA was ligated to EcoRI digested and dephosphorylated λgt11 phage vector arms (Stratagene). The ligation mix was packaged in vitro with Gigapack III Gold extracts according to the manufacturer's instructions (Stratagene). Recombinant phages were plated on *E. coli* Y1090r- and a total of ~340,000 primary lambda phages were generated of which ~60% were true recombinant phages

as judged by the blue/white color selection assay upon plating phages in the presence of IPTG and X-gal. The primary phage expression library was amplified at densities of approximately 3×10^4 PFU/135 mm Ø plate, collected and stored in aliquots in 7% v/v DMSO at -80°C . The titer of the amplified whole-*C. trachomatis*-genome random expression library was 6.7×10^9 PFU/ml.

Patient Serum

[0164] The patient pool serum used in the screening of the random expression library was identical to the previously described in Example 2.

Screening the Whole-*C. Trachomatis*-Genome Random Expression Library

[0165] The amplified λ gt11 expression library was absorbed to *E. coli* Y1090r- cells and plated at 5×10^4 - 10^5 PFU per 135 mm agar plate and incubated at 42°C . for $3\frac{1}{2}$ h. Plates are overlayed with dried nitrocellulose membrane filters (BioTrace NT, Pall Corporation) presaturated with 10 mM IPTG in H_2O and further incubated at 37°C . for additional $3\frac{1}{2}$ h. The filters were transferred to TBST containing 1.5% BSA and incubated at RT for 30 min, following incubation with 1:200 diluted patient pool serum at RT for 30 min. Excess patient serum is removed by 3 washings in TBST for 10 min each, following incubation with either alkaline phosphatase conjugated rabbit anti-human -IgA, -IgG, or -IgM at RT for 30 min. After final 3 washings in TBST for 10 min each, the filters were developed by BCIP/NBT substrate (Sigma Fast).

[0166] Positive immunoreactive plaque areas are collected in pools of 10 areas, titered, and rescreened at plating densities of 2.5 - 5×10^5 PFU per 135 mm agar plate for identification of individual positive plaques.

DNA Sequencing and Sequence Analysis.

[0167] The individual positive selected phage plaques were picked by pouncing the plaque area, suspended in 20 μl H_2O , vortexed for 10 sec and incubated at 37°C . for 15 min. The suspension was centrifuged in microfuge at maximum speed for 30 sec, and 4.5 μl of the cleared supernatant was used for PCR amplification using 2.5 pmol each of Forward primer, 5'-ccagccatcgccatctgctgcacg-3', and % gt11 EcoRI Reverse Primer (BioLabs) and one volume of Hot StarTaq Master Mix (Qiagen). The remaining phage suspension was diluted in 100 μl SM buffer and stored as phage stock at 4°C . with 25 μl CHCl_3 .

[0168] The PCR amplification was performed in a Gene Amp PCR System 9700 thermocycler (Applied Biosystem) at 95°C . for 15 min, and then 30 cycles at 95°C . for 1 min, 60°C . for 1 min, and 72°C . for 1 min. Four μl were tested by agarose gel electrophoresis. For sequencing the amplified DNA, the remaining 6 μl of PCR reaction is diluted five-fold and purified by MicroSpin S-300 HR columns according to the manufacturer's instructions (Amersham Biosciences). The sequencing was performed by the dideoxy chain termination method (contracted by MWG-BIOTECH, Germany) using either the sequencing primer, 5'-CACCAGAC-CACTGGTAATG-3', priming 28 bases downstream the EcoRI cloning site in the LacZ gene, or the 5'-GCCATCGC-CATCTGCTGCACG-3', priming 85 bases upstream the

EcoRI cloning site in the LacZ gene. Sequences were analysed with Vector NTI Suite software package (InforMax).

Results:

Identification of *C. Trachomatis* Sero-Reactive Antigens by Expression Library Screening.

[0169] The first screening of the *C. trachomatis* λ gt11 expression library using the pooled patient serum as primary antibody identified several immunoreactive plaque areas when using either anti-human IgA, -IgG, or IgM as secondary detection antibodies, respectively. In summary, 88 positive plaques areas were picked and pooled:

No. of plaque areas picked for rescreening:

Seroactive Class	# plaque hits	# pools for screening
IgA	24	2 pools á 12 plaque areas
IgG	50	5 pools á 10 plaque areas
IgM	14	1 pool á 14 plaque areas
Total	88	8 pools

[0170] The generated phage pools were rescreened using the same screening conditions as at the initial screening except that the plating density was much lower in order to enable identification of individual positive phage plaques. In summary, a total of 129 individual positive plaques were picked, annotated and used for direct sequence analyses and generation of phage stocks, respectively:

No. of individual picked positive plaques:

Sero reactive Class	# Individual plaques
IgA	41
IgG	79
IgM	9
Total	129

[0171] The identity of the insert expressed as P-galactosidase fusion in the individual isolated positive phages was identified by sequencing and Blast analysis (EMBL-EBI).

[0172] The identity of CT antigens were identified by screening the random expression library.

[0173] The sequences of a total of 103 individual plaques were determined and grouped in 22 unique sequence identities (PF=peptide fragment):

CT541-PF1 (aa pos. 111-243)
 CT443-PF1 (aa pos. 214-291)
 CT795-PF1 (aa pos. 1-163)
 CT396-PF1 (aa pos. 170-318)
 CT842-PF1 (aa pos. 433-515)
 CT283-PF1 (aa pos. 477-577)
 CT874-PF1 (aa pos. 330-426)
 CT051-PF1 (aa pos. 38-177)
 CT141-PF1 (aa pos. 17-126)

CT643-PF1 (aa pos. 769-841)
 CT681-PF1 (aa pos. 156-391)
 CT681-PF2 (aa pos. 199-329)
 CT681-PF3 (aa pos. 294-349)
 CT414-PF1 (aa pos. 605-722)
 CT414-PF2 (aa pos. 463-530)
 CT456-PF1 (aa pos. 695-840)
 CT456-PF2 (aa pos. 137-229)
 CT456-PF3 (aa pos. 243-321)
 CT456-PF4 (aa pos. 209-291)
 CT456-PF5 (aa pos. 175-279)
 CT456-PF6 (aa pos. 567-730)
 CT456-PF7 (aa pos. 71-180)
 CT456-PF8 (aa pos. 190-279)
 CT504-PF1

Example 5

Generation of Recombinant Adenovirus Encoding *C. Trachomatis* Antigens

Introduction

[0174] In order to explore an alternative delivery route of *C. trachomatis* antigens to target cells for screening for T-cell reactivity, we constructed and tested recombinant Adenovirus encoding the antigens by direct transduction of patient PBMC.

Materials and Methods.

Construction of Recombinant Adenovirus Stocks.

[0175] Recombinant adenovirus encoding selected *C. trachomatis* antigens were generated essentially by using the ViraPower Adenoviral Gateway Expression System (Invitrogen) introducing the CT genes in frame with an ATG initiation codon in the context of the Kozak sequence, ACCATGG, into the pAd/CMV/V5-DEST vector (Invitrogen). Stop codons were introduced just downstream the CT gene ORF's. Viable recombinant adenovirus are produced in transfected 293A cells according to the manufacturer's instructions (Invitrogen). Primary recombinant adenoviral stocks are prepared by the freeze-thaw method and stored in aliquots at -80°C . The titers measured as TCID₅₀ in 293A cells of the recombinant adenovirus stocks were determined by the Endpoint Method.

Results:

Preparation of Adenovirus Stocks

[0176] Full length *C. trachomatis* antigens were cloned in Adenovirus for direct transduction and expression of the CT antigens in the PBMC target cell assays.

[0177] The following CT antigens available as Adenovirus stocks: CT460, CT529, CT579, CT587, CT681, CT509, CT713, CT043, CT511, CT521, CT616.

T Cell Response to Adenoviral Transduced *C. Trachomatis* Antigens.

[0178] The immunological activities of four Adenovirus constructs (AdVpCT043, AdVpCT511, AdVpCT521 and

AdVpCT616) were investigated in 9 patients and 4 controls (FIG. 7). AdVpCT521 induced a strong IFN γ response ($>500\text{ pg/ml}$) in 6 out of 9 patients. AdVpCT511 were recognized with levels of IFN- γ exceeding 500 pg/ml in 4 out of 9 patients whereas AdVpCT616 and AdVpCT043 only stimulated a response in 2 and 3 patients respectively. In the control group one donor responded to AdVpCT511 and AdVpCT521.

Example 6

Rodent Protection Strategy

Introduction

[0179] The rodent protection strategy is used to evaluate the efficacy of *Chlamydia* antigens. Briefly, animals immunized with antigens will be infected with a vaginal challenge of *C. muridarum*. The protective capability of the immunizing antigen will be evaluated by quantitation of vaginal Chlamydial load and by scoring the chronic pathological changes. The pre-challenge immunieresponse to the vaccine antigen will be accessed by quantitation of INF γ after restimulation of spleen cells, and by assessing the serum antibody reactivity against a *C. trachomatis* EB lysate and the ELISA-reactivity against the immunogen. The antigens checked in this model are: Ct015, Ct025, Ct026, Ct030, Ct048, Ct063, Ct078, Ct080, Ct184, Ct521, Ct051, Ct089, Ct175, Ct443, Ct456, Ct511, Ct541, Ct583 & Ct603

Materials and Methods.

Animals

[0180] Female C57BL/6J, mice, 8-12 weeks of age, were obtained from Harlan Laboratories. Animals were housed under standard environmental conditions and provided standard food and water ad libitum. The use of mice is guided by the regulations set forward by the Danish ministry of justice (Lov om dyreforsøg, jvf lovbeholdelser nr. 726 af 9. September 1993), and Animal protection committees. A detailed description of the proposed experiments has been submitted to and approved by the regional ethical review board (2003/561-786) held by the applicant.

Chlamydia Muridarum

[0181] *C. muridarum* was propagated in HeLa 229 cells (ATCC, Rockville, Md., USA). The HeLa cells were grown in complete media (RPMI-1640 (Gibco BRL); 5% heat inactivated Fetal Bovine Serum (Cambrex bioscience); 1% v/v Hepes, 1% v/v L-glutamine, 1% v/v pyruvate and $10\text{ }\mu\text{g/ml}$ gentamycine. Subconfluent monolayers of HeLa 229 cells plated in 175 cm^2 flasks were pre-treated for 15 minutes at RT with $45\text{ }\mu\text{g/ml}$ DEAE-dextran in Hanks buffered salt solution (HBSS) and infected at an 1 MOI (i.e. one inclusion forming unit (IFU) of *C. muridarum* per HeLa cell) in 3 ml HBSS. After 2 h of incubation at 37°C , 50 ml complete media supplemented with 5% glucose and $1\text{ }\mu\text{g/ml}$ cycloheximid were added and the infected cells were further incubated for 42-44 hours in a humidified incubator containing 5% CO₂. After microscopically confirming the presence of inclusions within a proper amount of target cells the monolayer were dislodged from the flasks with a cell scraper and centrifuged 30 min at 35.000 g and 4°C . The pellets were resuspended in 5 ml HBSS per flask, sonicated on ice at $2\times 1000\text{ joule}$ and centrifuged at 500 g for 15 min 4°C . The supernatants were

collected and stored on ice. The pellets were resuspended in 5 ml HBSS and sonicated and centrifuged as in the last step. The supernatants were pooled and centrifuged for 30 min at 30,000 g, 4° C. and the pellets resuspended SPG buffer (250 mM Sucrose; 10 mM Na₂HPO₄; 5 mM L-Glutamic acid). After a brief sonication the suspension was gently layered over a 30% Diatrizoate solution and centrifuged at 40,000 g for 30 min. After centrifugation the pellet were resuspended in SPG buffer and stored at -70° C.

[0182] Infectivity of the *C. muridarum* preparation was quantitated by titration on McCoy cells followed by enumeration of inclusions in immunofluorescence assay. Briefly, 90-95% subconfluent HeLa 229 monolayers were centrifuged for 1 hour at 750 g at RT with titrated inoculum followed by incubation at for 2 h at 35° C. The inoculum was replaced by complete medium supplemented with 5% glucose and 1 µg/ml cycloheximide and further incubated for 42-44 h at 37° C. For staining the cells were fixed in 99% icecold ethanol for 15 min. The fixed cells were incubated with a rabbit polyclonal anti-*Chlamydia* MOMP antibody for 1 h followed by secondary staining with a FITC labelled swine-anti rabbit Ig antibody. The cells were counterstained with Propidium iodine. The inclusion positive cells in 20 high-power (40×) fields were enumerated with a fluorescence microscope to quantitate the infectivity of the *C. muridarum* stock (expressed in IFU/ul).

Infection of Mice

[0183] Mice were infected by the intra vaginal route by 10⁵ to 10⁷ IFU's (100-10,000 ID₅₀). The infection was monitored at day 7 and day 14 after inoculation by obtaining cervico-vaginal swabs followed by fluorescent staining and enumeration of infectious units in the specimen.

Immunization

[0184] Mice were immunized subcutaneously (sc) three times with 2 weeks interval at the base of the tail. The vaccines consisted of 1-5 µg of peptide (see above) emulsified in 250 µg DDA and 100 µg TDB. As a negative control, DDA/TDB alone, without peptide were injected. As a positive control, mice were infected intra nasally for 55-75 days with 10⁵ IFU *C. muridarum*. The nasal infection leaves the animals almost completely protected, comparable to the protection induced by the vaginal infection.

Lymphocyte Cultures, Serum Antibodies and Evaluation of Immuneinducing Potential

[0185] For evaluation of ability to induce a strong immuneresponse, spleens were taken at 21 days after last immunization and spleen lymphocytes were obtained by rubbing the tissue through a metal mesh to a single cell suspension, washed once in RPMI-1640 at 800 g at RT and resuspended in re-stimulation media. (RPMI-1640, Gibco, 10% heat-inactivated Fetal Bovine Serum, Biochrom AG, Berlin, Penicillin G 100 U/ml, streptomycin 100 µg/ml, 10 mM Hepes, 2 mM L-glutamine, 1 mM pyrovalate).

[0186] The isolated cells were cultured in triplicates in round-bottom 96-well plates at 2×10⁵ cells per well in 200 µl re-stimulation media. Peptides were added in concentrations ranging from 0.08 to 5 µg/ml. and incubated for 72 h. Negative and positive controls (either media or 5 µg/ml ConA) were included in all experiments as necessary. After restimulation the supernatants were harvested and IFN-γ quantitated

by enzyme-linked immunosorbent assay (Brandt, Elhay et al. 2000). Vaccine candidates giving high levels of critical IFNγ above 2000 pg/ul was: Ct015, Ct025, Ct026, Ct030, Ct048, Ct063, Ct078, Ct080, Ct184, Ct521, native *C. Muridarum* MOMP, Ct051, Ct175, Cy443, Ct456 & Ct603, (FIG. 16). At the same timepoint, blood samples were drawn from the eye sinus and serum prepared. Serum was tested for reactivity against *Chlamydia trachomatis* SvD and *Chlamydia muridarum* elementary bodies by western blot analysis (Theisen, Soe et al. 2004). Briefly, density gradient purified elementary bodies were electrophoresed on a 4-12% polyacrylamid gel, electro blotted onto nitrocellulose and blocked in skimmed milk in a Mesh buffer. Pools of sera (4 animals from each vaccine group) were diluted 1:100 and incubated with the blot for 1 hr, washed and further incubated with a secondary alkaline phosphatase coupled antibody for 1 hr. Reactions were visualized by incubation with BCIP/NBT (Sigma) substrate. Bands were evaluated as positives when observed size were in agreement with theoretical size. Positives were: Ct015, Ct030, Ct048, Ct078, Ct184 & Ct521 (FIG. 15)

[0187] Serum was tested by ELISA (Rosenkrands, Agger et al. 2005) for reactivity against the recombinant protein used for immunization and against heat-inactivated *Chlamydia muridarum* elementary bodies. Briefly, plates were coated with antigen (0.5 µg/ml) in carbonate buffer o/n, blocked with BSA and washed. The plates were incubated with prediluted samples for 2 hrs at room temperature, washed and incubated with a peroxidase conjugated secondary antibody for 1 hr. Reactions were visualized by incubation with TMB substrate and the reaction stopped with sulphuric acid and read at 450 nm. Titers at OD=1.0 were calculated after applying four-parameter fit on the data (FIG. 14). Antigen high in IgG1 were: Ct015 & Ct030. Antigens high in IgG2b were: Ct063, Ct521 High.

Evaluation of the Protective Efficacy

[0188] For evaluation of vaccine efficacy, mice were challenged 8-12 weeks after the first immunization by intra vaginal infection by 10⁵ to 10⁷ IFU's (100-10,000 ID₅₀). The protective efficacy of the vaccine candidates was monitored by pathological evaluation and by enumeration of infectious units obtained by cervicovaginal swabs.

[0189] The bacterial load was determined by cervicovaginal swabs obtained at 7, 14 and/or 21 days after challenge. The swabs were submerged in 1 ml SPG buffer at 4° C. until prepared. At the same day, *C. muridarum* EB's were mechanically shaken off of the swab by vortexing the specimen for 30 s at full speed in the presence of mm glass beads. The buffer was transferred to eppendorf tubes and stored at -80° C. until analyzed. Infectious EB's were quantitated by enumeration of inclusions in subconfluent McCoy cells in immunofluorescence assay as described above. (FIG. 8) Antigens inducing protection after enumeration of swab-IFU's at PID7 are: Ct015, Ct025, Ct048, Ct184, Ct521, Ct443, Ct603 and native *C. muridarum* MOMP.

[0190] For pathology whole genital tracts were evaluated macroscopically for signs of acute and chronic pathology at PID49. From the gross pathological evaluation a hydrosalpinx-score were calculated. The score is calculated as the ratio of hydrosalpinges over total number of fallopian tubes in the individual vaccine group (FIG. 9). Antigens inducing a fair protection at PID42 are Ct025, Ct063, Ct184, Ct521.

[0191] Based on the available material, Ct184 and Ct521 are the antigens performing best in the challenge model.

Formulated in Lipovacc, they are inducing the least pathology and the best protection against vaginal *Chlamydia*.

Example 7

Screening for *C. Trachomatis* Specific T-Cell Epitope Targets Using the Whole-Genome Random Expression Library

Introduction

[0192] The whole-genome random expression library was used for directly screening for potential *C. trachomatis* specific antigen targets that stimulate T-cell proliferation in patient PBMC's. Pools of bacteria expressing random selected λ gt11 phages expressing recombinant polypeptides in fusion with β -galactosidase in the lysogen host bacteria Y1089r- (facilitating lysogen phage growth) are directly administered to patient PBMC cells. Following incubation, where the patient PBMC's are activated, possibly through specific effector T-cells due to the bacterial expressed *C. trachomatis* antigen exposure, the mixture is cleared for further bacterial growth by adding antibiotics, and further incubated 2 to 4 days essentially as described in Example 1. The read out may be INF γ and/or specific T-cell proliferation.

[0193] In theory, a whole-genome random expression library containing individual random expressed *C. trachomatis* gene sequences of 0.4-0.8 kb in size covers any gene sequence (in correct orientation and in reading frame with the fusion partner, β -galactosidase), in about 1:10,000 individual lambda clones. Thus, screening of 10 to 20 pools each containing 500 to 1000 of randomly selected bacterial clones covers the whole *C. trachomatis* genome. Data by Alderson et al (2000) have shown that as much as adding 106 control bacteria/well containing as little as 104 T cells result in low level of unspecific INF γ and proliferation. Significant and specific INF γ release as well as specific T-cell proliferation was found by adding as little as 10^3 antigen specific bacteria/well containing as little as 104 T-cells. Thus, a pool with 106 bacteria containing 500 different individual clones added to 105 PBMC cells/well may expose the T-cell population in each well with 2000 bacteria specifically expressing a particular recombinant fusion.

Materials and Methods

[0194] Construction of the λ gt11 Phage Clone Expressing β -Galactosidase/CT521 Fusion.

[0195] A λ gt11- β gal/CT521 was constructed for use as positive T-cell epitope target control. The full length sequence encoding the CT521 was amplified by PCR using *C. trachomatis* serovar D genomic DNA as template and the specific forward primer, 5'-TATAGAATTCATGTTAATGCTAAACGAACAAA-3', and reverse primer, 5'-TATAGAATTCCTTATACCCCTTCCA-CACGCTTAACAAATCG-3', containing EcoRI sites for cloning into the EcoRI cloning site of the λ gt11 expression vector in frame with β -galactosidase open reading frame. The cloned recombinant phage construct was verified for correct orientation and sequence by direct sequencing individual phage plaques (see example 3).

Preparation of Whole-*Chlamydia Trachomatis*-Genome Random Expression Library as λ gt11 Lysogen Library.

[0196] The lysogen bacterial stock of the whole-*C. trachomatis*-genome random expression library in Y1089r- is essentially constructed by the method described by Singh et al (1989).

Example 8

[0197] PBMC from 10 *Chlamydia* patients and 5 controls were isolated and cultivated as described previously (Example 1). Cell cultures were established in triplicate cultures of 1.25×10^5 PBMCs and stimulated with 5 μ g of protein. Cell cultures without antigen were included as negative controls (C), and PHA (2 μ g/ml) was used as a mitogenic positive control (result not shown). The following antigens were tested: CT043, CT008, CT016, CT025, CT026, CT048, CT098, CT110, CT125, CT155, CT003, CT005, CT023, CT027, CT028, CT032, CT035, CT078, CT082, CT093, CT111, CT123, CT126, CT133, CT175, CT184, CT002, CT009, CT015, CT061, CT063, CT068, CT071, CT080, CT089, CT141, CT509, CT803, CT004, CT030, CT038, CT040, CT052, CT053, CT067, CT511, CT583, CT603, CT681, CT265, CT323, CT322, CT342, CT357r, CT375, CT376, CT456, CT213, CT168, CT396, CT443, CT587, CT610, CT679, CT842, CT875, CT561, CT659, CT112, CT124, CT150, CT201, CT245, CT246, CT405, CT420, CT426, CT507, CT512, CT513, CT514, CT516, CT316, CT439, CT492, CT520, CT523, CT526, CT611, CT613, CT626, CT630, CT647, CT649, CT725, CT734, CT779, CT801, CT833, CT835, CT836, CT845 and CT541 (FIG. 10).

[0198] As seen in FIG. 10 the degree of human recognition varies. Some are strongly and frequently recognized—more than 5 patients responding with a level of IFN- γ above all controls. These includes CT375, CT376, CT004, CT048, CT078, CT10, CT583, CT603, CT681, CT184, CT175, CT025, CT002, CT015, CT063, CT456, CT168, CT396, CT443, CT124, CT028, CT030, CT43, CT048, CT080, CT111, CT316, CT322, CT342, CT375, CT492, CT512, CT520, CT521, CT523, CT541, CT611, CT613, CT630, CT649, CT734, CT801, CT803 (FIG. 11) whereas others are not recognized at all (ex. CT071, CT133, CT005).

Example 9

Mapia Testing of Antibody Targets—Essentially as Described in Lyashchenko et. al. (2000).

[0199] Briefly, antigens from example 2 and 3 were purified as described in example 1. Antigens were printed on nitrocellulose membrane and tested for reaction against a panel of patient sera and control sera (20 of each). Controls were used for defining the visual cut-off. Patient sera with a clear reaction over the visual cut-off are regarded as positive and are ranked from 1 to 20 positives.

Antigen	Number of Positive
CT051	4
CT080	0
CT089	10
CT110	18
CT115	1
CT118	6
CT119	9

-continued

Antigen	Number of Positive
Ct125	8
Ct141	0
Ct155	0
Ct168	7
Ct174	0
Ct184	1
Ct283	1
Ct396	5
Ct443	19
Ct456	8
Ct541	9
Ct643	0
Ct681	19
Ct842	2
Ct874	4

Example 10

Protection Strategy in C3H/HeN Mice

[0200] The antigens examined in this model are: CT521, TC0052 (muridarum major outer membrane protein) and the combination of the two proteins.

Materials and Methods.

Animals

[0201] Female C3H/HeN mice, 8-12 weeks of age, were obtained from Harlan Laboratory. Animals were housed under standard environmental conditions and provided standard food and water ad libitum

Chlamydia Muridarum

[0202] *C. muridarum* was propagated in HeLa 229 cells and harvested as described in Example 6.

Infection of Mice

[0203] Mice were infected by the intravaginal route by 10^5 IFU's. The infection was monitored at day 7 day 14 and day 21 after inoculation by obtaining cervicovaginal swabs followed by fluorescent staining and enumeration of infectious units in the specimen as described in example 6.

Immunization

[0204] Mice were immunized subcutaneously (sc) three times with 2 weeks interval at the base of the tail. The vaccines consisted of either 5 μ g rCT521, 5 μ g rTC0052 or the combination (5 μ g rCT521+5 μ g rTC0052) emulsified in 250 μ g DDA and 100 μ g TDB. As a negative control, DDA/TDB alone, without protein was injected.

Lymphocyte Cultures and Evaluation of Immuneinducing Potential

[0205] For evaluation of ability to induce a strong immune response, blood samples were drawn from the eye sinus 7 days after the last immunization, pooled in groups (10 mice) and the blood lymphocytes purified on density gradient and resuspended in re-stimulation media (RPMI-1640, Gibco, 10% heat-inactivated Fetal Bovine Serum, Biochrom AG, Berlin, Penicillin G 100 U/ml, streptomycin 100 μ g/ml, 10 mM Hepes, 2 mM L-glutamine, 1 mM pyruvate).

[0206] The isolated cells were cultured in triplicates in round-bottom 96-well plates at 2×10^5 cells per well in 200 μ l re-stimulation media. Proteins were added in concentrations ranging from 0.31 μ g/ml to 10 μ g/ml and incubated for 72 h. Negative and positive controls (either media or 5 μ g/ml ConA) were included. After restimulation the supernatants were harvested and IFN- γ quantitated by enzyme-linked immunosorbent assay (Brandt et al., 2000) (FIG. 12). Immunization with rCT521 induced a strong IFN- γ release in response to restimulation with rCT521 and an epitope mapping (peptides described in example 1) of CT521 revealed P4 (aa 40-62) as the dominant epitope (FIG. 12a). Likewise immunization with rTC0052 also induced a strong release of IFN- γ in response to the homologous protein (FIG. 12b). Interestingly the mixture of rCT521 and rTC0052 very efficiently enhanced the response to rCT521 compared to immunization with rCT521 alone (FIG. 12c).

Evaluation of the Protective Efficacy

[0207] For evaluation of vaccine efficacy, mice were challenged 10 weeks after the first immunization by intravaginal infection with 10^5 IFU's. The protective efficacy of the vaccine candidates was monitored by enumeration of infectious units obtained by cervicovaginal swabs as described in example 6. Both rCT521 and rTC0052 induced high levels of protection and the combination of the two proteins had a positive additive effect on protection (FIG. 13). Protection experiments with rCT521 have been repeated in the C3H/HeN mice with similar results and high levels of protection after immunisation with rCT521 has also been found in BALB/cxC57BL/6j F1 mice (results not shown).

REFERENCES

- [0208] Alderson, M. R., Bement, T., Day, C. H., Zhu, L., Molesh, D., Sleiky, Y. A. W., Coler, R., Lewinsohn, D. M., Reed, S. G., and Dillon, D.C. (2000). "Wxpression cloning of an immunodominant family of *Mycobacterium tuberculosis* antigen using human CD4+ T cells." *J. Exp. Med.* 191(3):551-9.
- [0209] Andersen, P. and I. Heron (1993). "Simultaneous electroelution of whole SDS-polyacrylamide gels for the direct cellular analysis of complex protein mixtures." *J Immunol Methods* 161(1): 29-39.
- [0210] Brandt, L., M. Elhay, et al. (2000). "ESAT-6 subunit vaccination against *Mycobacterium tuberculosis*." *Infect Immun* 68(2): 791-5.
- [0211] Brunham, R. C. (1999). Human immunity to *Chlamydia*. *Chlamydia Intracellular biology, Pathogenesis, and Immunity*. R. S. Stephens. Washington, D.C., ASM Press: 211-238.
- [0212] Cote-Sierra, J., E. Jongert, et al. (1998). "A new membrane-bound Opri lipoprotein expression vector. High production of heterologous fusion proteins in gram (-) bacteria and the implications for oral vaccination." *Gene* 221(1): 25-34.
- [0213] Cotter, T. W., Q. Meng, et al. (1995). "Protective efficacy of major outer membrane protein-specific immunoglobulin A (IgA) and IgG monoclonal antibodies in a murine model of *Chlamydia trachomatis* genital tract infection." *Infect. Immun.* 63(12): 4704-4714.
- [0214] Fling, S. P., R. A. Sutherland, et al. (2001). "CD8+ T cells recognize an inclusion membrane-associated protein

- from the vacuolar pathogen *Chlamydia trachomatis*." *Proc. Natl. Acad. Sci. U.S.A* 98(3): 1160-1165.
- [0215] Goodall, J. C., G. Yeo, et al. (2001). "Identification of *Chlamydia trachomatis* antigens recognized by human CD4+ T lymphocytes by screening an expression library." *Eur. J. Immunol.* 31(5): 1513-1522.
- [0216] Gosselin, E. J., K. Wardwell, et al. (1992). "Enhanced antigen presentation using human Fc gamma receptor (monocyte/macrophage)-specific immunogens." *J Immunol* 149(11): 3477-81.
- [0217] Grayston, J. T. and S. P. Wang (1978). "The potential for vaccine against infection of the genital tract with *Chlamydia trachomatis*." *Sex Transm. Dis.* 5: 73-77.
- [0218] Gu, L., W. M. Wenman, et al. (1995). "*Chlamydia trachomatis* RNA polymerase alpha subunit: sequence and structural analysis." *J. Bacteriol.* 177(9): 2594-2601.
- [0219] Harboe, M., T. Oettinger, et al. (1996). "Evidence for occurrence of the ESAT-6 protein in *Mycobacterium tuberculosis* and virulent *Mycobacterium bovis* and for its absence in *Mycobacterium bovis* BCG." *Infect Immun* 64(1): 16-22.
- [0220] Hassell, A. B., D. J. Reynolds, et al. (1993). "Identification of T-cell stimulatory antigens of *Chlamydia trachomatis* using synovial fluid-derived T-cell clones." *Immunology* 79(4): 513-519.
- [0221] Katz, B. P., B. E. Batteiger, et al. (1987). "Effect of prior sexually transmitted disease on the isolation of *Chlamydia trachomatis*." *Sex Transm. Dis.* 14(3): 160-164.
- [0222] Kilgus, J., T. Jardetzky, et al. (1991). "Analysis of the permissive association of a malaria T cell epitope with DR molecules." *J Immunol* 146(1): 307-15.
- [0223] Kubo, A. and R. S. Stephens (2000). "Characterization and functional analysis of PorB, a *Chlamydia* porin and neutralizing target." *Mol. Microbiol.* 38(4): 772-780.
- [0224] LaVerda, D., L. N. Albanese, et al. (2000). "Seroreactivity to *Chlamydia trachomatis* Hsp10 correlates with severity of human genital tract disease." *Infect. Immun.* 68(1): 303-309.
- [0225] McCafferty, J., A. D. Griffiths, et al. (1990). "Phage antibodies: filamentous phage displaying antibody variable domains." *Nature* 348(6301): 552-4.
- [0226] Morrison, R. P. and H. D. Caldwell (2002). "Immunity to murine chlamydial genital infection." *Infect Immun* 70(6): 2741-51.
- [0227] Morrison, S. G., H. Su, et al. (2000). "Immunity to murine *Chlamydia trachomatis* genital tract reinfection involves B cells and CD4(+) T cells but not CD8(+) T cells." *Infect. Immun.* 68(12): 6979-6987.
- [0228] Ortiz, L., K. P. Demick, et al. (1996). "*Chlamydia trachomatis* major outer membrane protein (MOMP) epitopes that activate HLA class II-restricted T cells from infected humans." *J Immunol* 157(10): 4554-67.
- [0229] Pal, S., K. M. Barnhart, et al. (1999). "Vaccination of mice with DNA plasmids coding for the *Chlamydia trachomatis* major outer membrane protein elicits an immune response but fails to protect against a genital challenge." *Vaccine* 17(5): 459-465.
- [0230] Pal, S., I. Theodor, et al. (2001). "Immunization with the *Chlamydia trachomatis* mouse pneumonitis major outer membrane protein can elicit a protective immune response against a genital challenge." *Infect. Immun.* 69(10): 6240-6247.
- [0231] Pearson, W. R. and D. J. Lipman (1988). "Improved tools for biological sequence comparison." *Proc Natl Acad Sci USA* 85(8): 2444-8.
- [0232] Ravn, P., A. Demissie, et al. (1999). "Human T cell responses to the ESAT-6 antigen from *Mycobacterium tuberculosis*." *J Infect Dis* 179(3): 637-45.
- [0233] Rolph, M. S. and I. A. Ramshaw (1997). "Recombinant viruses as vaccines and immunological tools." *Curr Opin Immunol* 9(4): 517-24.
- [0234] Rosenkrands, I., E. M. Agger, et al. (2005). "Cationic liposomes containing mycobacterial lipids: a new powerful Th1 adjuvant system." *Infect Immun* 73(9): 5817-26.
- [0235] Schachter, J., J. Moncada, et al. (1988). "Nonculture methods for diagnosing chlamydial infection in patients with trachoma: a clue to the pathogenesis of the disease?" *J. Infect. Dis.* 158(6): 1347-1352.
- [0236] Shaw, J., V. Grund, et al. (2002). "Dendritic cells pulsed with a recombinant chlamydial major outer membrane protein antigen elicit a CD4(+) type 2 rather than type I immune response that is not protective." *Infect. Immun.* 70(3): 1097-1105.
- [0237] Sinigaglia, F., M. Guttinger, et al. (1988). "A malaria T-cell epitope recognized in association with most mouse and human MHC class II molecules." *Nature* 336(6201): 778-80.
- [0238] Starnbach, M. N., W. P. Loomis, et al. (2003). "An inclusion membrane protein from *Chlamydia trachomatis* enters the MHC class I pathway and stimulates a CD8+ T cell response." *J Immunol* 171(9): 4742-9.
- [0239] Stephens, R. S., S. Kalman, et al. (1998). "Genome sequence of an obligate intracellular pathogen of humans: *Chlamydia trachomatis*." *Science* 282(5389): 754-759.
- [0240] Stephens, R. S., E. A. Wagar, et al. (1988). "High-resolution mapping of serovar-specific and common antigenic determinants of the major outer membrane protein of *Chlamydia trachomatis*." *J. Exp. Med.* 167(3): 817-831.
- [0241] Stryhn, A., L. O. Pedersen, et al. (1996). "Peptide binding specificity of major histocompatibility complex class I resolved into an array of apparently independent subspecificities: quantitation by peptide libraries and improved prediction of binding." *Eur J Immunol* 26(8): 1911-8.
- [0242] Su, H. and H. D. Caldwell (1995). "CD4+ T cells play a significant role in adoptive immunity to *Chlamydia trachomatis* infection of the mouse genital tract." *Infect. Immun.* 63(9): 3302-3308.
- [0243] Su, H., M. Parnell, et al. (1995). "Protective efficacy of a parenterally administered MOMP-derived synthetic oligopeptide vaccine in a murine model of *Chlamydia trachomatis* genital tract infection: serum neutralizing IgG antibodies do not protect against chlamydial genital tract infection." *Vaccine* 13(11): 1023-1032.
- [0244] Theisen, M., S. Soe, et al. (2004). "A Plasmodium falciparum GLURP-MSP3 chimeric protein; expression in *Lactococcus lactis*, immunogenicity and induction of biologically active antibodies." *Vaccine* 22(9-10): 1188-98.
- [0245] Tipples, G. and G. McClarty (1995). "Cloning and expression of the *Chlamydia trachomatis* gene for CTP synthetase." *J. Biol. Chem.* 270(14): 7908-7914.

- [0246] Ulmer, J. B., J. J. Donnelly, et al. (1993). "Heterologous protection against influenza by injection of DNA encoding a viral protein." *Science* 259(5102): 1745-9.
- [0247] Wang, S. P., J. T. Grayston, et al. (1967). "Trachoma vaccine studies in monkeys." *Am. J. Ophthalmol.* 63(5): Suppl-30.
- [0248] Zhang, D. J., X. Yang, et al. (1999). "Characterization of immune responses following intramuscular DNA immunization with the MOMP gene of *Chlamydia trachomatis* mouse pneumonitis strain." *Immunology* 96(2): 314-321.
- [0249] Zhang, Y., J. Tao, et al. (1997). "Elongation factor Ts of *Chlamydia trachomatis*: structure of the gene and properties of the protein." *Arch. Biochem. Biophys.* 344(1): 43-52.

 SEQUENCE LISTING

<160> NUMBER OF SEQ ID NOS: 308

<210> SEQ ID NO 1

<211> LENGTH: 167

<212> TYPE: PRT

<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 1

```

Met Ser Arg Gln Asn Ala Glu Glu Asn Leu Lys Asn Phe Ala Lys Glu
1          5          10          15
Leu Lys Leu Pro Asp Val Ala Phe Asp Gln Asn Asn Thr Cys Ile Leu
          20          25          30
Phe Val Asp Gly Glu Phe Ser Leu His Leu Thr Tyr Glu Glu His Ser
          35          40          45
Asp Arg Leu Tyr Val Tyr Ala Pro Leu Leu Asp Gly Leu Pro Asp Asn
          50          55          60
Pro Gln Arg Arg Leu Ala Leu Tyr Glu Lys Leu Leu Glu Gly Ser Met
          65          70          75          80
Leu Gly Gly Gln Met Ala Gly Gly Gly Val Gly Val Ala Thr Lys Glu
          85          90          95
Gln Leu Ile Leu Met His Cys Val Leu Asp Met Lys Tyr Ala Glu Thr
          100          105          110
Asn Leu Leu Lys Ala Phe Ala Gln Leu Phe Ile Glu Thr Val Val Lys
          115          120          125
Trp Arg Thr Val Cys Ser Asp Ile Ser Ala Gly Arg Glu Pro Thr Val
          130          135          140
Asp Thr Met Pro Gln Met Pro Gln Gly Gly Gly Gly Gly Ile Gln Pro
          145          150          155          160
Pro Pro Ala Gly Ile Arg Ala
          165

```

<210> SEQ ID NO 2

<211> LENGTH: 501

<212> TYPE: DNA

<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 2

```

atgtccaggc agaatgctga ggaaaatcta aaaaattttg ctaaagagct taaactcccc      60
gacgtggcct tcgatcagaa taatacgtgc attttgtttg ttgatggaga gttttctctt      120
cacctgacct acgaagaaca ctctgatcgc ctttatgttt acgcacctct tcttgacgga      180
ctgccagaca atccgcaaag aaggttagct ctatatgaga agttgttaga aggctctatg      240
ctcggaggcc aaatggctgg tggaggggta ggagtcgcta ctaaggaaca gttgatctta      300
atgcactgcg tgtagacat gaagtatgca gagaccaacc tactcaaagc ttttgcacag      360

```

-continued

```

ctttttattg aaaccgttgt gaaatggcga actgtttgtt ctgatatcag cgtggacga 420
gaacccactg ttgataccat gccacaaatg cctcaagggg gtggcggagg aattcaacct 480
cctccagcag gaatccgtgc a 501

```

```

<210> SEQ ID NO 3
<211> LENGTH: 144
<212> TYPE: PRT
<213> ORGANISM: Chlamydia trachomatis

```

```

<400> SEQUENCE: 3

```

```

Met Ile Lys Leu Glu Cys Leu Gln Asp Pro Ser Pro Arg Lys Arg Arg
1           5           10           15
Thr Lys Leu Leu Gly Arg Gly Pro Ser Ser Gly His Gly Lys Thr Ser
          20           25           30
Gly Arg Gly His Lys Gly Asp Gly Ser Arg Ser Gly Tyr Lys Arg Arg
          35           40           45
Phe Gly Tyr Glu Gly Gly Gly Val Pro Leu Tyr Arg Arg Val Pro Thr
          50           55           60
Arg Gly Phe Ser His Thr Arg Phe Asp Lys Cys Val Glu Glu Ile Thr
65           70           75           80
Thr Gln Arg Leu Asn Glu Ile Phe Asp Asn Gly Ala Glu Val Ser Leu
          85           90           95
Glu Ala Leu Lys Glu Arg Lys Val Ile His Arg Glu Thr Ser Arg Val
          100          105          110
Lys Val Ile Leu Lys Gly Ala Leu Asp Lys Lys Leu Val Trp Lys Asp
          115          120          125
Ala Ala Ile Val Leu Ser Glu Gly Val Lys Ser Leu Ile Glu Ala Val
          130          135          140

```

```

<210> SEQ ID NO 4
<211> LENGTH: 432
<212> TYPE: DNA
<213> ORGANISM: Chlamydia trachomatis

```

```

<400> SEQUENCE: 4

```

```

atgattaagt tagagtgttt acaagatcct tcgcctcgta agcgaagaac gaaactcttg 60
ggccgaggac cttcttcttg tcacgggaaa acaagtggtc gaggacacaa aggagacggt 120
agccgttctg gatacaagag acgtttcgga tatgaagggg gaggcgtacc tttatacaga 180
agagttccta cagcaggatt ttctcataca cgctttgata aatgtgttga agaaatcaca 240
acacaacggt tgaatgagat ttttgacaat ggcgcagaag tatctttgga agctttaaaa 300
gaaagaaaag ttatccatag agagacttct cgtgttaaag taatccttaa aggagctctg 360
gataagaaat tagtctggaa agatgctgca atagtctgtt cagaaggagt aaaaagtctt 420
atcgaggctg tt 432

```

```

<210> SEQ ID NO 5
<211> LENGTH: 138
<212> TYPE: PRT
<213> ORGANISM: Chlamydia trachomatis

```

```

<400> SEQUENCE: 5

```

```

Met Leu Met Pro Lys Arg Thr Lys Phe Arg Lys Gln Gln Lys Gly Gln
1           5           10           15

```


-continued

Phe Ala Gly Leu Ser Lys Gly Ala Thr Phe Val Asp Phe Gly Glu Phe
 20 25 30
 Gly Met Gln Thr Leu Glu Arg Gly Trp Ile Thr Ser Arg Gln Ile Glu
 35 40 45
 Ala Cys Arg Val Ala Ile Asn Arg Tyr Leu Lys Arg Lys Gly Lys Val
 50 55 60
 Trp Ile Arg Val Phe Pro Asp Lys Ser Val Thr Lys Lys Pro Ala Glu
 65 70 75 80
 Thr Arg Met Gly Lys Gly Lys Gly Ala Pro Asp His Trp Val Val Val
 85 90 95
 Val Arg Pro Gly Arg Ile Leu Phe Glu Val Ala Asn Val Ser Lys Glu
 100 105 110
 Asp Ala Gln Asp Ala Leu Arg Arg Ala Ala Ala Lys Leu Gly Ile Arg
 115 120 125
 Thr Arg Phe Val Lys Arg Val Glu Arg Val
 130 135

<210> SEQ ID NO 6
 <211> LENGTH: 414
 <212> TYPE: DNA
 <213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 6

```

atgttaatgc ctaaacgaac aaaatttcgc aagcagcaga aaggtcagtt tgctggattg      60
agtaagggag caacgtttgt tgacttcggc gaatttggaa tgcagactct ggaaagagga      120
tggattacca gccgccaaat tgaggcatgc agggttgcta tcaacagata tttaaaacgt      180
aaagggaaaag tttggattcg agttttccca gataagagtg taacgaaaaa acctgctgaa      240
actcgaatgg gtaaaggtaa gggagctect gatcactggg tagttgttgt ccgtcccga      300
cgtattttat tcgaagtggc aaacgtttcg aaagaagatg ctcaggatgc tttgagaaga      360
gctgctgcaa agtttaggaat tagaacacga tttgttaagc gtgtggaaag ggta      414
  
```

<210> SEQ ID NO 7
 <211> LENGTH: 429
 <212> TYPE: PRT
 <213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 7

Met Gln Tyr Val Met Gly Arg Thr Asn Ser Met Thr Arg Gly Phe Leu
 1 5 10 15
 Asn Lys Arg Arg Val Leu Glu Lys Cys Arg Thr Ala Lys Gln Lys Ile
 20 25 30
 His Tyr Cys Ile Ser Arg Tyr Phe His Tyr Leu Pro Pro Val Leu Ala
 35 40 45
 Ile Leu Leu Pro Ile Gly Ser Trp Pro Phe Leu Ser Glu Gln Gln Trp
 50 55 60
 Trp Tyr Gly Ser Phe Leu Phe Pro Val Val Ser Ser Leu Gly Trp Leu
 65 70 75 80
 Phe Ala Ile Gly Arg Arg Glu Arg Gln Leu Arg Ala Ala Ala Gly Gln
 85 90 95
 Leu Leu Glu Ala Lys Ile Arg Lys Leu Thr Glu Gln Asp Glu Gly Leu
 100 105 110
 Lys Asn Ile Arg Glu Thr Ile Glu Lys Arg Gln Lys Glu Thr Asp Arg

-continued

115					120					125					
Leu	Lys	Leu	His	Asn	Asp	Lys	Leu	Val	Glu	Gln	Leu	Gly	Gln	Ala	Arg
130						135					140				
Glu	Val	Phe	Ile	Gln	Ala	Lys	Gly	Arg	Tyr	Asp	His	Met	Glu	Glu	Leu
145					150					155					160
Ser	Arg	Arg	Leu	Lys	Glu	Glu	Asn	Gln	Gln	Leu	Gln	Ile	Gln	Leu	Glu
				165					170					175	
Ala	Ala	Val	Arg	Glu	Arg	Asn	Glu	Lys	Ile	Leu	Glu	Asn	Gln	Glu	Leu
			180					185					190		
Leu	Gln	Glu	Leu	Lys	Glu	Thr	Leu	Ala	Tyr	Gln	Gln	Glu	Leu	His	Asp
	195						200					205			
Glu	Tyr	Gln	Ala	Thr	Phe	Val	Glu	Gln	His	Ser	Met	Leu	Asp	Lys	Arg
	210					215					220				
Gln	Ala	Tyr	Ile	Gly	Asn	Leu	Glu	Ala	Lys	Val	Gln	Asp	Leu	Met	Cys
225					230					235					240
Glu	Leu	Arg	Asn	Leu	Leu	Gln	Leu	Glu	Met	Gly	Ala	Lys	Thr	Asn	Leu
			245						250					255	
Pro	Gly	Lys	Pro	Val	Ala	Ser	Arg	Asp	Val	Val	Ala	Gln	Leu	Val	Leu
			260					265					270		
Glu	Phe	Arg	Lys	Ile	Val	Phe	Arg	Val	Glu	Thr	Thr	Glu	Ala	Ala	Asp
	275						280					285			
Ser	Leu	Thr	Ala	Leu	Arg	Tyr	Thr	Arg	Thr	Asp	Pro	Ser	Ala	His	Asn
	290					295					300				
Tyr	Ser	Leu	Ala	Cys	Arg	Gln	Leu	Phe	Asp	Gly	Leu	Arg	Glu	Glu	Asn
305				310						315					320
Leu	Gly	Met	Leu	Phe	Ile	Tyr	Ala	Pro	Phe	Ala	Gln	Arg	Val	Leu	Phe
			325						330					335	
Ala	Asn	Ala	Leu	Phe	Asn	Asp	Trp	Thr	Gly	Tyr	Gly	Leu	Glu	Asp	Phe
			340					345					350		
Leu	Asn	Arg	Glu	Ser	Asp	Val	Val	Leu	Glu	Gly	Phe	Ala	Gln	Trp	Glu
	355					360					365				
Arg	Asp	Leu	Leu	Thr	Glu	Ser	Arg	Val	Glu	Arg	Ser	Gly	Lys	Ile	Val
	370				375						380				
Ile	Lys	Thr	Lys	Ala	Phe	Gly	Ala	Thr	Pro	Phe	Tyr	Tyr	Cys	Val	Val
385				390						395					400
Thr	Leu	Asp	Lys	Gly	Pro	Phe	Ala	Gln	His	Ile	Leu	Gly	Val	Leu	Tyr
			405					410						415	
Pro	Ala	Lys	Ala	Ser	Phe	Phe	Thr	Asn	Leu	Ser	Tyr	Ile			
			420					425							

<210> SEQ ID NO 8

<211> LENGTH: 1287

<212> TYPE: DNA

<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 8

atgcagtatg tgaagggaag gaccaatagt atgacaaggg gttttttgaa taagcgaaga	60
gttctagaga aatgtaggac tgccaaacaa aaaatacact attgtatttc gcgatacttt	120
cattacctcc caccggtttt ggcgattctc ctgcctatag ggagttggcc tttttgtcc	180
gagcagcaat ggtggtatgg ttccctttctc ttccctggtg tttcttcttt aggggtggtg	240
ttcgcgattg ggaggcgaga gcggcagttg cgtgccgccg ctgggcagct ccttgaagca	300

-continued

```

aagattcgta agcttacaga gcaagacgaa ggattaaaaa atatacgaga gactattgaa 360
aagcgtcaaa aagaaacgga tcgtttaaaa ttgcacaatg ataagttggt ggagcaattg 420
ggacaagctc gagaagtctt tattcaagcc aaagggcggt acgaccatat ggaggagtgtg 480
tcccgaagat tgaagagga aaaccagcaa ttacaaatac agttggaagc tgcggttcgt 540
gaacgtaatg agaaaathtt agaaaatcaa gaattgcttc aggagctcaa agaaacgctt 600
gcttatcagc aagagctgca tgatgaatat caagcaacct ttgtggagca gcatagcatg 660
ctggataaga gacaggctta tattggtaat ttggaagcaa aagtacaaga cctcatgtgc 720
gaactacgta atctattgca attggaatg ggggctaaga cgaatttacc aggaaagcca 780
gtagcttctc gagatgtagt ggctcagctg gtattagagt ttcgtaaaat tgttttctgt 840
gtagagacaa cggaagcggc ggattctttg acagctttgc ggtatacaag aacagatccg 900
tctgccata actactcctt agcttgcgg caattattcg atgggttgag agaagaaaat 960
ctagggatgc tatttattta tgctcccttt gcgcaaagag tcctttttgc caatgctttg 1020
tttaatgatt ggacgggata cggattagaa gattttttta acagagagag cgatgttgtt 1080
cttgagggat tcgcgcaatg ggagcgggat cttttaacag aatctagagt agaacgttct 1140
ggtaaaattg ttattaaaac aaaagctttt ggggcgactc cctctatta ttgtgtagtc 1200
acgttagata agggctcctt tgctcaacat atactagggg ttttgtaccc tgcaaaagcc 1260
agttttttta caaatctttc ctatatt 1287

```

<210> SEQ ID NO 9

<211> LENGTH: 167

<212> TYPE: PRT

<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 9

```

Met Lys Pro Gln Leu Leu Leu Leu Glu Asp Val Asp Gly Leu Gly Arg
1             5             10             15
Ser Gly Asp Leu Val Val Ala Lys Pro Gly Tyr Val Arg Asn Tyr Leu
20            25            30
Leu Pro Lys Gly Lys Ala Val Val Ala Ser Ala Gly Thr Leu Arg Leu
35            40            45
Gln Ala Lys Leu Gln Glu Gln Arg Leu Leu Gln Ala Ala Ala Asp Lys
50            55            60
Glu Glu Ser Leu Arg Leu Ala Glu Met Leu Arg Ser Ile Val Leu Asp
65            70            75            80
Phe Gln Val Arg Val Asp Ser Glu Asn Asn Met Tyr Gly Ser Val Thr
85            90            95
Val Asn Asp Met Ile Ser Ala Ala Glu Gln Gln Gly Val Val Leu Thr
100           105           110
Arg Lys Asn Phe Pro Arg Ser His Ser Gly Ile Lys Asn Leu Gly Arg
115           120           125
His Val Val Gly Leu Lys Leu Lys Glu Gly Val Thr Ala Asp Leu His
130           135           140
Leu Glu Val Arg Ala Asp His Glu Ile Ile Glu Gln Lys Glu Leu Gln
145           150           155           160
Ser Ala Glu Glu Gln Glu Gly
165

```

-continued

```

<210> SEQ ID NO 10
<211> LENGTH: 501
<212> TYPE: DNA
<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 10
atgaaaccac aattactttt attagaggat gtcgatggct tagggcggtc cggcgatctt    60
gttggtcgcta agcccgata cgtagaaac tacctgctcc cttaaaggaa ggcagtgggt    120
gctagcgctg gaactctccg tttgcaagca aagttgcaag agcagcggtt gctgcaagct    180
gcggccgata aagaagagtc tcttcgtttg gcagagatgc ttagaagcat cgttttggat    240
ttccaagttc gtgtagattc tgagaataat atgtacgggt ccgtaaccgt gaatgatatg    300
attagtgtcg ctgagcaaca aggtgtgtgt cttacacgta agaatttccc tcgctctcat    360
agcgggtatta agaatctcgg aagacacgta gttggactga aattaaaga agcgtgact    420
gcggatcttc atttgaagt tcgtgctgat cacgaaatca ttgaacaaaa agaactccaa    480
agcgcagaag aacaagaagg t                                     501

```

```

<210> SEQ ID NO 11
<211> LENGTH: 326
<212> TYPE: PRT
<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 11
Met Ser Phe Phe His Thr Arg Lys Tyr Lys Leu Ile Leu Arg Gly Leu
1          5          10          15
Leu Cys Leu Ala Gly Cys Phe Leu Met Asn Ser Cys Ser Ser Ser Arg
20          25          30
Gly Asn Gln Pro Ala Asp Glu Ser Ile Tyr Val Leu Ser Met Asn Arg
35          40          45
Met Ile Cys Asp Cys Val Ser Arg Ile Thr Gly Asp Arg Val Lys Asn
50          55          60
Ile Val Leu Ile Asp Gly Ala Ile Asp Pro His Ser Tyr Glu Met Val
65          70          75          80
Lys Gly Asp Glu Asp Arg Met Ala Met Ser Gln Leu Ile Phe Cys Asn
85          90          95
Gly Leu Gly Leu Glu His Ser Ala Ser Leu Arg Lys His Leu Glu Gly
100         105         110
Asn Pro Lys Val Val Asp Leu Gly Gln Arg Leu Leu Asn Lys Asn Cys
115         120         125
Phe Asp Leu Leu Ser Glu Glu Gly Phe Pro Asp Pro His Ile Trp Thr
130         135         140
Asp Met Arg Val Trp Gly Ala Ala Val Lys Glu Met Ala Ala Ala Leu
145         150         155         160
Ile Gln Gln Phe Pro Gln Tyr Glu Glu Asp Phe Gln Lys Asn Ala Asp
165         170         175
Gln Ile Leu Ser Glu Met Glu Glu Leu Asp Arg Trp Ala Ala Arg Ser
180         185         190
Leu Ser Thr Ile Pro Glu Lys Asn Arg Tyr Leu Val Thr Gly His Asn
195         200         205
Ala Phe Ser Tyr Phe Thr Arg Arg Tyr Leu Ser Ser Asp Ala Glu Arg
210         215         220

```

-continued

Val	Ser	Gly	Glu	Trp	Arg	Ser	Arg	Cys	Ile	Ser	Pro	Glu	Gly	Leu	Ser
225					230				235					240	
Pro	Glu	Ala	Gln	Ile	Ser	Ile	Arg	Asp	Ile	Met	Arg	Val	Val	Glu	Tyr
			245					250						255	
Ile	Ser	Ala	Asn	Asp	Val	Glu	Val	Val	Phe	Leu	Glu	Asp	Thr	Leu	Asn
			260					265					270		
Gln	Asp	Ala	Leu	Arg	Lys	Ile	Val	Ser	Cys	Ser	Lys	Ser	Gly	Gln	Lys
		275					280					285			
Ile	Arg	Leu	Ala	Lys	Ser	Pro	Leu	Tyr	Ser	Asp	Asn	Val	Cys	Asp	Asn
	290					295					300				
Tyr	Phe	Ser	Thr	Phe	Gln	His	Asn	Val	Arg	Thr	Ile	Thr	Glu	Glu	Leu
305					310					315					320
Gly	Gly	Thr	Val	Leu	Glu										
				325											

<210> SEQ ID NO 12
 <211> LENGTH: 978
 <212> TYPE: DNA
 <213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 12

atgtcttttt	ttcatactag	aaaatataag	cttatectca	gaggactctt	gtgttttagca	60
ggctgtttct	taatgaacag	ctgttctctt	agtcgaggaa	atcaaccgcg	tgatgaaagc	120
atctatgtct	tgtctatgaa	tcgcatgatt	tgtgattgcg	tgtctcgcat	aactggggat	180
cgagtcaaga	atattgttct	gattgatgga	gcgattgac	ctcattcata	tgagatgggtg	240
aagggggatg	aagaccgaat	ggctatgagc	cagctgattt	tttgcaatgg	tttaggttta	300
gagcattcag	ctagtttacg	taaacattta	gagggttaacc	caaaagtcgt	tgatttaggt	360
caacgtttgc	taaacaataa	ctgttttgat	cttctgagtg	aagaaggatt	ccctgaccca	420
catatttgga	cggatatgag	agtatgggtt	gctgctgtaa	aagagatggc	tcgcgcat	480
attcaacaat	ttcctcaata	tgaagaagat	tttcaaaaga	atgcggatca	gatcttatca	540
gagatggagg	aacttgatcg	ttgggcagcg	cgcttctctt	ctacgattcc	tgaaaaaaat	600
cgctatttag	tcacaggcca	caatgcgttc	agttacttta	ctcgctcgga	tctatectct	660
gatgcggaga	gagtgctctg	ggagtggaga	tcgcgttgca	tttctccaga	agggttgtct	720
cctgaggctc	agattagtat	ccgagatatt	atgcgtgtag	tggagtatat	ctctgcaaac	780
gatgtagaag	ttgtcttttt	agaggatacc	ttaaatcaag	atgctttgag	aaagattgtt	840
tcttgctcta	agagcggaca	aaagattcgt	ctcgctaagt	ctcctttata	tagcgataat	900
gtctgtgata	actatttttag	cacgttccag	cacaatgttc	gcacaattac	agaagaattg	960
ggagggactg	ttcttgaa					978

<210> SEQ ID NO 13
 <211> LENGTH: 282
 <212> TYPE: PRT
 <213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 13

Met	Ser	Asp	Phe	Ser	Met	Glu	Thr	Leu	Lys	Asn	Leu	Arg	Gln	Gln	Thr
1				5					10					15	
Gly	Val	Gly	Leu	Thr	Lys	Cys	Lys	Glu	Ala	Leu	Glu	His	Ala	Lys	Gly
			20					25					30		

-continued

Asn Leu Glu Asp Ala Val Val Tyr Leu Arg Lys Leu Gly Leu Ala Ser
 35 40 45
 Ala Gly Lys Lys Glu His Arg Glu Thr Lys Glu Gly Val Ile Ala Ala
 50 55 60
 Arg Val Asp Glu Arg Gly Ala Ala Leu Val Glu Val Asn Val Glu Thr
 65 70 75 80
 Asp Phe Val Ala Asn Asn Asn Val Phe Arg Ala Phe Val Thr Ser Leu
 85 90 95
 Leu Ser Asp Leu Leu Asp His Glu Leu Ser Asp Val Asp Ala Leu Ala
 100 105 110
 Leu Val Met Ser Ser Gln Glu Pro Ser Leu Ser Val Glu Glu Leu Lys
 115 120 125
 Ala Val Thr Met Gln Thr Val Gly Glu Asn Ile Arg Ile Ser Arg Ala
 130 135 140
 Phe Tyr Thr Pro Val Asn Ser Gly Gln Ser Val Gly Ile Tyr Ser His
 145 150 155 160
 Gly Asn Gly Lys Ala Val Ala Ile Ala Phe Leu Ser Gly Ser Glu Asn
 165 170 175
 Gln Glu Ala Leu Ala Lys Asp Ile Ala Met His Ile Val Ala Ser Gln
 180 185 190
 Pro Gln Phe Leu Ser Lys Glu Ser Val Pro Gln Glu Val Leu Glu Arg
 195 200 205
 Glu Arg Glu Val Phe Ser Ser Gln Val Ala Gly Lys Pro Gln Glu Val
 210 215 220
 Val Glu Lys Ile Thr Gln Gly Lys Phe Arg Ala Phe Phe Gln Glu Ala
 225 230 235 240
 Cys Leu Leu Glu Gln Ala Phe Ile Lys Asp Pro Glu Val Thr Ile Gln
 245 250 255
 Gly Leu Ile Asp Arg Ala Ala Lys Ala Ser Gly Glu Pro Leu Lys Val
 260 265 270
 Glu His Phe Val Phe Trp Lys Met Gly Ala
 275 280

<210> SEQ ID NO 14

<211> LENGTH: 846

<212> TYPE: DNA

<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 14

atgagcgcact tctccatgga aacattgaaa aatttaagac agcagacagg tgtaggcctg 60
 actaaatgta aagaagctct tgagcacgcc aagggcaatt tagaggatgc ggttgtttat 120
 ttacgtaagc tcgggcttgc ctctgcaggc aaaaaagagc accgagaaac aaaagagggc 180
 gtgattgctg cagagttga tgaacgtggt gcagcgcttg ttgaagttaa cgttgaaacc 240
 gattttgttg ctaacaacaa cgtatttcga gcattcggtta cgagtttatt gtccgatctt 300
 cttgaccacg agcttagcga tggtagtgct ttggctctcg taatgtcttc tcaagagcct 360
 tccttatctg tggaagagct taaagctgtc acgatgcaaa cggttgagaga gaatatccgc 420
 attagccgag ctttctacac gcctgttaac tctgggtcaaa gtgtagggat ttattctcat 480
 ggaaatggaa aagctgtggc tatagctttc ctttctgggt ctgagaatca agaggctttg 540
 gctaaagaca ttgctatgca tattgtcgca agtcagccgc agttcttaag taaagaaagc 600

-continued

```

gttcctcaag aagttctaga aagagaacga gaagtatttt cttcccaagt ggctgggaaa 660
ccccaagaag tagttgagaa aattactcaa gggaaattta gggccttttt ccaagaggct 720
tgtttgtag aacaagcctt tattaaagac cctgaagtca caattcaagg tctgattgat 780
agagctgcaa aagctagtgg cgagccactc aaagttgagc actttgtctt ctggaaaatg 840
ggcgca 846

```

<210> SEQ ID NO 15
 <211> LENGTH: 263
 <212> TYPE: PRT
 <213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 15

```

Met Gly Asn Ile Lys Thr Leu Leu Glu Asn Arg Phe Lys Lys Pro Thr
1      5      10      15
Pro Asp Lys Met Glu Ser Leu Ala Lys Lys Arg Leu Glu Gly Glu Leu
20     25     30
Ser Pro Phe Leu Asn Gly Phe Thr Asn Pro Lys Leu Ser Ser Gln Glu
35     40     45
Glu Ala Arg Phe Arg Gln Leu Glu Glu Tyr Ser Phe Ser Lys Glu
50     55     60
Ile Ser His Asn Asp Leu Gln Gln Leu Cys His Leu Ser Ala Gln Val
65     70     75     80
Lys Gln Ile His His Gln Ala Ile Leu Leu His Gly Glu Arg Ile Lys
85     90     95
Lys Val Arg Glu Leu Leu Lys Thr Tyr Arg Glu Gly Val Phe Ser Ala
100    105    110
Trp Leu Leu Leu Thr Tyr Gly Asn Arg Gln Thr Pro Tyr Asn Phe Leu
115    120    125
Val Tyr Tyr Glu Leu Phe Ser Ala Leu Pro Asp Thr Leu Lys Leu Glu
130    135    140
Leu Glu Arg Leu Pro Arg Gln Ala Val Tyr Thr Leu Ala Ser Arg Glu
145    150    155    160
Gly Ser Gln Glu Lys Lys Glu Glu Ile Ile Arg Asn Tyr Gln Gly Glu
165    170    175
Thr Arg Gly Glu Leu Leu Glu Ile Ile Arg Arg Glu Phe Pro Leu Leu
180    185    190
Pro Thr Asp Arg Arg Gln Ser Ser Leu Ala Gln Gln Ala Phe Ser Phe
195    200    205
Phe Ala Lys Gly Thr Lys Leu Leu Gln Arg Cys Thr Asp Ile Ser Gln
210    215    220
Glu Glu Leu Leu Ser Leu Glu Lys Leu Ile Lys Lys Leu Gln Lys Val
225    230    235    240
Thr Thr Asn Leu Leu Ser Asn Thr Lys Val Ser Leu Asn Asp Asp Glu
245    250    255
Thr Gln Asn Ser Arg Asn Arg
260

```

<210> SEQ ID NO 16
 <211> LENGTH: 789
 <212> TYPE: DNA
 <213> ORGANISM: Chlamydia trachomatis

-continued

<400> SEQUENCE: 16

```

atgggaaata ttaaaaccct tttagagaat cgctttaaga aacctacacc cgataaaatg    60
gaatccctcg ctaaaaagcg tttagaagga gagctttctc cttttctaaa tgggtttact    120
aatcctaaac tctcttcgca agaggaaget agattccgtc aattactaga agagtactcc    180
ttttctaagg aaatctccca taacgatctc caacaactgt gtcacttata tgctcaggtt    240
aaacagattc atcatcaagc tatccttctc catggtgagc gaatcaagaa agttcgtgaa    300
ttattaaaaa cctatcgaga aggagttttt tcagcttggc tcttactcac ctatgggaat    360
cggcagacac cttataattt tcttgtttat tacgagctat tctcagctct tccagacact    420
cttaaactcg agttagaaag actgctctga caagcagtgat atactactgc ttctcgagaa    480
ggctcgcaag agaaaaaaga ggaaattatc cgtaactatc aaggtgaaac tcgtggagaa    540
ctcctagaaa ttatccgtag agaatttcgc ctacttecta ccgatcgacg tcaatcatcc    600
cttgcccaac aagccttttc tttttttgca aaaggaacaa aattattaca gcgatgtaca    660
gacattttctc aagaagagct cctctccctg gaaaaattga ttaaaaagtt acaaaaagtt    720
acaactaacc ttctttctaa cactaaggta tcccttaatg acgacgaaac ccaaaactct    780
agaaatcga                                     789

```

<210> SEQ ID NO 17

<211> LENGTH: 195

<212> TYPE: PRT

<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 17

```

Met Gly Ser Leu Val Gly Arg Gln Ala Pro Asp Phe Ser Gly Lys Ala
 1             5             10             15

Val Val Cys Gly Glu Glu Lys Glu Ile Ser Leu Ala Asp Phe Arg Gly
 20             25             30

Lys Tyr Val Val Leu Phe Phe Tyr Pro Lys Asp Phe Thr Tyr Val Cys
 35             40             45

Pro Thr Glu Leu His Ala Phe Gln Asp Arg Leu Val Asp Phe Glu Glu
 50             55             60

Arg Gly Ala Val Val Leu Gly Cys Ser Val Asp Asp Ile Glu Thr His
 65             70             75             80

Ser Arg Trp Leu Ala Val Ala Arg Asn Ala Gly Gly Ile Glu Gly Thr
 85             90             95

Glu Tyr Pro Leu Leu Ala Asp Pro Ser Phe Lys Ile Ser Glu Ala Phe
100            105            110

Gly Val Leu Asn Pro Glu Gly Ser Leu Ala Leu Arg Ala Thr Phe Leu
115            120            125

Ile Asp Lys Tyr Gly Val Val Arg His Ala Val Ile Asn Asp Leu Pro
130            135            140

Leu Gly Arg Ser Ile Asp Glu Glu Leu Arg Ile Leu Asp Ser Leu Ile
145            150            155            160

Phe Phe Glu Asn His Gly Met Val Cys Pro Ala Asn Trp Arg Ser Gly
165            170            175

Glu Arg Gly Met Val Pro Ser Glu Glu Gly Leu Lys Glu Tyr Phe Gln
180            185            190

Thr Met Asp
195

```


-continued

<210> SEQ ID NO 18
 <211> LENGTH: 585
 <212> TYPE: DNA
 <213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 18

```
atgggatcac tagttggaag acaggctccg gatttttctg gtaaagccgt tgtttgtgga    60
gaagagaaaag aaatctctct agcagacttt cgtggttaagt atgtagtgtct cttcttttat    120
cctaaagatt ttacctatgt ttgtcctaca gaattgcatg cttttcaaga tagattggta    180
gattttgaag agcgagggtgc agtcgtgctt ggttgctccg ttgacgacat tgagacacat    240
tctcgttggc tcgctgtagc gagaaatgca ggaggaatag agggaaacaga atatcctctg    300
ttagcagacc cttcttttaa aatatcagaa gcttttggtg ttttgaatcc tgaaggatcg    360
ctcgctttaa gacgactttt ccttatcgat aaatatgggg ttgttcgtca tgcggttatc    420
aatgatcttc ctttagggcg ttccattgac gaggaattgc gtattttaga ttcattgatc    480
ttctttgaga accacggaat ggtttgcca gctaactggc gttctggaga gcgtggaatg    540
gtgccttctg aagagggatt aaaagaatat ttccagacga tggat                    585
```

<210> SEQ ID NO 19
 <211> LENGTH: 116
 <212> TYPE: PRT
 <213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 19

```
Val Ala Leu Lys Ile Arg Leu Arg Gln Gln Gly Arg Lys Asn His Val
1          5          10          15
Val Tyr Arg Leu Val Leu Ala Asp Val Glu Ser Pro Arg Asp Gly Lys
20        25        30
Tyr Ile Glu Leu Leu Gly Trp Tyr Asp Pro His Ser Glu Gln Asn Tyr
35        40        45
Gln Leu Lys Ser Glu Arg Ile Phe Tyr Trp Leu Asn Gln Gly Ala Glu
50        55        60
Leu Thr Glu Lys Ala Gly Ala Leu Val Lys Gln Gly Ala Pro Gly Val
65        70        75        80
Tyr Ala Glu Leu Met Ala Lys Lys Val Ala Arg Arg Ala Val Val Arg
85        90        95
Gln Lys Arg Arg Ala Tyr Arg Gln Arg Leu Ala Ala Arg Lys Ala Glu
100       105       110
Ala Ala Ala Lys
115
```

<210> SEQ ID NO 20
 <211> LENGTH: 348
 <212> TYPE: DNA
 <213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 20

```
gtggcgtaa aaattcggtt aagacaacaa ggacgtaaga accatgttgt atatagatta    60
gtactagctg atgtggagtc tcctagagat ggtaaataata ttgagctggt gggatggtag    120
gatcctcata gcgagcagaa ttatcagctg aaaagcgaac ggatttttta ttggttgaat    180
caaggagctg agcttacaga gaaggctggg gctttagtga aacaaggagc tcctgggggt    240
```

-continued

tatgctgaac taatggctaa aaaagttgct cgtagagcag tcgttagaca aaaaagacga 300

gcttatcgtc agcgtcttgc tgcaagaaag gctgaagcag ctgctaag 348

<210> SEQ ID NO 21

<211> LENGTH: 301

<212> TYPE: PRT

<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 21

Val Met Gln Met Asp Leu Phe Tyr Ser Leu Leu Pro Ser Ser Asn Pro
1 5 10 15Val Glu Ser Val Thr Ile Gly Phe Phe Asp Gly Cys His Leu Gly His
20 25 30Gln Ala Leu Leu Ser Phe Leu Thr Lys Phe Pro Ser Lys Ser Gly Val
35 40 45Ile Thr Phe Ser Gln His Pro Glu His Thr Leu Ser Asn Ser Pro Pro
50 55 60Glu Thr Ile Thr Ser Leu Glu Glu Arg Val Gln Leu Leu Ala Gly Cys
65 70 75 80Gly Ile Asp Tyr Leu Ala Val Leu Pro Phe Asn Gln Glu Ile Ala Asn
85 90 95Gln Glu Ala Glu Pro Phe Ile Gln Ser Ile Tyr Lys Thr Leu Arg Pro
100 105 110Ser Arg Ile Val Leu Gly Tyr Asp Ser Arg Leu Gly Lys Gly Gly Leu
115 120 125Gly Thr Ala Gln Thr Leu Arg Pro Phe Ala Ala Ser Leu Gly Ile Ser
130 135 140Leu Glu Glu Val Pro Pro Leu Gln Ile Glu Gly Thr Ile Val Ser Ser
145 150 155 160Arg Lys Ile Arg Gln Phe Leu Arg Lys Lys Asp Leu Cys Ser Ala Glu
165 170 175Lys Phe Leu Gly Arg Pro Phe Ser Tyr Thr Gly Lys Val Ala His Gly
180 185 190Arg Gly Ile Gly Ala Ser Phe Gly Tyr Ala Thr Ile Asn Leu Pro Leu
195 200 205Thr His Ser Leu Leu Pro Leu Gly Val Tyr Thr Cys Thr Ile Val Ile
210 215 220Glu Gly Phe Ser Tyr Ala Gly Val Met Asn Leu Gly Met Ala Pro Thr
225 230 235 240Met Gln Arg His Gln Leu Cys Leu Glu Ala His Ile Leu Asp Phe Ser
245 250 255Glu Asp Leu Tyr Asp Lys Ser Ile Thr Val Ile Pro Glu Gln Phe Leu
260 265 270Arg Glu Glu Lys Leu Phe Ser Ser Lys Asp Glu Leu Val Leu Ala Ile
275 280 285Gln Glu Asp Ile Arg Gln Ala Arg Leu Asn Lys Asn Arg
290 295 300

<210> SEQ ID NO 22

<211> LENGTH: 903

<212> TYPE: DNA

<213> ORGANISM: Chlamydia trachomatis

-continued

<400> SEQUENCE: 22

```

gtgatgcaaa tggacttatt ctacagcctg ctcccgtcct ctaatcctgt agaatctgtt    60
actatagggt ttttcgatgg gtgtcattta ggacaccaag ctttgctttc ttttttaacg    120
aagtttccta gcaaatctgg agtaattacg ttcagccagc atcctgagca tactttgtct    180
aactctctc cagaaactat tacctctctt gaggagcgtg ttcagcttct ggtggctgc    240
ggcattgatt atctagccgt tctccctttt aaccaggaaa tagctaataca agaggcagag    300
ccatttatcc agtctattta caagactcta cgtccatcaa gaattgtctt gggttacgat    360
tctagacttg ggaagggtgg tttaggaaca gcacaaacgt taaggccttt tctgcctct    420
ttagggatat ctctagaaga agtccctccc ctacagattg aaggctactat tgtatctagc    480
agaaaaattc gacaatttct tagaaagaaa gatttgtgct ctgcagaaaa gtttcttggg    540
agaccttttt cttatacagg aaagggtgct catggacgag gaattggggc atcttttga    600
tatgcaacaa tcaatcttcc ccttaccat tctctacttc ctttaggggt atatacttgt    660
actatcgtaa ttgaagggtt cagctatgca ggtgttatga atttaggtat ggcgccacaca    720
atgcaaagac accaactatg cctagaggca catatccttg attttccaga agatctctac    780
gataagagta ttactgtgat tctgagcaa tttctcaggg aagaaaagct cttttcttct    840
aaagacgagc ttgtccttgc cattcaagaa gatatccgcc aagccctct caataaaaaat    900
aga                                                    903

```

<210> SEQ ID NO 23

<211> LENGTH: 112

<212> TYPE: PRT

<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 23

```

Lys His Met Pro Val Val Gln Lys Pro Ser Val Leu Glu Tyr Ala Pro
1          5          10          15
Val Ser Pro Ser Thr Thr Ser Asp Ser Lys Ile Pro Asn His Arg Ser
20          25          30
Gly Ala Ser Cys Ile Lys Ile Ser Met Ile Leu Ala Cys Ser Leu Leu
35          40          45
Ala Val Gly Ile Ile Leu Ala Ile Ala Leu Leu Ala Ser Pro Gly Ser
50          55          60
Leu Ala Tyr Val Leu Val Ala Gly Ile Leu Ala Leu His Ala Val Leu
65          70          75          80
Ala Leu Ala Leu Gly Leu Trp Ile Ser Ser Ser Thr Lys His Ala Leu
85          90          95
Leu Ser Glu Asn Ser Gly Thr Glu Leu Ile Thr Ile Lys Lys Gln Gln
100         105         110

```

<210> SEQ ID NO 24

<211> LENGTH: 339

<212> TYPE: DNA

<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 24

```

aaacatatgc ctgtagtaca gaaaccttca gttttggagt acgctcctgt ttctccttct    60
acgacttctg attcaaaaat accaaaccac cgatctggag cctcttgat caagatctcc    120
atgattttgg catgttctct tctagcggtc ggcattatc tcgcaatagc cttgcttgct    180

```

-continued

```

tcccctggaa gtcttgcccta tgtcttagta gctggatat tagctcttca tgccgtttta 240
gcccttgctt taggattatg gatctcctca tcaaccaagc atgcactact gagtgaaaac 300
tccggtaccg agctgattac aataaagaaa caacaataa 339

```

<210> SEQ ID NO 25
 <211> LENGTH: 82
 <212> TYPE: PRT
 <213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 25

```

Asp Leu Leu Arg Met Lys Glu Phe Leu Ala Tyr Ile Val Lys Asn Leu
1           5           10           15
Val Asp Lys Pro Glu Glu Val His Leu Lys Glu Val Gln Gly Thr Asn
20           25           30
Thr Ile Ile Tyr Glu Leu Thr Val Ala Lys Gly Asp Ile Gly Lys Ile
35           40           45
Ile Gly Lys Glu Gly Arg Thr Ile Lys Ala Ile Arg Thr Leu Leu Val
50           55           60
Ser Val Ala Ser Arg Asp Asn Val Lys Val Ser Leu Glu Ile Met Glu
65           70           75           80
Glu Arg

```

<210> SEQ ID NO 26
 <211> LENGTH: 249
 <212> TYPE: DNA
 <213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 26

```

gatttgcttc gcatgaaaga gtttttagcg tacattgtaa aaaatcttgt tgataagcca 60
gaggaagtgc atctgaaaga ggtgcaggga accaatacga ttatctacga attgactgtt 120
gctaaggagg atatcggtaa aattatcggt aaagaaggac gcactattaa ggctatccgt 180
actttattgg tttccgtagc aagtcgagat aatgtgaaag tcagcctaga aattatggaa 240
gagcggtaa 249

```

<210> SEQ ID NO 27
 <211> LENGTH: 102
 <212> TYPE: PRT
 <213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 27

```

Met Ser Asp Gln Ala Thr Thr Leu Lys Ile Lys Pro Leu Gly Asp Arg
1           5           10           15
Ile Leu Val Lys Arg Glu Glu Glu Ala Ser Thr Ala Arg Gly Gly Ile
20           25           30
Ile Leu Pro Asp Thr Ala Lys Lys Lys Gln Asp Arg Ala Glu Val Leu
35           40           45
Ala Leu Gly Thr Gly Lys Lys Asp Asp Lys Gly Gln Gln Leu Pro Phe
50           55           60
Glu Val Gln Val Gly Asn Ile Val Leu Ile Asp Lys Tyr Ser Gly Gln
65           70           75           80
Glu Leu Thr Val Glu Gly Glu Glu Tyr Val Ile Val Gln Met Ser Glu
85           90           95

```

-continued

Val Ile Ala Val Leu Gln
100

<210> SEQ ID NO 28
<211> LENGTH: 306
<212> TYPE: DNA
<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 28

```
atgtcagatc aagcaacgac cctcaagatt aaacctttgg gagatagaat tttagttaaa    60
agagaagaag aagcttccac tgcaagaggg ggaatcattc ttctgacac tgccaaaaaa    120
aagcaagata gagctgaagt tttagctcta ggaacaggca aaaaagatga taaagggcag    180
caacttcctt ttgaagttca gggttgtaac atcgttttaa ttgataaata ttctggccaa    240
gaacttactg tcgaagggtga agagtacgtc atcgttcaaa tgagcgaaagt tatcgagtt    300
ctgcaa                                           306
```

<210> SEQ ID NO 29
<211> LENGTH: 122
<212> TYPE: PRT
<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 29

```
Met Pro Arg Ile Ile Gly Ile Asp Ile Pro Ala Lys Lys Lys Leu Lys
1           5           10          15
Ile Ser Leu Thr Tyr Ile Tyr Gly Ile Gly Pro Ala Leu Ser Lys Glu
20          25          30
Ile Ile Ala Arg Leu Gln Leu Asn Pro Glu Ala Arg Ala Ala Glu Leu
35          40          45
Thr Glu Glu Glu Val Gly Arg Leu Asn Ala Leu Leu Gln Ser Asp Tyr
50          55          60
Val Val Glu Gly Asp Leu Arg Arg Arg Val Gln Ser Asp Ile Lys Arg
65          70          75          80
Leu Ile Thr Ile His Ala Tyr Arg Gly Gln Arg His Arg Leu Ser Leu
85          90          95
Pro Val Arg Gly Gln Arg Thr Lys Thr Asn Ser Arg Thr Arg Lys Gly
100         105         110
Lys Arg Lys Thr Val Ala Gly Lys Lys Lys
115         120
```

<210> SEQ ID NO 30
<211> LENGTH: 366
<212> TYPE: DNA
<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 30

```
atgccacgca tcattggaat agatattcct gcgaaaaaga aattaaaaat aagtcttaca    60
tatatttatg gaatagggcc agctctttct aaagagatca ttgctagatt gcagttgaat    120
cccgaagcta gagctgcaga gttgactgag gaagagggtg gtcgactaaa cgctctttta    180
cagtcggatt acgttggtga aggggatttg cgccgctcgt tgcaatctga tatcaaactg    240
ctgattacta tccatgctta tcgtggacaa agacatagac tttctttgcc tgttcgtggt    300
cagagaacaa aaacaaattc tcgcacgcgt aagggtaaac gtaaaactgt tgcaggtgaag    360
aagaaa                                           366
```

-continued

<210> SEQ ID NO 31
<211> LENGTH: 424
<212> TYPE: PRT
<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 31
Met Phe Asp Val Val Ile Ser Asp Ile Glu Ala Arg Glu Ile Leu Asp
1 5 10 15
Ser Arg Gly Tyr Pro Thr Leu Cys Val Lys Val Ile Thr Asn Thr Gly
20 25 30
Thr Phe Gly Glu Ala Cys Val Pro Ser Gly Ala Ser Thr Gly Ile Lys
35 40 45
Glu Ala Leu Glu Leu Arg Asp Lys Asp Pro Lys Arg Tyr Gln Gly Lys
50 55 60
Gly Val Leu Gln Ala Ile Ser Asn Val Glu Lys Val Leu Met Pro Ala
65 70 75 80
Leu Gln Gly Phe Ser Val Phe Asp Gln Ile Thr Ala Asp Ala Ile Met
85 90 95
Ile Asp Ala Asp Gly Thr Pro Asn Lys Glu Lys Leu Gly Ala Asn Ala
100 105 110
Ile Leu Gly Val Ser Leu Ala Leu Ala Lys Ala Ala Ala Asn Thr Leu
115 120 125
Gln Arg Pro Leu Tyr Arg Tyr Leu Gly Gly Ser Phe Ser His Val Leu
130 135 140
Pro Cys Pro Met Met Asn Leu Ile Asn Gly Gly Met His Ala Thr Asn
145 150 155 160
Gly Leu Gln Phe Gln Glu Phe Met Ile Arg Pro Ile Ser Ala Pro Ser
165 170 175
Leu Thr Glu Ala Val Arg Met Gly Ala Glu Val Phe Asn Ala Leu Lys
180 185 190
Lys Ile Leu Gln Asn Arg Gln Leu Ala Thr Gly Val Gly Asp Glu Gly
195 200 205
Gly Phe Ala Pro Asn Leu Ala Ser Asn Ala Glu Ala Leu Asp Leu Leu
210 215 220
Leu Thr Ala Ile Glu Thr Ala Gly Phe Thr Pro Arg Glu Asp Ile Ser
225 230 235 240
Leu Ala Leu Asp Cys Ala Ala Ser Ser Phe Tyr Asn Thr Gln Asp Lys
245 250 255
Thr Tyr Asp Gly Lys Ser Tyr Ala Asp Gln Val Gly Ile Leu Ala Glu
260 265 270
Leu Cys Glu His Tyr Pro Ile Asp Ser Ile Glu Asp Gly Leu Ala Glu
275 280 285
Glu Asp Phe Glu Gly Trp Lys Leu Leu Ser Glu Thr Leu Gly Asp Arg
290 295 300
Val Gln Leu Val Gly Asp Asp Leu Phe Val Thr Asn Ser Ala Leu Ile
305 310 315 320
Ala Glu Gly Ile Ala Gln Gly Leu Ala Asn Ala Val Leu Ile Lys Pro
325 330 335
Asn Gln Ile Gly Thr Leu Thr Glu Thr Ala Glu Ala Ile Arg Leu Ala
340 345 350
Thr Ile Gln Gly Tyr Ala Thr Ile Leu Ser His Arg Ser Gly Glu Thr

-continued

355	360	365	
Glu Asp Thr Thr Ile Ala Asp Leu Ala Val Ala Phe Asn Thr Gly Gln			
370	375	380	
Ile Lys Thr Gly Ser Leu Ser Arg Ser Glu Arg Ile Ala Lys Tyr Asn			
385	390	395	400
Arg Leu Met Ala Ile Glu Glu Glu Met Gly Pro Glu Ala Leu Phe Gln			
405	410	415	
Asp Ser Asn Pro Phe Ser Lys Ala			
420			

<210> SEQ ID NO 32
 <211> LENGTH: 1272
 <212> TYPE: DNA
 <213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 32

atgtttgatg tcgtcatctc cgatatagaa gcgagagaaa ttttagattc tcgaggctat	60
cccacattat gtgttaaagt catcactaat acaggaacct ttggtgaagc gtgcgttcct	120
tctggagcat ctacaggcat caaggaagct ttggaactgc gtgacaaaga tcctaaacgt	180
taccaaggga aaggggtctt acaagccatt tctaattgtc aaaaagtgc gatgcccgt	240
ttacaaggat tcagcgtatt tgaccaaatt acagctgatg cgattatgat tgatgctgat	300
ggaactccga acaaagaaaa gttaggagct aatgcgattc ttggagtctc cctagcatta	360
gcaaaagctg ctgcaataac ttacagaga cctttatata ggtatcttgg tggatcttct	420
tcgcatgtgc ttctctgccc tatgatgaat cttatcaatg gcggtatgca tgctacaaat	480
gggtctccaa tccaagaatt tatgattcgt ccaattagcg ctctctctct aacagaggct	540
gtgcggatgg gacgagaagt cttcaacgcc ttaaaaaaaa tcttacagaa tcgacagctg	600
gctacaggtg ttggtgatga aggcggatct gctcctaata ttgcctctaa tgccgaagct	660
ctggatctac tcttaacagc aatcgaaact gcaggattca cacctagaga agatatttct	720
ttagctctcg actgcgctgc ttcttctttc tataataccc aagataaaac ctatgatggg	780
aaatcgtatg cagatcaagt gggataactt gcagaactct gtgagcacta tcctatagat	840
tctatcgaag atgggctagc cgaagaagat tttagaggct ggaaactcct atccgagact	900
ttaggagatc gtgtgcaact agttggagac gacctatttg tgacgaattc tgcattgatt	960
gctgaaggaa tcgctcaagg acttgccaat gccgttctca tcaaaccaaa ccaaattgga	1020
acacttacag aaactgcaga agctattcgt ttagcaacta tacaaggcta cgctaccatt	1080
ctttcgcata gatcaggaga aacagaagat actaccatag cagacctgc tgcgctttt	1140
aatacaggtc agattaaaaac agggctctct tcccgttctg agcgtatcgc taagtataac	1200
cgtctaattg caattgaaga agagatgggt ccagaagctc tattccaaga ttcaaatccc	1260
ttttctaaag ca	1272

<210> SEQ ID NO 33
 <211> LENGTH: 359
 <212> TYPE: PRT
 <213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 33

Met Glu Ile Lys Val Leu Glu Cys Leu Lys Arg Leu Glu Glu Val Glu	
1	15

-continued

Lys Gln Ile Ser Asp Pro Asn Ile Phe Ser Asn Pro Lys Glu Tyr Ser
 20 25 30
 Ser Leu Ser Lys Glu His Ala Arg Leu Ser Glu Ile Lys Asn Ala His
 35 40 45
 Glu Ser Leu Val Ala Thr Lys Lys Ile Leu Gln Asp Asp Lys Leu Ala
 50 55 60
 Leu Ser Thr Glu Lys Asp Pro Glu Ile Val Ala Met Leu Glu Glu Gly
 65 70 75 80
 Val Leu Val Gly Glu Glu Ala Val Glu Arg Leu Ser Lys Gln Leu Glu
 85 90 95
 Asn Leu Leu Ile Pro Pro Asp Pro Asp Asp Asp Leu Ser Val Ile Met
 100 105 110
 Glu Leu Arg Ala Gly Thr Gly Gly Asp Glu Ala Ala Leu Phe Val Gly
 115 120 125
 Asp Cys Val Arg Met Tyr His Leu Tyr Ala Ala Ser Lys Gly Trp Gln
 130 135 140
 Cys Glu Val Leu Ser Thr Ser Glu Ser Asp Leu Gly Gly Tyr Lys Glu
 145 150 155 160
 Tyr Val Met Gly Ile Ser Gly Ala Ser Val Lys Arg Phe Leu Gln Tyr
 165 170 175
 Glu Ala Gly Thr His Arg Val Gln Arg Val Pro Glu Thr Glu Thr Gln
 180 185 190
 Gly Arg Val His Thr Ser Ala Val Thr Val Ala Val Leu Pro Glu Pro
 195 200 205
 Ala Glu Asp Asp Glu Glu Val Phe Ile Asp Glu Lys Asp Leu Arg Ile
 210 215 220
 Asp Thr Phe Arg Ser Ser Gly Ala Gly Gly Gln His Val Asn Val Thr
 225 230 235 240
 Asp Ser Ala Val Arg Ile Thr His Ile Pro Ser Gly Val Val Val Thr
 245 250 255
 Cys Gln Asp Glu Arg Ser Gln His Lys Asn Lys Ala Lys Ala Met Arg
 260 265 270
 Val Leu Lys Ala Arg Ile Arg Asp Ala Glu Val Gln Lys Arg Ala Gln
 275 280 285
 Glu Ala Ser Ala Met Arg Ser Ala Gln Val Gly Ser Gly Asp Arg Ser
 290 295 300
 Glu Arg Ile Arg Thr Tyr Asn Phe Pro Gln Asn Arg Val Thr Asp His
 305 310 315 320
 Arg Ile Gly Leu Thr Leu Tyr Asn Leu Asp Arg Val Met Glu Gly Glu
 325 330 335
 Leu Asp Met Ile Thr Thr Ala Leu Val Thr His Val His Arg Gln Leu
 340 345 350
 Phe Gly His Glu Glu Thr Ala
 355

<210> SEQ ID NO 34

<211> LENGTH: 1077

<212> TYPE: DNA

<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 34

atggaaataa aagttttaga gtgtttaaaag cgccttgaag aagttgaaaa gcagatatcc 60

-continued

```

gatccgaata tcttttagtaa tcttaaagaa tatagttcgc tgagcaagga gcatgcgcgt 120
ctttctgaga ttaaaaatgc tcatgagtca ttggttgcca caaagaaaat tcttcaggac 180
gataaactcg ctttatcaac agagaaggat ccagaaatag tagctatgct agaagaagga 240
gttctttagt gggaagaggc tgtagaacgt ctatcgaagc agttagaaaa cctgcttatt 300
ccacctgata cagatgatga tctcagtgtg attatggagt tgcgagcagg aacgggagga 360
gatgaagcgg ctctttttgt aggggactgt gtgcgcgtgt atcaccttta tgcagcaagt 420
aaggggtggc aatgcgaagt tctctctaca tcggagtcag atctcggagg ctacaaagaa 480
tatgttatgg ggatttctgg ggcttctgtg aaacgtttct tgcagtatga agcaggaaca 540
catcgtgtgc aaaggggtccc agaaacagag actcagggtg gggtacatac gtctgcggtg 600
acggtagctg ttcttcacga accagcagaa gatgacgaag aagttttcat tgatgagaag 660
gatttacgta ttgatacctt ccgttcttct ggagccggag gccagcacgt caacgttaca 720
gattccgctg tgcgtattac tcatattcct tctggcgttg tcgttacgtg ccaagatgaa 780
cgcagtcagc ataaaaataa agctaaggct atgcgcgtgc taaaagctcg tattcgcgat 840
gcagaagtgc agaagcgcgc gcaagaagcc tctgctatgc gttctgctca ggtaggaagc 900
ggagatcggt cggagcgaat tcgaacctat aattttcttc aaaaccgtgt gaccgatcac 960
cgaattggct taactttata taacttagat cgtgtaatgg aaggagagtt ggatatgatt 1020
acgacagctc ttgtaaccca cgtacatcgg cagctattcg gtcatgaaga aactgct 1077

```

<210> SEQ ID NO 35

<211> LENGTH: 448

<212> TYPE: PRT

<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 35

```

Met Ile Ser Ser Leu Ser Gln Lys Leu Ser Asn Ile Phe Ser Ser Leu
1           5           10           15
Phe Thr Ala Lys Arg Val Thr Glu Glu Ser Ile Ser Asp Ser Ile Arg
20          25          30
Glu Val Arg Leu Ala Leu Leu Asp Ala Asp Val Asn Tyr Gln Ala Val
35          40          45
Lys Asp Phe Ile Ala Lys Val Lys Gln Lys Val Val Gly Glu Glu Val
50          55          60
Trp Lys His Val Ser Pro Gly Gln Gln Phe Ile Lys Cys Leu His Glu
65          70          75          80
Glu Leu Ser Ser Ser Leu Ala Ser Glu Gln Thr Ala Val Ser Leu Arg
85          90          95
Gly Cys Pro Ala Val Ile Leu Leu Cys Gly Leu Gln Gly Ala Gly Lys
100         105         110
Thr Thr Thr Cys Ala Lys Leu Ala Asp Tyr Phe Leu Arg Glu Lys Lys
115         120         125
Ala Lys Lys Val Leu Val Ala Ser Cys Asp Leu Lys Arg Phe Ser Ala
130         135         140
Val Glu Gln Leu Glu Gly Leu Val Lys Gln Thr Gly Ala Asp Phe Phe
145         150         155         160
Arg Arg Glu Gly Asn Asp Pro Val Asp Met Ala Ala Glu Ala Val Gln
165         170         175

```

-continued

His Ala Lys Ser Gln Gly Tyr Asp Leu Val Leu Val Asp Thr Ala Gly
 180 185 190
 Arg Leu His Val Asp Asp Ala Leu Met Asp Glu Leu Val Ala Ile Ala
 195 200 205
 Arg Val Thr Thr Pro Cys Glu Thr Leu Phe Val Met Asn Leu Ala Met
 210 215 220
 Gly Gln Asp Ala Val Val Thr Ala Lys Ala Phe Asp Glu Arg Leu Gly
 225 230 235 240
 Leu Thr Gly Val Val Val Ser Met Ala Asp Gly Asp Ala Arg Ala Gly
 245 250 255
 Ala Val Leu Ser Val Lys Ser Leu Leu Asn Lys Pro Ile Lys Phe Glu
 260 265 270
 Gly Cys Gly Glu Lys Ile Lys Asp Leu Arg Pro Phe Asn Ala Gln Ser
 275 280 285
 Met Ala Glu Arg Ile Leu Gly Met Gly Asp Thr Ile Ser Leu Val Asp
 290 295 300
 Lys Met Arg Glu Cys Ile Ser Glu Glu Glu Asn Lys Glu Leu Glu Glu
 305 310 315 320
 Lys Leu Thr Lys Ala Thr Phe Thr Tyr Glu Asp Phe His Lys Gln Ile
 325 330 335
 Leu Ala Phe Arg Arg Leu Gly Pro Leu Arg Lys Ile Met Asn Met Met
 340 345 350
 Pro Ser Phe Gly Gly Ala Lys Pro Ser Asp Lys Asp Leu Glu Glu Ser
 355 360 365
 Glu Lys Gln Met Lys Arg Asn Glu Ala Ile Ile Leu Ser Met Thr Pro
 370 375 380
 Glu Glu Arg Lys Glu Leu Val Glu Leu Ser Met Ser Arg Met Lys Arg
 385 390 395 400
 Ile Ala Ala Gly Cys Gly Leu Thr Leu Gly Asp Val Asn Gln Phe Arg
 405 410 415
 Lys Gln Met Met Gln Ser Lys Lys Phe Phe Lys Gly Met Thr Arg Glu
 420 425 430
 Lys Met Glu Gln Met Gly Lys Lys Met Ser Gly Gly Asn Leu Trp Arg
 435 440 445

<210> SEQ ID NO 36

<211> LENGTH: 1344

<212> TYPE: DNA

<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 36

```

atgattagtt ctttatcgca aaaattatct aatattttct cctcactttt taccgcaaag      60
agggtgacag aggagagtat ttccgactcc attagagagg ttcgcttagc tcttctagat      120
gccgatgtga attatcaggc ggtgaaggat tttattgcta aagtgaagca gaaagttgtt      180
ggggaagaag tttggaaaca tgtctctcct gggcaacagt ttatcaagtg tttgcatgaa      240
gagctttcat cttctcttgc ttcagagcag accgctgttt cgttacgggg atgcccagct      300
gttattttac tctgcggggt acagggagcg gggaaaacga ctacttgtgc taagcttgct      360
gactattttc ttcagaaaaa gaaggcaaaag aaagtgctgg tagcctcctg tgatttgaaa      420
cgtttttcgg ctgtagaaca gttagaaggt ttagtaaaac aaacaggagc agattttttc      480
cgaaggaag gaaatgatcc tgtggacatg gcggcgagg cggttcagca tgcgaaaagc      540

```

-continued

```

caaggatatg atttagtcct tgtagatacc gctggacggc ttcattgtga tgatgcgttg      600
atggatgagt tagtagctat tgctcgtgta acgaccccgt gcgaaacctt gttcgttatg      660
aacttagcga tgggacaaga tgcggttggt actgcaaaag cttttgacga gcgcttaggc      720
ttaacagggtg tggttgtgtc tatggcagac ggtgatgctc gagctggagc ggtgttgtct      780
gtgaagtccct tgcttaataa gccaaataaa tttgaagggt gtggagagaa gataaaggat      840
ctacgtcctt ttaacgcaca gtcgatggca gaacgtattc ttggaatggg agatacgatc      900
agtctagtgg acaagatgct agagtgtatc tctgaagaag agaataaaga gttagaagaa      960
aagttaacaa aagcaacgtt cacttatgag gattttcata agcagatact tgcttttcgt    1020
cgttttagggc ctttgcgtaa gatcatgaat atgatgccaa gttttggtgg tgcaaacct      1080
agcgataagg atttgaaga atccgagaaa caaatgaaaa gaaatgaagc gattattctg      1140
tctatgactc cagaggaacg aaaggagtta gtggaattga gtatgagccg gatgaaaaga      1200
atcgtgcggg gctgtggatt gacgctaggt gatgtcaatc agttccgtaa gcaaatgatg      1260
caatctaaga agttttttaa gggaatgacc cgagagaaaa tggaacagat gggtaaaaaa      1320
atgtctggag ggaatctgtg gcgt                                           1344

```

```

<210> SEQ ID NO 37
<211> LENGTH: 287
<212> TYPE: PRT
<213> ORGANISM: Chlamydia trachomatis

```

```

<400> SEQUENCE: 37

```

```

Met Leu Leu Lys Gly Ala Pro Ala Ala Asp His Ile Leu Ala Thr Ile
1             5             10             15

Lys Glu Asn Ile Arg Ala Cys Ser Lys Ala Pro Gly Leu Ala Val Val
                20             25             30

Leu Ile Gly Asn Asn Pro Ala Ser Glu Ile Tyr Val Asn Met Lys Ile
            35             40             45

Lys Arg Ala Thr Asp Leu Gly Met Val Ser Lys Ser Tyr Arg Lys Pro
            50             55             60

Ser Asp Ala Thr Leu Ser Asp Ile Leu Ala Leu Ile His Gln Leu Asn
65             70             75             80

Asn Asp Glu Asn Ile His Gly Ile Leu Val Gln Leu Pro Leu Pro Lys
            85             90             95

His Leu Asp Ala Gln Ala Ile Leu Ser Thr Ile Thr Pro Asp Lys Asp
            100            105            110

Val Asp Gly Leu His Pro Val Asn Val Gly Lys Leu Leu Leu Gly Glu
            115            120            125

Thr Asp Gly Phe Ile Pro Cys Thr Pro Ala Gly Ile Val Glu Leu Cys
130            135            140

Lys Tyr Tyr Glu Ile Pro Leu His Gly Lys His Val Val Ile Leu Gly
145            150            155            160

Arg Ser Asn Ile Val Gly Lys Pro Leu Ala Ala Leu Leu Met Gln Arg
            165            170            175

His Ala Asp Thr Asn Ala Ser Val Thr Leu Leu His Ser Gln Ser Glu
            180            185            190

His Leu Thr Glu Ile Thr Arg Thr Ala Asp Ile Leu Ile Ser Ala Ile
195            200            205

```

-continued

Gly	Val	Pro	Leu	Phe	Val	Asn	Lys	Glu	Met	Ile	Ala	Glu	Lys	Thr	Val
210						215					220				
Ile	Met	Asp	Val	Gly	Thr	Ser	Arg	Ile	Pro	Ala	Ala	Asn	Pro	Lys	Gly
225					230					235					240
Tyr	Ile	Leu	Val	Gly	Asp	Val	Asp	Phe	Asn	Asn	Val	Val	Pro	Val	Cys
			245						250					255	
Arg	Ala	Ile	Thr	Pro	Val	Pro	Gly	Gly	Val	Gly	Pro	Met	Thr	Val	Ala
			260					265					270		
Met	Leu	Met	Arg	Asn	Thr	Trp	Glu	Ser	Phe	Leu	Arg	His	Thr	Ser	
	275						280					285			

<210> SEQ ID NO 38
 <211> LENGTH: 861
 <212> TYPE: DNA
 <213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 38

```

atgttatttaa aggggtgcgcc agcagctgac catattttag caacaatcaa ggaaaatatc   60
cgagcctgct ccaaagctcc tggctctgct gttgtgttga taggaaataa tccggcctca   120
gaaatctatg tgaatatgaa aatcaagcgt gctacggatt tggggatggt gtctaaatcc   180
tatcgcaagc cctcgatgc cactatcc gacattttag cgctcatcca ccaactcaat   240
aatgatgaga acatccacgg aatccttgtt caactcccc taccaaaaca ttagacgct   300
caagctattc ttccactat caccctgac aaagacgtcg atggactaca ccctgtcaat   360
gtagggaac tacttcttgg agaacagat ggatttatcc catgcactcc tctggaatt   420
gtggaactgt gcaaatatta tgagatccct ctccatggaa agcacgttgt tatcttagga   480
cgtagcaata tcgtaggtaa acctttagcg gccttactta tgcaaagaca tgcagatact   540
aatgctagtg tcactctcct tcatagccaa tctgagcacc ttaccgagat cactaggact   600
gcagatattc tcatttcagc tattggagta ccgctcttgg taaataaaga gatgattgca   660
gaaaaaacgg tgatcatgga tgcgggtacc tcaagaatcc ctgcagcgaa tcctaaaggt   720
tatatccttg taggagatgt cgattttaac aatgttgtag ctgtttgccg agccattact   780
cctgtccctg gtggagtcgg cccaatgacc gtcgctatgc taatgagaaa tacatgggaa   840
agttttttgc gtcataacct c                                     861
  
```

<210> SEQ ID NO 39
 <211> LENGTH: 560
 <212> TYPE: PRT
 <213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 39

Met	Ser	Ile	Ser	Gly	Ser	Gly	Asn	Val	Ser	Pro	Ala	Thr	Pro	Asp	Phe
1			5				10							15	
Asp	Pro	Ser	Ile	Leu	Met	Gly	Arg	Gln	Ala	Ala	Ser	Ala	His	Ala	Ala
	20						25					30			
Lys	Glu	Ala	Ser	Gly	Ala	Ser	Lys	Ala	Thr	Glu	Thr	Ser	Ala	Ala	Glu
	35					40					45				
Gln	Gln	Ala	Leu	Ile	Ser	Ser	Gly	Thr	Glu	Leu	Asp	Tyr	Val	Thr	Asp
	50				55					60					
Leu	Gln	Gln	Ser	Glu	Gly	Lys	Tyr	Lys	Lys	Thr	Leu	Asp	Lys	Thr	Ser
65				70						75				80	

-continued

Lys	Ser	Pro	Lys	Thr	Lys	Leu	Lys	Gly	Asn	Phe	Ser	Lys	Val	Arg	Ala		
			85						90					95			
Gly	Thr	Lys	Gly	Phe	Leu	Thr	Gly	Phe	Gly	Thr	Arg	Ala	Ser	Arg	Ile		
			100					105						110			
Ser	Ala	Arg	Lys	Ala	Glu	Asn	Asn	Gly	Glu	Gly	Met	Ser	Met	Ile	Pro		
			115				120						125				
Ser	Gln	Met	Glu	Tyr	Val	Lys	Lys	Lys	Gly	Asn	Arg	Val	Ser	Pro	Glu		
			130			135					140						
Met	Gln	Asn	Phe	Tyr	Leu	Gly	Ala	Ser	Gly	Leu	Trp	Ser	Pro	Thr	Ser		
					150					155					160		
Asp	Val	Ser	Ser	Ile	Thr	Glu	Asn	Cys	Leu	Gly	Ala	Thr	Ala	Leu	Ser		
				165					170						175		
Thr	Thr	Pro	Leu	Leu	Thr	Thr	Met	Gln	Asp	Pro	Val	Ser	Ile	Glu	His		
			180					185						190			
Leu	Ser	Ser	Gly	Glu	Ile	Thr	Ala	Leu	Ala	Ser	Phe	Asn	Pro	Asn	Val		
			195				200					205					
Arg	Thr	Ala	Ser	Leu	Asn	Glu	Gln	Thr	Ile	Asn	Ala	Trp	Thr	Glu	Ala		
					215					220							
Arg	Leu	Gly	Gly	Glu	Met	Val	Ser	Thr	Leu	Leu	Asp	Pro	Asn	Ile	Glu		
				230					235					240			
Thr	Ser	Ser	Leu	Leu	Arg	Arg	Ala	Pro	Thr	Val	Ser	Asn	Glu	Gly	Met		
			245					250						255			
Val	Asp	Val	Ser	Asp	Met	Gly	Asn	Gln	Thr	Thr	Ser	Leu	Ser	Met	Glu		
			260				265						270				
Gly	Leu	Val	Asn	Thr	Val	Val	Asp	Asp	Pro	Ala	Ser	Ala	Glu	Glu	Glu		
			275				280					285					
Lys	Lys	Thr	Gly	Glu	Leu	Ser	Leu	Glu	Glu	Met	Ala	Ala	Met	Ala	Lys		
			290			295				300							
Met	Met	Ala	Ala	Leu	Leu	Ser	Ser	Gly	Gln	Gly	Met	Ala	Val	Phe	Ile		
				310					315					320			
Ala	Ser	Ser	Thr	Pro	Ser	Ser	Gly	Leu	Thr	Gln	Phe	Pro	Glu	Pro	Lys		
				325				330						335			
Phe	Ser	Gly	Thr	Ile	Pro	His	His	Phe	Ser	Lys	Lys	Glu	Asp	Asn	Glu		
			340				345						350				
Thr	Ile	Trp	Gly	Leu	Asp	Ser	Gln	Ile	Gly	Ser	Ile	Ala	Phe	Asp	Thr		
		355					360					365					
Arg	Arg	Glu	Asn	Asn	Ala	Ser	Pro	Leu	Pro	Thr	Thr	Ser	Leu	His	Glu		
					375						380						
Glu	Ala	Ser	Tyr	Arg	Phe	Pro	Val	Gly	Glu	Ala	Pro	Leu	Asp	Val	Asn		
				390					395					400			
Glu	Ile	Pro	Phe	Ala	Val	Gln	His	Ser	Thr	Val	Phe	Ser	Lys	Glu	Thr		
			405						410					415			
Ala	Asn	Thr	Glu	Gln	Ala	Leu	Ile	Gln	Asn	Glu	Ser	Leu	Gly	Glu	Ile		
			420					425					430				
Pro	Val	Ser	Ala	Glu	Val	Val	Gly	Gln	Asp	Thr	Val	Ser	Ser	Ala	Tyr		
			435				440					445					
Gln	Phe	Pro	Ser	His	Leu	Gly	Met	Ala	Val	Leu	Ala	Ser	Val	Pro	Leu		
				455							460						
Ser	Thr	Glu	Asp	Tyr	Lys	Thr	Ala	Val	Glu	His	Arg	Lys	Gly	Pro	Gly		
				470						475				480			
Gly	Pro	Pro	Asp	Pro	Leu	Ile	Tyr	Gln	Tyr	Arg	Asn	Val	Ala	Val	Asp		

485										490					495				
Pro	Ala	Ile	Ile	Phe	Gln	Ser	Pro	Ser	Pro	Phe	Ser	Val	Ser	Ser	Arg				
			500				505						510						
Phe	Ser	Val	Gln	Gly	Lys	Pro	Glu	Ala	Val	Ala	Val	Tyr	Asn	Asp	Asp				
			515				520				525								
Gln	Glu	Glu	Ala	Ala	Gly	Gly	Asn	Arg	Asp	Ser	Asp	Glu	Gly	Lys	Asp				
			530				535				540								
Gln	Glu	Gln	Asp	Lys	Thr	Arg	Glu	Thr	Glu	Asp	Ala	Gly	Gly	Asp	Ser				
			545	550						555			560						
<210> SEQ ID NO 40																			
<211> LENGTH: 1680																			
<212> TYPE: DNA																			
<213> ORGANISM: Chlamydia trachomatis																			
<400> SEQUENCE: 40																			
atgtcaattt ctggaagtgg taatgtatct cctgcaactc ctgattttga cccatccatc 60																			
ttgatgggaa gacaggcggc atcagctcat gcagccaaag aggcctccgg agcatccaag 120																			
gctacggaaa cgctctgtgc agaacaacaa gcgttaatta gttctggaac ggaactagac 180																			
tatgtcacgg atttgcagca aagcgagggt aaatacaaaa agacctcga taagacttcg 240																			
aaatctccta aaacaaaatt aaaaggggaat ttttccaaag tacgtgcagg tactaaagga 300																			
ttccttacag gatttgaac gcgagcttct cgtattttctg ctcgtaaggc agaaaataat 360																			
ggagaaggga tgtctatgat ccctagccag atggaatatg tgaagaaaaa agggaatcgg 420																			
gtttctcctg aaatgcaaaa tttttatctt ggagcttcag gattatggag tccaacgtct 480																			
gatgtttctt ctataacgga aaattgtttg ggagctactg cctgtcaac aacccttta 540																			
ttgacgacta tgcaagatcc tgtgtctata gagcatctat catctggaga aatcactgca 600																			
ttagcttcgt ttaactctaa tgttcgtaca gcttctttga atgagcagac aattaatgct 660																			
tggacagaag ctagggtggg aggagaaatg gtttccactc tcttagacc caatattgag 720																			
acgtcttctc ttctacgtcg agctcctacc gtaagtaacg aagggatggt cgatgtttcg 780																			
gatatgggaa accgagctac aagtttatcc atggaaggat tagtaaatat tgttgttgat 840																			
gatccagctt ctgcagaaga agaaaaaaag actggagagc tctctttgga agagatggca 900																			
gccatggcaa aaatgatggc agcgctatta agctctggtc aagggatggc agtttttata 960																			
gcttcttcca ctctagttc aggccttaaca caatttcttg aacctaaagt ctcaggaact 1020																			
atccccatc atttttctaa aaaggaagat aacgaaacca ttgggggatt ggattctcag 1080																			
ataggaagca tagcatttga tacacggaga gaaaataatg cgtcccttt accgacaaca 1140																			
agcttgccacg aggaggett cttataggttc cctgtaggag aagctccttt ggatgttaat 1200																			
gaaatccctt ttgtctgtta acatagtacg gtattttcaa aggagactgc gaatacagaa 1260																			
caagctctta ttcagaatga gagtttggga gagataccag tttctgctga ggtagtagga 1320																			
caagatacgg ttagttcggc ttaccagttt ccttcccatt tagggatggc cgtgttagcc 1380																			
tcggttctc tttctacaga ggattataag actgcagtag aacatcgtaa aggtcctgga 1440																			
ggacctccag ccccatgtat ttatcaatc cgaatgtgg ctgttgatcc cgccattatt 1500																			
tttcaatcac cgtctccatt cagtgtttct tcgcgttttt ccgtgcaagg taagccggaa 1560																			
gctgtagctg tatacataga tgatcaagaa gaagctgcag gtggaaatcg agatagtgat 1620																			

-continued

gaagggaaag accaagagca ggataaaacg agagaaacag aggatgcagg aggcgattca 1680

<210> SEQ ID NO 41

<211> LENGTH: 167

<212> TYPE: PRT

<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 41

Met Ile Cys Cys Asp Lys Val Leu Ser Ser Val Gln Ser Met Pro Val
1 5 10 15Ile Asp Lys Cys Ser Val Thr Lys Cys Leu Gln Thr Ala Lys Gln Ala
20 25 30Ala Val Leu Ala Leu Ser Leu Phe Ala Val Phe Ala Ser Gly Ser Leu
35 40 45Ser Ile Leu Ser Ala Ala Val Leu Phe Ser Gly Thr Ala Ala Val Leu
50 55 60Pro Tyr Leu Leu Ile Leu Thr Thr Ala Leu Leu Gly Phe Val Cys Ala
65 70 75 80Val Ile Val Leu Leu Arg Asn Leu Ser Ala Val Val Gln Ser Cys Lys
85 90 95Lys Arg Ser Pro Glu Glu Ile Glu Gly Ala Ala Arg Pro Ser Asp Gln
100 105 110Gln Glu Ser Gly Gly Arg Leu Ser Glu Glu Ser Ala Ser Pro Gln Ala
115 120 125Ser Pro Thr Ser Ser Thr Phe Gly Leu Glu Ser Ala Leu Arg Ser Ile
130 135 140Gly Asp Ser Val Ser Gly Ala Phe Asp Asp Ile Asn Lys Asp Asn Ser
145 150 155 160Arg Ser Arg Ser His Ser Phe
165

<210> SEQ ID NO 42

<211> LENGTH: 501

<212> TYPE: DNA

<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 42

atgatctgct gtagacaaagt cttgtcgagc gtacaatcaa tgctgttat agataaatgc 60

tctgtaacga aatgcttaca aacggctaag caagcagctg ttcttgcggt gtctttgttt 120

gcggtgtttg cttcaggaag tttatccata ttatcagcgg cggtactggt tagtggcact 180

gctgctgttc ttccatatct gctgatatta acaacagctc ttctaggatt tgtttggtct 240

gttattgtgc ttttaagaaa tttatcagca gttgttcaga gttgtaaaaa gagatcacct 300

gaagaaattg aaggggctgc tcgtccctct gatcagcagg aatcaggagg acgtttgtcc 360

gaggagagcg cttcaccaca agcatctcct acttcgtcta cttttggtct tgaatecgct 420

ttgcgctcaa taggagatag tgtttctggg gcattcgatg atataataa ggacaacagc 480

cgttctcgat cacactcctt c 501

<210> SEQ ID NO 43

<211> LENGTH: 151

<212> TYPE: PRT

<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 43

-continued

Met Leu Ile Phe Phe Asp Lys Ser Gln Ser Gly Ala Leu Pro Asp Arg
 1 5 10 15
 Leu Glu Arg Ala Gly Asn Leu Leu Arg Phe Ala Val Asn Arg Gly Met
 20 25 30
 Ala Ser Gln Ile Lys Val Thr Ser Ala Gln Ser Gly His Ile Phe Phe
 35 40 45
 Ser Glu Lys Met Ile Ser Val Cys Lys Arg Ile Ala Cys Ile Val Leu
 50 55 60
 Cys Ile Val Leu Ala Pro Phe Cys Leu Leu Gly Ala Leu Ile Gly Thr
 65 70 75 80
 Ile Ala Tyr Lys Leu Ser Asn Ser Tyr Gln Asn Ala Leu Tyr Leu Phe
 85 90 95
 Arg Glu His Arg Asn Met Cys Ser Glu Val Glu Lys Ala Met Lys Gly
 100 105 110
 Lys Asn Lys Gln Ile Thr Arg Leu Gln Arg Asn Phe Arg Lys Val Leu
 115 120 125
 Glu Lys Lys His Ile Ala Asp Val Lys Lys Gln Lys Glu Tyr Gln Glu
 130 135 140
 Met Cys Arg Gln Ser Glu Ser
 145 150

<210> SEQ ID NO 44
 <211> LENGTH: 453
 <212> TYPE: DNA
 <213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 44

atgcttattt ttttcgataa atcacaaatca ggtgcgctac ctgatatagact agaacgcgct 60
 gggaatcttc tgagatttgc tgtaaatagg gggatggcct ctcaaataaa agtaacttct 120
 gctcagtcgt ggcatatttt cttttctgag aagatgatct ctgtatgcaa acgtattgct 180
 tgtattgttt tatgtattgt acttgcctcca ttttgtttgt taggagcttt gataggaacc 240
 attgcttaca aactatcaaaa ttcctatcag aatgctcttt acctcttccg cgagcatcga 300
 aatatgtgtt cggaagtaga aaaagctatg aaagggaata acaaacaaat tactcgttta 360
 caaagaaact ttcgaaaagt tttagaaaaa aaacatattg cagatgttaa gaaacaaaaa 420
 gaataccagg agatgtgtcg tcaatcagaa agt 453

<210> SEQ ID NO 45
 <211> LENGTH: 491
 <212> TYPE: PRT
 <213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 45

Met Tyr Arg Lys Ser Ala Leu Glu Leu Arg Asp Ala Val Val Asn Arg
 1 5 10 15
 Glu Leu Ser Val Thr Ala Ile Thr Glu Tyr Phe Tyr His Arg Ile Glu
 20 25 30
 Ser His Asp Glu Gln Ile Gly Ala Phe Leu Ser Leu Cys Lys Glu Arg
 35 40 45
 Ala Leu Leu Arg Ala Ser Arg Ile Asp Asp Lys Leu Ala Lys Gly Asp
 50 55 60
 Pro Ile Gly Leu Leu Ala Gly Ile Pro Ile Gly Val Lys Asp Asn Ile

-continued

65	70	75	80
His Ile Thr Gly Val Lys Thr Thr Cys Ala Ser Lys Met Leu Glu Asn	85	90	95
Phe Val Ala Pro Phe Asp Ser Thr Val Val Arg Arg Ile Glu Met Glu	100	105	110
Asp Gly Ile Leu Leu Gly Lys Leu Asn Met Asp Glu Phe Ala Met Gly	115	120	125
Ser Thr Thr Arg Tyr Ser Ala Phe His Pro Thr Asn Asn Pro Trp Asp	130	135	140
Leu Glu Arg Val Pro Gly Gly Ser Ser Gly Gly Ser Ala Ala Ala Val	145	150	155
Ser Ala Arg Phe Cys Pro Ile Ala Leu Gly Ser Asp Thr Gly Gly Ser	165	170	175
Ile Arg Gln Pro Ala Ala Phe Cys Gly Val Val Gly Phe Lys Pro Ser	180	185	190
Tyr Gly Ala Val Ser Arg Tyr Gly Leu Val Ala Phe Gly Ser Ser Leu	195	200	205
Asp Gln Ile Gly Pro Leu Thr Thr Val Val Glu Asp Val Ala Leu Ala	210	215	220
Met Asp Ala Phe Ala Gly Arg Asp Pro Lys Asp Ser Thr Thr Arg Asp	225	230	235
Phe Phe Lys Gly Thr Phe Ser Gln Ala Leu Ser Leu Glu Val Pro Lys	245	250	255
Leu Ile Gly Val Pro Arg Gly Phe Leu Asp Gly Leu Gln Glu Asp Cys	260	265	270
Lys Glu Asn Phe Phe Glu Ala Leu Ala Val Met Glu Arg Glu Gly Ser	275	280	285
Arg Ile Ile Asp Val Asp Leu Ser Val Leu Lys His Ala Val Pro Val	290	295	300
Tyr Tyr Ile Val Ala Ser Ala Glu Ala Ala Thr Asn Leu Ala Arg Phe	305	310	315
Asp Gly Val Arg Tyr Gly His Arg Cys Ala Gln Ala Asp Asn Met His	325	330	335
Glu Met Tyr Ala Arg Ser Arg Lys Glu Gly Phe Gly Lys Glu Val Thr	340	345	350
Arg Arg Ile Leu Leu Gly Asn Tyr Val Leu Ser Ala Glu Arg Gln Asn	355	360	365
Ile Phe Tyr Lys Lys Gly Met Ala Val Arg Ala Arg Leu Ile Asp Ala	370	375	380
Phe Gln Ala Ala Phe Glu Arg Cys Asp Val Ile Ala Met Pro Val Cys	385	390	395
Ala Thr Pro Ala Ile Arg Asp Gln Asp Val Leu Asp Pro Val Ser Leu	405	410	415
Tyr Leu Gln Asp Val Tyr Thr Val Ala Val Asn Leu Ala Tyr Leu Pro	420	425	430
Ala Ile Ser Val Pro Ser Gly Leu Ser Lys Glu Gly Leu Pro Leu Gly	435	440	445
Val Gln Phe Ile Gly Glu Arg Gly Ser Asp Gln Gln Ile Cys Gln Val	450	455	460
Gly Tyr Ser Phe Gln Glu His Ser Gln Ile Lys Gln Leu Tyr Pro Lys	465	470	475
			480

-continued

Ala Val Asn Gly Leu Phe Asp Gly Gly Ile Glu
 485 490

<210> SEQ ID NO 46
 <211> LENGTH: 1473
 <212> TYPE: DNA
 <213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 46

```

atgtatcgta agagtgccttt agaattaaga gatgctgtag tgaacagaga gctttcagtt    60
acagcgatta cagaatattt ttatcatcgt atagaaagtc atgacgaaca gattggagct    120
tttctttctc ttgttaaga gcgggctttg cttagagctt cacgtataga tgacaaacta    180
gcaaaaggag atccaatagg gttactagca ggaatcccta tcggagttaa agataatatt    240
catatcacag gagtgaaaac aacctgtgct tcgaaaatgt tggaaaactt cgtggctccc    300
tttgattcca cggtggtgag acgtatagag atggaagacg ggattttact gggtaagttg    360
aacatggatg agtttgccat gggatccaca actcgggtatt ccgcttttca tcctaccaat    420
aatccttggg atttagaacg agttccaggg ggttcttcag gtggatccgc ggcagcagtt    480
tcggcgaggt tctgtcctat cgcgttagga tcggataccg gaggatcgat tcgtcaacca    540
gcagcatttt gtggagttgt tggatttaaa ccttcctatg gagcagtttc tcgctacgga    600
ttagtcgctt ttggatccct tttagatcag attggacct tgacaacggt ggtagaggat    660
gtcgtctctg caatggatgc ctttctgtgt cgtgatccca aagattccac tacgagagac    720
ttttttaaag ggacgttttc gcaagccttg tcattggaag ttctaagtt aatcggagtt    780
cctagaggat tcctagacgg actgcaagaa gattgttaaag aaaacttttt cgaagctctt    840
gctgttatgg aacgtgaagg cagtcgcatt attgatgtag atctcagtg tttgaaacat    900
gcggtaacct tttactatat tgttgcctct gcagaagctg ccacaaactt agcccgtttt    960
gatggtgttc ggtatggtca tcgttgtgcg caggctgata acatgcatga aatgtatgcg   1020
cgttctcgta aagaaggctt tggaaaagaa gtaactcgta gaattctttt agggaattat   1080
gtgctttcag cagaaagaca aaacatcttt tataagaaag gaatggcagt tcgtgctcgc   1140
ttaatagacg cttttcaagc tgcttttgag cgctgtgatg tgatcgctat gcctgtatgc   1200
gcaacgcctg ccatcagaga tcaggatggt ttggatccgg tttctctata tctacaggat   1260
gtttataccg tagcggtaaa cttggcctat ttacctgcca ttccggttcc ttccggaactg   1320
tctaaagaag gtctcccat aggtgttcaa ttattgggg aaagaggttc ggatcagcag   1380
atttgtcaag taggatacag cttccaggaa cactcgcaaa tcaaacatt atatcctaaa   1440
gcagtgaatg gactttttga cggaggaata gaa                                1473

```

<210> SEQ ID NO 47
 <211> LENGTH: 363
 <212> TYPE: PRT
 <213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 47

Met Thr Pro Val Thr Pro Val Pro Pro Gln Ser Pro Gln Gln Val Lys
 1 5 10 15
 Gly Leu Leu Ser Arg Phe Leu Thr Ala Pro Asp Arg His Pro Lys Leu
 20 25 30

-continued

Arg	Tyr	Val	Tyr	Asp	Ile	Ala	Leu	Ile	Ala	Ile	Ser	Ile	Leu	Cys	Ile	
	35						40					45				
Val	Ser	Ile	Ile	Leu	Trp	Thr	Gln	Gly	Ser	Gly	Leu	Ala	Leu	Phe	Ala	
	50					55					60					
Ile	Ala	Pro	Ala	Leu	Ala	Ile	Gly	Ala	Leu	Gly	Val	Thr	Leu	Leu	Val	
65				70						75					80	
Ser	Asp	Leu	Ala	Glu	Ser	Gln	Lys	Ser	Lys	Glu	Ile	Ala	Asp	Thr	Val	
				85					90					95		
Ala	Ala	Val	Ser	Leu	Pro	Phe	Ile	Leu	Thr	Gly	Thr	Ala	Ala	Gly	Leu	
				100				105						110		
Met	Phe	Ser	Ala	Ile	Ala	Val	Gly	Gly	Gly	Ala	Val	Ile	Leu	Ala	Asn	
	115						120					125				
Pro	Leu	Phe	Leu	Met	Gly	Ser	Met	Thr	Leu	Gly	Phe	Ala	Leu	Met	Ser	
	130					135					140					
Leu	His	Arg	Val	Thr	Tyr	Gln	Tyr	Leu	Ser	Asn	Arg	Glu	Gln	Trp	Lys	
145					150					155					160	
Gln	Gln	Lys	Lys	Leu	Glu	Gln	Val	Glu	Leu	Ala	Ala	Trp	Glu	Ser	His	
				165					170					175		
Leu	Pro	Lys	Glu	Ser	Lys	Ser	Ser	Ala	Leu	Glu	Glu	Val	Arg	Tyr	Ser	
			180					185					190			
Pro	Arg	Leu	Met	Lys	Arg	Gly	Lys	Thr	Trp	Arg	Lys	Arg	Ala	Ile	Arg	
	195						200					205				
Arg	Lys	Asn	Tyr	Thr	Pro	Ile	Pro	Leu	Val	Asp	Lys	Thr	Leu	Gln	Thr	
	210					215					220					
Met	Gln	Pro	Asp	Ala	Leu	Phe	Ser	Ser	Thr	Thr	Thr	His	Ser	Thr	Asp	
225					230					235					240	
Ser	Glu	Gln	Ile	Leu	Thr	Ser	Val	Ser	Pro	Gln	Ser	Ser	Asp	Thr	Glu	
				245					250					255		
Ser	Ser	Ser	Ser	Ser	Ser	Phe	His	Thr	Pro	Pro	Asn	Ser	Asp	Lys	Glu	
				260				265					270			
Leu	Ser	Asp	Ser	Asn	Ser	Ser	Asp	Ser	Ser	Ser	Ser	Ser	Glu	Tyr	Met	
	275						280					285				
Asp	Ala	Leu	Glu	Thr	Val	Ala	Ala	Gly	Asp	Val	Ser	Gly	Ile	Thr	Pro	
	290					295					300					
Pro	Ser	Lys	Pro	Ser	Ser	Ser	Pro	Lys	Thr	Thr	Arg	Arg	Val	Val	Lys	
	305				310					315					320	
Leu	Ser	Arg	Ser	Glu	Arg	Asn	Ala	Gln	His	His	Arg	Asn	Lys	Asp	Gln	
				325					330					335		
Glu	Gln	Arg	Gln	Asp	Ser	Ser	Glu	Ser	Ser	Glu	Glu	Asp	Ser	Ser	Ser	
			340					345					350			
Asp	Ser	Ser	Gln	Lys	Lys	Lys	Pro	Ser	Arg	Lys						
	355						360									

<210> SEQ ID NO 48

<211> LENGTH: 1089

<212> TYPE: DNA

<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 48

atgactccag taacaccagt cctcccccac tctccccaac aggtaaaagg gcttttatcc	60
aggttttctga cggcacccga tcgtcacccc aaactacgct atgtttacga tattgtctct	120
atagctatta gtattctctg tattgtgagt atcattctct ggacacaagg gtctggactc	180

-continued

```

gctttatttg caatcgctcc agccttagct attggagccc taggagtcac tctgctagtc 240
tcagatcttg ccgaatccca gaaaagtaaa gagattgctg ataccgttgc ggcagtctct 300
cttcctttta tcctaacagg gacagctgct ggattgatgt tttctgctat tgccttaggc 360
ggaggcgctg taatcttagc gaatcctcta ttctaatgg gctctatgac tctcggttt 420
gctctgatgt ctctgcatag agtgacctat caatatctca gcaatcgca gcaatggaaa 480
cagcagaaga agctcaaca agttgagtta gctgctggg agagccatct tcctaagaa 540
agcaaactct ccgctctgga agaggttcgc tattccctc gtttgatgaa aagagggaa 600
acttggcgaa aacgggcaat cagaagaaaa aactatacac ctattccgtt ggtcgacaaa 660
acattgcaaa ccattgcaacc ggatgcactc ttctcctcta caaccacaca ttctacagat 720
agtgcagaga ttctaacttc tgcagctctc caaagctcag ataccgaatc ctctctttct 780
tctagcttcc acactccacc aaatagcgat aaagaactgt ccgactcgaa ttcttctgac 840
agcagctctt ctctgaata tatggatgct cttgaaaccg tagctgcagg agatgtctca 900
ggaataaccc ctccatccaa accctcttct tctccgaaaa cgacacgccg cgctcgtaaag 960
ctctctcgca gcgagagaaa tgctcagcat catcgtaata aagaccaaga gcaaagacaa 1020
gacagcagcg aatcttcgga agaggattcc tcatccgatt catctcaaaa gaagaaaccc 1080
tctcgtaaa 1089

```

<210> SEQ ID NO 49

<211> LENGTH: 352

<212> TYPE: PRT

<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 49

```

Met Glu Ile Asp Ile Leu Ser Leu Phe Pro Asp Tyr Phe Ala Ser Pro
1           5           10           15

Leu Gln Ala Thr Ile Leu Gly Arg Ala Ile Lys Gln Gly Ala Leu Ser
20          25          30

Val Arg Ser Arg Asp Ile Arg Glu Phe Gly Leu Gly Lys Trp Lys Gln
35          40          45

Val Asp Asp Ser Pro Tyr Asn Gly Glu Gly Met Leu Leu Met Ala Glu
50          55          60

Pro Val Val Gln Ala Ile Arg Ser Ile Arg Arg Lys Lys Ser Lys Val
65          70          75          80

Ile Tyr Leu Ser Pro Gln Gly Gln Leu Leu Ser Ala Lys Lys Ser Arg
85          90          95

Glu Leu Ala Ser Cys Ser His Leu Val Leu Leu Cys Gly His Tyr Glu
100         105         110

Gly Ile Asp Glu Arg Ala Leu Thr Ala Glu Val Asp Glu Glu Ile Ser
115         120         125

Ile Gly Asp Tyr Val Leu Thr Asn Gly Cys Ala Ala Ala Leu Val Leu
130         135         140

Val Asp Ala Leu Ala Arg Phe Ile Pro Gly Val Leu Gly Asn Gln Glu
145         150         155         160

Ser Ala Glu Tyr Asp Ser Leu Glu Asn Gly Leu Leu Glu Gly Pro Gln
165         170         175

Tyr Thr Arg Pro Arg Val Phe Glu Gly Glu Ser Val Pro Glu Val Leu
180         185         190

```

-continued

Leu Cys Gly Asp His Gln Lys Ile Ala Asp Trp Arg Lys Gln Val Ser
 195 200 205
 Leu Glu Arg Thr Arg Glu Arg Arg Pro Asp Leu Tyr Leu Gln Tyr Phe
 210 215 220
 Tyr Gly Asn Ser Ala Cys Leu Ser Thr Gln Glu Asp Leu Pro Arg Ile
 225 230 235 240
 Glu Val Val Ser Pro Lys Thr Phe Ser Val Val Leu Glu Val Gln Asp
 245 250 255
 Leu Arg Lys Ala Lys Lys Phe Tyr Ser Arg Met Phe Gly Lys Glu Cys
 260 265 270
 Trp Asp Gly Asp Lys Leu Phe Leu Leu Gly Lys Thr Ser Leu Tyr Leu
 275 280 285
 Gln Gln Thr Lys Glu Thr Arg Gly Pro Thr Thr Val Phe Ile Glu Leu
 290 295 300
 Glu Thr Asp His Asp Phe Val Arg Phe Leu Lys Arg Trp Glu Ile Leu
 305 310 315 320
 Gly Gly Glu Leu Gly Glu Gln Gly Thr Gly Gly Phe Pro Leu Arg Gln
 325 330 335
 Val Phe Asp Leu Asp Gly His Ile Trp Val Val Ser Cys Val Gln Lys
 340 345 350

<210> SEQ ID NO 50
 <211> LENGTH: 1056
 <212> TYPE: DNA
 <213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 50

```

atggagatag atattctctc tttattcccg gactattttg ctagtccttt acaggcgact    60
attttgggcc gagcaattaa acagggagct ttatctgttc gctcccgaga tattcgagag    120
ttcggccttag ggaatggaa gcaggtagat gactctccct ataatggaga ggggatgctt    180
ttgatggcag agcctgtggt acaggctatt agaagcataa gaagaaagaa gtccaaggtc    240
atatacttat ctccgcaggg acaactctct tccgcaaaga aaagtcgtga actggcgctg    300
tgttcgcatt tggtattgtt atgtggacac tatgagggaa ttgatgaaag ggcgttgact    360
gccgaagtgg atgaggagat aagtattggt gattacgttc tcaccaatgg gtgcgcggcg    420
gcttttagtt tcgtagatgc tcttgcgcg ttcattccgg gagttttagg gaaccaagaa    480
agtgcagagt acgactctct tgaaaatgga ttgtagaag gtcctcagta cactcgtcca    540
cgggtttttg aggggtgagtc gggtccctgaa gtgttgctct gtggagacca tcagaagatt    600
gcagattgga gaaaacaggt tagtctagag agaactagag aacgtcgacc agatctgtat    660
ctgcagtatt tttatggtaa cagtgcctgt ttaagtactc aagaggatct ccctaggata    720
gaggtagttt ctcccaaaac cttttctgta gttttagaag ttcaagatct tcgaaaagct    780
aagaagttct attccaggat gtttggaata gagtggtggg acggagataa attattcctt    840
ttagggaaga cgagtttgta cctgcaacag acaaaagaaa caagaggccc gaccacagta    900
tttatagagc tggagaccga tcatgatttt gttegttttt taaaacgatg ggaaatactc    960
ggaggggagc ttggtgaaca agggacggga gggtttcctt taagacaggt ttttgattta   1020
gatggccata tttgggttgt ctcttggtga cagaaa                                1056
  
```

-continued

```

<210> SEQ ID NO 51
<211> LENGTH: 550
<212> TYPE: PRT
<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 51

Val Glu Ser Ser Arg Ile Leu Ile Thr Ser Ala Leu Pro Tyr Ala Asn
 1             5             10             15
Gly Pro Leu His Phe Gly His Ile Thr Gly Ala Tyr Leu Pro Ala Asp
          20             25             30
Val Tyr Ala Arg Phe Gln Arg Leu Gln Gly Lys Glu Val Leu Tyr Ile
          35             40             45
Cys Gly Ser Asp Glu Tyr Gly Ile Ala Ile Thr Leu Asn Ala Glu Leu
          50             55             60
Ala Gly Met Gly Tyr Gln Glu Tyr Val Asp Met Tyr His Lys Leu His
          65             70             75             80
Lys Asp Thr Phe Lys Lys Leu Gly Ile Ser Val Asp Phe Phe Ser Arg
          85             90             95
Thr Thr Asn Thr Tyr His Pro Ala Ile Val Gln Asp Phe Tyr Arg Asn
          100            105            110
Leu Gln Glu Arg Gly Leu Val Glu Asn Gln Val Thr Glu Gln Leu Tyr
          115            120            125
Ser Glu Glu Glu Gly Lys Phe Leu Ala Asp Arg Tyr Val Val Gly Thr
          130            135            140
Cys Pro Lys Cys Gly Phe Asp Arg Ala Arg Gly Asp Glu Cys Gln Gln
          145            150            155            160
Cys Gly Ala Asp Tyr Glu Ala Arg Asp Leu Lys Glu Pro Arg Ser Lys
          165            170            175
Leu Thr Gly Ala Ala Leu Ser Leu Arg Asp Thr Glu His Ala Tyr Leu
          180            185            190
His Leu Glu Arg Met Lys Glu Asp Leu Leu Ala Phe Val Gln Gly Ile
          195            200            205
Tyr Leu Arg Pro His Met Arg Asn Phe Val Thr Asp Tyr Ile Glu His
          210            215            220
Leu Arg Pro Arg Ala Val Thr Arg Asp Leu Ser Trp Gly Ile Pro Val
          225            230            235            240
Pro Asp Leu Glu Asn Lys Val Phe Tyr Val Trp Phe Asp Ala Pro Ile
          245            250            255
Gly Tyr Ile Ser Gly Thr Met Asp Trp Ala Ala Ser Ile Gly Asp Pro
          260            265            270
Glu Ala Trp Lys Lys Phe Trp Leu Asp Asp Thr Val Thr Tyr Ala Gln
          275            280            285
Phe Ile Gly Lys Asp Asn Thr Ser Phe His Ala Ala Ile Phe Pro Ala
          290            295            300
Met Glu Ile Gly Gln Ser Leu Pro Tyr Lys Lys Val Asp Ala Leu Val
          305            310            315            320
Thr Ser Glu Phe Leu Leu Leu Glu Gly Phe Gln Phe Ser Lys Ser Asp
          325            330            335
Gly Asn Phe Ile Asp Met Asp Ala Phe Leu Glu Thr Tyr Ser Leu Asp
          340            345            350
Lys Leu Arg Tyr Val Leu Ala Ala Ile Ala Pro Glu Thr Ser Asp Ser
          355            360            365

```

-continued

Glu	Phe	Ser	Phe	Gln	Glu	Phe	Lys	Thr	Arg	Cys	Asn	Ser	Glu	Leu	Val
370							375				380				
Gly	Lys	Tyr	Gly	Asn	Phe	Val	Asn	Arg	Val	Leu	Ala	Phe	Ala	Val	Lys
385				390						395				400	
Asn	Gly	Cys	Thr	Glu	Leu	Ser	Ser	Pro	Gln	Leu	Glu	Gln	Lys	Asp	Leu
			405					410						415	
Asp	Phe	Ile	Ser	Lys	Ser	Gln	Lys	Leu	Ala	Lys	Asp	Ala	Ala	Glu	His
			420					425					430		
Tyr	Ala	Gln	Tyr	Ser	Leu	Arg	Lys	Ala	Cys	Ser	Thr	Ile	Met	Glu	Leu
		435					440					445			
Ala	Ala	Leu	Gly	Asn	Gly	Tyr	Phe	Asn	Asp	Glu	Ala	Pro	Trp	Lys	Leu
		450				455					460				
Ala	Lys	Glu	Gly	Asn	Trp	Asn	Arg	Val	Arg	Ala	Ile	Leu	Phe	Cys	Ala
465				470						475					480
Cys	Tyr	Cys	Gln	Lys	Leu	Leu	Ala	Leu	Ile	Ser	Tyr	Pro	Ile	Met	Pro
			485						490					495	
Glu	Thr	Ala	Leu	Lys	Ile	Leu	Glu	Met	Ile	Ala	Pro	His	Ser	Leu	Asp
			500					505					510		
Leu	Gly	Ser	Gln	Asp	Pro	Asp	Arg	Leu	Gln	Ser	Leu	Trp	Thr	Asp	Ser
		515					520					525			
Phe	Phe	Asp	Tyr	Ser	Glu	Glu	Lys	Phe	Ser	Leu	Lys	Glu	Pro	Glu	Leu
	530					535					540				
Leu	Phe	Thr	Met	Val	Glu										
545					550										

<210> SEQ ID NO 52

<211> LENGTH: 1650

<212> TYPE: DNA

<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 52

gtggaatctt cccgtattct tattacttct gcgttgccct acgcaaatgg tcctttgcat	60
tttggacata ttaccgggtgc ttatttgccct gcagatgttt atgcgcgttt tcagagacta	120
caaggcaaag aggtcttgta tatttgggtg tctgatgaat acggaatcgc aattaccctt	180
aatgcagagt tggcaggcat ggggtatcaa gaatatgtcg acatgtatca taagcttcat	240
aaagatacct tcaagaaatt gggaatttct gtagatttct tttccagaac tacgaacact	300
tatcatcctg ctattgtgca agattttctat cgaaacttgc aggaacgcgg actggtagag	360
aatcagggtga ccgaacagct gtattctgag gaagaaggga agtttctagc ggaccgttat	420
gttgtaggta cttgtcccaa gtgtgggttc gatcgagctc gaggagatga gtgtcagcag	480
tgcggtgccg attacgaagc tagagatctg aaagagcctc gttctaaatt aacgggggca	540
gctttatctt tacgtgatac ggaacatgct tacttgcaatt tggagcgcat gaaagaagat	600
ttgcttgctt tcgtgcaagg tatttatcta cgtccctata tgcgtaattt cgttacggat	660
tacatcgagc atttacgtcc tcgagcagtg actcgagatt tgtcttgggg aataccggtt	720
cctgatttgg aaaataaggt attctatgta tggttcgatg ctccaattgg ttacataagt	780
ggaactatgg attgggcagc atcgattgga gaccctgaag cttggaagaa gttttgggtg	840
gacgatactg tgacctacgc acagtttata ggtaaagata atacttcttt ccatgcggct	900
atttccctg ctatggaaat aggacaatct ctccctata agaaagtgga tgctcttgta	960

-continued

```

acatcagaat ttttattgtt agaaggtttc cagttcagta aatcggatgg gaattttata 1020
gacatggatg cgttttttaga aacgtattcc ttggataaac tgcgttatgt gttggcagcg 1080
attgctccag agacttcgga tagcgaattc tctttccaag agtccaagac gcgatgcaat 1140
tctgagcttg tagggaagta tggaaatttt gtgaatcgag ttctagcttt tgctgttaag 1200
aatggatgca cagagctttc ttctcctcaa ttagagcaaa aggatttggga ttttatctca 1260
aaatctcaaa aacttgctaa ggatgcagcc gaacattacg cacaatacag tttgcgtaag 1320
gcgtgttcca cgattatgga attagctgct ttagggaatg gctatttcaa tgatgaagct 1380
ccatggaaat tggctaaga gggttaactgg aatcgggtac gcgctattct attctgtgct 1440
tgttactgcc agaagtgtct agctctcatt tcctatccta ttatgcctga aacagcattg 1500
aagattttgg aaatgatagc tccacattcc ttagatctag gttccaaga tccagataga 1560
ttacaatctc tttggacaga ttcttttttt gattactcgg aagagaaatt ttctctgaaa 1620
gagcctgaat tattgttcac aatggtagag 1650

```

```

<210> SEQ ID NO 53
<211> LENGTH: 300
<212> TYPE: PRT
<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 53

```

```

Met Pro Ser Ser Phe Val Ser Gln Leu Ser Pro Ser Leu Phe Ser Ile
1           5           10           15

Leu Arg Glu Gln Leu Glu Lys Lys Gly Phe Thr Ile Ser Ile Pro Pro
          20           25           30

His Thr Val Phe Gln Gly Arg Ser Pro Thr Val Ser Cys Thr Val Tyr
          35           40           45

Gln Ser Gly Lys Ile Val Val Gln Gly Lys Gly Thr Gln Glu Phe Val
          50           55           60

Glu Phe Phe Leu Glu Pro Glu Ile Leu Gln Thr Phe Ser Ser Gln Asn
65           70           75           80

Val Gln Gln Asp Leu Arg Ser Arg Ile Gly Val Asp Glu Ser Gly Lys
          85           90           95

Gly Asp Phe Phe Gly Pro Leu Cys Thr Ala Gly Val Tyr Ala Ser Ser
          100          105          110

Pro Gln Ala Ile Glu Ala Leu Tyr Lys Thr Ser Ile Cys Asp Ser Lys
          115          120          125

Leu Ile Pro Asp Ala Lys Ile Leu Ser Leu Ala Gln Asn Ile Arg Ser
          130          135          140

Leu Cys Ala Cys Lys Val Ile Thr Leu Phe Pro Glu Lys Tyr Asn Ala
          145          150          155          160

Leu Tyr Ala Asn Phe Gln Asn Leu Asn Ser Leu Leu Ala Trp Thr His
          165          170          175

Ala Thr Ile Ile Asp Asn Leu Ala Pro His Pro Ala Gly Ala Val Phe
          180          185          190

Ala Ile Ser Asp Gln Phe Ala Ser Ser Glu Arg Val Leu Leu Gln Ala
          195          200          205

Val Arg Lys Lys Cys Ser Asp Ile Glu Leu Ile Gln Arg His Arg Ala
          210          215          220

Glu Gln Asp Val Val Val Ala Ala Ala Ser Ile Leu Ala Arg Glu Ala
          225          230          235          240

```


-continued

Phe Leu Ser Ser Ile His Ala Leu Glu Ser Gln Tyr Gln Ile Arg Leu
 245 250 255
 Leu Lys Gly Ala Ser Gly Lys Val Lys Gln Arg Ala Lys Glu Ile Leu
 260 265 270
 His Asn Lys Gly Gln Val Val Leu Glu Lys Val Cys Lys Thr His Phe
 275 280 285
 Lys Thr Phe Asn Glu Val Leu Gly Ser Gly Asn Gln
 290 295 300

<210> SEQ ID NO 54
 <211> LENGTH: 900
 <212> TYPE: DNA
 <213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 54

atgcctctct ctttcgtttc gcaactgtct cttcttttat tttctatact tcgagaacaa 60
 ctagaaaaga aagggttcac catctctatc cccccccaca ctgtatttca aggaagatct 120
 ccgaccgtta gctgcactgt atatcaatct gggaaaattg tagtacaggg taaaggaact 180
 caagaatttg tagaattttt ccttgagcca gagattctac aaacgttctc ctcacagaac 240
 gtacaacagg atttacgttc tcgcattggg gtggatgaat ctggaaaagg agattttttt 300
 gggcctctgt gcactgctgg agtatatgct tcttccccac aagctataga agctctttat 360
 aaaaccagca tttgtgatto taagctcatt cctgatgcta aaatcctttc tttageccaa 420
 aacattcgct cgctttgtgc gtgtaaagtc attacettgt tcccagaaaa atataacgca 480
 ctatatgcca atttccagaa tttaaactcc ctctagctt ggacacacgc cactattatc 540
 gataatttgg ctctctatcc tgcaggagca gtctttgcta tttcagacca attcgctctc 600
 tcagagagag tccttttaca ggctgttcgc aagaagtgc cgatattga attaatecag 660
 cgtcatcgtg cagaacaaga cgtgggtgga gctgcagctt ctatcttagc tcgtgaagct 720
 tttctctctt ccatacacgc cctagaatct caataccaaa tccgccttct aaaaggagct 780
 tctgggaaag tcaagcaacg agccaaagag attcttcata acaaaggaca ggttgtatta 840
 gaaaaagtct gtaaaacaca tttcaaaaca ttcaatgagg tgcttggttc gggcaatcaa 900

<210> SEQ ID NO 55
 <211> LENGTH: 242
 <212> TYPE: PRT
 <213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 55

Met Lys Val Lys Ile Asn Asp Gln Phe Ile Cys Ile Ser Pro Tyr Ile
 1 5 10 15
 Ser Ala Arg Trp Asn Gln Ile Ala Phe Ile Glu Ser Cys Asp Gly Gly
 20 25 30
 Thr Glu Gly Gly Ile Thr Leu Lys Leu His Leu Ile Asp Gly Glu Thr
 35 40 45
 Val Ser Ile Pro Asn Leu Gly Gln Ala Ile Val Asp Glu Val Phe Gln
 50 55 60
 Glu His Leu Leu Tyr Leu Glu Ser Thr Ala Pro Gln Lys Asn Lys Glu
 65 70 75 80
 Glu Glu Lys Ile Ser Ser Leu Leu Gly Ala Val Gln Gln Met Ala Lys
 85 90 95

-continued

Gly Cys Glu Val Gln Val Phe Ser Gln Lys Gly Leu Val Ser Met Leu
 100 105 110

Leu Gly Gly Ala Gly Ser Ile Asn Val Leu Leu Gln His Ser Pro Glu
 115 120 125

His Lys Asp His Pro Asp Leu Pro Thr Asp Leu Leu Glu Arg Ile Ala
 130 135 140

Gln Met Met Arg Ser Leu Ser Ile Gly Pro Thr Ser Ile Leu Ala Lys
 145 150 155 160

Pro Glu Pro His Cys Asn Cys Leu His Cys Gln Ile Gly Arg Ala Thr
 165 170 175

Val Glu Glu Glu Asp Ala Gly Val Ser Asp Glu Asp Leu Thr Phe Arg
 180 185 190

Ser Trp Asp Ile Ser Gln Ser Gly Glu Lys Met Tyr Thr Val Thr Asp
 195 200 205

Pro Leu Asn Pro Glu Glu Gln Phe Asn Val Tyr Leu Gly Thr Pro Ile
 210 215 220

Gly Cys Thr Cys Gly Gln Pro Tyr Cys Glu His Val Lys Ala Val Leu
 225 230 235 240

Tyr Thr

<210> SEQ ID NO 56
 <211> LENGTH: 726
 <212> TYPE: DNA
 <213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 56

atgaaagtta aaattaatga tcagttcatt tgtatttccc catacatttc tgctcgatgg 60
 aatcagatag ctttcataga gtcttgtgat ggagggaacgg aaggggggtat tactttgaaa 120
 ctccatttaa ttgatggaga gacagtctct atacctaatc taggacaagc gattgttgat 180
 gaggtgttcc aagagcactt gctatattta gagtccacag ctctcagaa aaacaaggaa 240
 gaggaaaaaa ttagctcttt gttaggagct gttcaacaaa tggctaaagg atcggaagta 300
 cagggttttt ctcaaaaggg cttgggtttct atgttactag gaggagctgg ttcgattaat 360
 gtgttgttgc aacattctcc agaacataag gatcatcctg atcttcctac cgatttactg 420
 gagaggatag cgcaaatgat gcgttcatta tctataggac caacttctat ttagctaa 480
 ccagagcctc attgcaactg tttgcattgt caaattggac gagctacagt ggaagaagag 540
 gatgccggag tatcgatga ggatcttact ttctgttcat gggatatctc tcaaatggga 600
 gaaaagatgt acactgttac agatcctttg aatccagaag agcagtttaa tgtgtattta 660
 ggaacgccga ttggatgcac atgtgggcag ccatactgtg aacacgtgaa agctgttctt 720
 tatact 726

<210> SEQ ID NO 57
 <211> LENGTH: 121
 <212> TYPE: PRT
 <213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 57

Met Gly Asn Leu Ile Lys Glu Leu Gln Asp Glu Gln Cys Arg Thr Asp
 1 5 10 15

Leu Ala Asp Phe Cys Val Gly Asp Thr Ile Arg Val Ala Thr Asn Ile

-continued

	20		25		30											
Ser	Glu	Gly	Gly	Lys	Glu	Arg	Val	Gln	Val	Phe	Gln	Gly	Thr	Val	Met	
	35						40					45				
Ala	Arg	Lys	Gly	Gly	Gly	Ala	Gly	Glu	Thr	Val	Ser	Leu	His	Arg	Val	
	50					55					60					
Ala	Tyr	Gly	Glu	Gly	Met	Glu	Lys	Ser	Phe	Leu	Leu	Asn	Ser	Pro	Lys	
65					70				75					80		
Ile	Val	Ser	Ile	Glu	Val	Val	Lys	Arg	Gly	Lys	Val	Ser	Arg	Ala	Arg	
			85					90					95			
Leu	Phe	Tyr	Leu	Arg	Gly	Lys	Thr	Gly	Lys	Ala	Ala	Lys	Val	Lys	Glu	
			100					105					110			
Leu	Ile	Gly	Ser	Arg	Ala	Ala	Lys	Lys								
	115						120									

<210> SEQ ID NO 58
 <211> LENGTH: 363
 <212> TYPE: DNA
 <213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 58

atggggaact taatcaagga attgcaagac gagcagtgcga gaactgatct cgctgatttc	60
tgtgttggtg acacgattcg tgtggctaca aacatttcag aaggagggaa ggagcgggtt	120
caggattatcc aaggaacagt catggcccggt aaaggcgggtg gtgcaggaga aacagtttct	180
cttcatagag ttgcttacgg tgaagggatg gagaagagct ttctactgaa tagccctaag	240
atcgtaagta ttgaagttgt aaaacgcgga aaagtatcgc gtgcacgcct cttctatttg	300
agaggaaaaa ctggtaaggc tgctaaagtt aaagagctta tcggttctcg ggctgctaag	360
aaa	363

<210> SEQ ID NO 59
 <211> LENGTH: 257
 <212> TYPE: PRT
 <213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 59

Met	Lys	Arg	Ile	Leu	Val	Tyr	Ser	Asp	Arg	Gly	Val	Ser	Pro	Tyr	Tyr	
1			5					10					15			
Leu	Arg	His	Thr	Val	Arg	Trp	Leu	Lys	Gln	Val	Ala	Ala	Pro	Phe	Gln	
	20						25					30				
Met	Glu	Val	Cys	Arg	Val	Asn	Gly	Arg	Phe	Leu	Ile	His	Glu	Pro	Leu	
	35					40					45					
Trp	Glu	Glu	Thr	Thr	Gln	Leu	Leu	Val	Ile	Pro	Gly	Gly	Ala	Asp	Val	
	50				55					60						
Pro	Tyr	His	Asn	Val	Leu	His	Gly	Leu	Gly	Thr	Ala	Arg	Ile	Asp	Asn	
65			70					75					80			
Tyr	Val	Arg	Glu	Gly	Gly	Cys	Tyr	Leu	Gly	Ile	Cys	Ala	Gly	Ala	Tyr	
			85					90				95				
Phe	Gly	Cys	Ala	Gln	Phe	Glu	Phe	Leu	Glu	Pro	Thr	Gly	Ser	Leu	Phe	
	100						105					110				
Val	Ala	Lys	Arg	Asp	Leu	Gly	Phe	Phe	Pro	Gly	Ala	Ala	Asn	Gly	Pro	
	115					120					125					
Val	Tyr	Glu	Ser	Ala	Phe	Ser	Tyr	Thr	Ser	Ser	Ser	Gly	Val	Leu	Ala	
	130					135					140					

-continued

Ala Pro Leu Val Phe Ala Asp Phe Pro Gly Glu Ser Phe Ser Leu Phe
 145 150 155 160

Asn Gly Gly Cys Cys Phe Glu Asn Ala Glu His Phe Pro Glu Ile Cys
 165 170 175

Ile Glu Ala Arg Tyr Asn Asn Leu Leu Gly Lys Pro Ala Ala Ile Val
 180 185 190

Ser Arg Arg Leu Asp Lys Gly Leu Val Val Leu Ser Gly Pro His Ile
 195 200 205

Glu Tyr Leu Pro Glu Phe Cys Ser Leu Gln Glu Asp Asn Val Ile Gln
 210 215 220

Ala Arg Glu Gln Ile Ala Ala His Ser Ser Ser Leu Glu Glu Tyr Lys
 225 230 235 240

Gln Phe Leu Ile His Arg Leu Leu Ser Asn Val Val Glu His Val Leu
 245 250 255

Tyr

<210> SEQ ID NO 60
 <211> LENGTH: 771
 <212> TYPE: DNA
 <213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 60

```

atgaagcgta tcttagtgta ttccgataga ggagtttctc cttactatct gcgccatact    60
gttcgctggg tgaagcaggt agctgctcca ttccagatgg aggtatgtcg cgtgaatgga    120
cgtttcttga ttcattgagc tctttgggaa gaaacaaccc agcttcttgt aattccagga    180
gggtgctgatg taccttatca taatgtgttg catggactgg ggacagcgcg tatcgataac    240
tacgtaagag agggaggctg ttacctaggt atttgcgcag gagcttattt tggttgcgcg    300
cagtttgaat ttctagagcc tacaggatct ttatttgttg ctaagcgaga tttaggtttt    360
ttcccgaggag ctgctaattg tctgttttat gaaagcgctt tttcttatac aagttcctct    420
ggagtttttag ccgctccact agttttcgct gattttcctg gagagagttt ctctcttttt    480
aatgggggat gctgtttcga aaatgcggaa catttccccg aaatatgcat cgaggcgcg    540
tataataatc ttcttggaac acctgcagct attgtctcca gacgctcga taaggggcta    600
gtcgtgcttt ctggtcctca tatagagtac ctcccagagt tttgctcctt gcaagaagat    660
aatgttatcc aggcgagaga gcaaattgca gcgcattctt cgagtctaga ggagtacaag    720
cagttcttaa tccatcgctt attgagtaat gtcgtcgagc acgttttgta t          771

```

<210> SEQ ID NO 61
 <211> LENGTH: 148
 <212> TYPE: PRT
 <213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 61

Met Leu Lys Lys Pro Asn Arg Asn Asp Pro Cys Pro Cys Gly Ser Gly
 1 5 10 15

Lys Lys Tyr Lys Gln Cys Cys Leu Lys Ser Gln Ala Leu Thr Ala Arg
 20 25 30

His Thr Pro Glu Gly Lys Phe Lys Phe Ser Ile Thr Ala Ser Pro Ala
 35 40 45

Ala Gly Ala Ser Thr Glu Gly Phe Thr Lys Leu Phe Arg Gln Ser Val

-continued

50	55	60	
Asp Ser Tyr Thr Ser Glu Gln Lys Glu Gly Met Ser Arg Phe Leu Ile			
65	70	75	80
Thr Lys Asn Lys Glu Pro Ile Gly Lys Arg Ala Ile Arg Lys Ala Lys			
	85	90	95
Ala Lys Glu Glu Arg Ile Ile Ser Glu Lys Leu Ser Gln His Glu Phe			
	100	105	110
Gln Val Met Asp Thr Glu Val Ser Gly Glu Asp Ile Gln Ser Ser Leu			
	115	120	125
Asp Tyr Glu Gln Phe Leu Pro Thr Glu Glu Asp Tyr Arg Val Gln Lys			
	130	135	140
Glu Glu Asp Ser			
145			

<210> SEQ ID NO 62
 <211> LENGTH: 444
 <212> TYPE: DNA
 <213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 62

atgttgaaaa agcctaataag aaacgatcct tgccttctgt ggtctgggaa gaagtataag	60
cagtgttggtt tgaatcacac agctctaact gctcgccata ctctgaagg gaagtttaag	120
ttttctataa cagcttcgcc tgccgcaggc gcttccacgg aaggtttcac aaaactgttt	180
cgccaatcag tggattctta tacctcagaa caaaaagagg ggatgagtcg gtttcttatt	240
actaaaaata aggaacctat agggaaacgc gcgattcgca aggctaaggc aaaagaagag	300
cgcacatctt cagagaaact aagccagcac gaatttcaag tgatggatac agaagtatcg	360
ggagaagata tacagtcttc actagattat gaacagtctt ttcctacaga agaagactac	420
cgtgtgcaga aagaggaaga ttca	444

<210> SEQ ID NO 63
 <211> LENGTH: 857
 <212> TYPE: PRT
 <213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 63

Met Lys Lys Ser Leu Ile Ile Val Glu Ser Pro Ala Lys Ile Lys Thr	
1	15
Leu Arg Lys Leu Leu Gly Glu Gly Phe Ile Phe Asp Ser Ser Leu Gly	
	30
His Ile Val Asp Leu Pro Ala Lys Gly Phe Gly Ile Asp Ile Glu Asn	
	45
Gly Phe Val Pro Asp Tyr Gln Ile Leu Glu Gly Lys Lys Glu Val Ile	
	60
Arg Lys Ile Cys Ala Glu Ala Lys Lys Cys Asp Val Val Tyr Leu Ala	
65	80
Pro Asp Pro Asp Arg Glu Gly Glu Ala Ile Ala Trp His Ile Ala Asn	
	95
Gln Leu Pro Lys Asp Thr Lys Ile Gln Arg Ile Ser Phe Asn Ala Ile	
	110
Thr Lys Gly Ala Val Thr Glu Ala Leu Lys His Pro Arg Glu Ile Asp	
	125

-continued

Met	Ala	Leu	Val	Asn	Ala	Gln	Gln	Ala	Arg	Arg	Phe	Leu	Asp	Arg	Ile	130	135	140
Val	Gly	Tyr	Lys	Ile	Ser	Pro	Ile	Leu	Gly	Arg	Lys	Leu	Gln	Arg	Trp	145	150	155
Ser	Gly	Val	Ser	Ala	Gly	Arg	Val	Gln	Ser	Val	Ala	Leu	Lys	Leu	Val	165	170	175
Val	Asp	Arg	Glu	Tyr	Ala	Ile	Glu	Arg	Phe	Val	Pro	Val	Glu	Phe	Trp	180	185	190
Asn	Ile	Arg	Val	His	Leu	Lys	Asp	Pro	Gln	Thr	Gln	Lys	Thr	Phe	Trp	195	200	205
Ala	His	Leu	His	Ser	Val	Asn	Gly	Lys	Lys	Trp	Glu	Lys	Glu	Ile	Pro	210	215	220
Glu	Gly	Lys	Thr	Ser	Asp	Glu	Val	Ile	Leu	Ile	Asp	Ser	Lys	Glu	Lys	225	230	235
Ala	Asp	Glu	Ile	Val	Ala	Leu	Leu	Glu	Ser	Ala	Thr	Tyr	Val	Val	Asp	245	250	255
Arg	Val	Glu	Ser	Lys	Glu	Lys	Lys	Arg	His	Ala	Tyr	Pro	Pro	Phe	Ile	260	265	270
Thr	Ser	Thr	Leu	Gln	Gln	Glu	Ala	Ser	Arg	His	Tyr	Arg	Phe	Ser	Ser	275	280	285
Ser	Arg	Thr	Met	Asn	Ile	Ala	Gln	Thr	Leu	Tyr	Glu	Gly	Val	Asp	Leu	290	295	300
Asp	Ser	Gln	Gly	Ala	Val	Gly	Leu	Ile	Thr	Tyr	Met	Arg	Thr	Asp	Ser	305	310	315
Val	Arg	Thr	Asp	Pro	Glu	Ala	Val	Lys	Gln	Val	Arg	Lys	Tyr	Ile	Glu	325	330	335
Gly	His	Phe	Gly	Lys	Glu	Phe	Val	Pro	Ser	Ser	Pro	Asn	Val	Tyr	Ala	340	345	350
Thr	Lys	Lys	Met	Ala	Gln	Asp	Ala	His	Glu	Ala	Ile	Arg	Pro	Thr	Asp	355	360	365
Val	Thr	Ile	Thr	Pro	Glu	Ser	Ile	Arg	Ser	Lys	Leu	Thr	Glu	Asp	Gln	370	375	380
Tyr	Lys	Leu	Tyr	Ser	Leu	Ile	Trp	Lys	Arg	Phe	Val	Ala	Ser	Gln	Met	385	390	395
Ile	Ser	Ala	Ile	Tyr	Asp	Thr	Leu	Ala	Ile	Arg	Ile	Thr	Thr	Asn	Lys	405	410	415
Gly	Ile	Asp	Leu	Arg	Ala	Thr	Gly	Ser	Cys	Leu	Lys	Phe	Lys	Gly	Phe	420	425	430
Leu	Ala	Val	Tyr	Glu	Glu	Lys	Arg	Asp	Glu	Glu	Gly	Asp	Glu	Glu	Glu	435	440	445
Asn	Ile	His	Leu	Pro	Lys	Leu	Asn	Glu	Arg	Asp	Val	Leu	Thr	Lys	Glu	450	455	460
Glu	Leu	Glu	Ala	Glu	Gln	Ser	His	Thr	Lys	Pro	Leu	Pro	Arg	Phe	Thr	465	470	475
Glu	Ala	Ser	Leu	Val	Lys	Glu	Leu	Glu	Lys	Ser	Gly	Ile	Gly	Arg	Pro	485	490	495
Ser	Thr	Tyr	Ala	Thr	Ile	Met	Asn	Lys	Ile	Gln	Ser	Arg	Glu	Tyr	Thr	500	505	510
Leu	Lys	Glu	Gly	Gln	Arg	Leu	Arg	Pro	Thr	Glu	Leu	Gly	Lys	Val	Val	515	520	525
Cys	Gln	Phe	Leu	Glu	Thr	Asn	Phe	Pro	Arg	Ile	Met	Asp	Ile	Gly	Phe			

-continued

530	535	540
Thr Ala Gly Met Glu Asp Glu Leu Glu Leu Ile Ala Asp Asn Lys Lys 545 550 555 560		
Pro Trp Lys Gln Leu Leu Gln Glu Phe Cys Glu Leu Phe Leu Pro Phe 565 570 575		
Val Val Thr Ala Glu Lys Glu Ala Phe Ile Pro Arg Ile Val Thr Glu 580 585 590		
Ile Asp Cys Pro Lys Cys His Lys Gly Lys Leu Val Lys Ile Trp Ala 595 600 605		
Lys Asn Arg Tyr Phe Phe Gly Cys Ser Glu Tyr Pro Thr Cys Asp Tyr 610 615 620		
Lys Thr Ser Glu Glu Glu Leu Thr Phe Asp Lys Asn Glu Tyr Ala Glu 625 630 635 640		
Asp Thr Pro Trp Asp Ala Pro Cys Ala Leu Cys Gly Gly Glu Met Lys 645 650 655		
Val Arg His Gly Lys Phe Gly Ser Phe Leu Gly Cys Glu Asn Tyr Pro 660 665 670		
Lys Cys His Tyr Ile Val Asn Leu Phe Lys Lys Gly Glu Ala Gly Ala 675 680 685		
Glu Pro Glu Ala Thr Val His Cys Pro Ala Glu Gly Cys Thr Gly His 690 695 700		
Leu Val Lys Arg Arg Ser Arg Phe Asn Lys Met Phe Tyr Ser Cys Ser 705 710 715 720		
Glu Tyr Pro Ala Cys Ser Val Ile Gly Asn Ser Val Asp Ala Val Ile 725 730 735		
Glu Lys Tyr Ala Gly Thr Pro Lys Thr Pro Tyr Glu Lys Lys Pro Lys 740 745 750		
Ala Lys Lys Ser Ile Ala Ser Thr Lys Gly Lys Ala Ala Lys Thr Val 755 760 765		
Lys Lys Ser Ser Ala Thr Thr Lys Lys Arg Ala Thr Lys Ala Tyr Thr 770 775 780		
Pro Ser Ala Ala Leu Ala Ala Val Ile Gly Ala Asp Pro Val Gly Arg 785 790 795 800		
Pro Glu Ala Thr Lys Lys Leu Trp Glu Tyr Ile Lys Glu Lys Gly Leu 805 810 815		
Gln Ser Pro Gln Asn Lys Lys Ile Ile Ile Pro Asp Ser Lys Leu Gln 820 825 830		
Gly Val Ile Gly Ala Asp Pro Ile Asp Met Phe Ala Leu Ser Lys Lys 835 840 845		
Leu Ser Ala His Leu Ile Lys Glu Glu 850 855		

<210> SEQ ID NO 64

<211> LENGTH: 2571

<212> TYPE: DNA

<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 64

```

atgaaaaaat ccttaatcat cggtgaatcc ccagccaaga ttaaaacttt gcgtaagttg      60
ttaggagaag gggtttatatt ttgactcttcc ttggggcata ttgttgatct tcttgcaaaa      120
gggtttggta ttgatattga aaatggattt gttccggact accaaatttt agaaggggaag      180

```

-continued

aaagaggta	ttcgaaaaat	ttgcgccgaa	gcgaaaaaat	gtgatgtagt	ttatctcget	240
cccgatccag	accgagaagg	agaggctata	gcatggcata	tcgcgaatca	gctgcctaag	300
gatactaaaa	ttcaacgtat	ttcattcaat	gccattacta	aaggagctgt	taccgaagct	360
ttgaagcatc	ctagggaaat	tgatatggcg	ttggtcaatg	cacagcaggc	acgacgcttt	420
ctagatcgca	ttgtgggata	caagatctct	ccgatcctag	gtcgcaagct	gcaacgttgg	480
tctgggggtt	ctgcaggaag	agtgcagtct	gtagctctta	aattagtagt	agatcgggaa	540
tatgctatag	aacgatttgt	tcccgtcgaa	ttttggaata	tccgagtga	tcttaagat	600
cctcaaaccc	aaaagacatt	ctgggctcat	ttgcattccg	tgaatgggaa	gaaatgggaa	660
aaagaaattc	ctgaagggaa	gacttctgat	gaagtgattt	taattgattc	taaagagaag	720
gcagatgaga	ttgtcgctct	attagaatca	gctacatag	ttgtagatcg	tgtagagtct	780
aaagagaaaa	aacgtcacgc	ctatctcccg	tttattactt	ctacgttgca	gcaagaagct	840
agtcgtcatt	accgcttttc	ctctccaga	acgatgaaca	tagcgcagac	tttatatgaa	900
ggggtagatt	tagatagtca	aggtgctgtg	ggattgatca	catacatgcg	aaccgattcc	960
gtacgtacgg	atcctgaagc	tgtaaaacag	gtgcgcaaat	atatcgaagg	tcattttggt	1020
aaggaattcg	ttccttcttc	tccgaacgtg	tatgccacga	aaaaaatggc	acaggatgca	1080
cacgaagcta	tacgtcctac	agatgttaca	atcactccgg	aatcgatacg	cagtaagtta	1140
acggaagatc	agtacaagct	gtattctttg	atatggaagc	gttttggtgc	atcacaaatg	1200
atatccgcaa	tttacgatac	actcgcgatt	cgtattacga	cgaataaagg	tatcgatctg	1260
cgtgctacag	gctcttgttt	gaaatttaaa	gggttcttag	ctgtttacga	agagaaaaga	1320
gatgaagaag	gggtgaaga	ggaaaacatt	catcttccga	agcttaatga	gcgagatgtt	1380
ctaacaagg	aagagttaga	agcagaacaa	tcgcatacca	agcctttgcc	gcgatttaca	1440
gaagcttctt	tagtgaaga	actcgagaag	tcaggaaatg	ggagaccttc	tacctatgcc	1500
actatcatga	ataaaatcca	gagtcgggaa	tatacgttga	aagaagggca	aaggctacgt	1560
cctactgaat	taggaaaaag	agtttgctag	tttttagaaa	cgaattttcc	tcgtattatg	1620
gatattgggt	ttaccgctgg	catggaagat	gagttagaac	tgattgctga	taataaaaaa	1680
ccttggaagc	agctattaca	agaattttgt	gaactcttcc	ttccttttgt	agtcacggca	1740
gaaaaagaag	cctttatccc	tcgtattgtg	acagaaatag	actgtccaaa	atgtcataaa	1800
gggaaattag	taaaaatttg	ggctaaaaat	cgtatattct	ttggttgctc	cgaatatcct	1860
acttgcgact	ataaaacttc	ggaagaggag	ctgacgttcg	acaaaaacga	gtatgctgaa	1920
gacactcctt	gggacgcacc	ctgtgctctg	tcgggaggag	aaatgaaagt	ccggcatggg	1980
aaatttgga	gtttccttgg	ctgcgagaac	tatccgaagt	gtcactacat	tgttaatctt	2040
ttcaaaaagg	gagaagctgg	ggctgagcct	gaagcgacag	tgcattgtcc	tcgagaagga	2100
tgtacaggac	accttgtgaa	aagacgctca	cgatttaata	aatgttttta	ttcttgctcc	2160
gaatatcctg	catgtagcgt	gattggtaac	tctgtagatg	ctgtaattga	aaagtatgca	2220
ggaacgccta	aaactcctta	tgagaagaaa	ccaaaagcga	aaaaatcaat	agcctctacc	2280
aagggaagg	ctgcaaaaac	agtgaaaaaa	agctcagcaa	caacaaaaaa	acgagctacc	2340
aaagcgtaca	caccttctgc	tgcttttagca	gcggtgattg	gtgcggatcc	tgtaggcgct	2400
cccgaagcca	ctaagaagct	atgggagtat	attaaggaaa	aaggattgca	atccctcaa	2460

-continued

aataaaaaaa tcattattcc tgatagtaaa ttgcaggag tgataggagc tgatccaatc 2520

gacatgttcg cgctatctaa aaaattaagc gcgcacttaa tcaaggaaga g 2571

<210> SEQ ID NO 65

<211> LENGTH: 1770

<212> TYPE: PRT

<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 65

Met Lys Phe Met Ser Ala Thr Ala Val Phe Ala Ala Ala Leu Ser Ser
1 5 10 15

Val Thr Glu Ala Ser Ser Ile Gln Asp Gln Ile Lys Asn Thr Asp Cys
20 25 30

Asn Val Ser Lys Leu Gly Tyr Ser Thr Ser Gln Ala Phe Thr Asp Met
35 40 45

Met Leu Ala Asp Asn Thr Glu Tyr Arg Ala Ala Asp Ser Val Ser Phe
50 55 60

Tyr Asp Phe Ser Thr Ser Ser Arg Leu Pro Arg Lys His Leu Ser Ser
65 70 75 80

Ser Ser Glu Ala Ser Pro Thr Thr Glu Gly Val Ser Ser Ser Ser Ser
85 90 95

Gly Glu Thr Asp Glu Lys Thr Glu Glu Glu Leu Asp Asn Gly Gly Ile
100 105 110

Ile Tyr Ala Arg Glu Lys Leu Thr Ile Ser Glu Ser Gln Asp Ser Leu
115 120 125

Ser Asn Gln Ser Ile Glu Leu His Asp Asn Ser Ile Phe Phe Gly Glu
130 135 140

Gly Glu Val Ile Phe Asp His Arg Val Ala Leu Lys Asn Gly Gly Ala
145 150 155 160

Ile Tyr Gly Glu Lys Glu Val Val Phe Glu Asn Ile Lys Ser Leu Leu
165 170 175

Val Glu Val Asn Ile Ala Val Glu Lys Gly Gly Ser Val Tyr Ala Lys
180 185 190

Glu Arg Val Ser Leu Glu Asn Val Thr Glu Ala Thr Phe Ser Ser Asn
195 200 205

Gly Gly Glu Gln Gly Gly Gly Gly Ile Tyr Ser Glu Gln Asp Met Leu
210 215 220

Ile Ser Asp Cys Asn Asn Val His Phe Gln Gly Asn Ala Ala Gly Ala
225 230 235 240

Thr Ala Val Lys Gln Cys Leu Asp Glu Glu Met Ile Val Leu Leu Ala
245 250 255

Glu Cys Val Asp Ser Leu Ser Glu Asp Thr Leu Asp Ser Thr Pro Glu
260 265 270

Thr Glu Gln Thr Glu Ser Asn Gly Asn Gln Asp Gly Ser Ser Glu Thr
275 280 285

Glu Asp Thr Gln Val Ser Glu Ser Pro Glu Ser Thr Pro Ser Pro Asp
290 295 300

Asp Val Leu Gly Lys Gly Gly Gly Ile Tyr Thr Glu Lys Ser Leu Thr
305 310 315 320

Ile Thr Gly Ile Thr Gly Thr Ile Asp Phe Val Ser Asn Ile Ala Thr
325 330 335

Asp Ser Gly Ala Gly Val Phe Thr Lys Glu Asn Leu Ser Cys Thr Asn

-continued

340							345					350				
Thr	Asn	Ser	Leu	Gln	Phe	Leu	Lys	Asn	Ser	Ala	Gly	Gln	His	Gly	Gly	
		355					360					365				
Gly	Ala	Tyr	Val	Thr	Gln	Thr	Met	Ser	Val	Thr	Asn	Thr	Thr	Ser	Glu	
	370					375					380					
Ser	Ile	Thr	Thr	Pro	Pro	Leu	Ile	Gly	Glu	Val	Ile	Phe	Ser	Glu	Asn	
385					390					395					400	
Thr	Ala	Lys	Gly	His	Gly	Gly	Gly	Ile	Cys	Thr	Asn	Lys	Leu	Ser	Leu	
				405					410					415		
Ser	Asn	Leu	Lys	Thr	Val	Thr	Leu	Thr	Lys	Asn	Ser	Ala	Lys	Glu	Ser	
			420					425					430			
Gly	Gly	Ala	Ile	Phe	Thr	Asp	Leu	Ala	Ser	Ile	Pro	Ile	Thr	Asp	Thr	
		435					440					445				
Pro	Glu	Ser	Ser	Thr	Pro	Ser	Ser	Ser	Ser	Pro	Ala	Ser	Thr	Pro	Glu	
	450					455					460					
Val	Val	Ala	Ser	Ala	Lys	Ile	Asn	Arg	Phe	Phe	Ala	Ser	Thr	Ala	Lys	
465					470					475					480	
Pro	Ala	Ala	Pro	Ser	Leu	Thr	Glu	Ala	Glu	Ser	Asp	Gln	Thr	Asp	Gln	
				485					490					495		
Thr	Glu	Thr	Ser	Asp	Thr	Asn	Ser	Asp	Ile	Asp	Val	Ser	Ile	Glu	Asn	
			500					505					510			
Ile	Leu	Asn	Val	Ala	Ile	Asn	Gln	Asn	Thr	Ser	Ala	Lys	Lys	Gly	Gly	
		515					520					525				
Ala	Ile	Tyr	Gly	Lys	Lys	Ala	Lys	Leu	Ser	Arg	Ile	Asn	Asn	Leu	Glu	
	530					535					540					
Leu	Ser	Gly	Asn	Ser	Ser	Gln	Asp	Val	Gly	Gly	Gly	Leu	Cys	Leu	Thr	
545					550					555					560	
Glu	Ser	Val	Glu	Phe	Asp	Ala	Ile	Gly	Ser	Leu	Leu	Ser	His	Tyr	Asn	
				565					570					575		
Ser	Ala	Ala	Lys	Glu	Gly	Gly	Ala	Ile	His	Ser	Lys	Thr	Val	Thr	Leu	
			580					585					590			
Ser	Asn	Leu	Lys	Ser	Thr	Phe	Thr	Phe	Ala	Asp	Asn	Thr	Val	Lys	Ala	
		595					600					605				
Ile	Val	Glu	Ser	Thr	Pro	Glu	Ala	Pro	Glu	Glu	Ile	Pro	Pro	Val	Glu	
	610					615					620					
Gly	Glu	Glu	Ser	Thr	Ala	Thr	Glu	Asp	Pro	Asn	Ser	Asn	Thr	Glu	Gly	
625					630					635				640		
Ser	Ser	Ala	Asn	Thr	Asn	Leu	Glu	Gly	Ser	Gln	Gly	Asp	Thr	Ala	Asp	
				645					650					655		
Thr	Gly	Thr	Gly	Asp	Val	Asn	Asn	Glu	Ser	Gln	Asp	Thr	Ser	Asp	Thr	
			660					665					670			
Gly	Asn	Ala	Glu	Ser	Glu	Glu	Gln	Leu	Gln	Asp	Ser	Thr	Gln	Ser	Asn	
		675					680					685				
Glu	Glu	Asn	Thr	Leu	Pro	Asn	Ser	Asn	Ile	Asp	Gln	Ser	Asn	Glu	Asn	
	690					695					700					
Thr	Asp	Glu	Ser	Ser	Asp	Ser	His	Thr	Glu	Glu	Ile	Thr	Asp	Glu	Ser	
705					710					715					720	
Val	Ser	Ser	Ser	Ser	Glu	Ser	Gly	Ser	Ser	Thr	Pro	Gln	Asp	Gly	Gly	
				725					730					735		
Ala	Ala	Ser	Ser	Gly	Ala	Pro	Ser	Gly	Asp	Gln	Ser	Ile	Ser	Ala	Asn	
				740				745					750			

-continued

Ala Cys Leu Ala Lys Ser Tyr Ala Ala Ser Thr Asp Ser Ser Pro Val
 755 760 765
 Ser Asn Ser Ser Gly Ser Glu Glu Pro Val Thr Ser Ser Ser Asp Ser
 770 775 780
 Asp Val Thr Ala Ser Ser Asp Asn Pro Asp Ser Ser Ser Ser Gly Asp
 785 790 795 800
 Ser Ala Gly Asp Ser Glu Glu Pro Thr Glu Pro Glu Ala Gly Ser Thr
 805 810 815
 Thr Glu Thr Leu Thr Leu Ile Gly Gly Gly Ala Ile Tyr Gly Glu Thr
 820 825 830
 Val Lys Ile Glu Asn Phe Ser Gly Gln Gly Ile Phe Ser Gly Asn Lys
 835 840 845
 Ala Ile Asp Asn Thr Thr Glu Gly Ser Ser Ser Lys Ser Asp Val Leu
 850 855 860
 Gly Gly Ala Val Tyr Ala Lys Thr Leu Phe Asn Leu Asp Ser Gly Ser
 865 870 875 880
 Ser Arg Arg Thr Val Thr Phe Ser Gly Asn Thr Val Ser Ser Gln Ser
 885 890 895
 Thr Thr Gly Gln Val Ala Gly Gly Ala Ile Tyr Ser Pro Thr Val Thr
 900 905 910
 Ile Ala Thr Pro Val Val Phe Ser Lys Asn Ser Ala Thr Asn Asn Ala
 915 920 925
 Asn Asn Thr Thr Asp Thr Gln Arg Lys Asp Thr Phe Gly Gly Ala Ile
 930 935 940
 Gly Ala Thr Ser Ala Val Ser Leu Ser Gly Gly Ala His Phe Leu Glu
 945 950 955 960
 Asn Val Ala Asp Leu Gly Ser Ala Ile Gly Leu Val Pro Gly Thr Gln
 965 970 975
 Asn Thr Glu Thr Val Lys Leu Glu Ser Gly Ser Tyr Tyr Phe Glu Lys
 980 985 990
 Asn Lys Ala Leu Lys Arg Ala Thr Ile Tyr Ala Pro Val Val Ser Ile
 995 1000 1005
 Lys Ala Tyr Thr Ala Thr Phe Asn Gln Asn Arg Ser Leu Glu Glu
 1010 1015 1020
 Gly Ser Ala Ile Tyr Phe Thr Lys Glu Ala Ser Ile Glu Ser Leu
 1025 1030 1035
 Gly Ser Val Leu Phe Thr Gly Asn Leu Val Thr Leu Thr Leu Ser
 1040 1045 1050
 Thr Thr Thr Glu Gly Thr Pro Ala Thr Thr Ser Gly Asp Val Thr
 1055 1060 1065
 Lys Tyr Gly Ala Ala Ile Phe Gly Gln Ile Ala Ser Ser Asn Gly
 1070 1075 1080
 Ser Gln Thr Asp Asn Leu Pro Leu Lys Leu Ile Ala Ser Gly Gly
 1085 1090 1095
 Asn Ile Cys Phe Arg Asn Asn Glu Tyr Arg Pro Thr Ser Ser Asp
 1100 1105 1110
 Thr Gly Thr Ser Thr Phe Cys Ser Ile Ala Gly Asp Val Lys Leu
 1115 1120 1125
 Thr Met Gln Ala Ala Lys Gly Lys Thr Ile Ser Phe Phe Asp Ala
 1130 1135 1140

Ile	Arg	Thr	Ser	Thr	Lys	Lys	Thr	Gly	Thr	Gln	Ala	Thr	Ala	Tyr
1145	1145					1150					1155			
Asp	Thr	Leu	Asp	Ile	Asn	Lys	Ser	Glu	Asp	Ser	Glu	Thr	Val	Asn
1160	1160					1165					1170			
Ser	Ala	Phe	Thr	Gly	Thr	Ile	Leu	Phe	Ser	Ser	Glu	Leu	His	Glu
1175	1175					1180					1185			
Asn	Lys	Ser	Tyr	Ile	Pro	Gln	Asn	Val	Val	Leu	His	Ser	Gly	Ser
1190	1190					1195					1200			
Leu	Val	Leu	Lys	Pro	Asn	Thr	Glu	Leu	His	Val	Ile	Ser	Phe	Glu
1205	1205					1210					1215			
Gln	Lys	Glu	Gly	Ser	Ser	Leu	Val	Met	Thr	Pro	Gly	Ser	Val	Leu
1220	1220					1225					1230			
Ser	Asn	Gln	Thr	Val	Ala	Asp	Gly	Ala	Leu	Val	Ile	Asn	Asn	Met
1235	1235					1240					1245			
Thr	Ile	Asp	Leu	Ser	Ser	Val	Glu	Lys	Asn	Gly	Ile	Ala	Glu	Gly
1250	1250					1255					1260			
Asn	Ile	Phe	Thr	Pro	Pro	Glu	Leu	Arg	Ile	Ile	Asp	Thr	Thr	Thr
1265	1265					1270					1275			
Gly	Gly	Ser	Gly	Gly	Thr	Pro	Ser	Thr	Asp	Ser	Glu	Ser	Asn	Gln
1280	1280					1285					1290			
Asn	Ser	Asp	Asp	Thr	Glu	Glu	Gln	Asn	Asn	Asn	Asp	Ala	Ser	Asn
1295	1295					1300					1305			
Gln	Gly	Glu	Ser	Ala	Asn	Gly	Ser	Ser	Ser	Pro	Ala	Val	Ala	Ala
1310	1310					1315					1320			
Ala	His	Thr	Ser	Arg	Thr	Arg	Asn	Phe	Ala	Ala	Ala	Ala	Thr	Ala
1325	1325					1330					1335			
Thr	Pro	Thr	Thr	Thr	Pro	Thr	Ala	Thr	Thr	Thr	Thr	Ser	Asn	Gln
1340	1340					1345					1350			
Val	Ile	Leu	Gly	Gly	Glu	Ile	Lys	Leu	Ile	Asp	Pro	Asn	Gly	Thr
1355	1355					1360					1365			
Phe	Phe	Gln	Asn	Pro	Ala	Leu	Arg	Ser	Asp	Gln	Gln	Ile	Ser	Leu
1370	1370					1375					1380			
Leu	Val	Leu	Pro	Thr	Asp	Ser	Ser	Lys	Met	Gln	Ala	Gln	Lys	Ile
1385	1385					1390					1395			
Val	Leu	Thr	Gly	Asp	Ile	Ala	Pro	Gln	Lys	Gly	Tyr	Thr	Gly	Thr
1400	1400					1405					1410			
Leu	Thr	Leu	Asp	Pro	Asp	Gln	Leu	Gln	Asn	Gly	Thr	Ile	Ser	Val
1415	1415					1420					1425			
Leu	Trp	Lys	Phe	Asp	Ser	Tyr	Arg	Gln	Trp	Ala	Tyr	Val	Pro	Arg
1430	1430					1435					1440			
Asp	Asn	His	Phe	Tyr	Ala	Asn	Ser	Ile	Leu	Gly	Ser	Gln	Met	Leu
1445	1445					1450					1455			
Met	Val	Thr	Val	Lys	Gln	Gly	Leu	Leu	Asn	Asp	Lys	Met	Asn	Leu
1460	1460					1465					1470			
Ala	Arg	Phe	Glu	Glu	Val	Ser	Tyr	Asn	Asn	Leu	Trp			

-continued

1520	1525	1530
Gly Lys Thr Lys Ser Leu	Lys Arg Glu Asn Asn Tyr	Thr His Lys
1535	1540	1545
Gly Ser Glu Tyr Ser Tyr	Gln Ala Ser Val Tyr Gly	Gly Lys Pro
1550	1555	1560
Phe His Phe Val Ile Asn	Lys Lys Thr Glu Lys Ser	Leu Pro Leu
1565	1570	1575
Leu Leu Gln Gly Val Ile	Ser Tyr Gly Tyr Ile Lys	His Asp Thr
1580	1585	1590
Val Thr His Tyr Pro Thr	Ile Arg Glu Arg Asn Lys	Gly Glu Trp
1595	1600	1605
Glu Asp Leu Gly Trp Leu	Thr Ala Leu Arg Val Ser	Ser Val Leu
1610	1615	1620
Arg Thr Pro Ala Gln Gly	Asp Thr Lys Arg Ile Thr	Val Tyr Gly
1625	1630	1635
Glu Leu Glu Tyr Ser Ser	Ile Arg Gln Lys Gln Phe	Thr Glu Thr
1640	1645	1650
Glu Tyr Asp Pro Arg Tyr	Phe Asp Asn Cys Thr Tyr	Arg Asn Leu
1655	1660	1665
Ala Ile Pro Met Gly Leu	Ala Phe Glu Gly Glu Leu	Ser Gly Asn
1670	1675	1680
Asp Ile Leu Met Tyr Asn	Arg Phe Ser Val Ala Tyr	Met Leu Ser
1685	1690	1695
Ile Tyr Arg Asn Ser Pro	Thr Cys Lys Tyr Gln Val	Leu Ser Ser
1700	1705	1710
Gly Glu Gly Gly Glu Ile	Ile Cys Gly Val Pro Thr	Arg Asn Ser
1715	1720	1725
Ala Arg Gly Glu Tyr Ser	Thr Gln Leu Tyr Leu Gly	Pro Leu Trp
1730	1735	1740
Thr Leu Tyr Gly Ser Tyr	Thr Ile Glu Ala Asp Ala	His Thr Leu
1745	1750	1755
Ala His Met Met Asn Cys	Gly Ala Arg Met Thr Phe	
1760	1765	1770

<210> SEQ ID NO 66

<211> LENGTH: 5310

<212> TYPE: DNA

<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 66

```

atgaaattta tgtcagctac tgcgtgtatgt gctgcagcac tctcctccgt tactgaggcg      60
agctcgatcc aagatcaaat aaagaatacc gactgcaatg ttagcaaat aggatattca      120
acttctcaag catttactga tatgatgcta gcagacaaca cagagtatcg agctgctgat      180
agtggttcat tctatgactt ttcgacatct tccagattac ctgaaaaaca tcttagtagt      240
agtagtgaag cttctccaac gacagaagga gtgtcttcat cttcatctgg agaaactgat      300
gagaaaacag aagaagaact agacaatggc ggaatcattt atgctagaga gaaactaact      360
atctcagaat ctcaggactc tctctctaat caaagcatag aactocatga caatagtatt      420
ttcttcggag aaggtgaagt tatctttgat cacagagttg cctcaaaaa cggaggagct      480
atttatggag agaagaggt agtctttgaa aacataaaat ctctactagt agaagtaaat      540

```

-continued

atcgcggtcg	agaaagggg	tagcgtctat	gcaaaagaac	gagtatcttt	agaaaatgtt	600
accgaagcaa	ccttctcctc	caatgggtggg	gaacaagggtg	gtggtggaat	ctattcagaa	660
caggatatgt	taatcagtga	ttgcaacaat	gtacatttcc	aagggaatgc	tgcaggagca	720
acagcagtaa	aacaatgtct	ggatgaagaa	atgatcgtat	tgctcgcaga	atgcgttgat	780
agcttatccg	aagatacact	ggatagcact	ccagaaacgg	aacagactga	gtcaaatgga	840
aatcaagacg	gttcgtctga	aacagaagat	acacaagtat	cagaatcacc	agaatcaact	900
cctagccccg	acgatgtttt	aggtaaagggt	ggtggtatct	atacagaaaa	atctttgacc	960
atcactggaa	ttacagggac	tatagatttt	gtcagtaaca	tagctaccga	ttctggagca	1020
ggtgtattca	ctaaagaaaa	cttgtcttgc	accaacacga	atagcttaca	gtttttgaaa	1080
aactcggcag	gtcaacatgg	aggaggagcc	tacgttactc	aaacctgtc	tgttactaat	1140
acaactagt	aaagtataac	tactccccct	ctcataggag	aagtgatttt	ctctgaaaat	1200
acagctaaag	ggcacgggtg	tggtatctgc	actaacaac	tttctttatc	taatttaaaa	1260
acggtgactc	tactaaaaaa	ctctgcaaa	gagtctggag	gagctatttt	tacagatctg	1320
gcgtctatac	caataacaga	taccocagaa	tcttctaccc	cctcttcctc	ctcgctgca	1380
agcactcctg	aagtagttgc	ttctgctaaa	ataaatcgat	tctttgcctc	tacggcaaaa	1440
cggcgagccc	cttctctaac	agaggctgag	tctgatcaaa	cggatcaaac	agaaacttct	1500
gatactaata	gcgatataga	cgtgtcgtat	gagaacattt	tgaatgtcgc	tatcaatcaa	1560
aacacttctg	cgaaaaaagg	aggggctatt	tacgggaaaa	aagctaaact	ttcccgtatt	1620
aacaatcttg	aactttcagg	gaattcatcc	caggatgtag	gaggagggtc	ctgtttaact	1680
gaaagcgtag	aatttgatgc	aattggatcg	ctcttatccc	actataactc	tgctgctaaa	1740
gaagggtggg	ctattcatcc	taaaacgggt	actctatcta	acctcaagtc	taccttcaact	1800
tttgagata	acactgttaa	agcaatagta	gaaagcactc	ctgaagctcc	agaagagatt	1860
cctccagtag	aaggagaaga	gtctacagca	acagaagatc	caaattctaa	tacagaagga	1920
agttcggcta	acactaacct	tgaaggatct	caaggggata	ctgctgatac	agggactggt	1980
gatgttaaca	atgagtctca	agacacatca	gatactggaa	acgctgaatc	tgaagaacaa	2040
ctacaagatt	ctacacaatc	taatgaagaa	aatacccttc	ccaatagtaa	tattgatcaa	2100
tctaacgaaa	acacagacga	atcatctgat	agccacactg	aggaaataac	tgacgagagt	2160
gtctcatcgt	cctctgaaa	tggatcatct	actcctcaag	atggaggagc	agcttcttca	2220
ggggctccct	caggagatca	atctatctct	gcaaacgctt	gtttagctaa	aagctatgct	2280
gogagtactg	atagctcccc	cgtatctaat	tcttcagggt	cagaagagcc	tgtcacttct	2340
tcttcagatt	cagacgttac	tgcacttctt	gataatccag	actcttcctc	atctggagat	2400
agcgtgggag	actctgaaga	accgactgag	ccagaagctg	gttctacaac	agaaactctt	2460
actttaatag	gaggagggtgc	tatctatgga	gaaactgtta	agattgagaa	cttctctggc	2520
caagggaatat	tttctgga	caaagctatc	gataacacca	cagaaggctc	ctcttccaaa	2580
tctgacgtcc	tggagggtgc	ggtctatgct	aaaacattgt	ttaatctcga	tagcgggagc	2640
tctagacgaa	ctgtcacctt	ctccgggaat	actgtctctt	ctcaatctac	aacaggtcag	2700
gttgctggag	gagctatcta	ctctcctact	gtaaccattg	ctactcctgt	agtattttct	2760
aaaaactctg	caacaaacaa	tgctaataac	actacagata	ctcagagaaa	agacaccttt	2820

-continued

ggaggagcta tcggagctac ttctgctgtt tctctatcag gaggggctca tttcttagaa	2880
aacgttctg acctcggatc tgctattggg ttggtgccag gcacacaaaa tacagaaaca	2940
gtgaaattag agtctggctc ctactacttt gaaaaaata aagctttaaa acgagctact	3000
atttacgcac ctgtcgtttc cattaaagcc tatactgcga catttaacca aaacagatct	3060
ctagaagaag gaagcgcgat ttactttaca aaagaagcat ctattgagtc tttaggctct	3120
gttctcttca caggaaactt agtaacccta acgctaagca caactacaga aggcacacca	3180
gccacaacct caggagatgt aacaaaatat ggtgctgcta tctttggaca aatagcaagc	3240
tcaaacggat ctacagcgga taaccttccc ctgaaactca ttgcttcagg aggaaatatt	3300
tggttcgaa acaatgaata cgcctact tcttctgata cgggaacctc tactttctgt	3360
agtattcgg gagatgttaa attaaccatg caagctgcaa aagggaaaac gatcagtttc	3420
tttgatgcaa tccggacctc tactaagaaa acaggtacac aggcaactgc ctacgatact	3480
ctcgatatta ataatctga ggattcagaa actgtaaact ctgcgtttac aggaacgatt	3540
ctgttctcct ctgaattaca tgaaaaataa tcctatatcc cacaaaacgt agttctacac	3600
agtggatctc ttgtattgaa gccaaatacc gagcttcatt ttatttcttt tgagcagaaa	3660
gaaggctctt ctctcgttat gacacctgga tctgttcttt cgaaccagac tgttctgat	3720
ggagctttgg tcataataa catgaccatt gatttatcca gcgtagagaa aaatggtatt	3780
gctgaaggaa atatctttac tcctccagaa ttgagaatca tagacactac tacagtgga	3840
agcggtgga ccccatctac agatagtga agtaaccaga atagtatga taccgaggag	3900
caaaaataa atgacgcctc gaatcaagga gaaagcgga atggatcgtc ttctcctgca	3960
gtagctgctg cacacacatc tcgtacaaga aactttgccc ctgcagctac agccacacct	4020
acgacaacac caacggctac aactacaaca agcaaccaag taatcctagg aggagaaatt	4080
aaactcatcg atcctaattg gaccttcttc cagaacctcg cattaagatc cgaccaacaa	4140
atctccttgt tagtgctccc tacagactca tcaaaaatgc aagctcagaa aatagtactg	4200
acgggtgata ttgctcctca gaaaggatat acaggaacac tcaactctgga tcctgatcaa	4260
ctacaaaatg gaacgatctc agtgctctgg aaatttgact cttatagaca atgggcttat	4320
gtacctagag acaatcattt ctatgcgaac tcgattctgg gatctcaaat gtaaatggtc	4380
acagtcaaac aaggcttgct caacgataaa atgaatctag ctgcctttga ggaagttagc	4440
tataacaacc tgtggatctc aggactagga acgatgctat cgcaagtagg aacacctact	4500
tctgaagaat tcacttatta cagcagagga gcttctgttg ccttagatgc taaaccagcc	4560
catgatgtga ttgttgagc tgcatttagt aagatgatcg ggaaaacaaa atccttgaaa	4620
agagagaata actacactca caaaggatcc gaatattctt accaagcatc ggtatacgga	4680
ggcaaacctt tccactttgt aatcaataaa aaacgggaaa aatcgctacc gctattgtta	4740
caaggagtca tctcttacgg atatatcaaa catgatacag tgactcacta tccaacgatc	4800
cgtgaacgaa acaaaggaga atgggaagac ttaggatggc tgacagctct ccgtgtctcc	4860
tctgtcttaa gaactcctgc acaaggggat actaaacgta tcaactgtta cggagaattg	4920
gaatactcca gtatcgtca gaaacaattc acagaaacag aatacgatcc tcgttacttc	4980
gacaaactga cctatagaaa cttagcaatt cctatggggg tagcattcga aggagagctc	5040
tctggtaacg atattttgat gtacaacaga ttctctgtag catacatgct atcaatctat	5100

-continued

```

cgaaattctc caacatgcaa ataccaagtg ctctcttcag gagaaggcgg agaaattatt 5160
tgtggagtag cgacaagaaa ctcagctcgc ggagaatata gcacgcagct gtacctggga 5220
cctttgtgga ctctgtatgg atcctacacg atagaagcag acgcacatac actagctcat 5280
atgatgaact gcggtgctcg tatgacattc 5310

```

```

<210> SEQ ID NO 67
<211> LENGTH: 878
<212> TYPE: PRT
<213> ORGANISM: Chlamydia trachomatis

```

```

<400> SEQUENCE: 67

```

```

Met Arg Pro Asp His Met Asn Phe Cys Cys Leu Cys Ala Ala Ile Leu
1      5      10      15
Ser Ser Thr Ala Val Leu Phe Gly Gln Asp Pro Leu Gly Glu Thr Ala
20     25     30
Leu Leu Thr Lys Asn Pro Asn His Val Val Cys Thr Phe Phe Glu Asp
35     40     45
Cys Thr Met Glu Ser Leu Phe Pro Ala Leu Cys Ala His Ala Ser Gln
50     55     60
Asp Asp Pro Leu Tyr Val Leu Gly Asn Ser Tyr Cys Trp Phe Val Ser
65     70     75     80
Lys Leu His Ile Thr Asp Pro Lys Glu Ala Leu Phe Lys Glu Lys Gly
85     90     95
Asp Leu Ser Ile Gln Asn Phe Arg Phe Leu Ser Phe Thr Asp Cys Ser
100    105    110
Ser Lys Glu Ser Ser Pro Ser Ile Ile His Gln Lys Asn Gly Gln Leu
115    120    125
Ser Leu Arg Asn Asn Gly Ser Met Ser Phe Cys Arg Asn His Ala Glu
130    135    140
Gly Ser Gly Gly Ala Ile Ser Ala Asp Ala Phe Ser Leu Gln His Asn
145    150    155    160
Tyr Leu Phe Thr Ala Phe Glu Glu Asn Ser Ser Lys Gly Asn Gly Gly
165    170    175
Ala Ile Gln Ala Gln Thr Phe Ser Leu Ser Arg Asn Val Ser Pro Ile
180    185    190
Ser Phe Ala Arg Asn Arg Ala Asp Leu Asn Gly Gly Ala Ile Cys Cys
195    200    205
Ser Asn Leu Ile Cys Ser Gly Asn Val Asn Pro Leu Phe Phe Thr Gly
210    215    220
Asn Ser Ala Thr Asn Gly Gly Ala Ile Cys Cys Ile Ser Asp Leu Asn
225    230    235    240
Thr Ser Glu Lys Gly Ser Leu Ser Leu Ala Cys Asn Gln Glu Thr Leu
245    250    255
Phe Ala Ser Asn Ser Ala Lys Glu Lys Gly Gly Ala Ile Tyr Ala Lys
260    265    270
His Met Val Leu Arg Tyr Asn Gly Pro Val Ser Phe Ile Asn Asn Ser
275    280    285
Ala Lys Ile Gly Gly Ala Ile Ala Ile Gln Ser Gly Gly Ser Leu Ser
290    295    300
Ile Leu Ala Gly Glu Gly Ser Val Leu Phe Gln Asn Asn Ser Gln Arg
305    310    315    320

```


-continued

Thr	Ser	Asp	Gln	Gly	Leu	Val	Arg	Asn	Ala	Ile	Tyr	Leu	Glu	Lys	Asp	325	330	335
Ala	Ile	Leu	Ser	Ser	Leu	Glu	Ala	Arg	Asn	Gly	Asp	Ile	Leu	Phe	Phe	340	345	350
Asp	Pro	Ile	Val	Gln	Glu	Ser	Ser	Ser	Lys	Glu	Ser	Pro	Leu	Pro	Ser	355	360	365
Ser	Leu	Gln	Ala	Ser	Val	Thr	Ser	Pro	Thr	Pro	Ala	Thr	Ala	Ser	Pro	370	375	380
Leu	Val	Ile	Gln	Thr	Ser	Ala	Asn	Arg	Ser	Val	Ile	Phe	Ser	Ser	Glu	385	390	395
Arg	Leu	Ser	Glu	Glu	Glu	Lys	Thr	Pro	Asp	Asn	Leu	Thr	Ser	Gln	Leu	405	410	415
Gln	Gln	Pro	Ile	Glu	Leu	Lys	Ser	Gly	Arg	Leu	Val	Leu	Lys	Asp	Arg	420	425	430
Ala	Val	Leu	Ser	Ala	Pro	Ser	Leu	Ser	Gln	Asp	Pro	Gln	Ala	Leu	Leu	435	440	445
Ile	Met	Glu	Ala	Gly	Thr	Ser	Leu	Lys	Thr	Ser	Ser	Asp	Leu	Lys	Leu	450	455	460
Ala	Thr	Leu	Ser	Ile	Pro	Leu	His	Ser	Leu	Asp	Thr	Glu	Lys	Ser	Val	465	470	475
Thr	Ile	His	Ala	Pro	Asn	Leu	Ser	Ile	Gln	Lys	Ile	Phe	Leu	Ser	Asn	485	490	495
Ser	Gly	Asp	Glu	Asn	Phe	Tyr	Glu	Asn	Val	Glu	Leu	Leu	Ser	Lys	Glu	500	505	510
Gln	Asn	Asn	Ile	Pro	Leu	Leu	Thr	Leu	Ser	Lys	Glu	Gln	Ser	His	Leu	515	520	525
His	Leu	Pro	Asp	Gly	Asn	Leu	Ser	Ser	His	Phe	Gly	Tyr	Gln	Gly	Asp	530	535	540
Trp	Thr	Phe	Ser	Trp	Lys	Asp	Ser	Asp	Glu	Gly	His	Ser	Leu	Ile	Ala	545	550	555
Asn	Trp	Thr	Pro	Lys	Asn	Tyr	Val	Pro	His	Pro	Glu	Arg	Gln	Ser	Thr	565	570	575
Leu	Val	Ala	Asn	Thr	Leu	Trp	Asn	Thr	Tyr	Ser	Asp	Met	Gln	Ala	Val	580	585	590
Gln	Ser	Met	Ile	Asn	Thr	Ile	Ala	His	Gly	Gly	Ala	Tyr	Leu	Phe	Gly	595	600	605
Thr	Trp	Gly	Ser	Ala	Val	Ser	Asn	Leu	Phe	Tyr	Ala	His	Asp	Ser	Ser	610	615	620
Gly	Lys	Pro	Ile	Asp	Asn	Trp	His	His	Arg	Ser	Leu	Gly	Tyr	Leu	Phe	625	630	635
Gly	Ile	Ser	Thr	His	Ser	Leu	Asp	Asp	His	Ser	Phe	Cys	Leu	Ala	Ala	645	650	655
Gly	Gln	Leu	Leu	Gly	Lys	Ser	Ser	Asp	Ser	Phe	Ile	Thr	Ser	Thr	Glu	660	665	670
Thr	Thr	Ser	Tyr	Ile	Ala	Thr	Val	Gln	Ala	Gln	Leu	Ala	Thr	Pro	Leu	675	680	685
Met	Lys	Ile	Ser	Ala	Gln	Ala	Cys	Tyr	Asn	Glu	Ser	Ile	His	Glu	Leu	690	695	700
Lys	Thr	Lys	Tyr	Arg	Ser	Phe	Ser	Lys	Glu	Gly	Phe	Gly	Ser	Trp	His	705	710	715
Ser	Val	Ala	Val	Ser	Gly	Glu	Val	Cys	Ala	Ser	Ile	Pro	Ile	Val	Ser			

-continued

725										730					735				
Asn	Gly	Ser	Gly	Leu	Phe	Ser	Ser	Phe	Ser	Ile	Phe	Ser	Lys	Leu	Gln				
			740				745						750						
Gly	Phe	Ser	Gly	Thr	Gln	Asp	Gly	Phe	Glu	Glu	Ser	Ser	Gly	Glu	Ile				
			755				760				765								
Arg	Ser	Phe	Ser	Ala	Ser	Ser	Phe	Arg	Asn	Ile	Ser	Leu	Pro	Met	Gly				
			770				775				780								
Ile	Thr	Phe	Glu	Lys	Lys	Ser	Gln	Lys	Thr	Arg	Asn	Tyr	Tyr	Tyr	Phe				
			785				790				795			800					
Leu	Gly	Ala	Tyr	Ile	Gln	Asp	Leu	Lys	Arg	Asp	Val	Glu	Ser	Gly	Pro				
			805				810						815						
Val	Val	Leu	Leu	Lys	Asn	Ala	Val	Ser	Trp	Asp	Ala	Pro	Met	Ala	Asn				
			820				825						830						
Leu	Asp	Ser	Arg	Ala	Tyr	Met	Phe	Arg	Leu	Thr	Asn	Gln	Arg	Ala	Leu				
			835				840						845						
His	Arg	Leu	Gln	Thr	Leu	Leu	Asn	Val	Ser	Tyr	Val	Leu	Arg	Gly	Gln				
			850				855						860						
Ser	His	Ser	Tyr	Ser	Leu	Asp	Leu	Gly	Thr	Thr	Tyr	Arg	Phe						
			865				870						875						
<210> SEQ ID NO 68																			
<211> LENGTH: 2634																			
<212> TYPE: DNA																			
<213> ORGANISM: Chlamydia trachomatis																			
<400> SEQUENCE: 68																			
atgcgacctg atcatatgaa cttctgttgt ctatgtgctg ctattttgtc atccacagcg 60																			
gtcctctttg gccaggatcc cttagggtgaa accgccctcc tcactaaaaa tcctaatacat 120																			
gtcgtctgta cattttttga ggactgtacc atggagagcc tctttcctgc tctttgtgct 180																			
catgcatcac aagatgatcc tttgtatgta ctgggaaatt cctactgttg gttcgtatct 240																			
aaactccata tcacggaccc caaagaggct ctttttaaaq aaaaaggaga tctttccatt 300																			
caaaattttc gcttcctttc cttcacagat tgctcttcca aggaaagctc tccttctatt 360																			
attcatcaaa agaatggtca gttatccttg cgcaataatg gtagcatgag tttctgtcga 420																			
aatcatgctg aaggctcttg aggagccatc tctgcgggat ccttttctct acaacacaac 480																			
tatcttttca cagcttttga agagaattct tctaaaggaa atggcggagc cattcaggct 540																			
caaacettct ctttatctag aaatgtgtcg cctatttctt tcgcccgtaa tcgtgcggat 600																			
ttaaattggc gcgctatttg ctgtagtaat cttatttgtt cagggaatgt aaacctcttc 660																			
tttttctact gaaactccgc cacgaatgga ggcgctattt gttgtatcag cgatctaaac 720																			
acctcagaaa aaggctctct ctctcttgct tgtaaccaag aaacgctatt tgcaagcaat 780																			
tctgctaaag aaaaaggcgg ggctatttat gccaagcaca tggatttgcg ttataacggg 840																			
cctgtttctc tcattaacaa cagcgctaaa atagggtggag ctatcgccat ccagtcggga 900																			
gggagtctct ctatccttgc aggtgaagga tctgttctgt tcagaataa ctcaccaacg 960																			
acctccgacc aaggctctagt aagaaacgcc atctacttag agaaagatgc gattctttct 1020																			
tccttagaag ctcgcaacgg agatattctt ttctttgatc ctattgtaca agaaagtagc 1080																			
agcaaagaat cgctctctcc ctctcttttg caagccagcg tgactcttcc caccacagcc 1140																			
accgcattcc ctttagttat tcagacaagt gcaaaccggt cagtgtatct ctcgagcgaa 1200																			

-continued

```

cgtctttctg aagaagaaaa aactcctgat aacctcactt cccaactaca gcagcctatc 1260
gaactgaaat ccggacgctt agttttaaaa gatcgcgctg tcctttccgc gccttctctc 1320
tctcaggatc ctcaagctct cctcattatg gaagcgggaa cttctttaaa aacttctctc 1380
gatttgaagt tagctacgct aagtattccc cttcattcct tagatactga aaaaagcgta 1440
actatccacg ccctaacctt ttctatccaa aagatcttcc tctctaattc tggagatgag 1500
aatttttatg aaaatgtaga gcttctcagt aaagagcaaa acaatattcc tctccttact 1560
ctctctaaag agcaatctca ttacatctct cctgatggga acctctcttc tcactttgga 1620
tatcaaggag attggacttt ttcttgaaa gattctgatg aagggcattc tctgattgct 1680
aattggacgc ctaaaaaacta tgtgctcat ccagaacgtc aatctacact cgttgcgaaac 1740
actctttgga acacctatcc cgatatgcaa gctgtgcagt cgatgattaa tacaatagcg 1800
cacggaggag cctatctatt tggaacgtgg ggatctgctg tttctaattt attctatgct 1860
cacgacagct ctgggaaacc tatcgataat tggcatcata gaagccttgg ctacctatcc 1920
gggatcagta ctacagttt agatgacctt tctttctgct tggctgcagg acaattactc 1980
gggaaatcgt ccgattcctt tattacgtct acagaaacga cctcctatat agctactgta 2040
caagcgcaac tcgctacccc tctaatgaaa atctctgcac aggcattgcta taatgaaagt 2100
atccatgagc taaaaacaaa atacgctccc ttctctaaag aaggattcgg atcctggcat 2160
agcgttgacg tatccggaga agtggtgcga tcgattccca ttgtatccaa tggttccgga 2220
ctgttcagct ccttctctat tttctctaaa ctgcaaggat tttcaggaac acaggacggt 2280
tttgaggaga gttcgggaga gattcgggtc tttcttgcca gctctttcag aaatatttca 2340
cttctatgga gaataacatt tgaaaaaaa tccccaaaaa cagaaacta ctattacttt 2400
ctgggagcct acatccaaga cctaaaacgt gatgtggaat cgggacctgt agtgttactc 2460
aaaaatgccg tctcctggga tgctcctatg gcgaacttgg attcgcgagc ctacatgttc 2520
aggcttacga atcaaaagac tctgcataga cttcagacgc tgttaaagt gtcttacgta 2580
ctgcgcgggc aaagccatag ttactccctg gatctgggga ccacttacag gttc 2634

```

<210> SEQ ID NO 69

<211> LENGTH: 1005

<212> TYPE: PRT

<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 69

```

Met Thr Asn Ser Ile Ser Gly Tyr Gln Pro Thr Val Thr Thr Ser Thr
1           5           10           15
Ser Ser Thr Thr Ser Ala Ser Gly Ala Ser Gly Ser Leu Gly Ala Ser
20          25          30
Ser Val Ser Thr Thr Ala Asn Ala Thr Val Thr Gln Thr Ala Asn Ala
35          40          45
Thr Asn Ser Ala Ala Thr Ser Ser Ile Gln Thr Thr Gly Glu Thr Val
50          55          60
Val Asn Tyr Thr Asn Ser Ala Ser Ala Pro Asn Val Thr Val Ser Thr
65          70          75          80
Ser Ser Ser Ser Thr Gln Ala Thr Ala Thr Ser Asn Lys Thr Ser Gln
85          90          95
Ala Val Ala Gly Lys Ile Thr Ser Pro Asp Thr Ser Glu Ser Ser Glu

```

-continued

100							105					110				
Thr	Ser	Ser	Thr	Ser	Ser	Ser	Asp	His	Ile	Pro	Ser	Asp	Tyr	Asp	Asp	
		115					120					125				
Val	Gly	Ser	Asn	Ser	Gly	Asp	Ile	Ser	Asn	Asn	Tyr	Asp	Asp	Val	Gly	
	130					135					140					
Ser	Asn	Asn	Gly	Asp	Ile	Ser	Ser	Asn	Tyr	Asp	Asp	Ala	Ala	Ala	Asp	
145				150						155					160	
Tyr	Glu	Pro	Ile	Arg	Thr	Thr	Glu	Asn	Ile	Tyr	Glu	Ser	Ile	Gly	Gly	
				165					170					175		
Ser	Arg	Thr	Ser	Gly	Pro	Glu	Asn	Thr	Ser	Gly	Gly	Ala	Ala	Ala	Ala	
			180					185					190			
Leu	Asn	Ser	Leu	Arg	Gly	Ser	Ser	Tyr	Ser	Asn	Tyr	Asp	Asp	Ala	Ala	
	195						200					205				
Ala	Asp	Tyr	Glu	Pro	Ile	Arg	Thr	Thr	Glu	Asn	Ile	Tyr	Glu	Ser	Ile	
	210					215					220					
Gly	Gly	Ser	Arg	Thr	Ser	Gly	Pro	Glu	Asn	Thr	Ser	Gly	Gly	Ala	Ala	
225						230				235					240	
Ala	Ala	Leu	Asn	Ser	Leu	Arg	Gly	Ser	Ser	Tyr	Ser	Asn	Tyr	Asp	Asp	
			245						250					255		
Ala	Ala	Ala	Asp	Tyr	Glu	Pro	Ile	Arg	Thr	Thr	Glu	Asn	Ile	Tyr	Glu	
			260					265						270		
Ser	Ile	Gly	Gly	Ser	Arg	Thr	Ser	Gly	Pro	Glu	Asn	Thr	Ser	Asp	Gly	
		275					280					285				
Ala	Ala	Ala	Ala	Ala	Leu	Asn	Ser	Leu	Arg	Gly	Ser	Ser	Tyr	Thr	Thr	
	290					295					300					
Gly	Pro	Arg	Asn	Glu	Gly	Val	Phe	Gly	Pro	Gly	Pro	Glu	Gly	Leu	Pro	
305						310				315					320	
Asp	Met	Ser	Leu	Pro	Ser	Tyr	Asp	Pro	Thr	Asn	Lys	Thr	Ser	Leu	Leu	
			325						330					335		
Thr	Phe	Leu	Ser	Asn	Pro	His	Val	Lys	Ser	Lys	Met	Leu	Glu	Asn	Ser	
			340					345					350			
Gly	His	Phe	Val	Phe	Ile	Asp	Thr	Asp	Arg	Ser	Ser	Phe	Ile	Leu	Val	
	355					360						365				
Pro	Asn	Gly	Asn	Trp	Asp	Gln	Val	Cys	Ser	Ile	Lys	Val	Gln	Asn	Gly	
	370				375						380					
Lys	Thr	Lys	Glu	Asp	Leu	Asp	Ile	Lys	Asp	Leu	Glu	Asn	Met	Cys	Ala	
385					390					395					400	
Lys	Phe	Cys	Thr	Gly	Phe	Ser	Lys	Phe	Ser	Gly	Asp	Trp	Asp	Ser	Leu	
			405						410					415		
Val	Glu	Pro	Met	Val	Ser	Ala	Lys	Ala	Gly	Val	Ala	Ser	Gly	Gly	Asn	
			420					425					430			
Leu	Pro	Asn	Thr	Val	Ile	Ile	Asn	Asn	Lys	Phe	Lys	Thr	Cys	Val	Ala	
		435					440					445				
Tyr	Gly	Pro	Trp	Asn	Ser	Gln	Glu	Ala	Ser	Ser	Gly	Tyr	Thr	Pro	Ser	
	450					455					460					
Ala	Trp	Arg	Arg	Gly	His	Arg	Val	Asp	Phe	Gly	Gly	Ile	Phe	Glu	Lys	
465					470					475					480	
Ala	Asn	Asp	Phe	Asn	Lys	Ile	Asn	Trp	Gly	Thr	Gln	Ala	Gly	Pro	Ser	
			485						490					495		
Ser	Glu	Asp	Asp	Gly	Ile	Ser	Phe	Ser	Asn	Glu	Thr	Pro	Gly	Ala	Gly	
			500					505					510			

-continued

Pro	Ala	Ala	Ala	Pro	Ser	Pro	Thr	Pro	Ser	Ser	Ile	Pro	Ile	Ile	Asn
	515						520					525			
Val	Asn	Val	Asn	Val	Gly	Gly	Thr	Asn	Val	Asn	Ile	Gly	Asp	Thr	Asn
	530					535					540				
Val	Asn	Thr	Thr	Asn	Thr	Thr	Pro	Thr	Thr	Gln	Ser	Thr	Asp	Ala	Ser
545				550						555					560
Thr	Asp	Thr	Ser	Asp	Ile	Asp	Asp	Ile	Asn	Thr	Asn	Asn	Gln	Thr	Asp
			565						570					575	
Asp	Ile	Asn	Thr	Thr	Asp	Lys	Asp	Ser	Asp	Gly	Ala	Gly	Gly	Val	Asn
		580						585					590		
Gly	Asp	Ile	Ser	Glu	Thr	Glu	Ser	Ser	Ser	Gly	Asp	Asp	Ser	Gly	Ser
	595						600					605			
Val	Ser	Ser	Ser	Glu	Ser	Asp	Lys	Asn	Ala	Ser	Val	Gly	Asn	Asp	Gly
	610					615					620				
Pro	Ala	Met	Lys	Asp	Ile	Leu	Ser	Ala	Val	Arg	Lys	His	Leu	Asp	Val
625					630					635					640
Val	Tyr	Pro	Gly	Glu	Asn	Gly	Gly	Ser	Thr	Glu	Gly	Pro	Leu	Pro	Ala
			645						650					655	
Asn	Gln	Thr	Leu	Gly	Asp	Val	Ile	Ser	Asp	Val	Glu	Asn	Lys	Gly	Ser
		660						665					670		
Ala	Gln	Asp	Thr	Lys	Leu	Ser	Gly	Asn	Thr	Gly	Ala	Gly	Asp	Asp	Asp
		675					680					685			
Pro	Thr	Thr	Thr	Ala	Ala	Val	Gly	Asn	Gly	Ala	Glu	Glu	Ile	Thr	Leu
	690					695					700				
Ser	Asp	Thr	Asp	Ser	Gly	Ile	Gly	Asp	Asp	Val	Ser	Asp	Thr	Ala	Ser
705					710					715					720
Ser	Ser	Gly	Asp	Glu	Ser	Gly	Gly	Val	Ser	Ser	Pro	Ser	Ser	Glu	Ser
			725						730					735	
Asn	Lys	Asn	Thr	Ala	Val	Gly	Asn	Asp	Gly	Pro	Ser	Gly	Leu	Asp	Ile
		740						745					750		
Leu	Ala	Ala	Val	Arg	Lys	His	Leu	Asp	Lys	Val	Tyr	Pro	Gly	Asp	Asn
	755						760					765			
Gly	Gly	Ser	Thr	Glu	Gly	Pro	Leu	Gln	Ala	Asn	Gln	Thr	Leu	Gly	Asp
	770					775					780				
Ile	Val	Gln	Asp	Met	Glu	Thr	Thr	Gly	Thr	Ser	Gln	Glu	Thr	Val	Val
785					790					795					800
Ser	Pro	Trp	Lys	Gly	Ser	Thr	Ser	Ser	Thr	Glu	Ser	Ala	Gly	Gly	Ser
			805						810					815	
Gly	Ser	Val	Gln	Thr	Leu	Leu	Pro	Ser	Pro	Pro	Pro	Thr	Pro	Ser	Thr
		820						825					830		
Thr	Thr	Leu	Arg	Thr	Gly	Thr	Gly	Ala	Thr	Thr	Thr	Ser	Leu	Met	Met
		835					840					845			
Gly	Gly	Pro	Ile	Lys	Ala	Asp	Ile	Ile	Thr	Thr	Gly	Gly	Gly	Gly	Arg
	850					855					860				
Ile	Pro	Gly	Gly	Gly	Thr	Leu	Glu	Lys	Leu	Leu	Pro	Arg	Ile	Arg	Ala
865					870					875					880
His	Leu	Asp	Ile	Ser	Phe	Asp	Ala	Gln	Gly	Asp	Leu	Val	Ser	Thr	Glu
			885					890						895	
Glu	Pro	Gln	Leu	Gly	Ser	Ile	Val	Asn	Lys	Phe	Arg	Gln	Glu	Thr	Gly
			900					905					910		

-continued

Ser	Arg	Gly	Ile	Leu	Ala	Phe	Val	Glu	Ser	Ala	Pro	Gly	Lys	Pro	Gly
		915					920					925			
Ser	Ala	Gln	Val	Leu	Thr	Gly	Thr	Gly	Gly	Asp	Lys	Gly	Asn	Leu	Phe
	930					935					940				
Gln	Ala	Ala	Ala	Ala	Val	Thr	Gln	Ala	Leu	Gly	Asn	Val	Ala	Gly	Lys
945					950					955				960	
Val	Asn	Leu	Ala	Ile	Gln	Gly	Gln	Lys	Leu	Ser	Ser	Leu	Val	Asn	Asp
			965					970						975	
Asp	Gly	Lys	Gly	Ser	Val	Gly	Arg	Asp	Leu	Phe	Gln	Ala	Ala	Ala	Gln
		980						985					990		
Thr	Thr	Gln	Val	Leu	Ser	Ala	Leu	Ile	Asp	Thr	Val	Gly			
	995						1000					1005			

<210> SEQ ID NO 70

<211> LENGTH: 3015

<212> TYPE: DNA

<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 70

```

atgacgaatt ctatatcagg ttatcaacct actgttacaa cttctacatc atcaaccact    60
tcggcatcag gtgcttcagg atctctggga gcttcttctg tatctactac cgcaaacgct    120
acagttacac aaacagcaaa cgcaacaaat tcagcgggcta catcttctat ccaaacgact    180
ggagagactg tagtaaaacta tacgaattca gcttcggccc ccaatgtaac tgtatcgacc    240
tcctcttctt ccacacaagc cacagccact tcgaataaaa cttcccaagc cgttgctgga    300
aaaatcactt ctccagatac ttcagaaagc tcagaaaacta gctctacctc atcaagcgat    360
catatcccta gcgattacga tgacgttggt agcaatagtg gagatattag caacaactac    420
gatgacgtag gtagtaacaa cggagatatc agtagcaatt atgacgatgc tgctgctgat    480
tacgagccga taagaactac tgaaaatatt tatgagagta ttggtggctc tagaacaagt    540
ggcccagaaa atacaagtgg tgggtgcagca gcagcactca attctctaag aggctcctcc    600
tacagcaatt atgacgatgc tgctgctgat tacgagccga taagaactac tgaaaatatt    660
tatgagagta ttggtggctc tagaacaagt ggcccagaaa atacgagtgg tgggtgcagca    720
gcagcactca attctctaag aggctcctcc tacagcaatt atgacgatgc tgctgctgat    780
tacgagccga taagaactac tgaaaatatt tatgagagta ttggtggctc tagaacaagt    840
ggcccagaaa atacgagtga tgggtgcagca gcagcagcac tcaattctct aagaggctcc    900
tcctacacaa cagggcctcg taacgagggg gtattcggcc ctggaccgga aggactacca    960
gacatgtctc ttctctcata cgatcctaca aataaaacct cgttattgac ttctctctcc   1020
aacccctcatg taaagtcgaa aatgcttgaa aactcggggc atttcgtctt cattgataca   1080
gatagaagta gtttcattct tgttctaac ggaaattggg accaagtctg ttcaattaaa   1140
gttcaaaatg gaaagaccaa agaagatctc gacatcaaag acttggaata catgtgtgca   1200
aaattctgta caggggttag caaattctct ggtgactggg acagtcttgt agaacctatg   1260
gtgtcagcca aagctggagt ggccagcggg ggcaatcttc ccaatacagt gattatcaat   1320
aataaattca aaacttgctg tgcttatggt ccttggaata gccaggaagc aagtcttggt   1380
tatacacctt ctgcttgagg acgtgggcat cgagtagatt ttggaggaat ttttgagaaa   1440
gccaacgact ttaataaaat caactgggga actcaagccg ggctagtag cgaagacgat   1500

```

-continued

```

ggcatttctt tctccaatga aactcctgga gctggctctg cagctgctcc atcaccaacg 1560
ccatcctcta ttctatcat caatgtcaat gtcaatgttg gcggaactaa tgtgaatatt 1620
ggagatacga atgtcaacac gactaacacc acaccaacaa ctcaatctac agacgcctct 1680
acagatacaa gcgatatcga tgacataaat accaacaacc aaactgatga tatcaatacg 1740
acagacaaag actctgacgg agctgggtgga gtcaatggcg atatatccga aacagaatcc 1800
tcttctggag atgattcagg aagtgtctct tctcagaat cagacaagaa tgcctctgtc 1860
ggaaatgacg gacctgctat gaaagatatc ctttctgccg tgcgtaaca cctagacgtc 1920
gtttaccctg gcgaaaatgg cggttctaca gaagggcctc tcccagctaa ccaaactctc 1980
ggagacgtaa tctctgatgt agagaataaa ggctccgctc aggatacaaa attgtcagga 2040
aatacaggag ctgggggatga cgatccaaca accacagctg ctgtaggtaa tggagcggaa 2100
gagatcactc ttccgacac agattctggt atcggagatg atgtatccga tacagcgtct 2160
tcatctgggg atgaatccgg aggagtctcc tctccctctt cagaatccaa taaaaatact 2220
gccgttgga atgacggacc ttctggacta gatatcctcg ctgccgtacg taaacattta 2280
gataagggtt accctggcga caatgggtgt tctacagaag ggctctcca agctaacca 2340
actcttgagg atatcgcca ggatatggaa acaacaggga catccaaga aaccgttgta 2400
tccccatgga aaggaagcac ttcttcaacg gaatcagcag gaggaagtgg tagcgtacaa 2460
acactactgc cttcaccacc tccaaccccg tcaactacaa cattaagaac gggcacagga 2520
gctaccacca catccttgat gatgggagga ccaatcaaag ctgacataat aacaactggt 2580
ggcggaggac gaattcctgg aggaggaacg ttagaaaagc tgctccctcg tatacgtcgc 2640
cacttagaca tatectttga tgcgcaaggc gatctcgtaa gtactgaaga gcctcagctt 2700
ggctcgattg taaacaaatt ccgccaagaa actggttcaa gaggaatctt agctttcgtt 2760
gagagtgtc caggcaagcc gggatctgca caggtcttaa cgggtacagg gggagataaa 2820
ggcaacctat tccaagcagc tgccgcagtc acccaagcct taggaaatgt tgcagggaaa 2880
gtcaaccttg cgatacaagg ccaaaaaacta tcatccctag tcaatgacga cgggaagggg 2940
tctgttgga gagatttatt ccaagcagca gcccaacaa ctcaagtgtc aagcgcactg 3000
attgataccg tagga 3015

```

<210> SEQ ID NO 71

<211> LENGTH: 393

<212> TYPE: PRT

<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 71

```

Met Lys Lys Leu Leu Lys Ser Val Leu Val Phe Ala Ala Leu Ser Ser
1           5           10           15

```

```

Ala Ser Ser Leu Gln Ala Leu Pro Val Gly Asn Pro Ala Glu Pro Ser
20           25           30

```

```

Leu Met Ile Asp Gly Ile Leu Trp Glu Gly Phe Gly Gly Asp Pro Cys
35           40           45

```

```

Asp Pro Cys Ala Thr Trp Cys Asp Ala Ile Ser Met Arg Val Gly Tyr
50           55           60

```

```

Tyr Gly Asp Phe Val Phe Asp Arg Val Leu Lys Thr Asp Val Asn Lys
65           70           75           80

```

```

Glu Phe Gln Met Gly Ala Lys Pro Thr Thr Asp Thr Gly Asn Ser Ala

```

-continued

85				90				95							
Ala	Pro	Ser	Thr	Leu	Thr	Ala	Arg	Glu	Asn	Pro	Ala	Tyr	Gly	Arg	His
			100						105				110		
Met	Gln	Asp	Ala	Glu	Met	Phe	Thr	Asn	Ala	Ala	Cys	Met	Ala	Leu	Asn
		115							120				125		
Ile	Trp	Asp	Arg	Phe	Asp	Val	Phe	Cys	Thr	Leu	Gly	Ala	Thr	Ser	Gly
	130					135					140				
Tyr	Leu	Lys	Gly	Asn	Ser	Ala	Ser	Phe	Asn	Leu	Val	Gly	Leu	Phe	Gly
	145				150					155					160
Asp	Asn	Glu	Asn	Gln	Lys	Thr	Val	Lys	Ala	Glu	Ser	Val	Pro	Asn	Met
			165						170					175	
Ser	Phe	Asp	Gln	Ser	Val	Val	Glu	Leu	Tyr	Thr	Asp	Thr	Thr	Phe	Ala
			180						185					190	
Trp	Ser	Val	Gly	Ala	Arg	Ala	Ala	Leu	Trp	Glu	Cys	Gly	Cys	Ala	Thr
		195					200						205		
Leu	Gly	Ala	Ser	Phe	Gln	Tyr	Ala	Gln	Ser	Lys	Pro	Lys	Val	Glu	Glu
	210					215					220				
Leu	Asn	Val	Leu	Cys	Asn	Ala	Ala	Glu	Phe	Thr	Ile	Asn	Lys	Pro	Lys
	225				230					235					240
Gly	Tyr	Val	Gly	Lys	Glu	Phe	Pro	Leu	Asp	Leu	Thr	Ala	Gly	Thr	Asp
			245						250					255	
Ala	Ala	Thr	Gly	Thr	Lys	Asp	Ala	Ser	Ile	Asp	Tyr	His	Glu	Trp	Gln
			260						265					270	
Ala	Ser	Leu	Ala	Leu	Ser	Tyr	Arg	Leu	Asn	Met	Phe	Thr	Pro	Tyr	Ile
		275					280						285		
Gly	Val	Lys	Trp	Ser	Arg	Ala	Ser	Phe	Asp	Ala	Asp	Thr	Ile	Arg	Ile
	290					295					300				
Ala	Gln	Pro	Lys	Ser	Ala	Thr	Ala	Ile	Phe	Asp	Thr	Thr	Thr	Leu	Asn
	305				310					315					320
Pro	Thr	Ile	Ala	Gly	Ala	Gly	Asp	Val	Lys	Thr	Gly	Ala	Glu	Gly	Gln
			325						330					335	
Leu	Gly	Asp	Thr	Met	Gln	Ile	Val	Ser	Leu	Gln	Leu	Asn	Lys	Met	Lys
		340							345				350		
Ser	Arg	Lys	Ser	Cys	Gly	Ile	Ala	Val	Gly	Thr	Thr	Ile	Val	Asp	Ala
		355					360						365		
Asp	Lys	Tyr	Ala	Val	Thr	Val	Glu	Thr	Arg	Leu	Ile	Asp	Glu	Arg	Ala
	370					375					380				
Ala	His	Val	Asn	Ala	Gln	Phe	Arg	Phe							
	385					390									

<210> SEQ ID NO 72

<211> LENGTH: 1179

<212> TYPE: DNA

<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 72

atgaaaaaac tcttgaaatc ggtattagta ttgtccgctt tgagttctgc ttctctcttg	60
caagctctgc ctgtggggaa tctgtctgaa ccaagcetta tgatcgacgg aattctgtgg	120
gaagggttcg gcgagatcc ttgcgatact tgcgccactt ggtgtgacgc tatcagcatg	180
cgtgttggtt actacggaga ctttggtttt gaccgtgttt tgaactga tgtgaataaa	240
gaatttcaga tgggtgcaa gcctacaact gatacaggca atagtgcagc tccatccact	300

-continued

```

cttacagcaa gagagaatcc tgcttacggc cgacatatgc aggatgctga gatgtttaca 360
aatgccgctt gcatggcatt gaatatattgg gatcgttttg atgtattctg tacattagga 420
gccaccagtg gatattctaa aggaaactct gcttctttca atttagttgg attgtttgga 480
gataatgaaa atcaaaaaac ggtcaaagcg gagtctgtac caaatatgag ctttgatcaa 540
tctgttgttg agttgtatac agatactact tttgcgtgga gcgtcggcgc tcgcgagct 600
ttgtgggaat gtggatgtgc aacttttagga gcttcattcc aatatgctca atctaaacct 660
aaagtagaag aattaaacgt tctctgcaat gcagcagagt ttactattaa taaacctaaa 720
gggtatgtag gtaaggagtt tcctcttgat cttacagcag gaacagatgc tgcgacagga 780
actaaggatg cctctattga ttaccatgaa tggcaagcaa gtttagctct ctcttacaga 840
ctgaatatgt tcactcccta cattggagtt aaatggtctc gagcaagctt tgatgccgat 900
acgattcgta tagccagcgc aaaatcagct acagctattt ttgatactac cacgcttaac 960
ccaactattg ctggagctgg cgatgtgaaa actggcgagc agggtcagct cggagacaca 1020
atgcaaactc tttccttgca attgaacaag atgaaatcta gaaaatcttg cggtattgca 1080
gtaggaacaa ctattgtgga tgcagacaaa tacgcagtta cagttgagac tcgcttgatc 1140
gatgagagag cagctcacgt aaatgcacaa ttccgcttc 1179

```

```

<210> SEQ ID NO 73
<211> LENGTH: 164
<212> TYPE: PRT
<213> ORGANISM: Chlamydia trachomatis

```

```

<400> SEQUENCE: 73

```

```

Met Asp Leu Lys  Gln Ile Glu Lys Leu Met Ile Ala Met Gly Arg Asn
1          5          10          15
Lys Met Lys Arg  Ile Val Ile Lys Arg Glu Gly Leu Glu Leu Glu Leu
20         25         30
Glu Arg Asp Thr Val Pro Ser Ile Gln Glu Pro Val Phe Tyr Asp Asn
35         40         45
Arg Leu Phe Ala Gly Phe Ser Gln Glu Arg Pro Ile Pro Thr Asp Gln
50         55         60
Asn Leu Gly Asn Pro Ile Val Lys Glu Ser Ile Glu Lys Lys Glu Ser
65         70         75         80
Glu Ala Pro Ala Gln Gly Asp Phe Ile Val Ser Pro Leu Val Gly Thr
85         90         95
Phe Tyr Gly Ser Pro Ser Pro Glu Ala Pro Ala Phe Ile Lys Pro Gly
100        105        110
Asp Thr Val Ser Glu Asp Thr Val Val Cys Ile Val Glu Ala Met Lys
115        120        125
Val Met Asn Glu Val Lys Ala Gly Met Ser Gly Arg Val Glu Glu Ile
130        135        140
Leu Ile Thr Asn Gly Asp Pro Val Gln Phe Gly Ser Lys Leu Phe Arg
145        150        155        160
Ile Val Lys Ala

```

```

<210> SEQ ID NO 74
<211> LENGTH: 492
<212> TYPE: DNA
<213> ORGANISM: Chlamydia trachomatis

```

-continued

<400> SEQUENCE: 74

```

atggatttaa agcagataga aaagctcatg attgctatgg gccgtaataa aatgaagcgc      60
attgttatca agcgtgaagg ttggagtta gagttagaaa gggatacagt cccaagtatt      120
caggagccag tcttttatga taacagactg ttgctggat tttccaaga aagacctatt      180
cctacagatc aaaaccttgg gaatcctatt gttaaagaga gtatcgagaa gaaagaaagt      240
gaggcgctg ctcagggaga ttttattgtt tctccgctgg taggcacttt ttatggctct      300
ccttcgccag aggtcccagc atttattaag cctggggata ctgtttcaga ggataccgtt      360
gtttgtatcg tggaagctat gaaggtaatg aacagggtaa aggcaggaat gtctggctgc      420
gtagaagaaa tattgattac taatggtgat ccagtcagct ttggttctaa gttattccgt      480
atagttaagg ct                                          492

```

<210> SEQ ID NO 75

<211> LENGTH: 150

<212> TYPE: PRT

<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 75

```

Met Glu Lys Arg Lys Asp Thr Lys Thr Thr Leu Ala Lys Ala Ser Asp
1             5             10             15
Asp Arg Asn Lys Ala Trp Tyr Val Val Asn Ala Glu Gly Lys Thr Leu
20            25            30
Gly Arg Leu Ser Ser Glu Val Ala Lys Ile Leu Arg Gly Lys His Lys
35            40            45
Val Thr Phe Thr Pro His Val Ala Met Gly Asp Gly Val Ile Val Ile
50            55            60
Asn Ala Glu Lys Val Arg Leu Thr Gly Ala Lys Arg Ala Gln Lys Val
65            70            75            80
Tyr His Tyr Tyr Thr Gly Phe Ile Ser Gly Met Arg Glu Val Pro Phe
85            90            95
Glu Asn Met Ile Ala Arg Lys Pro Ala Tyr Val Ile Glu His Ala Val
100           105           110
Lys Gly Met Leu Pro Lys Thr Lys Leu Gly Arg Arg Gln Met Lys Ser
115           120           125
Leu Arg Val Leu Lys Gly Ser Ser Tyr Ala Gln Tyr Glu Ala Ile Lys
130           135           140
Pro Ile Val Leu Asp Ala
145           150

```

<210> SEQ ID NO 76

<211> LENGTH: 450

<212> TYPE: DNA

<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 76

```

atggaaaaaa gaaaagatac gaaaacgacc ctagctaagg cttcggacga tcgaaacaaa      60
gcttggtatg tagttaatgc tgaagggag accttaggga gattatcttc agaagttgcg      120
aagatcctga gaggtaagca taagggtgact ttactcctc acgtagcgat gggagatggt      180
gtcattgtga tcaatgctga gaaagtgcgt ttgactggcg caaaaagagc tcagaaagtg      240
tatcactatt acacaggctt tatttctggg atgcgagaag ttccttttga aaacatgatt      300

```

-continued

```

gcgcgaaagc ctgcttatgt tatcgagcat gctgttaaag gaatgttgcc taaaacaaaa 360
cttggaagac gtcaaatgaa atctttaaga gttttgaaag gtagttctta cgcacagtat 420
gaagctatca aaccaattgt tttagacgcg 450

```

<210> SEQ ID NO 77
 <211> LENGTH: 129
 <212> TYPE: PRT
 <213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 77

```

Met Ile Gln Glu Ser Val Ala Thr Gly Arg Arg Lys Gln Ala Val Ser
1           5           10           15
Ser Val Arg Leu Arg Ser Gly Asn Gly Lys Ile Asp Val Asn Gly Lys
20           25           30
Thr Leu Glu Gln Tyr Phe Pro Leu Glu Val Gln Arg Ala Thr Ile Leu
35           40           45
Ala Pro Leu Arg Met Leu Gly Asp Val Asn Ser Phe Asp Leu Ile Ile
50           55           60
Arg Val Ser Gly Gly Gly Val Gln Gly Gln Val Ile Ala Thr Arg Leu
65           70           75           80
Gly Leu Ala Arg Ala Val Leu Gln Glu Lys Glu Asp Met Lys Gln Glu
85           90           95
Leu Lys Ala Gln Gly Phe Leu Thr Arg Asp Pro Arg Lys Lys Glu Arg
100          105          110
Lys Lys Tyr Gly Arg Lys Lys Ala Arg Lys Ser Phe Gln Phe Ser Lys
115          120          125

```

Arg

<210> SEQ ID NO 78
 <211> LENGTH: 387
 <212> TYPE: DNA
 <213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 78

```

atgatacaag agtctgttgc aacaggcaga agaaagcagg ctgtttctag cggtcgtctt 60
cggtctggaa atggaaaaat tgacgtaaat ggaaagactt tagagcaata tttccctctt 120
gaagttcaaa gagcaaccat cttagctccg ctgagaatgc tcggtgatgt caacagtttc 180
gatttgatta tccgagtaag tggaggaggg gttcaaggtc aggttattgc tactcgattg 240
ggtttagcta gagctgttct gcaagagaaa gaagacatga agcaagaatt gaaggctcaa 300
ggcttcttga ctcgagatcc tcgtaagaaa gagcgtaaaa aatacggtcg taagaaagct 360
cgtaagagtt tccaattctc caaacga 387

```

<210> SEQ ID NO 79
 <211> LENGTH: 267
 <212> TYPE: PRT
 <213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 79

```

Met Ser Arg Lys Pro Ala Ser Asn Ser Ser Arg Asn Thr Lys Arg Ser
1           5           10           15
Ser Asp Thr Ser Trp Glu Val Ile Ala Gln Asp Tyr Asn Lys Ala Val
20           25           30

```

-continued

Asp Arg Asp Gly His Phe Tyr His Lys Glu Val Ile Leu Pro Asn Leu
 35 40 45
 Leu Ser Lys Leu His Ile Ser Arg Ser Ser Ser Leu Val Asp Val Gly
 50 55 60
 Cys Gly Gln Gly Ile Leu Glu Lys His Leu Pro Lys His Leu Pro Tyr
 65 70 75 80
 Leu Gly Ile Asp Leu Ser Pro Ser Leu Leu Arg Phe Ala Lys Lys Ser
 85 90 95
 Ala Ser Ser Lys Ser Arg Arg Phe Leu His His Asp Met Thr Gln Pro
 100 105 110
 Val Pro Ala Asp His His Glu Gln Phe Ser His Ala Thr Ala Ile Leu
 115 120 125
 Ser Leu Gln Asn Met Glu Ser Pro Glu Gln Ala Ile Ala His Thr Ala
 130 135 140
 Asn Leu Leu Ala Pro Gln Gly Arg Leu Phe Ile Val Leu Asn His Pro
 145 150 155 160
 Cys Phe Arg Ile Pro Arg Leu Ser Ser Trp Leu Tyr Asp Glu Pro Lys
 165 170 175
 Lys Leu Leu Ser Arg Lys Ile Asp Arg Tyr Leu Ser Pro Val Ala Val
 180 185 190
 Pro Ile Val Val His Pro Gly Glu Lys His Ser Glu Thr Thr Tyr Ser
 195 200 205
 Phe His Phe Pro Leu Ser Tyr Trp Val Gln Ala Leu Ser Asn His Asn
 210 215 220
 Leu Leu Ile Asp Ser Met Glu Glu Trp Ile Ser Pro Lys Lys Ser Ser
 225 230 235 240
 Gly Lys Arg Ala Arg Ala Glu Asn Leu Cys Arg Lys Glu Phe Pro Leu
 245 250 255
 Phe Leu Phe Ile Ser Ala Leu Lys Ile Ser Lys
 260 265

<210> SEQ ID NO 80
 <211> LENGTH: 801
 <212> TYPE: DNA
 <213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 80

atgtccagaa aaccggcttc taactcatcc cggaacacca aacggtcctc agacacttcc 60
 tgggaagtca ttgccaaga ttataataaa gccgttgatc gcatgggaca tttctatcat 120
 aaggaagtga ttctccctaa tctcctttct aagctacata tttcccgctc atcgtctctg 180
 gttgatgtag gatgtggtca agggattttg gagaagcatt tacccaaaca tctcccttat 240
 ctaggaatcg atctttccccc tagtctgctg cgttttgcaa agaaaagcgc ttctcaaaa 300
 tcacgtcgct ttcttcatca cgatatgacg caaccggtag cagcagatca tcatgagcag 360
 ttttcccatg ctacagcaat cctttctctt cagaatatgg aatctccaga acaagctatc 420
 gcacacacag cgaatctttt ggctctcaca ggtaggttgt ttattgttct caaccatcca 480
 tgctttcgca tccttaggct ttcttcatgg ctttatgatg agcctaaaaa actcttatct 540
 agaaaaatag accgctatct ctctctctgtg gcggttccta tcgttgtgca tcttgagaaa 600
 aaacattctg agacgacata ttctttccat ttccccttaa gctattgggt acaagcttta 660

-continued

```

tctaatacaca atctttctgat tgatagtatg gaagaatgga tctcccctaa aaaatctctca 720
gggaagagggg ctgcagcaga aaatctttgt cgcaaggagt ttccgctttt cttgtttatc 780
tcagcattaa aaatatcaaa a 801

```

```

<210> SEQ ID NO 81
<211> LENGTH: 52
<212> TYPE: PRT
<213> ORGANISM: Chlamydia trachomatis

```

```

<400> SEQUENCE: 81

```

```

Met Ala Ser Lys Asn Arg Glu Ile Ile Lys Leu Lys Ser Thr Glu Ser
1           5           10           15
Ser Glu Met Tyr Trp Thr Val Lys Asn Lys Arg Lys Thr Ser Gly Arg
                20           25           30
Leu Glu Leu Lys Lys Tyr Asp Arg Lys Leu Arg Lys His Val Ile Phe
            35           40           45
Lys Glu Ala Lys
            50

```

```

<210> SEQ ID NO 82
<211> LENGTH: 156
<212> TYPE: DNA
<213> ORGANISM: Chlamydia trachomatis

```

```

<400> SEQUENCE: 82

```

```

atggccagca aaaaccgcga aattatcaaa ttgaaaagta ccgaaagtgc tgaaatgtat 60
tggactgtta aaaataaaag aaaaacaagc ggctcgactag aacttaaaaa gtatgataga 120
aagctgcgta agcacgttat cttcaaagaa gctaag 156

```

```

<210> SEQ ID NO 83
<211> LENGTH: 529
<212> TYPE: PRT
<213> ORGANISM: Chlamydia trachomatis

```

```

<400> SEQUENCE: 83

```

```

Met His His Arg Lys Phe Leu Ala Val Ser Ile Ala Phe Val Ser Leu
1           5           10           15
Ala Phe Gly Leu Thr Ser Cys Tyr His Lys Lys Glu Glu Pro Lys Asp
            20           25           30
Val Leu Arg Ile Ala Ile Cys His Asp Pro Met Ser Leu Asp Pro Arg
            35           40           45
Gln Val Phe Leu Ser Lys Asp Val Ser Ile Val Lys Ala Leu Tyr Glu
            50           55           60
Gly Leu Val Arg Glu Lys Glu Ala Ala Phe Gln Leu Ala Leu Ala Glu
            65           70           75           80
Arg Tyr His Gln Ser Asp Asp Gly Cys Val Tyr Thr Phe Phe Leu Lys
            85           90           95
Asn Thr Phe Trp Ser Asn Gly Asp Val Val Thr Ala Tyr Asp Phe Glu
            100          105          110
Glu Ser Ile Lys Gln Ile Tyr Phe Arg Glu Ile Asp Asn Pro Ser Leu
            115          120          125
Arg Ser Leu Ala Leu Ile Lys Asn Ser His Ala Val Leu Thr Gly Ala
            130          135          140
Leu Pro Val Glu Asp Leu Gly Val Arg Ala Leu Asn Ala Lys Thr Leu

```

-continued

145	150	155	160
Glu Ile Val Leu	Glu Asn Pro Phe	Pro Tyr Phe Leu	Glu Ile Leu Ala
	165	170	175
His Pro Val Phe	Tyr Pro Val His	Thr Ser Leu Arg	Glu Tyr Tyr Lys
	180	185	190
Asp Lys Arg Asn	Lys Arg Val Phe	Pro Ile Ile Ser	Asn Gly Pro Phe
	195	200	205
Ala Ile Gln Cys	Tyr Glu Pro Gln	Arg Tyr Leu Leu	Ile Asn Lys Asn
	210	215	220
Pro Leu Tyr His	Ala Lys His Asp	Val Leu Leu Asn	Ser Val Cys Leu
	225	230	235
Gln Ile Val Pro	Asp Ile His Thr	Ala Met Gln Leu	Phe Gln Lys Asn
	245	250	255
His Ile Asp Leu	Val Gly Leu Pro	Trp Ser Ser Ser	Phe Ser Leu Glu
	260	265	270
Glu Gln Arg Asn	Leu Pro Arg Glu	Lys Leu Phe Asp	Tyr Pro Val Leu
	275	280	285
Ser Cys Ser Val	Leu Phe Cys Asn	Ile His Gln Thr	Pro Leu Asn Asn
	290	295	300
Pro Ser Leu Arg	Thr Ala Leu Ser	Leu Ala Ile Asn	Arg Glu Thr Leu
	305	310	315
Leu Lys Leu Ala	Gly Lys Gly Cys	Ser Ala Thr Ser	Phe Val His Pro
	325	330	335
Gln Leu Ser Gln	Ile Pro Ala Thr	Thr Leu Ser Gln	Asp Glu Arg Ile
	340	345	350
Ala Leu Ala Lys	Gly Tyr Leu Thr	Glu Ala Leu Lys	Thr Leu Ser Gln
	355	360	365
Glu Asp Leu Glu	Lys Ile Thr Leu	Ile Tyr Pro Ile	Glu Ser Val Cys
	370	375	380
Leu Arg Ala Val	Val Gln Glu Ile	Arg Gln Gln Leu	Phe Asp Val Leu
	385	390	395
Gly Phe Lys Ile	Ser Thr Leu Gly	Leu Glu Tyr His	Cys Phe Leu Asp
	405	410	415
Lys Arg Ser Arg	Gly Glu Phe Ser	Leu Ala Thr Gly	Asn Trp Ile Ala
	420	425	430
Asp Tyr His Gln	Ala Ser Ala Phe	Leu Ser Val Leu	Gly Asn Gly Thr
	435	440	445
Arg Tyr Lys Asp	Phe Gln Leu Ile	Asn Trp Gln Asn	Gln Lys Tyr Thr
	450	455	460
Asn Ile Val Ala	Gln Leu Leu Ile	Gln Glu Ser Ser	Asp Leu Gln Leu
	465	470	475
Met Ala Glu Gln	Leu Leu Leu Lys	Glu Ser Pro Leu	Ile Pro Leu Tyr
	485	490	495
His Leu Asp Tyr	Val Tyr Ala Lys	Gln Pro Arg Val	Ser Asp Leu Gln
	500	505	510
Thr Ser Ser Arg	Gly Glu Ile Asp	Leu Lys Arg Val	Ser Leu Ala Glu
	515	520	525

Gly

<210> SEQ ID NO 84

<211> LENGTH: 1587

-continued

<212> TYPE: DNA

<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 84

```

atgcatacaca ggaagttttt agcagttttc attgctttcg taagtttagc ttttgggcta    60
acatcttggtt atcataaaaa agaagaacca aaagatgttt tgcggattgc gatctgtcat    120
gatccaatgt ctttagatcc gcgtcagggt tttttaagca aagatgtttc tattgtaaaa    180
gctctctatg aagggttagt cggggaaaaa gaagctgcgt tccagctagc tttggcagaa    240
agatatcatc aatctgatg tggttgtgtt tatacttttt ttctaaaaaa tacattctgg    300
agcaacggag atgttgtaac agcatatgat tttgaagagt ctattaaaca aatttatttc    360
cgagaaattg ataacccttc gttacgctct cttgcattaa ttaaaaattc tcatgctgtt    420
ttaacaggag ctctccctgt tgaagattta ggtgtagag ctttgaatgc gaaaactcta    480
gaaattgttt tagaaaaacc ttttccctat tttctagaga tattggcgca ccgggttttt    540
tatccggtgc acacctcttt acgagaatat tacaagata agcgtaacaa acgcgttttc    600
ccgataattt ctaatgggtc ttttgcgatt caatgttatg agccgcaaag atatttacta    660
atcaacaaaa accctctgta tcatgccaa cagcatgttc tgttaaattc ggtatgtttg    720
cagatagttc ctgatatcca tacagctatg cagttattcc aaaaaatca tatcgattta    780
gttgggttac cctggagctc ctctttttct ttagaagaac aaagaaatct ccctagagaa    840
aaattatttg attatctgt attgagttgc tctgttttat tctgtaacat tcatcaaaaa    900
cctttaaata atccctcgtt gagaacagcc ctctctttag caatcaatcg agaaaacttta    960
ttaaaactag caggtaaagg ctgtagcgtt acgagctttg ttcacccaca attatctcag   1020
atacctgcta ctactttgtc tcaagatgag cggattgctt tagcaaaaagg ctacttgacc   1080
gaagctttaa agactttatc tcaagaagat ttagaaaaaa ttacattaat ttatctata   1140
gaatctgttt gcttacgagc cgttgttcaa gaaattcgcc aacaattatt tgatgtactg   1200
ggatttaaaa tttctacatt aggattagaa tatcattgtt ttttagacaa acgttccaga   1260
ggagaattct ccttagcaac tggtaattgg attgcagact atcatcaagc tagtgetttc   1320
ctgtctgtcc taggtaatgg gacaagatat aaagactttc aattgattaa ctggcagaac   1380
caaaagtaca caaatatagt tgctcaactt ctgattcaag aatcaagcga cctacagctt   1440
atggcagagc agttgttgct taaagaaagt cctcttatto ctctatacca cctcgattat   1500
gtgtatgcga aacagcctcg ggtgtctgat ctccaaacct cttctcgtgg agaaattgat   1560
ttaaaaagag tttcattagc tgaagga                                     1587

```

<210> SEQ ID NO 85

<211> LENGTH: 339

<212> TYPE: PRT

<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 85

```

Glu Tyr Val Arg Phe Val Lys Val Lys Arg Gly Trp Leu Met Val Ser
1           5           10          15

Gln Thr Val Ser Val Ala Val Thr Gly Gly Thr Gly Gln Ile Ala Tyr
20          25          30

Ser Phe Leu Phe Ser Leu Ala His Gly Asp Val Phe Gly Leu Asp Cys
35          40          45

```

-continued

Gly	Ile	Asp	Leu	Arg	Ile	Tyr	Asp	Ile	Pro	Gly	Thr	Glu	Arg	Ala	Leu	
50					55						60					
Ser	Gly	Val	Arg	Met	Glu	Leu	Asp	Asp	Gly	Ala	Phe	Pro	Leu	Leu	Gln	
65					70				75						80	
Arg	Val	Gln	Val	Thr	Thr	Ser	Leu	His	Asp	Ala	Phe	Asp	Gly	Ile	Asp	
				85					90					95		
Ala	Ala	Phe	Leu	Ile	Gly	Ser	Val	Pro	Arg	Gly	Pro	Gly	Met	Glu	Arg	
			100					105					110			
Arg	Asp	Leu	Leu	Lys	Lys	Asn	Gly	Glu	Ile	Phe	Ala	Thr	Gln	Gly	Lys	
		115					120					125				
Ala	Leu	Asn	Thr	Thr	Ala	Lys	Arg	Asp	Ala	Lys	Ile	Phe	Val	Val	Gly	
		130				135						140				
Asn	Pro	Val	Asn	Thr	Asn	Cys	Trp	Ile	Ala	Met	Asn	His	Ala	Pro	Arg	
145					150				155						160	
Leu	Leu	Arg	Lys	Asn	Phe	His	Ala	Met	Leu	Arg	Leu	Asp	Gln	Asn	Arg	
			165					170					175			
Met	His	Ser	Met	Leu	Ser	His	Arg	Ala	Glu	Val	Pro	Leu	Ser	Ala	Val	
			180					185					190			
Ser	Gln	Val	Val	Val	Trp	Gly	Asn	His	Ser	Ala	Lys	Gln	Val	Pro	Asp	
		195				200						205				
Phe	Thr	Gln	Ala	Leu	Ile	Asn	Asp	Arg	Pro	Ile	Ala	Glu	Thr	Ile	Ala	
		210				215						220				
Asp	Arg	Asp	Trp	Leu	Glu	Asn	Ile	Met	Val	Pro	Ser	Val	Gln	Ser	Arg	
225					230					235					240	
Gly	Ser	Ala	Val	Ile	Glu	Ala	Arg	Gly	Lys	Ser	Ser	Ala	Ala	Ser	Ala	
			245					250						255		
Ala	Arg	Ala	Leu	Ala	Glu	Ala	Ala	Arg	Ser	Ile	Tyr	Gln	Pro	Lys	Glu	
			260					265					270			
Gly	Glu	Trp	Phe	Ser	Ser	Gly	Val	Cys	Ser	Asp	His	Asn	Pro	Tyr	Gly	
		275					280					285				
Leu	Pro	Glu	Asp	Leu	Ile	Phe	Gly	Phe	Pro	Cys	Arg	Met	Leu	Ala	Thr	
		290				295					300					
Gly	Glu	Tyr	Glu	Val	Ile	Pro	Arg	Leu	Pro	Trp	Asp	Ala	Phe	Ile	Arg	
305					310					315					320	
Gly	Lys	Met	Gln	Ile	Ser	Leu	Asp	Glu	Ile	Leu	Gln	Glu	Lys	Ala	Ser	
			325					330						335		

Val Ser Leu

<210> SEQ ID NO 86

<211> LENGTH: 1020

<212> TYPE: DNA

<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 86

ttacaaagat acgctagctt tttcctgaag aatctcatca agagatat	60
acggataaag gcatcccaag gaagccttgg aatcacttca tattctcccg ttgctagcat	120
tcgacaaggg aaaccaaaaga ttaaattcttc cggtaatcca tagggattgt ggtccgaaca	180
cactccggaa gaaaaccatt ctcttctttt tggctgatat attgatcgag cagcctctgc	240
taaagctcgt gctgcagaag ctgccgaaga cttccctcgt gcttcgatta ctgcactacc	300
acgactctgt acagaaggca ccataatatt ctctaacca tcaacgatccg ctatcgtctc	360

-continued

```

tgcgatagga cggtcattaa tcagagcttg cgtaaaatca ggcacttggt tggcggagtg 420
atttcccaaa accacaactt gtgatacagc cgataaaggt acttctgctc tatgcgataa 480
catgctatgc atacgattct ggtccaatcg tagcatcgca tgaaagtctt ttctcaataa 540
tctgggagca tgattcattg ctatccagca attggtattc acagggttcc caacaacaaa 600
aatctttgca tcccgcttgg ctgttggtgt caaagctttt ccttgcgtag caaaaatctc 660
cccatttttc tttagaagat ctcttctctc cattctctggg cctctaggaa ctgaccctat 720
aaggaatgcc gcatcaatgc catcaaaagc atcatgcaat gatgtcgta cctgcacacg 780
ctgtaataaa gggaaagcac catcatctag ctccatgcgc acaccagata aagccctttc 840
tggtccagga atactgtaga tacgcagatc gatgccacaa tcaaggccaa aaacatctcc 900
atgagccaga gaaaatagaa agctataggc tatttgccct gttctctctg ttactgctac 960
actcactggt tgagaaacca taagccaccc tctctttact ttacaaaaac gcacatactc 1020

```

```

<210> SEQ ID NO 87
<211> LENGTH: 160
<212> TYPE: PRT
<213> ORGANISM: Chlamydia trachomatis

```

```

<400> SEQUENCE: 87

```

```

Met Arg Ile Ile Pro Phe Asp Pro Tyr Gly Ser Met Ala Phe Gln Ala
1      5      10      15
Ile Ala Lys Asp Pro Gln Glu Arg Lys Asn Gly Ser Ile Ser Glu Lys
20     25     30
Ile Ser Glu Glu Ile Ala Arg Asn Glu Ala Leu Arg Met Ala Leu Leu
35     40     45
Ala Ile Ala Asp Gln Glu Asp Lys Glu Lys Lys Gln Lys His Arg Phe
50     55     60
Lys Ile Leu Thr Lys Lys Gln Thr Arg Ile Leu Leu Gly Gln Leu Arg
65     70     75     80
His Phe Arg Leu Asp Phe Gln Lys Leu Gln Ala Gly Val Val Ile Glu
85     90     95
Trp Ser Trp Asp Asp Lys Ser Glu Arg Ser Lys Ser Leu Gly Ser Arg
100    105    110
Ile Thr Arg Lys Ser Lys Lys Thr Ile Cys Ile Ser Ala Ala Ala Ala
115    120    125
Gln Ala Ile Ala His Ala Ala Glu Ala Trp Val Ile Ala Arg Asn Glu
130    135    140
Gly Ile Leu Glu Met Thr Leu Ser Leu Phe Gln His Lys Asp Asn Glu
145    150    155    160

```

```

<210> SEQ ID NO 88
<211> LENGTH: 480
<212> TYPE: DNA
<213> ORGANISM: Chlamydia trachomatis

```

```

<400> SEQUENCE: 88

```

```

atgagaataa tcccttttga tccttatgga tccatggctt ttcaagcgat agcgaaagat 60
cctcaagagc gaaagaatgg gagcatatca gagaaaattt cagaagagat tgctcgtaat 120
gaagctttac gcatggcttt attggctatt gccgatcaag aagataaaga aaaaaaacia 180
aagcatcggt tcaaaatctt aacaaaaaaa caaaccagga tattgcttgg tcagctacgt 240

```

-continued

```

catttccgat tggatttcca aaaactgcaa gcaggagttg tcctcgagtg gtcttgggat    300
gataaatccg agcgctctaa gtcattagga tctcggatta ccagaaaatc taagaaaacg    360
atctgtatta gcgctgctgc agcacaagct attgctcatg ccgcagaggc ttgggtgatt    420
gcccgcgaatg aaggaatctt ggagatgacg ttgtcactat tccaacataa agacaacgaa    480

```

```

<210> SEQ ID NO 89
<211> LENGTH: 421
<212> TYPE: PRT
<213> ORGANISM: Chlamydia trachomatis

```

```

<400> SEQUENCE: 89

```

```

Met Thr Ala Ser Gly Gly Ala Gly Gly Leu Gly Ser Thr Gln Thr Val
1      5      10      15
Asp Val Ala Arg Ala Gln Ala Ala Ala Thr Gln Asp Ala Gln Glu
20     25     30
Val Ile Gly Ser Gln Glu Ala Ser Glu Ala Ser Met Leu Lys Gly Cys
35     40     45
Glu Asp Leu Ile Asn Pro Ala Ala Ala Thr Arg Ile Lys Lys Lys Gly
50     55     60
Glu Lys Phe Glu Ser Leu Glu Ala Arg Arg Lys Pro Thr Ala Asp Lys
65     70     75     80
Ala Glu Lys Lys Ser Glu Ser Thr Glu Glu Lys Gly Asp Thr Pro Leu
85     90     95
Glu Asp Arg Phe Thr Glu Asp Leu Ser Glu Val Ser Gly Glu Asp Phe
100    105    110
Arg Gly Leu Lys Asn Ser Phe Asp Asp Asp Ser Ser Pro Asp Glu Ile
115    120    125
Leu Asp Ala Leu Thr Ser Lys Phe Ser Asp Pro Thr Ile Lys Asp Leu
130    135    140
Ala Leu Asp Tyr Leu Ile Gln Thr Ala Pro Ser Asp Gly Lys Leu Lys
145    150    155    160
Ser Thr Leu Ile Gln Ala Lys His Gln Leu Met Ser Gln Asn Pro Gln
165    170    175
Ala Ile Val Gly Gly Arg Asn Val Leu Leu Ala Ser Glu Thr Phe Ala
180    185    190
Ser Arg Ala Asn Thr Ser Pro Ser Ser Leu Arg Ser Leu Tyr Phe Gln
195    200    205
Val Thr Ser Ser Pro Ser Asn Cys Ala Asn Leu His Gln Met Leu Ala
210    215    220
Ser Tyr Leu Pro Ser Glu Lys Thr Ala Val Met Glu Phe Leu Val Asn
225    230    235    240
Gly Met Val Ala Asp Leu Lys Ser Glu Gly Pro Ser Ile Pro Pro Ala
245    250    255
Lys Leu Gln Val Tyr Met Thr Glu Leu Ser Asn Leu Gln Ala Leu His
260    265    270
Ser Val Asn Ser Phe Phe Asp Arg Asn Ile Gly Asn Leu Glu Asn Ser
275    280    285
Leu Lys His Glu Gly His Ala Pro Ile Pro Ser Leu Thr Thr Gly Asn
290    295    300
Leu Thr Lys Thr Phe Leu Gln Leu Val Glu Asp Lys Phe Pro Ser Ser
305    310    315    320

```

-continued

Ser Lys Ala Gln Lys Ala Leu Asn Glu Leu Val Gly Pro Asp Thr Gly
 325 330 335

Pro Gln Thr Glu Val Leu Asn Leu Phe Phe Arg Ala Leu Asn Gly Cys
 340 345 350

Ser Pro Arg Ile Phe Ser Gly Ala Glu Lys Lys Gln Gln Leu Ala Ser
 355 360 365

Val Ile Thr Asn Thr Leu Asp Ala Ile Asn Ala Asp Asn Glu Asp Tyr
 370 375 380

Pro Lys Pro Gly Asp Phe Pro Arg Ser Ser Phe Ser Ser Thr Pro Pro
 385 390 395 400

His Ala Pro Val Pro Gln Ser Glu Ile Pro Thr Ser Pro Thr Ser Thr
 405 410 415

Gln Pro Pro Ser Pro
 420

<210> SEQ ID NO 90
 <211> LENGTH: 1263
 <212> TYPE: DNA
 <213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 90

```

atgactgcat caggaggagc tggagggcta ggcagcacc c aaacagtaga cgttgcgcga      60
gcacaagctg ctgcagctac tcaagatgca caagaggtta tcggctctca ggaagcttct      120
gaggcaagta tgctcaaaag atgtgaggat ctcataaatc ctgcagctgc aaccgaatc      180
aaaaaaaaag gagagaagtt tgaatcatta gaagctcgtc gcaaaccaac agcggataaa      240
gcagaaaaga aatccgagag cacagaggaa aaaggcgata ctctcttga agatcgtttc      300
acagaagatc ttccgaagt ctccggagaa gattttcgag gattgaaaaa ttcgttcgat      360
gatgattctt ctctcgacga aattctcgat gcgctcaca gtaaattttc tgatcccaca      420
ataaaggatc tagctcttga ttatctaatt caaacagctc cctctgatgg gaaacttaag      480
tccactctca ttcaggcaaa gcatcaactg atgagccaga atcctcaggc gattgttgga      540
ggacgcaatg ttctgttagc ttcagaaacc tttgttcca gagcaaatc atctcettca      600
tcgcttcgct ccttatattt ccaagtaacc tcatccccc ctaattgcgc taatttacat      660
caaatgcttg cttcttactt gccatcagag aaaaccgctg ttatggagtt tctagtaaat      720
ggcatggtag cagatttaaa atcggagggc ccttccatc ctctcgaaa attgcaagta      780
tatatgacgg aactaagcaa tctccaagcc ttacactctg taaatagctt ttttgataga      840
aatattggga acttgaaaa tagcttaaa catgaaggac atgcccctat tccatcctta      900
acgacaggaa atttaactaa aaccttctta caattagtag aagataaatt cccttcctct      960
tccaaagctc aaaaggcatt aaatgaactg gtaggcccag atactggtcc tcaaaactgaa    1020
gttttaaaact tattcttcg cgctcttaaat ggctgttcgc ctagaatatt ctctggagct    1080
gaaaaaaaaa agcagctggc atcggttatc acaaatacgc tagatgcgat aaatgcggat    1140
aatgaggatt atcctaaacc aggtgacttc ccacgatctt ccttctctag tacgctcct    1200
catgctccag tacctcaate tgagattcca acgtcaccta cctcaacaca gcctccatca    1260
ccc                                                                1263

```

<210> SEQ ID NO 91
 <211> LENGTH: 313

-continued

<212> TYPE: PRT

<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 91

Met Leu Ala Gly Ser Lys Arg Lys His Lys Thr Pro Glu Asp Thr Ser
 1 5 10 15
 Ser Ser Ser Ser Lys Arg Ala Arg Ser Ser Ser Ser Gln Val Val Pro
 20 25 30
 Arg Leu Leu Gln His His Glu Leu Ile Gln Leu Tyr Ser Ala His Gln
 35 40 45
 Gln Arg Asn Asn Glu Pro Val Lys Met Ile Cys Glu Thr Ile Leu Gln
 50 55 60
 Ala Lys Arg Ser Val Leu Leu Lys Ile Phe Asn Ile Gly Ser Pro Arg
 65 70 75 80
 Ile Leu Ala Ala Leu Ala Glu Ala Ser Asn Arg Ala Pro Val Ser Val
 85 90 95
 His Tyr Gln Met Gly Pro Phe Ser Lys His Cys Thr Glu Gly Asn Val
 100 105 110
 Gln Phe Arg Pro Arg Arg Gly Cys Ser Leu Leu His Arg Lys Thr Leu
 115 120 125
 Leu Ile Asp Asn Asn Ile Val Val Thr Gly Thr Ala Asn Tyr Thr Glu
 130 135 140
 Ala Ser Leu Glu Lys Asp Val Asn Leu Thr Ala Lys Ile Phe Ser Glu
 145 150 155 160
 His Leu Tyr Arg Trp Ala Phe Arg His Asp Arg Gly Glu Val Arg Val
 165 170 175
 Gly Ser Gln Gln Val Ser Tyr Tyr Ser Leu Ser Gln Ile Arg Arg Asp
 180 185 190
 Leu Cys Val Lys Ala Ile Leu Glu Ala Asn Gly Ile Val Leu Arg Glu
 195 200 205
 Arg Thr Cys Glu Gly Ile Leu His Thr Lys Val Cys Cys Ile Asp Ser
 210 215 220
 Ser Thr Leu Ile Ile Gly Ser Val Asn Trp Ser Arg Gly Gly Leu Thr
 225 230 235 240
 Leu Asn Leu Glu Glu Phe Leu Ile Ile Asn Pro Leu Thr Glu Thr Gln
 245 250 255
 Leu Glu Cys Tyr Asn Glu Leu Trp Ala His Ile Glu Thr Asn Ser Arg
 260 265 270
 Leu Met Thr Lys Glu Leu Ile Gln Leu His Glu Lys Arg Lys Lys Ser
 275 280 285
 Ile Thr Asp Pro Lys Gln Ile Ser Ser Ser Thr Gln Asp Glu Glu Asn
 290 295 300
 Ala Ser Thr Ser Ala Glu Gln Gln Phe
 305 310

<210> SEQ ID NO 92

<211> LENGTH: 939

<212> TYPE: DNA

<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 92

atgctcgccg gatccaagag aaaacacaag actcccggaag acactttcttc ttctctctct 60
 aaacgagccc gatctttcttc gagccaagtc gtacctagac tcttacagca tcacgaactg 120

-continued

```

atccaactct actctgctca tcagcaaaga aataacgaac ctgtgaaaat gatttgtgaa 180
acaattctac aagctaagcg cagcgttcta ttaaaaatat ttaatatcgg atccccaga 240
attcttgtag ccttagctga ggcttctaata agagcgccctg tctccgtaca ctatcaaata 300
gggccttttt caaaacactg tactgaagga aatgtgcagt ttagacctcg aagagggtgt 360
tctcttttac atagaaaaac ccttcttata gacaataata ttgtcgttac gggaacagca 420
aactatacag aggcctctct tgaaaaagat gtgaacttaa cggctaaaat atttagcgaa 480
cacctatata gctgggcttt cgcacacgat cgaggagagg tgcgagtagg ctgcaacaa 540
gtatcctact attcgctaag tcaaatacga agagacttgt gcgtcaaagc tatcctcgaa 600
gctaacggca ttgtcctacg agaactgaca tgcgaaggca ttctgcatac caaagtctgc 660
tgtattgata gctcgacact cattatagga tccgtcaact ggagtagagg aggtcttaca 720
ttaaatctgg aagagtcttt gattatcaat ccgcttacag agacacaact cgaatgctat 780
aacgagcttt gggcacatat agaaacaaac agtagattga tgactaaga gctgattcag 840
ttacatgaga agagaaaaaa atccataaca gaccctaagc aaatctcttc ttctactcaa 900
gacgaagaga atgcttccac atcagcagaa cagcagttc 939

```

```

<210> SEQ ID NO 93
<211> LENGTH: 100
<212> TYPE: PRT
<213> ORGANISM: Chlamydia trachomatis

```

```

<400> SEQUENCE: 93

```

```

Val Ser Leu Ile Thr Thr Gln Thr Gly Tyr Phe Ala Arg Gln Asn Arg
1             5             10            15
Arg Gly Gly Phe Gln Val Phe Tyr Ser Ile Tyr Gly Leu Glu Gly Lys
20            25            30
Val Gln Pro His Gln Ala Pro Gly Asp Met Leu Cys Asp Ile Thr Glu
35            40            45
Asp Val Val Leu Thr Val Lys Asp Val Asp Glu Ser Asp Tyr Gln Gln
50            55            60
Lys Arg Ile Tyr Val Val Leu Asp Leu Ala Thr Glu Glu Glu Arg Arg
65            70            75            80
Leu Arg Ala Asp Lys Asn Val Ile Leu Ile Pro Arg Gly Glu Asn Ser
85            90            95
Lys Lys Arg Lys
100

```

```

<210> SEQ ID NO 94
<211> LENGTH: 300
<212> TYPE: DNA
<213> ORGANISM: Chlamydia trachomatis

```

```

<400> SEQUENCE: 94

```

```

gtgtcgttga ttacaacgca aacaggatac ttgtctcggc agaacagacg aggagggttc 60
caagtcttct atagtattta cggattagaa gggaaagtgc aaccacacca agctcctgga 120
gatatgctat gcgacattac tgaagacgta gtgttaacgg tcaaagatgt ggatgaaagc 180
gactaccaac agaaacgaat ttatgtgggt ttagatttag cgacggaaga agagcgtagg 240
ttgcgagcag ataagaacgt gatccttatt cctagagggg agaattctaa gaaaagaaaa 300

```

-continued

<210> SEQ ID NO 95
<211> LENGTH: 148
<212> TYPE: PRT
<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 95

Met Asn Ile Ala Lys Gln Gln Gln Ala Phe Leu Gly Ile Asp Tyr Gly
1 5 10 15
Lys Lys Arg Ile Gly Leu Ala Phe Ala Ser Ser Pro Leu Leu Ile Pro
20 25 30
Leu Pro Ile Gly Asn Val Glu Ala Arg Ser Ser Leu Thr Leu Thr Ala
35 40 45
Gln Ala Leu Val Ser Ile Ile Lys Glu Arg Ala Val Thr Thr Val Val
50 55 60
Phe Gly Asn Pro Leu Pro Met Gln Lys Ala Tyr Ala Ser Ser Val Gln
65 70 75 80
Ser Glu Ile Gln Glu Leu Ala Ala Leu Ile Gln Glu Met Thr Ala Ile
85 90 95
Glu Val Ile Leu Trp Asp Glu Arg Leu Ser Ser Ala Gln Ala Glu Arg
100 105 110
Met Leu Lys Ser Asp Cys Gly Leu Asn Arg Lys Gln Arg Lys Asn Pro
115 120 125
Ser Asp Ser Leu Ala Ala Thr Leu Ile Leu Ser Ser Phe Leu Asp Ser
130 135 140
Arg Lys Leu Tyr
145

<210> SEQ ID NO 96
<211> LENGTH: 444
<212> TYPE: DNA
<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 96

atgaacatcg ctaagcaaca acaagctttt ttagggatcg attatgggaa aaaacgtatt 60
ggcctagctt ttgccagttc cctctctctg atccctttgc ctatagggaa tgtagaagcc 120
cgttcctctc ttactttgac agctcaagcg ctctgtctcta ttatcaaaga gcgtgctgtt 180
acgacagtag ttttcgggaa tccattacct atgcataaag cttatgcttc aagcgtgcaa 240
tcagaaattc aagaactagc cgcactcatc caagaaatga ctgctataga agtcattctt 300
tgggatgagc ggctatcttc agcacaagca gaacgcatgt taaaaagcga ttgtgggctt 360
aatcgaaaac agcggaaaaa tccttcggat agtctagctg ccactttaat cctttctagc 420
tttttagatt ctcgaaaact atac 444

<210> SEQ ID NO 97
<211> LENGTH: 571
<212> TYPE: PRT
<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 97

Met Ser Val Thr Gly Gln Asp Asn Lys Glu Leu Gln Gln Glu Phe Val
1 5 10 15
Ile Val Gly Glu Pro Ile Val Pro Gly Ile Gly Leu Gly Lys Ala Leu
20 25 30

-continued

Leu	Leu	Gly	Lys	Ser	Ser	Leu	Arg	Ile	Arg	Glu	Leu	Thr	Leu	Pro	Gln
	35						40					45			
Glu	Glu	Val	Glu	His	Glu	Ile	Ser	Arg	Tyr	Tyr	Lys	Ala	Leu	Lys	Arg
	50					55					60				
Ser	Arg	Ser	Asp	Leu	Ala	Ala	Leu	Glu	Lys	Glu	Ala	Lys	Gly	Lys	Gln
65				70						75					80
Gly	Tyr	Gln	Glu	Ile	Ala	Ser	Ile	Leu	Gln	Ala	His	Leu	Glu	Ile	Ile
				85					90					95	
Lys	Asp	Pro	Leu	Leu	Thr	Glu	Glu	Val	Val	Lys	Thr	Ile	Arg	Lys	Asp
			100					105					110		
Arg	Lys	Asn	Ala	Glu	Phe	Val	Phe	Ser	Ser	Val	Met	Gly	Glu	Ile	Glu
		115					120					125			
Lys	Ser	Leu	Cys	Ala	Val	Gln	Lys	Thr	Thr	Ala	Thr	Arg	Val	Asp	Arg
	130					135					140				
Val	Gln	Asp	Ile	His	Asp	Ile	Ser	Asn	Arg	Val	Ile	Gly	His	Leu	Cys
145					150					155					160
Cys	Gln	His	Lys	Ser	Ser	Leu	Gly	Glu	Phe	Asp	Gln	Asn	Leu	Ile	Val
			165						170					175	
Phe	Ser	Glu	Glu	Leu	Thr	Pro	Ser	Glu	Ala	Ala	Asn	Ala	Asn	Pro	Glu
		180						185					190		
Tyr	Ile	Arg	Gly	Phe	Val	Ser	Leu	Glu	Gly	Ala	Lys	Thr	Ser	His	Thr
	195						200					205			
Ala	Ile	Val	Ser	Leu	Ala	Lys	Asn	Ile	Pro	Tyr	Val	Ala	Asn	Phe	Thr
	210					215					220				
Thr	Glu	Leu	Trp	Asp	Thr	Ile	Lys	Glu	Phe	Ser	Gly	Thr	Leu	Val	Leu
225					230					235					240
Ile	Asn	Gly	Asp	Lys	Gly	Glu	Ile	Thr	Phe	Asn	Pro	Gln	Leu	Ser	Thr
			245						250					255	
Ile	Gln	Thr	Tyr	Arg	Lys	Gln	Ala	Ser	Val	Ser	Val	Thr	Val	Pro	
		260					265						270		
Val	Gln	Val	Gln	Thr	Gly	Lys	Asn	Leu	Pro	Leu	Ile	Ser	Leu	Ser	Ala
		275					280						285		
Gln	Ile	Val	Ser	Thr	Glu	Glu	Leu	Pro	Met	Ile	Glu	Arg	Glu	Ser	Pro
	290					295					300				
Gly	Thr	Ser	Val	Gly	Leu	Phe	Arg	Ser	Glu	Phe	Met	Ala	Phe	Ser	Leu
305					310					315					320
Gly	Arg	Leu	Pro	Cys	Val	Glu	Glu	Gln	Ala	Asp	Gln	Tyr	Ala	Gln	Leu
			325						330					335	
Val	Gln	Phe	Gln	Cys	Ser	Asp	Ile	His	Val	Leu	Arg	Leu	Phe	Asp	Phe
		340						345					350		
Gly	Glu	Asp	Lys	Glu	Cys	Pro	Cys	Ile	Ser	Ser	Ser	His	Arg	Ser	Val
	355						360					365			
Arg	Trp	Leu	Leu	Glu	Gln	Glu	Lys	Val	Leu	Lys	Glu	Gln	Leu	Gln	Ala
	370					375					380				
Ile	Ala	Ile	Val	Ser	Arg	Ile	Gly	Arg	Leu	Lys	Val	Leu	Ile	Pro	Gly
385					390					395					400
Val	Ile	Asp	Ala	Ser	Glu	Ile	Ala	Leu	Val	Lys	Arg	Leu	Phe	Gln	Glu
			405						410					415	
Glu	Ile	Arg	Leu	Leu	Lys	Gly	Ile	Ser	Glu	Asn	Ile	Leu	Trp	Gly	Ser
		420					425						430		
Met	Ile	Glu	Ile	Pro	Ser	Ala	Val	Trp	Met	Ile	Glu	Glu	Ile	Leu	Gln

-continued

435	440	445
Glu Ser Ser Phe Val Ala Leu Gly Thr Asn Asp Leu Ala Gln Tyr Thr		
450	455	460
Leu Gly Thr Ser Arg Glu Arg Ser Leu Leu Gly Glu Arg Ser Arg Val		
465	470	475 480
Pro His Pro Ser Val Ile Arg Met Ile His His Val Val Glu Gln Ala		
485	490	495
Lys Gln Lys Asn Val Pro Val Ser Val Cys Gly Glu Met Ala Gly Asp		
500	505	510
Pro Ala Leu Leu Pro Met Phe Leu Gly Leu Gly Val Lys Glu Leu Ser		
515	520	525
Ala Val Ile Pro Ala Ile Asn Ser Leu Lys Met Arg Leu Leu Asp Leu		
530	535	540
Asn Ser Arg Glu Cys Ser Arg Leu Thr Lys Gln Leu Leu Arg Ala Lys		
545	550	555 560
Thr Tyr Glu Glu Val His Gln Leu Leu Tyr Val		
565	570	
<210> SEQ ID NO 98		
<211> LENGTH: 1713		
<212> TYPE: DNA		
<213> ORGANISM: Chlamydia trachomatis		
<400> SEQUENCE: 98		
atgagcggtta cgggtcaaga taataaggag ttgcaacagg agtttggttat ttagggggag	60	
cctatagtc cttggaatagg gctaggga gctttattgt tgggcaaatc ttctttgcgg	120	
atacgagagc taactcttcc tcaagaagaa gtggaacatg agatcagtcg ctactacaag	180	
gctttgaaga gatctcgttc agatctagct gctttagaaa aagaagcaaa gggaaagcag	240	
ggatatcaag agatagcttc cattttgcag gcacatctag aaattataaa agaccctctt	300	
ctcacggaag aggtgggttaa aacaattaga aaagatcgaa agaatgcgga gtttggtttt	360	
tctctctgca tgggagagat agagaaatct ctatgtgctg tacagaagac gactgctacc	420	
agagtagatc gagttcagga tatccatgat atttctaate gagtgattgg ccatctttgt	480	
tgtagcagata agagttcttt aggggagttt gatcagaatc ttattgtctt ttcggaagag	540	
cttactccct cgggaagccgc aaatgctaata cccgagtaca tcagggggctt tgtatcttta	600	
gagggcgcaa aaacttcgca taccgcgatt gtatcttttg ctaaaaatat tccttatgtt	660	
gccaatttta ctacagagtt atgggatact attaaagagt ttagtgggac attagttctc	720	
attaatgggg ataagggaga gattacgttt aatcctcagc taagtacgat acaaaacttat	780	
tatcgtaagc aagcgtctgt ttctgtcact gttccagtc aggtgcagac agggaaaaat	840	
ctgcctctta tctctctctc agcacagata gtaagtacag aagaattgcc catgattgaa	900	
agggagtcct cagggacaag tggtgggctc ttccgttcag aatttatggc tttttctttg	960	
ggacgcttac cctgtgttga agaacaagct gatcaatag ctcaattagt tcagtttcag	1020	
tggtcagata ttcattgtatt gcgtttgttt gattttggag aggataaaga gtgtccttgt	1080	
atttctctct ctcatcggtg agtacgggtg ttattagaac aagaaaaagt attgaaggag	1140	
cagttgcagg ctattgctat tgtttctaga ataggacgac ttaaggtatt gattcctggg	1200	
gtgatagatg cttcagaaat tgcttttagta aagcggcttt ttcaagaaga aattcggcta	1260	

-continued

```

ttgaaagga tcagtgaata tatcttatgg ggaagcatga tagagatccc ttctgcagtt 1320
tggatgatag aggaaatttt acaagagagt tctttttag tagcttaggtac taatgatctt 1380
gctcagtata ctttaggcac ttctagagag cgttccttac ttggggagcg gagtagagtg 1440
ccgcacccct ctgttattag aatgattcat catgtttag agcaggctaa acagaagaat 1500
gttcccgtat ctgtatgtgg agagatggca ggagaccctg ctcttctgcc tatgttttta 1560
ggactagggg taaaggagtt atcagctgtc atcccagcaa taaattcttt gaaaatgcga 1620
ttattagatt tgaactcaag ggagtgtctc cgtttaacga agcagttatt gcgggcgaaa 1680
acatacgaag aggttcatca actcctgtat gtg 1713

```

```

<210> SEQ ID NO 99
<211> LENGTH: 90
<212> TYPE: PRT
<213> ORGANISM: Chlamydia trachomatis

```

```

<400> SEQUENCE: 99

```

```

Ser Leu Asn Lys Ser Gly Val Thr Ile Pro Gly Leu Leu Cys Val Arg
1           5           10          15
Ala Arg Arg Ala Leu Leu Asn Lys Thr Asn Tyr Val Leu Arg Leu Phe
20          25          30
Met Pro Ser Val Lys Val Arg Val Gly Glu Pro Ile Asp Arg Ala Leu
35          40          45
Arg Ile Leu Lys Lys Lys Ile Asp Lys Glu Gly Ile Leu Lys Thr Ser
50          55          60
Lys Ser His Arg Phe Tyr Asp Lys Pro Ser Val Lys Lys Arg Ala Lys
65          70          75          80
Ser Lys Ala Ala Ala Lys Tyr Arg Gly Arg
85          90

```

```

<210> SEQ ID NO 100
<211> LENGTH: 273
<212> TYPE: DNA
<213> ORGANISM: Chlamydia trachomatis

```

```

<400> SEQUENCE: 100

```

```

ctaacgacca cgaattttgg ctgcagcctt ggattttgct cgttttttta cagaagggtt 60
gtcgtagaat ctatgagact tagaagtttt caaaattcct tctttgtcga ttttttctt 120
taaaattctt agagctcgat ctataggctc tccaactctg actttaacac tgggcatgaa 180
taaccttaat acgtaattgg ttttatttaa taacgcgcgc ctagctcgaa cgcacaagag 240
accggggatt gtaacaccac ttttatttag gct 273

```

```

<210> SEQ ID NO 101
<211> LENGTH: 695
<212> TYPE: PRT
<213> ORGANISM: Chlamydia trachomatis

```

```

<400> SEQUENCE: 101

```

```

Met Ala Phe Glu Thr Phe Ser Val Ala Leu Asp Lys Asp Lys Thr Leu
1           5           10          15
Ile Phe Glu Thr Gly Lys Ile Ala Arg Gln Ala Ser Gly Ala Val Leu
20          25          30
Val Lys Met Asn Glu Thr Trp Val Phe Ser Ser Ala Cys Ala Ala Ser
35          40          45

```

-continued

Leu	Ser	Glu	Ala	Val	Asp	Phe	Leu	Pro	Phe	Arg	Val	Asp	Tyr	Gln	Glu	50	55	60
Lys	Phe	Ser	Ser	Ala	Gly	Arg	Thr	Ser	Gly	Gly	Phe	Leu	Lys	Arg	Glu	65	70	75
Gly	Arg	Pro	Ser	Glu	Arg	Glu	Ile	Leu	Val	Ser	Arg	Leu	Met	Asp	Arg	85	90	95
Ser	Leu	Arg	Pro	Ser	Phe	Pro	Asn	Arg	Leu	Met	Gln	Asp	Ile	Gln	Val	100	105	110
Leu	Ser	Tyr	Val	Trp	Ser	Tyr	Asp	Gly	Lys	Thr	Leu	Pro	Asp	Pro	Leu	115	120	125
Ala	Ile	Cys	Gly	Ala	Ser	Ala	Ala	Leu	Ala	Ile	Ser	Glu	Val	Pro	Gln	130	135	140
Asn	Cys	Ile	Val	Ala	Gly	Val	Arg	Val	Gly	Leu	Val	Gly	Gly	Lys	Trp	145	150	155
Val	Ile	Asn	Pro	Thr	Arg	Asp	Glu	Leu	Ser	Ala	Ser	Lys	Leu	Asp	Leu	165	170	175
Val	Met	Ala	Gly	Thr	Ala	Ser	Ala	Val	Leu	Met	Ile	Glu	Gly	His	Cys	180	185	190
Asp	Phe	Leu	Thr	Glu	Glu	Gln	Val	Leu	Glu	Ala	Ile	Ala	Phe	Gly	Gln	195	200	205
Thr	Tyr	Ile	Ala	Lys	Ile	Cys	Asp	Ala	Ile	Glu	Ala	Trp	Gln	Lys	Ala	210	215	220
Ile	Gly	Lys	Gln	Lys	Asn	Phe	Ser	Ala	Val	Leu	Asp	Met	Pro	Glu	Asp	225	230	235
Val	Gln	Asn	Val	Val	Ser	Asp	Phe	Ile	Arg	Glu	Lys	Phe	Glu	Lys	Ala	245	250	255
Leu	Ser	Phe	Arg	Asp	Lys	Glu	Ala	Leu	Glu	Gln	Ala	Ser	Lys	Glu	Leu	260	265	270
Glu	Glu	Ser	Val	Ile	Ala	Asn	Leu	Val	Gln	Glu	Glu	Asn	Ser	Asp	Phe	275	280	285
Ser	Leu	Leu	Asn	Val	Lys	Ala	Ala	Phe	Lys	Thr	Ala	Lys	Ser	Asn	Gln	290	295	300
Met	Arg	Ala	Leu	Ile	Gln	Asp	Leu	Gly	Ile	Arg	Val	Asp	Gly	Arg	Thr	305	310	315
Thr	Thr	Glu	Ile	Arg	Pro	Ile	Ser	Ile	Glu	Thr	Pro	Phe	Leu	Pro	Arg	325	330	335
Thr	His	Gly	Ser	Cys	Leu	Phe	Thr	Arg	Gly	Glu	Thr	Gln	Ser	Met	Ala	340	345	350
Val	Cys	Thr	Leu	Gly	Gly	Glu	Asn	Met	Ala	Gln	Arg	Phe	Glu	Asp	Leu	355	360	365
Asn	Gly	Asp	Gly	Ala	Ala	Arg	Phe	Tyr	Leu	Gln	Tyr	Phe	Phe	Pro	Pro	370	375	380
Phe	Ser	Val	Gly	Glu	Val	Gly	Arg	Ile	Gly	Ser	Pro	Gly	Arg	Arg	Glu	385	390	395
Ile	Gly	His	Gly	Lys	Leu	Ala	Glu	Lys	Ala	Leu	Ser	His	Val	Leu	Pro	405	410	415
Glu	Thr	Ser	Arg	Phe	Pro	Tyr	Ile	Ile	Arg	Leu	Glu	Ser	Asn	Ile	Thr	420	425	430
Glu	Ser	Asn	Gly	Ser	Ser	Ser	Met	Ala	Ser	Val	Cys	Gly	Gly	Cys	Leu	435	440	445

-continued

Ala	Leu	Met	Asp	Ala	Gly	Val	Pro	Ile	Lys	Ala	Pro	Val	Ala	Gly	Ile
450			455			460									
Ala	Met	Gly	Leu	Ile	Leu	Asp	Arg	Asp	Gln	Ala	Ile	Ile	Leu	Ser	Asp
465			470			475			480						
Ile	Ser	Gly	Ile	Glu	Asp	His	Leu	Gly	Asp	Met	Asp	Phe	Lys	Val	Ala
			485			490			495						
Gly	Thr	Ala	Lys	Gly	Ile	Thr	Ala	Phe	Gln	Met	Asp	Ile	Lys	Ile	Glu
			500			505			510						
Gly	Ile	Thr	His	Lys	Ile	Met	Glu	Gln	Ala	Leu	Ala	Gln	Ala	Lys	Gln
515			520			525									
Gly	Arg	Ser	His	Ile	Leu	Asn	Leu	Met	Thr	Gln	Val	Leu	Ala	Ser	Pro
530			535			540									
Lys	Gly	Thr	Val	Ser	Lys	Tyr	Ala	Pro	Arg	Ile	Glu	Thr	Met	Gln	Ile
545			550			555			560						
Asn	Thr	Ser	Lys	Ile	Ala	Thr	Val	Ile	Gly	Pro	Gly	Gly	Lys	Gln	Ile
			565			570			575						
Arg	Gln	Ile	Ile	Glu	Arg	Ser	Gly	Ala	Gln	Val	Asp	Ile	Asn	Asp	Asp
			580			585			590						
Gly	Val	Ile	Asn	Ile	Ala	Ala	Ser	Thr	Gln	Glu	Ser	Ile	Asn	Lys	Ala
595			600			605									
Lys	Glu	Leu	Ile	Glu	Gly	Leu	Thr	Gly	Glu	Val	Glu	Val	Gly	Lys	Val
610			615			620									
Tyr	Asn	Gly	Arg	Val	Thr	Ser	Ile	Ala	Thr	Phe	Gly	Val	Phe	Val	Glu
625			630			635			640						
Val	Leu	Pro	Gly	Lys	Glu	Gly	Leu	Cys	His	Ile	Ser	Glu	Leu	Ser	Lys
			645			650			655						
Gln	Lys	Val	Asp	Asn	Ile	Ser	Asp	Phe	Val	Lys	Glu	Gly	Asp	Lys	Leu
			660			665			670						
Ala	Val	Lys	Leu	Leu	Ser	Ile	Asn	Glu	Lys	Gly	Gln	Leu	Lys	Leu	Ser
675			680			685									
His	Lys	Ala	Thr	Leu	Glu	Asp									
690			695												

```
<210> SEQ ID NO 102
<211> LENGTH: 2085
<212> TYPE: DNA
<213> ORGANISM: Chlamydia trachomatis
```

<400> SEQUENCE: 102

atggcttttg	agactttttc	tgttgcgtta	gacaaagata	aaacattaat	tttcgagaca	60
gggaaaatag	ctcgccaggc	cagtggggct	gttctcgtca	aaatgaacga	gacttggggt	120
ttttcttcag	cgtgtgcagc	ctccttgtea	gaggetgtcg	attttctgcc	tttcagagta	180
gactatcaag	agaagttttc	ctccgcagga	agaacctctg	gaggatttct	aaaacgtgaa	240
ggacggcctt	ccgagagaga	aattcttggt	tctcggttaa	tggatcgctc	tttgcgtccg	300
tcgtttcta	atagactcat	gcaagatatt	caagtcttgt	cctacgtttg	gtcttacgac	360
gggaaaactt	tacctgatcc	tctagctatt	tgcggagctt	ctgccgcttt	agctatctca	420
gaggttcttc	aaaattgtat	cgttgcgggt	gtacgcgttg	ggctcgtcgg	aggaaaagtgg	480
gtcattaacc	caaccagaga	tgagttaagt	gcctccaagc	tggatctcgt	catggcagga	540
acagcttctg	cagttttaat	gattgaagga	cattgcgact	ttttaacaga	agagcaagtt	600

-continued

```

ctagaagcca ttgcttttgg gcaaacctat atagctaaaa tatgcatgc tattgaagca 660
tggcagaaag ctatcggaac acaaaagaat ttctctgccg ttcttgatat gccagaagac 720
gtacaaaatg tagtttcaga ttttattaga gaaaaattcg aaaaagcatt gtctttttaga 780
gataaagaag ctctagagca agcctcgaaa gaattagagg aatccgttat tgctaacttg 840
gttcaagaag aaaacagtga tttttctttg ttgaacgtta aggctgcatt taagacagca 900
aatccaatc aaatgcgagc tcttatccaa gatcttggtta ttcgtgtaga tggacgaacc 960
accacagaga ttgcgcccat ttccatagag actccttttc ttccaagaac acacggaagt 1020
tgcttattta ctgcgggaga gacgcaaagc atggccgtat gtacgcttgg aggcgaaaat 1080
atggcgagc gattcgaaga tctgaatgga gatggagccg ctgcttcta tctacagtat 1140
ttcttcctc ctttctcgtt agggagaagt ggacgaattg gttccccagg aagacgtgaa 1200
attggacatg ggaaattagc tgagaaagct ttaagtcatg ttcttctga gacatcacga 1260
ttcccttata tcattcgctc agaatactaat attactgagt ctaatggatc ttctccatg 1320
gcacccgtat gtggaggctg tcttgacctc atggatgctg gagttcctat caaagctccc 1380
gtggcaggta ttgctatggg cttaatctta gatcgagatc aagccatcat cttgtctgat 1440
atttcggta tagaagatca tctaggagat atggacttta aagtagccgg aacagctaaa 1500
ggattacag ctttccaaat ggatatcaag atagaggga tcaactcataa gattatggag 1560
caagctctag cgcaagctaa acaaggcgct agtcatatcc ttaatcttat gacacaggtt 1620
ctggcctccc ctaagggaac tgtttctaaa tatgctccgc gcattgaaac tatgcagatc 1680
aatacctcaa aaatcgcaac ggtcattggt cccggaggaa aacaaatccg tcaaattatc 1740
gagcgttctg gtgcgcaagt tgacatcaat gatgacggcg tcattaacat agctgcaagc 1800
acccaagaat cgattaacaa agctaaagaa cttatcgaag gattaactgg agaagttgaa 1860
gtcggtaaaag tttataatgg ccgtgttaca tctatcgcaa catttggggg attcgtagaa 1920
gtcctcccag gaaaagaagg gctctgtcat atttctgaat tgtctaaaca aaaagtagac 1980
aatatctctg actttgtcaa agaaggagac aagcttctg ttaaactcct tagcattaac 2040
gaaaaaggcc agttgaagct gagccataag gcaacgctgg aagat 2085

```

```

<210> SEQ ID NO 103
<211> LENGTH: 77
<212> TYPE: PRT
<213> ORGANISM: Chlamydia trachomatis

```

```

<400> SEQUENCE: 103

```

```

Val Phe Leu Gly Met Ala Lys Lys Glu Asp Thr Ile Val Leu Glu Gly
1           5           10           15
Arg Val Glu Glu Leu Leu Pro Gly Met His Phe Arg Val Met Leu Glu
20          25          30
Asn Gly Val Pro Ile Thr Ala His Leu Cys Gly Lys Met Arg Met Ser
35          40          45
Asn Ile Arg Leu Leu Val Gly Asp Arg Val Thr Val Glu Met Ser Thr
50          55          60
Tyr Asp Leu Thr Lys Ala Arg Val Val Tyr Arg His Arg
65          70          75

```

```

<210> SEQ ID NO 104
<211> LENGTH: 234

```

-continued

```

<212> TYPE: DNA
<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 104

ttaacgatgt ctgtagacaa cacgagcctt cgtcaaatca taagtagaca tttcgacggt      60
cacgcatctt ccaacgagca agcggatatt actcatacgc attttaccgc acagatgcgc      120
tgtaatggga accccattct ctaacatcac cctaaaatgc atgccgggca acaactcttc      180
cactctacct tctagaacga tcgtatcttc tttttttgcc attcctaaaa aaac          234

```

```

<210> SEQ ID NO 105
<211> LENGTH: 97
<212> TYPE: PRT
<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 105

Met Lys Lys Arg Ser Ser Arg Lys Leu Ala Gln Val Ile Gly Arg Lys
1             5             10             15

Thr Gly Asn Tyr Phe Pro Ala Ser Ile Glu Gly Glu Thr Lys Lys Glu
                20             25             30

His Lys His His Tyr Ser Thr Ala Ser Lys Glu Lys Glu Ser Leu Arg
        35             40             45

Lys Arg Ala Lys Glu Phe Asp Val Leu Val His Ser Leu Leu Asp Lys
        50             55             60

His Val Pro Gln Asn Ser Asp Gln Val Leu Ile Phe Thr Tyr Gln Asn
65             70             75             80

Gly Phe Val Glu Thr Asp Phe His Asn Phe Gly Arg Tyr Ser Val Lys
        85             90             95

```

Leu

```

<210> SEQ ID NO 106
<211> LENGTH: 291
<212> TYPE: DNA
<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 106

atgaaaaaaaa gaagcagtcg caagctagct caagtgattg ggcgtaagac gggaaactat      60
ttcccagctt ctattgaagg cgaaaccaag aaagagcaca aacatcatta cagcacagcc      120
tcaaaagaaa aagagtctct acgaaaaaga gcgaaagagt tcgatgtgct agtacattcg      180
ttattagata aacacgttcc tcaaaattct gaccaagttt tgatttttac gtaccagaat      240
ggctttgtgg agacagactt tcataatttt ggccgatatt ctgtgaaact g          291

```

```

<210> SEQ ID NO 107
<211> LENGTH: 361
<212> TYPE: PRT
<213> ORGANISM: Chlamydia trachomatis

```

```

<400> SEQUENCE: 107

Met Lys Lys Thr Lys His Leu Ile Ser Lys Ile Met Phe Ser Leu Val
1             5             10             15

Ser Leu Phe Val Gly Gly Phe Leu Leu Lys Ala Pro Ala Pro Thr Gln
        20             25             30

Ser Ala Asp Thr Phe Gln Thr Leu Ile Glu Ser Lys Glu Pro Val Ile
        35             40             45

```

-continued

Phe 50	Thr	Lys	Gln	Cys	Gly	Asp 55	Asn	Val	Thr	Gln	Ile 60	Leu	Cys	Asp	Ala
Ile 65	Asp	Ser	Ala	Lys	Lys	Asp 70	Ile	Phe	Leu	Ser 75	Ile	Tyr	Asp	Leu	Ser 80
Ala	Pro	Ala	Ile	Thr 85	Thr	Ser	Leu	Lys	Lys 90	Gln	Val	Ser	Ala	Arg 95	Ile
Pro	Val	Cys	Ile 100	His	Tyr	Gln	Arg	Ile 105	Ser	Lys	Asn	Ala	Glu 110	Phe	Ser
Gln	Ser 115	Pro	Tyr	Leu	Thr	Leu	Gly 120	Glu	His	Pro	Pro	Met 125	His	Arg	Lys
Leu 130	Met	His	Gln	Lys	Thr	Met 135	Ala	Ile	Asp	Gly	Glu 140	Leu	Ala	Trp	Ile
Gly 145	Ser	Ala	Asn	Phe	Thr 150	Leu	Ala	Ser	Leu	Glu 155	Lys	Ser	Ala	Asn	Leu 160
Ile	Ile	Gly	Leu 165	Lys	Ser	Ala	Glu	Ile	Cys 170	His	Phe	Ile	Lys	Thr 175	Gln
Thr	Ser	Gly	Arg 180	Cys	Phe	Ile	Asn	Asn 185	Gln	Leu	Ile	Glu	Tyr 190	Phe	Ser
Phe	Asp 195	Gly	Gly	Ser	Ser	Ala	Ala 200	Leu	Glu	Thr	Val	Leu 205	His	His	Ile
Arg 210	Ser	Ala	Lys	Glu	Ser	Ile 215	Gln	Val	Gly	Met	Phe 220	Ala	Leu	Thr	Leu
Pro 225	Gln	Ile	Ile	Ala	Glu 230	Leu	Asn	Ala	Ala	Gln	Asn 235	Cys	Gly	Val	Asp 240
Val	Val	Ile	Leu 245	Val	Asp	Lys	Gly	Tyr	Lys 250	Ser	Phe	Thr	Val	Gln 255	Gln
Ile	Lys	Gln	Leu 260	Glu	His	Pro	Ser	Leu 265	Ser	Ile	Tyr	Glu	Lys 270	Val	Thr
Pro	Tyr 275	Gln	Leu	His	His	Lys	Phe 280	Gly	Ile	Phe	Asp 285	Lys	Lys	Thr	Leu
Ile 290	Thr	Gly	Ser	Val	Asn 295	Trp	Ser	Glu	Asn	Gly	Phe 300	Leu	Ile	Asn	Thr
Glu 305	Asp	Met	Ile	Val	Ile 310	Glu	Asn	Leu	Thr	Glu 315	Lys	Gln	Gln	Ser	Lys 320
Ile	Gln	Ala	Ile 325	Trp	Glu	Gly	Leu	Val	Arg 330	Glu	Cys	Ala	Leu	Tyr 335	Tyr
Ser	Pro	Asp	Gln 340	Glu	Glu	Lys	Glu	Lys 345	Asp	Pro	Leu	Ile	Ile 350	Pro	Phe
Pro	Pro	Ser 355	Glu	Lys	Lys	Gln	Ala	Ala							

```
<210> SEQ ID NO 108
<211> LENGTH: 1083
<212> TYPE: DNA
<213> ORGANISM: Chlamydia trachomatis
```

<400> SEQUENCE: 108

atgaaaaaaaa	caaaacacct	tatttccaaa	ataatgttca	gcttagtttc	cctttttggt	60
ggaggatttt	tactaaaagc	cccagccccc	actcaatctg	ctgatacctt	ccaaacgctt	120
attgaatcca	aggaacctgt	tatcttcacc	aaacagtgtg	gagacaaagt	aacgcaaata	180
ctatgtgatg	cgatagactc	tgcaaaaaaa	gatatttttc	tcagtattta	tgacctatct	240

-continued

```

gctcccgcta tcacgacaag tttgaaaaaa caagtgtccg ctgcgattcc tgtatgtatt 300
cattaccaac gtatctctaa aaatgctggag ttctctcagt ctccctatct taccttggga 360
gaacatcctc ccatgcacag aaaactcatg catcaaaaaa ctatggcaat agatggagaa 420
ctcgcttgga tcggatctgc taattttaca ttagcttcgt tagagaagag cgtaaccta 480
ataattggat taaaaagcgc agaaatttgt ctttttatta aaacgcaaac ctctggtcgg 540
tgctttatta acaatcaact catcgagtat ttttcctttg atgggggggag ttctgctgct 600
ctagaaacag ttcttcacca tattegatca gcgaaagaat ccatccaagt aggtatgttt 660
gctctcactt tacctcagat tattgctgaa ttgaatgccg cacaaaactg tgggtgtgat 720
gtagtgatcc tcgtcgacaa aggatacaaa tcctttaccg tacagcaaat taagcaattg 780
gaacatccta gtctctctat ttatgaaaag gtaaccccg accaactaca tcataaattt 840
ggcattttcg ataaaaagac gctaattaca ggatctgtca attggtctga gaatggcttc 900
cttattaata cagaagacat gattgtcatt gaaaatctga cagaaaaaca gcaagcaaaa 960
atacaggcga tatgggaagg attagtaaga gagtgtgctt tgtattactc cccagatcaa 1020
gaggaaaaag aaaaagatcc tttaatcatt ccgttcctc ctacgcgaaaa aaaacaagct 1080
gct 1083

```

<210> SEQ ID NO 109

<211> LENGTH: 458

<212> TYPE: PRT

<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 109

```

Leu Met Lys Lys Val Leu Ile Ala Asn Arg Gly Glu Ile Ala Ile Arg
1           5           10           15
Ile Ile Arg Ala Cys His Asp Leu Gly Leu Ala Thr Val Ala Val Tyr
20          25          30
Ser Met Ala Asp Gln Glu Ala Leu His Val Leu Leu Ala Asp Glu Ala
35          40          45
Val Cys Ile Gly Glu Ala Gln Ala Ala Lys Ser Tyr Leu Lys Ile Ala
50          55          60
Asn Ile Leu Ala Ala Cys Glu Ile Thr Gly Val Asp Ala Val His Pro
65          70          75          80
Gly Tyr Gly Phe Leu Ser Glu Asn Ala Asn Phe Ala Ser Ile Cys Glu
85          90          95
Ser Cys Gly Leu Thr Phe Ile Gly Pro Ser Ala Glu Ser Ile Ala Thr
100         105         110
Met Gly Asp Lys Val Ala Ala Lys Gln Leu Ala Lys Lys Ile Lys Cys
115         120         125
Pro Val Ile Pro Gly Ser Glu Gly Val Val Lys Asp Glu Val Glu Gly
130         135         140
Ile Arg Ile Ala Glu Lys Ile Gly Phe Pro Ile Val Ile Lys Ala Val
145         150         155         160
Ala Gly Gly Gly Gly Arg Gly Ile Arg Ile Val Arg Glu Lys Asp Glu
165         170         175
Phe Tyr Arg Ala Phe Thr Ala Ala Arg Ala Glu Ala Glu Ala Gly Phe
180         185         190
Asn Asn Pro Asp Val Tyr Ile Glu Lys Phe Ile Glu Asn Pro Arg His
195         200         205

```

-continued

Leu Glu Val Gln Val Ile Gly Asp Lys His Gly Asn Tyr Val Tyr Leu
 210 215 220
 Gly Glu Arg Asp Cys Thr Val Gln Arg Arg Arg Gln Lys Leu Ile Glu
 225 230 235 240
 Glu Thr Pro Ser Pro Ile Leu Thr Pro Glu Met Arg Ala Lys Val Gly
 245 250 255
 Lys Val Ala Val Asp Leu Ala Arg Ser Ala Gly Tyr Phe Ser Val Gly
 260 265 270
 Thr Val Glu Phe Leu Leu Asp Lys Glu Lys Arg Phe Tyr Phe Met Glu
 275 280 285
 Met Asn Thr Arg Ile Gln Val Glu His Thr Ile Thr Glu Glu Val Thr
 290 295 300
 Gly Ile Asp Leu Leu Lys Ala Gln Ile Ser Val Ala Lys Gly Glu Lys
 305 310 315 320
 Leu Pro Trp Lys Gln Lys Asn Ile Lys Phe Lys Gly His Val Ile Gln
 325 330 335
 Cys Arg Ile Asn Ala Glu Asp Pro Ile Asn Asn Phe Thr Pro Ser Pro
 340 345 350
 Gly Arg Leu Asp Tyr Tyr Leu Pro Pro Ala Gly Pro Ala Val Arg Val
 355 360 365
 Asp Gly Ala Cys Tyr Ser Gly Tyr Ala Ile Pro Pro Tyr Tyr Asp Ser
 370 375 380
 Met Ile Ala Lys Val Ile Thr Lys Gly Lys Asn Arg Glu Glu Ala Ile
 385 390 395 400
 Ala Ile Met Lys Arg Ala Leu Lys Glu Phe His Ile Gly Gly Val His
 405 410 415
 Ser Thr Ile Pro Phe His Gln Phe Met Leu Asp Asn Pro Lys Phe Leu
 420 425 430
 Leu Ser Asp Tyr Asp Ile Asn Tyr Val Asp Gln Leu Leu Ala Ser Gly
 435 440 445
 Ser Thr Phe Leu Asn Leu Ala Asp Gly Ser
 450 455

<210> SEQ ID NO 110
 <211> LENGTH: 1377
 <212> TYPE: DNA
 <213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 110

ttaatgaaga aagtattgat tgcaaataga ggcgagatag ctattcggat tattcgagca	60
tgtcatgatac taggattagc tactgttgct gtatattcta tggcggatca agaagctttg	120
catgtgcttc ttgctgacga agctgtttgt attggagaag ctcaggcagc aaaatectac	180
ctaaagatcg ccaatatttt agctgcttgt gagattactg gggtagatgc tgtgcatect	240
ggttatgggt tcttaagtga aaatgcaaac ttgcttcta tttgtgaaag ttgtgggctc	300
acatttatcg gtctagtgc tgagtcgata gcgactatgg gagataaagt cgcagctaag	360
cagttggcta aaaagattaa gtgccttgta atccctggat ctgaagggtg agtgaaggat	420
gagggtgaag ggattagaat tgcagaaaa atcggaattcc ccacgtcat caaagctgtt	480
gctggaggcg gtggacgagg aatacggatt gttagagaaa aagacgaatt ctacagggtc	540
tttactgccg ctcggtctga agcagaagcg ggatttaata atcctgacgt gtatattgaa	600

-continued

```

aaattttattg aaaatccaag acatttagaa gttcaagtaa ttggagataa gcacggaaat    660
tacgtgtatc ttggagaacg agattgtaca gtacaaaggc gtcggcaaaa attaatagaa    720
gagactccaa gtccattttt aactccagaa atgcgagcta aagttggaaa agtagcagtg    780
gatttagctc ggagtgcccg gtattttctct gttggaacag tagaatttct gttagataag    840
gagaagcgtt tttatttcat ggagatgaat acgcgtatcc aagtggaaca tactattacg    900
gaagaagtga cagggatcga tttgttaaag gctcagatta gtgtcgctaa gggagaaaaa    960
ctgccttgga agcaaaagaa tataaagttt aaagggcacg tgattcaatg ccgaatcaat  1020
gcagaggatc caattaataa ctttactcct tcccctggta gattagatta ttatctccct  1080
cctgcaggtc ctgctgtgcg agtagacggg gcttgctaca gtggttatgc gatacctcct  1140
tattatgatt ccatgattgc taaggtaatc acaaaaggaa agaatcgaga ggaagcgata  1200
gccattatga aaagagcttt aaaagagttc catattggtg ggggtcattc tacaattcct  1260
tttcatcagt tcattgttga taatccgaag tttcttcttt ctgattatga tattaattac  1320
gtggaccagc ttttagcgtc tggtagcacc tttttaaatt tagctgatgg cagctaa    1377

```

<210> SEQ ID NO 111

<211> LENGTH: 544

<212> TYPE: PRT

<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 111

```

Met Val Ala Lys Asn Ile Lys Tyr Asn Glu Glu Ala Arg Lys Lys Ile
1           5           10          15
Gln Lys Gly Val Lys Thr Leu Ala Glu Ala Val Lys Val Thr Leu Gly
20          25          30
Pro Lys Gly Arg His Val Val Ile Asp Lys Ser Phe Gly Ser Pro Gln
35          40          45
Val Thr Lys Asp Gly Val Thr Val Ala Lys Glu Val Glu Leu Ala Asp
50          55          60
Lys His Glu Asn Met Gly Ala Gln Met Val Lys Glu Val Ala Ser Lys
65          70          75          80
Thr Ala Asp Lys Ala Gly Asp Gly Thr Thr Thr Ala Thr Val Leu Ala
85          90          95
Glu Ala Ile Tyr Thr Glu Gly Leu Arg Asn Val Thr Ala Gly Ala Asn
100         105         110
Pro Met Asp Leu Lys Arg Gly Ile Asp Lys Ala Val Lys Val Val Val
115         120         125
Asp Gln Ile Arg Lys Ile Ser Lys Pro Val Gln His His Lys Glu Ile
130         135         140
Ala Gln Val Ala Thr Ile Ser Ala Asn Asn Asp Ala Glu Ile Gly Asn
145         150         155         160
Leu Ile Ala Glu Ala Met Glu Lys Val Gly Lys Asn Gly Ser Ile Thr
165         170         175
Val Glu Glu Ala Lys Gly Phe Glu Thr Val Leu Asp Ile Val Glu Gly
180         185         190
Met Asn Phe Asn Arg Gly Tyr Leu Ser Ser Tyr Phe Ala Thr Asn Pro
195         200         205
Glu Thr Gln Glu Cys Val Leu Glu Asp Ala Leu Val Leu Ile Tyr Asp
210         215         220

```

-continued

Lys Lys Ile Ser Gly Ile Lys Asp Phe Leu Pro Val Leu Gln Gln Val
 225 230 235 240
 Ala Glu Ser Gly Arg Pro Leu Leu Ile Ile Ala Glu Asp Ile Glu Gly
 245 250 255
 Glu Ala Leu Ala Thr Leu Val Val Asn Arg Ile Arg Gly Gly Phe Arg
 260 265 270
 Val Cys Ala Val Lys Ala Pro Gly Phe Gly Asp Arg Arg Lys Ala Met
 275 280 285
 Leu Glu Asp Ile Ala Ile Leu Thr Gly Gly Gln Leu Ile Ser Glu Glu
 290 295 300
 Leu Gly Met Lys Leu Glu Asn Ala Asn Leu Ala Met Leu Gly Lys Ala
 305 310 315 320
 Lys Lys Val Ile Val Ser Lys Glu Asp Thr Thr Ile Val Glu Gly Met
 325 330 335
 Gly Glu Lys Glu Ala Leu Glu Ala Arg Cys Glu Ser Ile Lys Lys Gln
 340 345 350
 Ile Glu Asp Ser Ser Ser Asp Tyr Asp Lys Glu Lys Leu Gln Glu Arg
 355 360 365
 Leu Ala Lys Leu Ser Gly Gly Val Ala Val Ile Arg Val Gly Ala Ala
 370 375 380
 Thr Glu Ile Glu Met Lys Glu Lys Lys Asp Arg Val Asp Asp Ala Gln
 385 390 395 400
 His Ala Thr Ile Ala Ala Val Glu Glu Gly Ile Leu Pro Gly Gly Gly
 405 410 415
 Thr Ala Leu Ile Arg Cys Ile Pro Thr Leu Glu Ala Phe Leu Pro Met
 420 425 430
 Leu Thr Asn Glu Asp Glu Gln Ile Gly Ala Arg Ile Val Leu Lys Ala
 435 440 445
 Leu Ser Ala Pro Leu Lys Gln Ile Ala Ala Asn Ala Gly Lys Glu Gly
 450 455 460
 Ala Ile Ile Phe Gln Gln Val Met Ser Arg Ser Ala Asn Glu Gly Tyr
 465 470 475 480
 Asp Ala Leu Arg Asp Ala Tyr Thr Asp Met Leu Glu Ala Gly Ile Leu
 485 490 495
 Asp Pro Ala Lys Val Thr Arg Ser Ala Leu Glu Ser Ala Ala Ser Val
 500 505 510
 Ala Gly Leu Leu Leu Thr Thr Glu Ala Leu Ile Ala Glu Ile Pro Glu
 515 520 525
 Glu Lys Pro Ala Ala Ala Pro Ala Met Pro Gly Ala Gly Met Asp Tyr
 530 535 540

<210> SEQ ID NO 112

<211> LENGTH: 1632

<212> TYPE: DNA

<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 112

atggtcgcta aaaacattaa atacaacgaa gaagccagaa agaaaattca aaaaggagtt 60
 aagacttttag ctgaagctgt aaaagtcact ctaggccta aaggacgaca tgttgtcata 120
 gataaaagct tcggatcccc tcaagtaact aaagatggtg ttaccgttgc gaaagaagtt 180
 gagcttgccg acaaacatga aaatatgggc gctcaaatgg tcaaagaagt cgccagcaaa 240

-continued

```

actgctgaca aagctggaga cggaactaca acagctactg ttcttgetga agctatctat    300
acagaaggat tacgcaatgt aacagctgga gcaaatccaa tggacctcaa acgaggtatt    360
gataaagctg ttaaggttgt tggtgatcaa atcagaaaaa tcagcaaaccc tgttcagcat    420
cataaagaaa ttgctcaagt tgcaacaatt tctgctaata atgatgcaga aatcggaat    480
ctgattgctg aagcaatgga gaaagttggt aaaaacggct ctatcactgt tgaagaagca    540
aaaggatttg aaaccgtttt ggatattggt gaaggaatga atttcaatag aggttacctc    600
tctagctact tcgcaacaaa tccagaaact caagaatgtg tattagaaga cgctttggtt    660
ctaactctacg ataagaaaat ttctgggatac aaagatttcc ttctgtttt acaacaagtt    720
gctgaatccg gccgtcctct tcttattata gcagaagaca ttgaaggcga agcttttagct    780
actttggtcg tgaacagaat tcgtggagga ttccgggttt gcgcagtaa agctccaggc    840
tttgagata gaagaaaagc tatgtagaa gacatcgcta tcttaactgg cgttcaactc    900
attagcgaag agttgggcat gaaattagaa aacgctaact tagctatgtt aggtaaagct    960
aaaaaagtta tcgtttctaa agaagacacg accatcgctg aaggaatggg tgaanaagaa 1020
gctttagaag ctggttgca aagcatcaaa aaacaaattg aagacagctc ttctgattac 1080
gataaagaaa aactccaaga gcgtcttgct aagctctctg gtggagtagc agtcattcgc 1140
gttgagctg caacagagat tgagatgaaa gagaaaaaag atcgtgtaga cgatgctcaa 1200
catgctacaa tcgctgctgt tgaagaagga attcttctct gtggaggaac ggcattaatc 1260
cggtgtatcc ctactcttg agccttcttg ccaatgttga ctaatgaaga tgagcaaat 1320
ggagctcgca ttgttttgaa agctctttcc gctcctttga aacaaattgc tgcaaacgca 1380
ggaaaagaag gtgctatcat cttccaacaa gttatgtccc gttctgcgaa cgaaggatat 1440
gatgcattgc gtgatgcata cacagatatg cttgaagctg gtattttaga tctgtctaaa 1500
gtaacccgtt ctgctttaga aagcgcggtt tccgtagctg gattactttt gacaacagaa 1560
gctctcattg cagagattcc agaagaaaaa cctgctgcag ctccagcaat gcctggcgca 1620
ggaatggact at                                                    1632

```

<210> SEQ ID NO 113

<211> LENGTH: 273

<212> TYPE: PRT

<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 113

```

Met Thr Thr Pro Thr Leu Ile Val Thr Pro Pro Ser Pro Pro Ala Pro
1           5           10           15

Ser Tyr Ser Ala Asn Arg Val Pro Gln Pro Ser Leu Met Asp Lys Ile
20          25          30

Lys Lys Ile Ala Ala Ile Ala Ser Leu Ile Leu Ile Gly Thr Ile Gly
35          40          45

Phe Leu Ala Leu Leu Gly His Leu Val Gly Phe Leu Ile Ala Pro Gln
50          55          60

Ile Thr Ile Val Leu Leu Ala Leu Phe Ile Ile Ser Leu Ala Gly Asn
65          70          75          80

Ala Leu Tyr Leu Gln Lys Thr Ala Asn Leu His Leu Tyr Gln Asp Leu
85          90          95

Gln Arg Glu Val Gly Ser Leu Lys Glu Ile Asn Phe Met Leu Ser Val

```

-continued

100					105					110					
Leu	Gln	Lys	Glu	Phe	Leu	His	Leu	Ser	Lys	Glu	Phe	Ala	Thr	Thr	Ser
	115						120					125			
Lys	Asp	Leu	Ser	Ala	Val	Ser	Gln	Asp	Phe	Tyr	Ser	Cys	Leu	Gln	Gly
	130					135					140				
Phe	Arg	Asp	Asn	Tyr	Lys	Gly	Phe	Glu	Ser	Leu	Leu	Asp	Glu	Tyr	Lys
	145					150					155				160
Asn	Ser	Thr	Glu	Glu	Met	Arg	Lys	Leu	Phe	Ser	Gln	Glu	Ile	Ile	Ala
			165						170					175	
Asp	Leu	Lys	Gly	Ser	Val	Ala	Ser	Leu	Arg	Glu	Glu	Ile	Arg	Phe	Leu
		180						185					190		
Thr	Pro	Leu	Ala	Glu	Glu	Val	Arg	Arg	Leu	Ala	His	Asn	Gln	Gln	Ser
		195					200					205			
Leu	Thr	Val	Val	Ile	Glu	Glu	Leu	Lys	Thr	Ile	Arg	Asp	Ser	Leu	Arg
		210				215					220				
Asp	Glu	Ile	Gly	Gln	Leu	Ser	Gln	Leu	Ser	Lys	Thr	Leu	Thr	Ser	Gln
	225					230					235				240
Ile	Ala	Leu	Gln	Arg	Lys	Glu	Ser	Ser	Asp	Leu	Cys	Ser	Gln	Ile	Arg
			245						250					255	
Glu	Thr	Leu	Ser	Ser	Pro	Arg	Lys	Ser	Ala	Ser	Pro	Ser	Thr	Lys	Ser
		260						265					270		

Ser

<210> SEQ ID NO 114
 <211> LENGTH: 819
 <212> TYPE: DNA
 <213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 114

```

atgacaacgc ctactctaatt cgtgaccocct ccattctcccc ctgcaccttc ctactcagcc      60
aatcgcgtag ctcaaccttc tttgatggac aaaattaaga aaatagcagc cattgcctcc      120
ctaattctta taggcacaat aggccttttta gctcttttgg gacatcttgt tggtcttctg      180
atcgctccac aaatcactat tgtttctctt gccctattca ttatctcatt agcagggaat      240
gctctttatc tacagaaaac cgctaatacta catctatacc aggatctgca aagagaagtt      300
gggtctctaa aagaaattaa tttcatgctg agcgtttctac agaaagaatt tcttcattta      360
tctaaagaat ttgcaacgac atctaaagac ctctctgctg tatctcaaga tttttattct      420
tgtttgcaag gatttagaga taactataaa ggttttgaat ctcttttgga tgagtataaa      480
aactctacag aagaaatgag caaacttttt tcgcaagaaa tcatagcaga tcttaaaggc      540
tctgttgccct cattaagaga ggaaatccga ttcttaaccc cattagcaga agaagtctgc      600
cgattagcgc ataaccagca atcattaaca gtgggttattg aagaattaaa aacaattcgt      660
gatagcttac gagatgaaat tggacaactt tcacaacttt ctaaaactct taccagtcaa      720
attgcattac aacgaaaaga gagctcagat ctgtgttccc agataagaga gacgctctcc      780
tccccagaa agtctgcac accctctaca aaaagctcc                                819
  
```

<210> SEQ ID NO 115
 <211> LENGTH: 243
 <212> TYPE: PRT
 <213> ORGANISM: Chlamydia trachomatis

-continued

<400> SEQUENCE: 115

```

Met Lys Asn Ile Leu Ser Trp Met Leu Met Phe Ala Val Ala Leu Pro
1      5      10      15
Ile Val Gly Cys Asp Asn Gly Gly Gly Ser Gln Thr Ser Ala Thr Glu
20      25      30
Lys Ser Met Val Glu Asp Ser Ala Leu Thr Asp Asn Gln Lys Leu Ser
35      40      45
Arg Thr Phe Gly His Leu Leu Ser Arg Gln Leu Ser Arg Thr Glu Asp
50      55      60
Phe Ser Leu Asp Leu Val Glu Val Ile Lys Gly Met Gln Ser Glu Ile
65      70      75      80
Asp Gly Gln Ser Ala Pro Leu Thr Asp Thr Glu Tyr Glu Lys Gln Met
85      90      95
Ala Glu Val Gln Lys Ala Ser Phe Glu Ala Lys Cys Ser Glu Asn Leu
100     105     110
Ala Ser Ala Glu Lys Phe Leu Lys Glu Asn Lys Glu Lys Ala Gly Val
115     120     125
Ile Glu Leu Glu Pro Asn Lys Leu Gln Tyr Arg Val Val Lys Glu Gly
130     135     140
Thr Gly Arg Val Leu Ser Gly Lys Pro Thr Ala Leu Leu His Tyr Thr
145     150     155     160
Gly Ser Phe Ile Asp Gly Lys Val Phe Asp Ser Ser Glu Lys Asn Lys
165     170     175
Glu Pro Ile Leu Leu Pro Leu Thr Lys Val Ile Pro Gly Phe Ser Gln
180     185     190
Gly Met Gln Gly Met Lys Glu Gly Glu Val Arg Val Leu Tyr Ile His
195     200     205
Pro Asp Leu Ala Tyr Gly Thr Ala Gly Gln Leu Pro Pro Asn Ser Leu
210     215     220
Leu Ile Phe Glu Val Lys Leu Ile Glu Ala Asn Asp Asp Asn Val Ser
225     230     235     240
Val Thr Glu

```

<210> SEQ ID NO 116

<211> LENGTH: 729

<212> TYPE: DNA

<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 116

```

atgaagaata tattaagttg gatgcttatg ttgcagtcg ctctgcctat cgtaggatgt      60
gataacggag gcggttcgca aacatcggtc acggagaaaa gcatggtaga agactctgca      120
ttgacagaca atcaaaagtt atcaagaact ttgggcatt tattgtctcg tcagttgagc      180
cgaacggaag atttttcggt agatcttggt gaagtgatta aagggatgca atctgaaata      240
gatggacaga gtgctccttt aacagacaca gaatatgaaa aacaaatggc agaagtacaa      300
aaagctagtt tcgaagcaaa atgctcggaa aatttagctt ctgcagaaaa attcttaaaa      360
gaaaaataag agaaggtcgg gggtattgag ttagagccta ataagttaca gtaccgtggt      420
gtgaaagagg gtacaggacg gggtctttct gggaagccta cagctttgct tcactataca      480
gggagcttca tcgatgggaa gggttttgat tcttcagaga agaataaaga gcccatttta      540
ctgcctttga ccaaagtaat tcctggatgt tcccaaggtg tgcaaggtat gaaagaagga      600

```

-continued

```

gagggttcgag ttctttacat acatccagat ttagcttacg gaacagctgg acaattacct    660
ccaaactctc tactcatttt tgaagtgaag ttaattgaag caaacgacga taatgtatct    720
gttacagaa                                                                729

```

```

<210> SEQ ID NO 117
<211> LENGTH: 553
<212> TYPE: PRT
<213> ORGANISM: Chlamydia trachomatis

```

```

<400> SEQUENCE: 117

```

```

Met Arg Ile Gly Asp Pro Met Asn Lys Leu Ile Arg Arg Ala Val Thr
1           5           10           15
Ile Phe Ala Val Thr Ser Val Ala Ser Leu Phe Ala Ser Gly Val Leu
20           25           30
Glu Thr Ser Met Ala Glu Ser Leu Ser Thr Asn Val Ile Ser Leu Ala
35           40           45
Asp Thr Lys Ala Lys Asp Asn Thr Ser His Lys Ser Lys Lys Ala Arg
50           55           60
Lys Asn His Ser Lys Glu Thr Pro Val Asp Arg Lys Glu Val Ala Pro
65           70           75           80
Val His Glu Ser Lys Ala Thr Gly Pro Lys Gln Asp Ser Cys Phe Gly
85           90           95
Arg Met Tyr Thr Val Lys Val Asn Asp Asp Arg Asn Val Glu Ile Thr
100          105          110
Gln Ala Val Pro Glu Tyr Ala Thr Val Gly Ser Pro Tyr Pro Ile Glu
115          120          125
Ile Thr Ala Thr Gly Lys Arg Asp Cys Val Asp Val Ile Ile Thr Gln
130          135          140
Gln Leu Pro Cys Glu Ala Glu Phe Val Arg Ser Asp Pro Ala Thr Thr
145          150          155          160
Pro Thr Ala Asp Gly Lys Leu Val Trp Lys Ile Asp Arg Leu Gly Gln
165          170          175
Gly Glu Lys Ser Lys Ile Thr Val Trp Val Lys Pro Leu Lys Glu Gly
180          185          190
Cys Cys Phe Thr Ala Ala Thr Val Cys Ala Cys Pro Glu Ile Arg Ser
195          200          205
Val Thr Lys Cys Gly Gln Pro Ala Ile Cys Val Lys Gln Glu Gly Pro
210          215          220
Glu Asn Ala Cys Leu Arg Cys Pro Val Val Tyr Lys Ile Asn Ile Val
225          230          235          240
Asn Gln Gly Thr Ala Thr Ala Arg Asn Val Val Val Glu Asn Pro Val
245          250          255
Pro Asp Gly Tyr Ala His Ser Ser Gly Gln Arg Val Leu Thr Phe Thr
260          265          270
Leu Gly Asp Met Gln Pro Gly Glu His Arg Thr Ile Thr Val Glu Phe
275          280          285
Cys Pro Leu Lys Arg Gly Arg Ala Thr Asn Ile Ala Thr Val Ser Tyr
290          295          300
Cys Gly Gly His Lys Asn Thr Ala Ser Val Thr Thr Val Ile Asn Glu
305          310          315          320
Pro Cys Val Gln Val Ser Ile Ala Gly Ala Asp Trp Ser Tyr Val Cys

```

-continued

325										330					335				
Lys	Pro	Val	Glu	Tyr	Val	Ile	Ser	Val	Ser	Asn	Pro	Gly	Asp	Leu	Val				
340										345					350				
Leu	Arg	Asp	Val	Val	Val	Glu	Asp	Thr	Leu	Ser	Pro	Gly	Val	Thr	Val				
355										360					365				
Leu	Glu	Ala	Ala	Gly	Ala	Gln	Ile	Ser	Cys	Asn	Lys	Val	Val	Trp	Thr				
370										375					380				
Val	Lys	Glu	Leu	Asn	Pro	Gly	Glu	Ser	Leu	Gln	Tyr	Lys	Val	Leu	Val				
385										390					395				
Arg	Ala	Gln	Thr	Pro	Gly	Gln	Phe	Thr	Asn	Asn	Val	Val	Val	Lys	Ser				
405										410					415				
Cys	Ser	Asp	Cys	Gly	Thr	Cys	Thr	Ser	Cys	Ala	Glu	Ala	Thr	Thr	Tyr				
420										425					430				
Trp	Lys	Gly	Val	Ala	Ala	Thr	His	Met	Cys	Val	Val	Asp	Thr	Cys	Asp				
435										440					445				
Pro	Val	Cys	Val	Gly	Glu	Asn	Thr	Val	Tyr	Arg	Ile	Cys	Val	Thr	Asn				
450										455					460				
Arg	Gly	Ser	Ala	Glu	Asp	Thr	Asn	Val	Ser	Leu	Met	Leu	Lys	Phe	Ser				
465										470					475				
Lys	Glu	Leu	Gln	Pro	Val	Ser	Phe	Ser	Gly	Pro	Thr	Lys	Gly	Thr	Ile				
485										490					495				
Thr	Gly	Asn	Thr	Val	Val	Phe	Asp	Ser	Leu	Pro	Arg	Leu	Gly	Ser	Lys				
500										505					510				
Glu	Thr	Val	Glu	Phe	Ser	Val	Thr	Leu	Lys	Ala	Val	Ser	Ala	Gly	Asp				
515										520					525				
Ala	Arg	Gly	Glu	Ala	Ile	Leu	Ser	Ser	Asp	Thr	Leu	Thr	Val	Pro	Val				
530										535					540				
Ser	Asp	Thr	Glu	Asn	Thr	His	Ile	Tyr											
545										550									

```
<210> SEQ ID NO 118
<211> LENGTH: 1659
<212> TYPE: DNA
<213> ORGANISM: Chlamydia trachomatis
```

<400> SEQUENCE: 118

atcgcaatag	gagatcctat	gaacaaactc	atcagacgag	cagtgacgat	cttcgcggtg	60
actagtgtgg	cgagtttatt	tgctagcggg	gtgttagaga	cctctatggc	agagtctctc	120
tctacaaacg	ttattagctt	agctgacacc	aaagcgaaag	acaacacttc	tcataaaagc	180
aaaaaagcaa	gaaaaaacca	cagcaaaagag	actcccgtag	accgtaaaga	ggttgctccg	240
gttcattgagt	ctaaagctac	aggacctaaa	caggattctt	gctttggcag	aatgtataca	300
gtcaaagtta	atgatgatcg	caatgttgaa	atcacacaag	ctgttcctga	atatgctacg	360
gtaggatctc	cctatcctat	tgaaattact	gctacaggta	aaagggattg	tgttgatgtt	420
atcattactc	agcaattacc	atgtgaagca	gagttcgtac	gcagtgatcc	agcgacaact	480
cctactgctg	atggtaagct	agtttgaaaa	attgaccgct	taggacaagg	cgaaaagagt	540
aaaattactg	tatgggtaaa	acctcttaaa	gaaggttgct	gctttacagc	tgcaacagta	600
tgcgcttgtc	cagagatccg	ttcggttaca	aaatgtggac	aacctgctat	ctgtgttaaa	660
caagaaggcc	cagagaatgc	ttgtttgcgt	tgcccagtag	ttacaaaaat	taatatagtg	720

-continued

```

aaccaaggaa cagcaacagc tcgtaacggt gttgttgaaa atcctgttcc agatgggttac 780
gctcattctt ctggacagcg tgtactgacg tttactcttg gagatatgca acctggagag 840
cacagaacaa ttactgtaga gttttgtccg cttaaacgtg gtcgtgctac caatatagca 900
acggtttctt actgtggagg acataaaaat acagcaagcg taacaactgt gatcaacgag 960
ccttgcgtag aagtaagtat tgcaggagca gattggtctt atgtttgtaa gcctgtagaa 1020
tatgtgatct ccgtttccaa tcttgagatg cttgtgttgc gagatgtcgt cgttgaagac 1080
actctttctc ccggagtcac agttcttgaa gctgcaggag ctcaaatttc ttgtaataaa 1140
gtagtttggg ctgtgaaaga actgaatcct ggagagtctc tacagtataa agttctagta 1200
agagcacaaa ctctgggaca attcacaaat aatgttggtg tgaagagctg cctgactgt 1260
ggtagctgta cttcttgccg agaagcgaca acttactgga aaggagtgcg tgctactcat 1320
atgtgcgtag tagatacttg tgacctgtgt tgtgtaggag aaaatactgt ttaccgtatt 1380
tgtgtcacca acagagggtc tgcagaagat acaaatgttt ctttaatgct taaattctct 1440
aaagaactgc aacctgtatc cttctctgga ccaactaaag gaacgattac aggcaataca 1500
gtagtattcg attcggtacc tagattaggt tctaaagaaa ctgtagagtt ttctgtaaca 1560
ttgaaagcag tatcagctgg agatgctcgt ggggaagcga ttctttcttc cgatacattg 1620
actgttccag tttctgatac agagaataca cacatctat 1659

```

```

<210> SEQ ID NO 119
<211> LENGTH: 163
<212> TYPE: PRT
<213> ORGANISM: Chlamydia trachomatis

```

```

<400> SEQUENCE: 119

```

```

Met Arg Phe Leu Leu Ala Leu Phe Ser Leu Ile Leu Val Leu Pro Ala
1           5           10          15
Thr Glu Ala Phe Ser Thr Glu Asp Lys Gln Cys Gln Gln Glu Ala Glu
20          25          30
Glu Asp Cys Ser Gln Val Ala Asp Thr Cys Val Phe Tyr Ser Tyr Ala
35          40          45
Glu Gly Leu Glu His Ala Arg Asp Glu Gly Lys Leu Thr Leu Val Val
50          55          60
Leu Leu Asp Thr Ser Gly Tyr Ser Phe Glu Thr Leu Ala Asp Ala Ala
65          70          75          80
His Ala Met Glu Ser Ser Leu Leu Ser Thr Phe Ala Asp Phe Val Val
85          90          95
Leu Ser Arg Arg Glu Ala Val Pro Leu Ile Tyr Pro Pro Val Pro Asp
100         105         110
Pro Met Val Gly Glu Ile Ala Leu Phe Leu Glu Ala Phe Ser Asp Gln
115         120         125
Thr Phe Pro Ser Gln Pro Val Ile Val Thr Leu Ala Ile Gly Ala Ser
130         135         140
Ser Ala Glu Ile Met Asp Ile Thr Glu Ile Pro Ser Ile Asn Pro Glu
145         150         155         160
Phe Val Glu

```

```

<210> SEQ ID NO 120
<211> LENGTH: 489
<212> TYPE: DNA

```


-continued

<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 120

```

atgagattct tgttagcttt attctcactg atactagtgc ttctgcgac tgaggcattc      60
tcaacagagg ataagcagtg tcaacaagaa gcagaggaag actgtagtca ggtagcggac      120
acctgcgtat tttatagcta tgcagagggg ttagaacacg caagggacga agggaaactc      180
accttagtag tattgttaga tacttctggg tattccttcg agactcttgc tgatgcagcc      240
catgctatgg aaagtctggt gctatccaca tttgctgatt ttgtggttct ttctaggagg      300
gaagcagttc cactgattta tctctcgggt ccagatccta tggttggcga gatagcgttg      360
ttcttagaag ctttctcaga tcaaacatct ccatcacagc ctgtgattgt taccttagct      420
attggggctt cttctgcaga gatcatggat attacgaga ttccgtcaat aaatcctgaa      480
tttggtgag                                     489

```

<210> SEQ ID NO 121

<211> LENGTH: 660

<212> TYPE: PRT

<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 121

```

Met Ser Glu Lys Arg Lys Ser Asn Lys Ile Ile Gly Ile Asp Leu Gly
1      5      10      15

Thr Thr Asn Ser Cys Val Ser Val Met Glu Gly Gly Gln Pro Lys Val
20     25     30

Ile Ala Ser Ser Glu Gly Thr Arg Thr Thr Pro Ser Ile Val Ala Phe
35     40     45

Lys Gly Gly Glu Thr Leu Val Gly Ile Pro Ala Lys Arg Gln Ala Val
50     55     60

Thr Asn Pro Glu Lys Thr Leu Ala Ser Thr Lys Arg Phe Ile Gly Arg
65     70     75     80

Lys Phe Ser Glu Val Glu Ser Glu Ile Lys Thr Val Pro Tyr Lys Val
85     90     95

Ala Pro Asn Ser Lys Gly Asp Ala Val Phe Asp Val Glu Gln Lys Leu
100    105    110

Tyr Thr Pro Glu Glu Ile Gly Ala Gln Ile Leu Met Lys Met Lys Glu
115    120    125

Thr Ala Glu Ala Tyr Leu Gly Glu Thr Val Thr Glu Ala Val Ile Thr
130    135    140

Val Pro Ala Tyr Phe Asn Asp Ser Gln Arg Ala Ser Thr Lys Asp Ala
145    150    155    160

Gly Arg Ile Ala Gly Leu Asp Val Lys Arg Ile Ile Pro Glu Pro Thr
165    170    175

Ala Ala Ala Leu Ala Tyr Gly Ile Asp Lys Glu Gly Asp Lys Lys Ile
180    185    190

Ala Val Phe Asp Leu Gly Gly Gly Thr Phe Asp Ile Ser Ile Leu Glu
195    200    205

Ile Gly Asp Gly Val Phe Glu Val Leu Ser Thr Asn Gly Asp Thr His
210    215    220

Leu Gly Gly Asp Asp Phe Asp Gly Val Ile Ile Asn Trp Met Leu Asp
225    230    235    240

Glu Phe Lys Lys Gln Glu Gly Ile Asp Leu Ser Lys Asp Asn Met Ala

```

																245								250								255			
Leu	Gln	Arg	260			Leu	Lys	Asp	Ala	Ala	Glu	Lys	Ala	Lys	Ile	Glu	Leu	Ser																	
Gly	Val	Ser	Ser	Thr	Glu	Ile	Asn	Gln	Pro	Phe	Ile	Thr	Ile	Asp	Ala																				
Asn	Gly	Pro	Lys	His	Leu	295			Leu	Thr	Leu	Thr	Arg	Ala	Gln	Phe	Glu																		
His	Leu	Ala	Ser	Ser	Leu	Ile	Glu	Arg	Thr	Lys	Gln	Pro	Cys	Ala	Gln																				
Ala	Leu	Lys	Asp	325			Ala	Lys	Leu	Ser	Ala	Ser	Asp	Ile	Asp	Asp	Val	Leu																	
Leu	Val	Gly	Gly	Met	Ser	Arg	Met	Pro	Ala	Val	Gln	Ala	Val	Val	Lys																				
Glu	Ile	Phe	Gly	Lys	Glu	Pro	Asn	Lys	Gly	Val	Asn	Pro	Asp	Glu	Val																				
Val	Ala	Ile	Gly	Ala	Ala	Ile	Gln	Gly	Gly	Val	Leu	Gly	Gly	Glu	Val																				
Lys	Asp	Val	Leu	Leu	Leu	Asp	Val	Ile	Pro	Leu	Ser	Leu	Gly	Ile	Glu																				
Thr	Leu	Gly	Gly	Val	Met	Thr	Pro	Leu	Val	Glu	Arg	Asn	Thr	Thr	Ile																				
Pro	Thr	Gln	Lys	Lys	Gln	Ile	Phe	Ser	Thr	Ala	Ala	Asp	Asn	Gln	Pro																				
Ala	Val	Thr	Ile	Val	Val	Leu	Gln	Gly	Glu	Arg	Pro	Met	Ala	Lys	Asp																				
Asn	Lys	Glu	Ile	Gly	Arg	Phe	Asp	Leu	Thr	Asp	Ile	Pro	Pro	Ala	Pro																				
Arg	Gly	His	Pro	Gln	Ile	Glu	Val	Thr	Phe	Asp	Ile	Asp	Ala	Asn	Gly																				
Ile	Leu	His	Val	Ser	Ala	Lys	Asp	Ala	Ala	Ser	Gly	Arg	Glu	Gln	Lys																				
Ile	Arg	Ile	Glu	Ala	Ser	Ser	Gly	Leu	Lys	Glu	Asp	Glu	Ile	Gln	Gln																				
Met	Ile	Arg	Asp	Ala	Glu	Leu	His	Lys	Glu	Glu	Asp	Lys	Gln	Arg	Lys																				
Glu	Ala	Ser	Asp	Val	Lys	Asn	Glu	Ala	Asp	Gly	Met	Ile	Phe	Arg	Ala																				
Glu	Lys	Ala	Val	Lys	Asp	Tyr	His	Asp	Lys	Ile	Pro	Ala	Glu	Leu	Val																				
Lys	Glu	Ile	Glu	Glu	His	Ile	Glu	Lys	Val	Arg	Gln	Ala	Ile	Lys	Glu																				
Asp	Ala	Ser	Thr	Thr	Ala	Ile	Lys	Ala	Ala	Ser	Asp	Glu	Leu	Ser	Thr																				
His	Met	Gln	Lys	Ile	Gly	Glu	Ala	Met	Gln	Ala	Gln	Ser	Ala	Ser	Ala																				
Ala	Ala	Ser	Ser	Ala	Ala	Asn	Ala	Gln	Gly	Gly	Pro	Asn	Ile	Asn	Ser																				
Glu	Asp	Leu	Lys	Lys	His	Ser	Phe	Ser	Thr	Arg	Pro	Pro	Ala	Gly	Gly																				
Ser	Ala	Ser	Ser	Thr	Asp	Asn	Ile	Glu	Asp	Ala	Asp	Val	Glu	Ile	Val																				

-continued

Asp Lys Pro Glu
660

<210> SEQ ID NO 122

<211> LENGTH: 1980

<212> TYPE: DNA

<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 122

atgagcga	aaagaa	agtc	taacaaa	att	attggtatcg	acctagggac	gaccaactct	60
tgcgtctctg	tatatgaagg	tgcccaacct	aaagtatttg	cctcttctga	aggaactcgt			120
actactcctt	ctatcgttgc	ttttaagggt	ggcgaaactc	ttgttggaat	tcttgcaaaa			180
cgtcaggcag	taaccaatcc	tgaaaaaaca	ttggcttcta	ctaagcgatt	catcggtaga			240
aaattctctg	aagtcgaatc	tgaaattaaa	acagtccct	acaaagttgc	tctaactcg			300
aaaggagatg	cgttctttga	tgtggaacaa	aaactgtaca	ctccagaaga	aatcggcgct			360
cagatcctca	tgaagatgaa	ggaaactgct	gaggcttata	tcggagaaac	agtaacggaa			420
gcagtcatta	ccgtaccagc	ttactttaac	gattctcaaa	gagcttctac	aaaagatgct			480
ggacgtatcg	caggattaga	tgttaaacgc	attattcctg	aaccaacagc	ggccgctctt			540
gcttatggta	ttgataagga	aggagataaa	aaaatcgccg	tcttcgactt	aggaggagga			600
actttcgata	tttctatctt	ggaaatcggg	gacggagttt	ttgaagttct	ctcaaccaac			660
ggggatactc	acttgggagg	agacgacttc	gatggagtca	tcatcaactg	gatgcttgat			720
gaattcaaaa	aacaagaagg	cattgatcta	agcaaagata	acatggcttt	gcaaagattg			780
aaagatgctg	ctgaaaaagc	aaaaatagaa	ttgtctgggtg	tatcgtctac	tgaatcaat			840
cagccattca	tcactatcga	cgctaataga	cctaaacatt	tggtcttaac	tctaactcgc			900
gctcaattcg	aacacctagc	ttcctctctc	attgagcgaa	ccaaacaacc	ttgtgctcag			960
gctttaaag	atgctaatt	gtccgcttct	gacattgatg	atgttcttct	agtgggcgga			1020
atgtccagaa	tgccctcggt	acaagcagtt	gtaaaagaga	tctttggtaa	agagccta			1080
aaaggcgta	atccagatga	agttgtagcg	attggagctg	ctattcaggg	tggtgtctct			1140
ggcgagaga	tgaaagacgt	tctgttggtg	gatgtgatc	ccctctcttt	aggaattgag			1200
actctaggtg	gggtcatgac	tcctttggta	gagagaaaca	ctacaatccc	tactcagaag			1260
aagcaaatct	tctctacagc	cgctgacaat	cagccagcag	tgactatcgt	cgttcttcaa			1320
ggatgaacgc	ctatggcgaa	agacaataag	gaaattggaa	gatttgatct	aacagacatt			1380
cctctgctc	ctcgcgcca	tcacaaaatt	gaggtaacct	tcgatattga	tgccaacgga			1440
attttacacg	tttctgctaa	agatgctgct	agtggacgcg	aacaaaaaat	ccgtattgaa			1500
gcaagctctg	gattaaaaga	agatgaaatt	caacaaatga	tccgcgatgc	agagcttcat			1560
aaagaggaag	acaaacaacg	aaaagaagct	tctgatgtga	aaaatgaagc	cgatggaatg			1620
atctttagag	ccgaaaaagc	tgtgaaagat	taccacgaca	aaattcctgc	agaacttggt			1680
aaagaaattg	aagagcatat	tgagaaagta	cgccaagcaa	tcaaagaaga	tgettccaca			1740
acagctatca	aagcagcttc	tgatgagttg	agtactcata	tgcaaaaaat	cggagaagct			1800
atgcaggctc	aatccgcata	cgcagcagca	tcttctgcag	cgaatgctca	aggagggcca			1860
aacattaact	ccgaagatct	gaaaaaacat	agtttcagca	cacgacctcc	agcaggagga			1920

-continued

agcgccctctt ctacagacaa cattgaagat gctgatgttg aaattgttga taaacctgag 1980

<210> SEQ ID NO 123

<211> LENGTH: 698

<212> TYPE: PRT

<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 123

Leu Phe Ser Lys Lys Lys Gly Leu Leu Leu Ala Phe Phe Asn Lys His
 1 5 10 15
 Gln Lys Lys Phe Ile Gly Leu Val Ile Ala Gly Val Cys Leu Ser Gly
 20 25 30
 Val Gly Val Gly Val Gly Gln Thr Val Lys Lys Thr Asn Lys Leu Gly
 35 40 45
 Ser Gly Lys Thr Val Tyr Arg Thr Pro Leu Gly Arg Lys Tyr Ser Glu
 50 55 60
 Lys Glu Phe Leu Leu Leu Lys His Phe Leu Ser Asn Glu Ala Tyr Pro
 65 70 75 80
 Phe Thr Gly Asn Pro Arg Glu Trp Asn Phe Leu Asn Glu Gly Leu Leu
 85 90 95
 Thr Glu Arg Phe Leu Thr Asn Lys Leu Gly Glu Lys Ile Phe Leu Ser
 100 105 110
 Ile Tyr Lys Ser Gly Phe Pro Ala Phe Asp Lys Glu Arg Ser Tyr Glu
 115 120 125
 Gly Tyr Arg Arg Phe Asp Ala Pro Phe Ile Ser Ser Glu Glu Val Trp
 130 135 140
 Lys Ser Ser Ala Pro Gln Leu Arg Glu Ala Phe His Ile Phe Gln Gln
 145 150 155 160
 Leu Thr Asp Pro Val Ser Pro Glu Gly Phe Ala Ala Arg Val Arg Leu
 165 170 175
 Phe Leu Glu Glu Lys Lys Phe Pro His Tyr Val Leu Arg Gln Met Leu
 180 185 190
 Glu Tyr Arg Arg Gln Met Phe Asn Leu Pro Val Asp Asn Ser Leu Val
 195 200 205
 Gln Gly Arg Asp Leu Arg Leu Phe Gly Tyr Lys Asn Val Lys Asp Trp
 210 215 220
 Phe Gly Asp Lys Tyr Ile Ser Ser Val Thr Glu Ala Met Leu Cys Phe
 225 230 235 240
 Ile Asp Glu Gln Lys Lys Lys Val Gly Met Pro Ser Leu Lys Glu Ala
 245 250 255
 Arg Gln Asp Phe Tyr Asp Lys Ala Gln His Ala Phe Ala Arg Leu Ser
 260 265 270
 Lys His Ala Glu Phe Asn Leu Thr Phe Glu Gln Leu Val Ala Ser Phe
 275 280 285
 Tyr Ala Phe Met Gly Val Glu Glu Ser Asp Phe Leu Ser Met Tyr Arg
 290 295 300
 Glu Ile Leu Leu Tyr Lys Lys Ala Leu Leu Ser Leu Glu Gly Ala Val
 305 310 315 320
 Ser Phe Asp Tyr Tyr Pro Leu Gln Lys Phe Phe Ser Met Gly Lys Asp
 325 330 335
 Ser Val Ser Val Glu Leu Phe His Leu Pro Asp Ser Leu Val Phe Lys
 340 345 350

-continued

Asp Lys Glu Asp Leu Glu Ala Phe Glu Thr Tyr Leu His Leu Thr Ala
 355 360 365
 Phe Pro Ser Ala His Val Leu Asp Val Pro Thr Lys Ala Phe Pro Ile
 370 375 380
 Glu Arg Val Arg Arg Lys Ala Glu Cys Leu Val Gly Lys Arg Phe Ala
 385 390 395 400
 Val Ser Tyr Gln Ser Val Lys Leu Ser Asp Leu Glu Lys Tyr Val Pro
 405 410 415
 Met Ser Gln Val Tyr Gln Trp Tyr Gln Asn Pro Glu Asn Phe Glu Glu
 420 425 430
 Ile Val Leu Glu Phe Pro Glu Leu Glu Thr Ser Ser Ser Leu Arg Asp
 435 440 445
 Ile Leu Asn Leu Arg Pro Ala Ile Val Glu Lys Ala His Ser Tyr Val
 450 455 460
 Arg Lys Ala Ile Leu Arg Ala Asp Pro Glu Arg Ile Gln Ser Glu Leu
 465 470 475 480
 Ala Lys Lys Glu Arg Gln Glu Glu Glu Leu Phe Leu Ser Ile Gly Lys
 485 490 495
 Asp His Val Leu Pro Gly Ile Gln Asn Gly Val Arg Leu Ala Asn Val
 500 505 510
 Leu Met Gln Gln Asp Ser Val Asp Ser Tyr Thr Gln Asp Asn Glu His
 515 520 525
 Phe Tyr Ser Ile Ser Val Ile Ser Arg Ala Asp Lys Asp Glu Val Leu
 530 535 540
 Pro Tyr Lys Glu Val Leu Arg Lys Gly Leu Lys Lys Val Leu Leu Glu
 545 550 555 560
 Lys Tyr Lys Ala Glu Glu Arg Ile Ser Arg Val Leu Thr His Leu Gln
 565 570 575
 Glu Ala Phe Pro Asn Ser Gln Gly Gln Asp Leu Tyr Gln Arg Arg Leu
 580 585 590
 Val Arg Phe Val Lys Ala Phe Gln Thr Gly Lys Leu Ala Gln Gly Asp
 595 600 605
 Leu Phe Gly Gly Leu Glu Lys Thr Met Lys Thr Phe Ser Arg Gly Asp
 610 615 620
 Gln Gly Ala Pro Gln Glu Phe Glu Asp Met Phe Ala Leu Lys Glu Gly
 625 630 635 640
 Gln Val Ser Asp Val Leu Phe Asp Leu Asp Lys Gly Pro Phe Tyr Tyr
 645 650 655
 Thr Ala Ile Ser Lys Ser Cys Cys Asp Tyr Pro Val Ser Leu Asp Lys
 660 665 670
 Leu Leu Phe Ala Lys Ser His Leu Asn Glu Glu Phe Leu Arg Pro Tyr
 675 680 685
 Leu Glu Glu Val Phe Phe His Asn Pro Ser
 690 695

<210> SEQ ID NO 124

<211> LENGTH: 2094

<212> TYPE: DNA

<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 124

ttgttctcaa aaaagaaggg tctcttggtta gcatttttta acaagcatca aaagaagttt 60

-continued

atcggactag ttatcgctgg cgtttgttta tctggagttg gcgtaggcgt tggtaaaacc	120
gttaagaaaa caaacaaatt aggatctggt aaaacagtct atagaactcc tttggtagg	180
aatattcttg aaaaagaatt ccttcttttg aaacattttt tatccaatga agcctatcct	240
tttacaggga atcctaggga gtggaatttt cttaatgagg gtttgtaac cgagcgtttc	300
ctaacgaata agttagggga aaagatcttc ctgagtatat acaagctctg atttccagct	360
tttgataaag agaggagtta cgaagggtat cggcgattcg atgctccttt tatttcttca	420
gaagaagttt ggaatcttc cgcgcctcaa ttacgagagg ctttccatat attccagcaa	480
ttgactgac cagtctctcc agaagggttt gctgctcgag taaggctgtt cttagaagaa	540
aaaaaattcc ctactacgt tcttagacaa atgctggaat atcgtcgtca gatgttcaat	600
cttccagtcg acaattcttt ggttcaaggt cgtgatttac gtctattcgg atataaaaat	660
gtgaaagatt ggtttgggga taagtacatt tcttctgtta cagaggcaat gttatgtttt	720
atagatgagc aaaaaagaa ggttgggatg ccttccttaa aagaagctcg ccaagatttt	780
tatgataagg cgcaacatgc atttgctaga ctgagtaaac atgctgagtt caatttaaca	840
ttcgagcagc tagtggcctc tttttatgct tttatggggg tagaagagtc tgattttctc	900
agtatgtatc gagaaatttt gttatataag aaagctcttt tatctctaga aggggctgtg	960
agtttcgatt actatccttt gcagaagttc ttttctatgg ggaaagattc ggtatctgtg	1020
gagttattcc atttaccgga tagtttagtt ttcaaggaca aagaagattt agaagctttt	1080
gagacctacc tccatttaac agcttttctc tccgctcagc ttttagatgt tcccacaaaa	1140
gcctttccaa tagaaagggc acgacgtaaa gccgagtgtc tggttgggaa acgtttcgtc	1200
gtttcttacc agagcgtaaa actatcggat ctagaaaaat atgtgccgat gtctcaagtc	1260
taccagtggt atcaaaatcc tgaaaaactt gaagaaattg tattagaatt tccagagtta	1320
gaaaccagtt ctctctacg cgatatctta aatttgagac cagctattgt agagaaagcc	1380
cattcctatg taagaaaaagc aattctctgt gcagatccag agcggattca atctgaatta	1440
gctaagaaag agcggcaaga ggaagaactt ttcttgctta taggtaagga tcatgtgtta	1500
ccaggatttc agaacggtgt tcgttttagct aatgtgctga tgcaacaaga ttctgtagat	1560
agctatactc aagataatga acatttctat tccattagtg taatcagtcg cgcagataag	1620
gatgaggttt tgccgtataa agaagttttg cgcaaagggc taaagaaagt tctattagag	1680
aaatacaaaag cagaagagcg cattagtcgt gttttgacgc atctgcaaga agcttttcca	1740
aatagtcagg gccaggattt atatcagaga cgttttagtta gatttgctaa agctttccaa	1800
acaggaaaat tagcgcaggg agatcttttt gggggactag agaaaactat gaagacgttt	1860
tctagagggt atcagggggc ccctcaagag ttcaagata tgtttgctt aaaagaaggt	1920
caagtatccg atgtgttatt cgatttggat aaaggccctt tctattacac tgctatttcc	1980
aagtcttggt gtgattatcc agtaagccta gataagctat tatttgctaa aagtcacttg	2040
aatgaggaat ttttaagacc ctatttggaa gaagtttttt ttcacaaccc tagt	2094

<210> SEQ ID NO 125

<211> LENGTH: 520

<212> TYPE: PRT

<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 125

-continued

Met	Asn	Lys	Lys	Glu	Arg	Ile	Asn	Lys	Lys	Asn	Ala	Ser	Thr	Lys	Phe
1				5					10					15	
Gln	Arg	Ser	Thr	Pro	Thr	Arg	Ala	Leu	Leu	Ser	Ile	Gly	Ser	Gln	Gln
			20					25					30		
Leu	Ser	Ser	Phe	Thr	Lys	Leu	Ser	Phe	Asp	Gly	Gln	Ala	Lys	Leu	Thr
		35					40				45				
Gly	Val	Ala	Thr	Pro	Thr	Arg	Asp	Thr	Asp	Val	Val	Pro	Leu	Gln	Tyr
	50					55					60				
Leu	Gln	Ala	Arg	Tyr	Leu	Ser	Lys	Asn	Asp	Pro	Asn	Pro	Gly	Tyr	Leu
65					70					75					80
Pro	Ile	His	Gly	Gly	Asn	Met	Thr	Gly	Asn	Ile	Asn	Met	Gly	Thr	His
			85						90					95	
Ser	Val	Phe	Asn	Leu	Lys	Gln	Pro	Glu	Lys	Pro	Lys	Ile	Glu	Leu	Pro
			100						105				110		
Ser	Glu	Thr	Asp	Lys	Pro	Lys	Asp	Pro	Arg	Glu	Glu	Asp	Gly	Phe	Ala
		115					120					125			
Glu	Lys	Thr	Ala	Glu	Glu	Gln	Glu	Gln	Glu	Ile	Lys	Glu	Tyr	Asn	Thr
	130					135						140			
Lys	Leu	Ala	Glu	Tyr	Gln	Lys	Lys	Ile	Asp	Asp	Tyr	Asn	Ala	Ala	Trp
145					150					155					160
Glu	Ala	Phe	Tyr	Ser	Glu	Ala	Ala	Thr	Val	Lys	Tyr	Val	Lys	Gly	Ile
			165						170					175	
Val	Asp	Lys	Ile	Leu	Asn	Asn	Asp	Lys	Leu	Ser	Thr	Ala	Leu	Asn	Ser
		180						185					190		
Ala	Thr	Glu	Val	Glu	Lys	Lys	Ile	Ala	Leu	Ala	Gln	Lys	Ala	Leu	Gly
		195					200					205			
Ile	Glu	Ile	Thr	Ile	Asn	Pro	Asp	Ala	Asp	Thr	Asn	Pro	Asp	Thr	Asp
	210				215						220				
Gln	Glu	Thr	Pro	Asp	Pro	Ala	Pro	Val	Ala	Asp	Thr	Glu	Glu	Lys	Glu
225					230					235					240
Ser	Pro	Pro	Leu	Ser	Tyr	Asn	Asp	Leu	Pro	Ser	Val	Ile	Lys	Asn	Ser
			245						250					255	
Gln	Phe	Val	Val	Thr	Gln	Ser	Gln	Asn	Lys	Ile	Thr	Gly	Asp	Leu	Lys
		260						265					270		
Met	Thr	Asn	Ala	Gln	Ile	Ala	Asn	Ile	Lys	Thr	Pro	Asp	Thr	Gly	Asp
		275					280					285			
Ser	Asn	Tyr	Ala	Ala	Asn	Val	Thr	Tyr	Leu	Glu	Ser	Lys	Leu	Lys	Gln
	290					295					300				
Pro	Gln	Arg	Ala	Phe	Leu	Ser	Asn	Thr	Leu	Pro	Thr	Glu	Ser	Ser	Ser
305					310					315					320
Ser	Ile	Ser	Leu	Asn	Gly	His	Ile	Pro	Trp	Leu	Ser	Thr	Thr	Asn	Gly
			325						330					335	
Ser	Ser	Ser	Pro	Ala	Glu	Pro	Asp	Phe	Lys	Ser	Lys	Leu	Ala	Asp	Gln
			340					345					350		
Cys	Phe	Asp	Thr	Ser	Ser	Gln	Glu	Asn	Leu	Lys	Val	Lys	Thr	Ala	Gly
	355						360					365			
Leu	Leu	Val	Leu	Ser	Val	Arg	Gly	Thr	Trp	Ser	Pro	Thr	Thr	Ser	Pro
	370					375					380				
Ile	Thr	Asn	Gly	Ser	Thr	Pro	Thr	Pro	Thr	Thr	Ile	Ser	Val	Asn	Leu
385					390					395					400
Thr	Val	Thr	Pro	Asp	Asn	Ser	Ser	Arg	Thr	Asn	Thr	Ser	Ser	Ser	Gly

-continued

405	410	415
Ser Asp Ser Ser Gly Asp Ala Ser Ala Thr Thr Leu Thr Ile Pro Leu		
420	425	430
Thr Leu Tyr Ser Gly Glu Ser Val Gln Leu Gln Leu Pro Ile Thr Thr		
435	440	445
Thr Ser Ser Val Lys Ile Ala Thr Thr Thr Ser Gln Thr Ser Asn Gly		
450	455	460
Gly Ser Asp Thr Ser Ser Gln Ile Thr Leu Ser Ser Trp Ser Trp Glu		
465	470	475
Ala Ala Leu Tyr Pro Thr Asp Val Thr Val Thr Asn Lys Thr Thr Pro		
485	490	495
Pro Thr Thr Glu Thr Pro Ser Ser Pro Ser Pro Ser Ser Pro Asn Ser		
500	505	510
Glu Ser Thr Glu Gly Gln Thr Pro		
515	520	
 <210> SEQ ID NO 126		
<211> LENGTH: 1560		
<212> TYPE: DNA		
<213> ORGANISM: Chlamydia trachomatis		
 <400> SEQUENCE: 126		
atgaataaaa aagaacgaat taataaaaaa aacgcaccta cgaaatttca acgaagtaca	60	
cccactagag ctttactgag tattgggtca caacagctct cttcattcac taagttaagc	120	
tttgatggac aagctaagtt aaccggagta gctactccga ctctgtgatac ggatgttggtg	180	
ccactacaat accttcaagc acgctatcta tctaaaaatg acccaaattcc aggttatctt	240	
cccattcatg gagggaaacat gactgggaac attaatatgg gaacgcattc cgtattttaat	300	
ttgaagcagc cagagaaacc taagatagag ctctcttcgc aaaccgacaa accaaaagac	360	
ccgcgagaag aagacgggtt tgcagaaaaa acagccgagg aacaagaaca agagatcaaa	420	
gagtacaaca caaagctggc agaataccag aaaaaaatcg atgattacaa tgcagcatgg	480	
gaagcttttt actcagaagc agctactgtg aaatatgtca aaggtattgt tgataagatt	540	
ttgaacaatg acaaaactaag cacagctcta aattctgcta ctgaagtaga aaaaaaatc	600	
gcattggctc aaaaagctct cggcattgaa attacgatca accccgacgc tgatactaat	660	
cccgatactg accaagaaac acctgatcca gctcctgtcg cagatacaga agaaaaggaa	720	
tccctctctt tatcttataa cgatctcctt tcggttaatta agaattctca gtttgtggtg	780	
acacaatctc agaataagat tacaggggat ctaaagatga ctaatgcaca gatcgccaat	840	
atcaaaactc cggatactgg tgacagtaat tatgcagcca atgtaacctc cctggagtc	900	
aaactcaaac aacctcagag agcttttctt tctaatactc ttccaactga aagctcttca	960	
tctatatctc ttaatgggca tattccttgg ctcagcacia caaacggatc ttctctctct	1020	
gcagaacctg attttaagag caaactagct gatcaatgct tcgacacctc atcacaagaa	1080	
aatctaaaag taaaaacggc aggcctactg gttttatctg taagagggac gtggagtcct	1140	
acaacttccc caataactaa tggaagcaca ccgacacca cgactatctc cgtgaacctc	1200	
acagtcactc cagacaattc tagtagaacc aatactcta gtacgggatc agactcttct	1260	
ggagacgctt cagcaactac acttactatc cctctgacac tatactctgg ggaatctgta	1320	
caactacaac ttctattatc gactacatct agtgtaaaaa tagctacaac tacctcccaa	1380	

-continued

```

acttctaagt gaggaagtga tacctcatca caaataaacac tatcatcttg gtcttgggaa 1440
gcagctctat atccaacgga tgttaccgta accaataaaaa caactcctcc aacaacagaa 1500
acaccttcgt ctccatcacc atcatcacct aattcagagt caacagaagg acaaacacct 1560

```

```

<210> SEQ ID NO 127
<211> LENGTH: 133
<212> TYPE: PRT
<213> ORGANISM: Chlamydia trachomatis

```

```

<400> SEQUENCE: 127

```

```

Asn Leu Ala Ser Ala Glu Lys Phe Leu Lys Glu Asn Lys Glu Lys Ala
1      5      10      15
Gly Val Ile Glu Leu Glu Pro Asn Lys Leu Gln Tyr Arg Val Val Lys
20     25     30
Glu Gly Thr Gly Arg Val Leu Ser Gly Lys Pro Thr Ala Leu Leu His
35     40     45
Tyr Thr Gly Ser Phe Ile Asp Gly Lys Val Phe Asp Ser Ser Glu Lys
50     55     60
Asn Lys Glu Pro Ile Leu Leu Pro Leu Thr Lys Val Ile Pro Gly Phe
65     70     75     80
Ser Gln Gly Met Gln Gly Met Lys Glu Gly Glu Val Arg Val Leu Tyr
85     90     95
Ile His Pro Asp Leu Ala Tyr Gly Thr Ala Gly Gln Leu Pro Pro Asn
100    105    110
Ser Leu Leu Ile Phe Glu Val Lys Leu Ile Glu Ala Asn Asp Asp Asn
115    120    125
Val Ser Val Thr Glu
130

```

```

<210> SEQ ID NO 128
<211> LENGTH: 399
<212> TYPE: DNA
<213> ORGANISM: Chlamydia trachomatis

```

```

<400> SEQUENCE: 128

```

```

aatttagctt ctgcagaaaa attcttaaaa gaaaataaag agaaggctgg gggtattgag 60
ttagagccta ataagttaca gtaccgtggt gtgaaagagg gtacaggacg ggttctttct 120
gggaagccta cagctttgct tcaactatata gggagcttca tcgatgggaa ggtttttgat 180
tcttcagaga agaataaaga gcccatTTta ctgcctttga ccaaagtaat tcttgattt 240
tcccaaggta tgcaagggtat gaaagaagga gaggttcgag ttctttacat acatccagat 300
ttagcttacg gaacagctgg acaattacct ccaaactctc tactcatttt tgaagtgaag 360
ttaattgaag caaacgacga taatgtatct gttacagaa 399

```

```

<210> SEQ ID NO 129
<211> LENGTH: 77
<212> TYPE: PRT
<213> ORGANISM: Chlamydia trachomatis

```

```

<400> SEQUENCE: 129

```

```

Pro Ala Ile Cys Val Lys Gln Glu Gly Pro Glu Asn Ala Cys Leu Arg
1      5      10      15
Cys Pro Val Val Tyr Lys Ile Asn Ile Val Asn Gln Gly Thr Ala Thr

```

-continued

20	25	30	
Ala Arg Asn Val Val Val Glu Asn Pro Val Pro Asp Gly Tyr Ala His			
35	40	45	
Ser Ser Gly Gln Arg Val Leu Thr Phe Thr Leu Gly Asp Met Gln Pro			
50	55	60	
Gly Glu His Arg Thr Ile Thr Val Glu Phe Cys Pro Leu			
65	70	75	
 <210> SEQ ID NO 130			
<211> LENGTH: 231			
<212> TYPE: DNA			
<213> ORGANISM: Chlamydia trachomatis			
 <400> SEQUENCE: 130			
cctgctatct gtgttaaaca agaaggccca gagaatgctt gtttgcgttg cccagtagtt			60
tacaaaatta ataatgtgaa ccaaggaaca gcaacagctc gtaacgttgt tgttgaaaat			120
cctgttccag atggttacgc tcattcttct ggacagcgtg tactgacgtt tactcttgga			180
gatatgcaac ctggagagca cagaacaatt actgtagagt tttgtccgct t			231
 <210> SEQ ID NO 131			
<211> LENGTH: 163			
<212> TYPE: PRT			
<213> ORGANISM: Chlamydia trachomatis			
 <400> SEQUENCE: 131			
Met Arg Phe Leu Leu Ala Leu Phe Ser Leu Ile Leu Val Leu Pro Ala			
1	5	10	15
Thr Glu Ala Phe Ser Thr Glu Asp Lys Gln Cys Gln Gln Glu Ala Glu			
20	25	30	
Glu Asp Cys Ser Gln Val Ala Asp Thr Cys Val Phe Tyr Ser Tyr Ala			
35	40	45	
Glu Gly Leu Glu His Ala Arg Asp Glu Gly Lys Leu Thr Leu Val Val			
50	55	60	
Leu Leu Asp Thr Ser Gly Tyr Ser Phe Glu Thr Leu Ala Asp Ala Ala			
65	70	75	80
His Ala Met Glu Ser Ser Leu Leu Ser Thr Phe Ala Asp Phe Val Val			
85	90	95	
Leu Ser Arg Arg Glu Ala Val Pro Leu Ile Tyr Pro Pro Val Pro Asp			
100	105	110	
Pro Met Val Gly Glu Ile Ala Leu Phe Leu Glu Ala Phe Ser Asp Gln			
115	120	125	
Thr Phe Pro Ser Gln Pro Val Ile Val Thr Leu Ala Ile Gly Ala Ser			
130	135	140	
Ser Ala Glu Ile Met Asp Ile Thr Glu Ile Pro Ser Ile Asn Pro Glu			
145	150	155	160
Phe Val Glu			

<210> SEQ ID NO 132
 <211> LENGTH: 514
 <212> TYPE: DNA
 <213> ORGANISM: Chlamydia trachomatis

 <400> SEQUENCE: 132
 attttagtag aagaggagtt ctctcatgag attcttggtta gctttattct cactgatact 60

-continued

```

agttcttctt gcgactgagg cattctcaac agaggataag cagtgtcaac aagaagcaga    120
ggaagactgt agtcaggtag cggacacctg cgtattttat agctatgcag agggtttaga    180
acacgcaagg gacgaaggga aactcacctt agtagtattg ttagatactt ctgggtattc    240
cttcgagact cttgctgatg cagcccatgc tatggaaagt tcgttgctat ccacatttgc    300
tgattttgtg gttctttcta ggaggggaagc agttccactg atttatcctc cggttccaga    360
tcctatgggtt ggcgagatag cgttggttctt agaagcttcc tcagatcaaa catttccatc    420
acagcctgtg attgttacct tagctattgg ggcttcttct gcagagatca tggatattac    480
cgagattccg tcaataaatc ctgaatttgt tgag                                514

```

```

<210> SEQ ID NO 133
<211> LENGTH: 149
<212> TYPE: PRT
<213> ORGANISM: Chlamydia trachomatis

```

```

<400> SEQUENCE: 133

```

```

Arg Ile Ile Pro Glu Pro Thr Ala Ala Ala Leu Ala Tyr Gly Ile Asp
1      5      10      15
Lys Glu Gly Asp Lys Lys Ile Ala Val Phe Asp Leu Gly Gly Gly Thr
20     25     30
Phe Asp Ile Ser Ile Leu Glu Ile Gly Asp Gly Val Phe Glu Val Leu
35     40     45
Ser Thr Asn Gly Asp Thr His Leu Gly Gly Asp Asp Phe Asp Gly Val
50     55     60
Ile Ile Asn Trp Met Leu Asp Glu Phe Lys Lys Gln Glu Gly Ile Asp
65     70     75     80
Leu Ser Lys Asp Asn Met Ala Leu Gln Arg Leu Lys Asp Ala Ala Glu
85     90     95
Lys Ala Lys Ile Glu Leu Ser Gly Val Ser Ser Thr Glu Ile Asn Gln
100    105    110
Pro Phe Ile Thr Ile Asp Ala Asn Gly Pro Lys His Leu Ala Leu Thr
115    120    125
Leu Thr Arg Ala Gln Phe Glu His Leu Ala Ser Ser Leu Ile Glu Arg
130    135    140
Thr Lys Gln Pro Cys
145

```

```

<210> SEQ ID NO 134
<211> LENGTH: 447
<212> TYPE: DNA
<213> ORGANISM: Chlamydia trachomatis

```

```

<400> SEQUENCE: 134

```

```

cgcattattc ctgaaccaac agcggccgct cttgcttatg gtattgataa ggaaggagat    60
aaaaaaatcg ccgtcttcga cttaggagga ggaactttcg atatttctat cttggaaatc    120
ggtgacggag tttttgaagt tctctcaacc aacgggggata ctacttggg aggagacgac    180
ttcgatggag tcatcatcaa ctggatgctt gatgaattca aaaaacaaga aggcattgat    240
ctaagcaaag ataactggc tttgcaaaga ttgaaagatg ctgctgaaaa agcaaaaata    300
gaattgtctg gtgtatcgtc tactgaaatc aatcagccat tcatcactat cgacgctaata    360
ggacctaaac atttggtttt aactetaact cgcgctcaat tcgaacacct agcttctctc    420

```

-continued

ctcattgagc gaaccaaaca accttgc

447

<210> SEQ ID NO 135

<211> LENGTH: 82

<212> TYPE: PRT

<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 135

Ser Asn Gly Ser Ser Ser Met Ala Ser Val Cys Gly Gly Cys Leu Ala
 1 5 10 15

Leu Met Asp Ala Gly Val Pro Ile Lys Ala Pro Val Ala Gly Ile Ala
 20 25 30

Met Gly Leu Ile Leu Asp Arg Asp Gln Ala Ile Ile Leu Ser Asp Ile
 35 40 45

Ser Gly Ile Glu Asp His Leu Gly Asp Met Asp Phe Lys Val Ala Gly
 50 55 60

Thr Ala Lys Gly Ile Thr Ala Phe Gln Met Asp Ile Lys Ile Glu Gly
 65 70 75 80

Ile Thr

<210> SEQ ID NO 136

<211> LENGTH: 246

<212> TYPE: DNA

<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 136

tctaattggat ctctctccat ggcacccgta tgtggaggct gtcttgcaact catggatgct 60

ggagttccta tcaaaagctcc cgtggcaggt attgctatgg gcttaatctt agatcgagat 120

caagccatca tcttgctctga tatttccggg atagaagatc atctaggaga tatggacttt 180

aaagtagccg gaacagctaa aggtattaca gctttccaaa tggatatcaa gatagaggga 240

atcact 246

<210> SEQ ID NO 137

<211> LENGTH: 101

<212> TYPE: PRT

<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 137

Gln Ser Glu Leu Ala Lys Lys Glu Arg Gln Glu Glu Glu Leu Phe Leu
 1 5 10 15

Ser Ile Gly Lys Asp His Val Leu Pro Gly Ile Gln Asn Gly Val Arg
 20 25 30

Leu Ala Asn Val Leu Met Gln Gln Asp Ser Val Asp Ser Tyr Thr Gln
 35 40 45

Asp Asn Glu His Phe Tyr Ser Ile Ser Val Ile Ser Arg Ala Asp Lys
 50 55 60

Asp Glu Val Leu Pro Tyr Lys Glu Val Leu Arg Lys Gly Leu Lys Lys
 65 70 75 80

Val Leu Leu Glu Lys Tyr Lys Ala Glu Glu Arg Ile Ser Arg Val Leu
 85 90 95

Thr His Leu Gln Glu
 100

-continued

```

<210> SEQ ID NO 138
<211> LENGTH: 303
<212> TYPE: DNA
<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 138

caatctgaat tagctaagaa agagcggcaa gaggaagaac tttcttgc tataggttaag      60
gatcatgtgt taccaggtat tcagaacggt gttcgttttag ctaatgtgct gatgcaacaa      120
gattctgtag atagctatac tcaagataat gaacatttct attccattag tgtaatcagt      180
cgcgagata aggatgaggt ttgccgtat aaagaagttt tgcgcaaagg gctaaagaaa      240
gttctattag agaatacaa agcagaagag cgcattagtc gtgttttgac gcatctgcaa      300
gaa                                                                    303

```

```

<210> SEQ ID NO 139
<211> LENGTH: 97
<212> TYPE: PRT
<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 139

Ala Ile Tyr Leu Glu Lys Asp Ala Ile Leu Ser Ser Leu Glu Ala Arg
1             5             10             15

Asn Gly Asp Ile Leu Phe Phe Asp Pro Ile Val Gln Glu Ser Ser Ser
20            25            30

Lys Glu Ser Pro Leu Pro Ser Ser Leu Gln Ala Ser Val Thr Ser Pro
35            40            45

Thr Pro Ala Thr Ala Ser Pro Leu Val Ile Gln Thr Ser Ala Asn Arg
50            55            60

Ser Val Ile Phe Ser Ser Glu Arg Leu Ser Glu Glu Lys Thr Pro
65            70            75            80

Asp Asn Leu Thr Ser Gln Leu Gln Gln Pro Ile Glu Leu Lys Ser Gly
85            90            95

Arg

```

```

<210> SEQ ID NO 140
<211> LENGTH: 291
<212> TYPE: DNA
<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 140

gccatctact tagagaaaga tgcgattctt tcttccttag aagctcgcaa cggagatatt      60
cttttctttg atcctattgt acaagaaagt agcagcaaag aatcgctctt tcctcctctt      120
ttgcaagcca gcgtgacttc tcccaccca gccacgcgat ctcttttagt tattcagaca      180
agtgcaaacc gtctagtgat ttctcgcgag gaacgtcttt ctgaagaaga aaaaactcct      240
gataacctca ctcccaact acagcagcct atcgaactga aatcgggccg g                291

```

```

<210> SEQ ID NO 141
<211> LENGTH: 141
<212> TYPE: PRT
<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 141

Lys Leu Ser Phe Asp Gly Gln Ala Lys Leu Thr Gly Val Ala Thr Pro
1             5             10             15

```

-continued

Thr Arg Asp Thr Asp Val Val Pro Leu Gln Tyr Leu Gln Ala Arg Tyr
 20 25 30
 Leu Ser Lys Asn Asp Pro Asn Pro Gly Tyr Leu Pro Ile His Gly Gly
 35 40 45
 Asn Met Thr Gly Asn Ile Asn Met Gly Thr His Ser Val Phe Asn Leu
 50 55 60
 Lys Gln Pro Glu Lys Pro Lys Ile Glu Leu Pro Ser Glu Thr Asp Lys
 65 70 75 80
 Pro Lys Asp Pro Arg Glu Glu Asp Gly Phe Ala Glu Lys Thr Ala Glu
 85 90 95
 Glu Gln Glu Gln Glu Ile Lys Glu Tyr Asn Thr Lys Leu Ala Glu Tyr
 100 105 110
 Gln Lys Lys Ile Asp Asp Tyr Asn Ala Ala Trp Glu Ala Phe Tyr Ser
 115 120 125
 Glu Ala Ala Thr Val Lys Tyr Val Lys Gly Ile Val Asp
 130 135 140

<210> SEQ ID NO 142
 <211> LENGTH: 423
 <212> TYPE: DNA
 <213> ORGANISM: Chlamydia trachomatis
 <400> SEQUENCE: 142

aagttaagct ttgatggaca agctaagtta accggagtag ctactccgac tcgtgatacg 60
 gatgttggtgc cactacaata ccttcaagca cgctatctat ctaaaaatga cccaaatcca 120
 ggttatcttc ccattcatgg agggaacatg actgggaaca ttaatatggg aacgcattcc 180
 gtatttaatt tgaagcagcc agagaaacct aagatagagc ttccttccga aaccgacaaa 240
 ccaaagacc cgcgagaaga agacgggttt gcagaaaaaa cagccgagga acaagaacaa 300
 gagatcaaag agtacaacac aaagctggca gaataccaga aaaaaatcga tgattacaat 360
 gcagcatggg aagcttttta ctcaagaagca gctactgtga aatatgtcaa aggtattgtt 420
 gat 423

<210> SEQ ID NO 143
 <211> LENGTH: 110
 <212> TYPE: PRT
 <213> ORGANISM: Chlamydia trachomatis
 <400> SEQUENCE: 143

Lys Lys Tyr Lys Gln Cys Cys Leu Lys Ser Gln Ala Leu Thr Ala Arg
 1 5 10 15
 His Thr Pro Glu Gly Lys Phe Lys Phe Ser Ile Thr Ala Ser Pro Ala
 20 25 30
 Ala Gly Ala Ser Thr Glu Gly Phe Thr Lys Leu Phe Arg Gln Ser Val
 35 40 45
 Asp Ser Tyr Thr Ser Glu Gln Lys Glu Gly Met Ser Arg Phe Leu Ile
 50 55 60
 Thr Lys Asn Lys Glu Pro Ile Gly Lys Arg Ala Ile Arg Lys Ala Lys
 65 70 75 80
 Ala Lys Glu Glu Arg Ile Ile Ser Glu Lys Leu Ser Gln His Glu Phe
 85 90 95
 Gln Val Met Asp Thr Glu Val Ser Gly Glu Asp Ile Gln Ser
 100 105 110

-continued

<210> SEQ ID NO 144
<211> LENGTH: 330
<212> TYPE: DNA
<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 144

```
aagaagtata agcagtggtt tttgaaatca caagctctaa ctgctcgcca tactcctgaa    60
gggaagttta agttttctat aacagcttcg cctgccgcag gcgcttcac ggaaggtttc    120
acaaaactgt ttgccaatc agtggattct tatacctcag aacaaaaaga ggggatgagt    180
cggtttctta ttactaaaaa taaggaacct atagggaaac gcgcgattcg caaggctaag    240
gcaaaagaag agcgcatcat ttcagagaaa ctaagccagc acgaatttca agtgatggat    300
acagaagtat cgggagaaga tatacagtct                                     330
```

<210> SEQ ID NO 145
<211> LENGTH: 73
<212> TYPE: PRT
<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 145

```
Lys Lys Ser Ser Ala Thr Thr Lys Lys Arg Ala Thr Lys Ala Tyr Thr
1             5             10             15
Pro Ser Ala Ala Leu Ala Ala Val Ile Gly Ala Asp Pro Val Gly Arg
                20             25             30
Pro Glu Ala Thr Lys Lys Leu Trp Glu Tyr Ile Lys Glu Lys Gly Leu
                35             40             45
Gln Ser Pro Gln Asn Lys Lys Ile Ile Ile Pro Asp Ser Lys Leu Gln
                50             55             60
Gly Val Ile Gly Ala Asp Pro Ile Asp
65             70
```

<210> SEQ ID NO 146
<211> LENGTH: 219
<212> TYPE: DNA
<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 146

```
aaaaaaagct cagcaacaac aaaaaaacga gctaccaaag cgtacacacc ttctgctgct    60
ttagcagcgg tgattggtgc ggatcctgta gggcgctccg aagccactaa gaagctatgg    120
gagtatatta aggaaaaagg attgcaatcc cctcaaaata aaaaaatcat tattcctgat    180
agtaaattgc agggagtgat aggagctgat ccaatcgac                                     219
```

<210> SEQ ID NO 147
<211> LENGTH: 236
<212> TYPE: PRT
<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 147

```
Val Gly Leu Phe Gly Asp Asn Glu Asn Gln Lys Thr Val Lys Ala Glu
1             5             10             15
Ser Val Pro Asn Met Ser Phe Asp Gln Ser Val Val Glu Leu Tyr Thr
                20             25             30
Asp Thr Thr Phe Ala Trp Ser Val Gly Ala Arg Ala Ala Leu Trp Glu
                35             40             45
```

-continued

Cys Gly Cys Ala Thr Leu Gly Ala Ser Phe Gln Tyr Ala Gln Ser Lys
 50 55 60
 Pro Lys Val Glu Glu Leu Asn Val Leu Cys Asn Ala Ala Glu Phe Thr
 65 70 75 80
 Ile Asn Lys Pro Lys Gly Tyr Val Gly Lys Glu Phe Pro Leu Asp Leu
 85 90 95
 Thr Ala Gly Thr Asp Ala Ala Thr Gly Thr Lys Asp Ala Ser Ile Asp
 100 105 110
 Tyr His Glu Trp Gln Ala Ser Leu Ala Leu Ser Tyr Arg Leu Asn Met
 115 120 125
 Phe Thr Pro Tyr Ile Gly Val Lys Trp Ser Arg Ala Ser Phe Asp Ala
 130 135 140
 Asp Thr Ile Arg Ile Ala Gln Pro Lys Ser Ala Thr Ala Ile Phe Asp
 145 150 155 160
 Thr Thr Thr Leu Asn Pro Thr Ile Ala Gly Ala Gly Asp Val Lys Thr
 165 170 175
 Gly Ala Glu Gly Gln Leu Gly Asp Thr Met Gln Ile Val Ser Leu Gln
 180 185 190
 Leu Asn Lys Met Lys Ser Arg Lys Ser Cys Gly Ile Ala Val Gly Thr
 195 200 205
 Thr Ile Val Asp Ala Asp Lys Tyr Ala Val Thr Val Glu Thr Arg Leu
 210 215 220
 Ile Asp Glu Arg Ala Ala His Val Asn Ala Gln Phe
 225 230 235

<210> SEQ ID NO 148
 <211> LENGTH: 708
 <212> TYPE: DNA
 <213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 148

```

gttggattgt ttggagataa tgaaaatcaa aaaacgggtca aagcggagtc tgtaccaaatt      60
atgagctttg atcaatctgt tgttgagttg tatacagata ctacttttgc gtggagcgctc      120
ggcgctcgcg cagcttttgg ggaatgtgga tgtgcaactt taggagcttc attccaatat      180
gctcaatcta aacctaaagt agaagaatta aacgtttctct gcaatgcagc agagtttact      240
attaataaac ctaaagggtg ttaggtaag gagtttcctc ttgatcttac agcaggaaca      300
gatgctgcga caggaactaa ggatgctctt attgattacc atgaatggca agcaagttta      360
gctctctctt acagactgaa tatgttcaact ccctacattg gagttaaatg gtctcgagca      420
agcttttgat cggatacgat tcgtatagcc cagccaaaat cagctacagc tatttttgat      480
actaccacgc ttaacccaac tattgttgga gctggcgatg tgaaaactgg cgcagaggggt      540
cagctcggag acacaatgca aatcgtttcc ttgcaattga acaagatgaa atctagaaaa      600
tcttgcggta ttgcagtagg aacaactatt gtggatgcag acaataacgc agttacagtt      660
gagactcgct tgatcgatga gagagcagct cacgtaaatg cacaattc      708
  
```

<210> SEQ ID NO 149
 <211> LENGTH: 131
 <212> TYPE: PRT
 <213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 149

-continued

Ala Ala Leu Trp Glu Cys Gly Cys Ala Thr Leu Gly Ala Ser Phe Gln
1 5 10 15

Tyr Ala Gln Ser Lys Pro Lys Val Glu Glu Leu Asn Val Leu Cys Asn
20 25 30

Ala Ala Glu Phe Thr Ile Asn Lys Pro Lys Gly Tyr Val Gly Lys Glu
35 40 45

Phe Pro Leu Asp Leu Thr Ala Gly Thr Asp Ala Ala Thr Gly Thr Lys
50 55 60

Asp Ala Ser Ile Asp Tyr His Glu Trp Gln Ala Ser Leu Ala Leu Ser
65 70 75 80

Tyr Arg Leu Asn Met Phe Thr Pro Tyr Ile Gly Val Lys Trp Ser Arg
85 90 95

Ala Ser Phe Asp Ala Asp Thr Ile Arg Ile Ala Gln Pro Lys Ser Ala
100 105 110

Thr Ala Ile Phe Asp Thr Thr Thr Leu Asn Pro Thr Ile Ala Gly Ala
115 120 125

Gly Asp Val
130

<210> SEQ ID NO 150

<211> LENGTH: 393

<212> TYPE: DNA

<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 150

```
gcagctttgt gggaatgtgg atgtgcaact ttaggagctt cattccaata tgctcaatct    60
aaacctaaag tagaagaatt aaacgtttctc tgcaatgcag cagagtttac tattaataaa    120
cctaaagggt atgtaggtaa ggagtttctc cttgatctta cagcaggaac agatgctgcg    180
acaggaacta aggatgcctc tattgattac catgaatggc aagcaagttt agctctctct    240
tacagactga atatgttcac tccctacatt ggagttaaat ggtctcgagc aagctttgat    300
gccgatacga ttcgatatgc ccagccaaaa tcagctacag ctatttttga tactaccacg    360
cttaacccaa ctattgctgg agctggcgat gtg                                393
```

<210> SEQ ID NO 151

<211> LENGTH: 56

<212> TYPE: PRT

<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 151

Arg Ala Ser Phe Asp Ala Asp Thr Ile Arg Ile Ala Gln Pro Lys Ser
1 5 10 15

Ala Thr Ala Ile Phe Asp Thr Thr Thr Leu Asn Pro Thr Ile Ala Gly
20 25 30

Ala Gly Asp Val Lys Thr Gly Ala Glu Gly Gln Leu Gly Asp Thr Met
35 40 45

Gln Ile Val Ser Leu Gln Leu Asn
50 55

<210> SEQ ID NO 152

<211> LENGTH: 168

<212> TYPE: DNA

<213> ORGANISM: Chlamydia trachomatis

-continued

<400> SEQUENCE: 152

```
cgagcaagct ttgatgccga tacgattcgt atagcccagc caaaatcagc tacagctatt    60
tttgatacta ccacgcttaa cccaactatt gctggagctg gcgatgtgaa aactggcgca    120
gagggtcagc tcggagacac aatgcaaate gtttccttgc aattgaac                168
```

<210> SEQ ID NO 153

<211> LENGTH: 118

<212> TYPE: PRT

<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 153

```
Thr Val Lys Ala Ile Val Glu Ser Thr Pro Glu Ala Pro Glu Glu Ile
1      5      10      15
Pro Pro Val Glu Gly Glu Glu Ser Thr Ala Thr Glu Asp Pro Asn Ser
20     25     30
Asn Thr Glu Gly Ser Ser Ala Asn Thr Asn Leu Glu Gly Ser Gln Gly
35     40     45
Asp Thr Ala Asp Thr Gly Thr Gly Asp Val Asn Asn Glu Ser Gln Asp
50     55     60
Thr Ser Asp Thr Gly Asn Ala Glu Ser Glu Glu Gln Leu Gln Asp Ser
65     70     75     80
Thr Gln Ser Asn Glu Glu Asn Thr Leu Pro Asn Ser Asn Ile Asp Gln
85     90     95
Ser Asn Glu Asn Thr Asp Glu Ser Ser Asp Ser His Thr Glu Glu Ile
100    105    110
Thr Asp Glu Ser Val Ser
115
```

<210> SEQ ID NO 154

<211> LENGTH: 354

<212> TYPE: DNA

<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 154

```
actgttaaag caatagtaga aagcactcct gaagctccag aagagattcc tccagtagaa    60
ggagaagagt ctacagcaac agaagatcca aattctaata cagaaggaag ttcggctaac    120
actaaccttg aaggatctca aggggatact gctgatacag ggactggtga tgttaacaat    180
gagtctcaag acacatcaga tactggaaac gctgaatctg aagaacaact acaagattct    240
acacaatcta atgaagaaaa tacccttccc aatagtaata ttgatcaatc taacgaaaac    300
acagacgaat catctgatag ccacactgag gaaataactg acgagagtgt ctcc        354
```

<210> SEQ ID NO 155

<211> LENGTH: 68

<212> TYPE: PRT

<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 155

```
Pro Glu Val Val Ala Ser Ala Lys Ile Asn Arg Phe Phe Ala Ser Thr
1      5      10      15
Ala Lys Pro Ala Ala Pro Ser Leu Thr Glu Ala Glu Ser Asp Gln Thr
20     25     30
Asp Gln Thr Glu Thr Ser Asp Thr Asn Ser Asp Ile Asp Val Ser Ile
35     40     45
```

-continued

Glu Asn Ile Leu Asn Val Ala Ile Asn Gln Asn Thr Ser Ala Lys Lys
50 55 60

Gly Gly Ala Ile
65

<210> SEQ ID NO 156
<211> LENGTH: 204
<212> TYPE: DNA
<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 156

cgggaagtag ttgcttctgc taaaataaat cgattctttg cctctacggc aaaacgggca 60
gcccttcttc taacagagggc tgagtctgat caaacggatc aaacagaaac ttctgatact 120
aatagcgata tagactgtgc gattgagaac attttgaatg tcgctatcaa tcaaaacact 180
tctgcgaaaa aaggaggggc tatc 204

<210> SEQ ID NO 157
<211> LENGTH: 243
<212> TYPE: PRT
<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 157

Val Gly Asn Gly Ala Glu Glu Ile Thr Leu Ser Asp Thr Asp Ser Gly
1 5 10 15
Ile Gly Asp Asp Val Ser Asp Thr Ala Ser Ser Ser Gly Asp Glu Ser
20 25 30
Gly Gly Val Ser Ser Pro Ser Ser Glu Ser Asn Lys Asn Thr Ala Val
35 40 45
Gly Asn Asp Gly Pro Ser Gly Leu Asp Ile Leu Ala Ala Val Arg Lys
50 55 60
His Leu Asp Lys Val Tyr Pro Gly Asp Asn Gly Gly Ser Thr Glu Gly
65 70 75 80
Pro Leu Gln Ala Asn Gln Thr Leu Gly Asp Ile Val Gln Asp Met Glu
85 90 95
Thr Thr Gly Thr Ser Gln Glu Thr Val Val Ser Pro Trp Lys Gly Ser
100 105 110
Thr Ser Ser Thr Glu Ser Ala Gly Gly Ser Gly Ser Val Gln Thr Leu
115 120 125
Leu Pro Ser Pro Pro Pro Thr Pro Ser Thr Thr Thr Leu Arg Thr Gly
130 135 140
Thr Gly Ala Thr Thr Thr Ser Leu Met Met Gly Gly Pro Ile Lys Ala
145 150 155 160
Asp Ile Ile Thr Thr Gly Gly Gly Gly Arg Ile Pro Gly Gly Gly Thr
165 170 175
Leu Glu Lys Leu Leu Pro Arg Ile Arg Ala His Leu Asp Ile Ser Phe
180 185 190
Asp Ala Gln Gly Asp Leu Val Ser Thr Glu Glu Pro Gln Leu Gly Ser
195 200 205
Ile Val Asn Lys Phe Arg Gln Glu Thr Gly Ser Arg Gly Ile Leu Ala
210 215 220
Phe Val Glu Ser Ala Pro Gly Lys Pro Gly Ser Ala Gln Val Leu Thr
225 230 235 240

-continued

Gly Thr Gly

<210> SEQ ID NO 158

<211> LENGTH: 729

<212> TYPE: DNA

<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 158

```

gtaggtaatg gageggaaga gatcactctt tccgacacag attctggtat cggagatgat      60
gtatccgata cagcgtcttc atctggggat gaatccggag gagtctcttc tcctctttca    120
gaatccaata aaaatactgc cggtggaaat gacggacctt ctggactaga tctctcgcct    180
gccgtacgta aacatttaga taagggttac cctggcgaca atggtggttc tacagaaggg    240
cctctccaag ctaacaaaac tcttgagat atcgtccagg atatggaaac aacagggaca    300
tccaagaaa ccgttgtatc cccatggaaa ggaagcactt cttcaacgga atcagcagga    360
ggaagtggta gcgtacaaac actactgcct tcaccacctc caaccccgtc aactacaaca    420
ttaagaacgg gcacaggagc taccaccaca tccttgatga tgggaggacc aatcaaagct    480
gacataataa caactggtgg cggaggacga attcctggag gaggaacgtt agaaaagctg    540
ctccctcgta tacgtgcgca cttagacata tcctttgatg cgcaaggcga tctcgtaagt    600
actgaagagc ctacgcttgg ctgcattgta aacaaattcc gccaaagaac tggttcaaga    660
ggaatcttag ctttcgttga gagtgctcca ggcaagccgg gatctgcaca ggtcttaacg    720
ggtacaggc                                     729

```

<210> SEQ ID NO 159

<211> LENGTH: 93

<212> TYPE: PRT

<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 159

```

Ser Asn Asn Tyr Asp Asp Val Gly Ser Asn Asn Gly Asp Ile Ser Ser
1          5          10          15

Asn Tyr Asp Asp Ala Ala Ala Asp Tyr Glu Pro Ile Arg Thr Thr Glu
20        25        30

Asn Ile Tyr Glu Ser Ile Gly Gly Ser Arg Thr Ser Gly Pro Glu Asn
35        40        45

Thr Ser Gly Gly Ala Ala Ala Leu Asn Ser Leu Arg Gly Ser Ser
50        55        60

Tyr Ser Asn Tyr Asp Asp Ala Ala Ala Asp Tyr Glu Pro Ile Arg Thr
65        70        75        80

Thr Glu Asn Ile Tyr Glu Ser Ile Gly Gly Ser Arg Thr
85          90

```

<210> SEQ ID NO 160

<211> LENGTH: 279

<212> TYPE: DNA

<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 160

```

agcaacaact acgatgacgt aggtagtaac aacggagata tcagtagcaa ttatgacgat      60
gctgctgctg attacgagcc gataagaact actgaaaata tttatgagag tattggtggc    120
tctagaacaa gtggcccaga aaatacaagt ggtggtgcag cagcagcact caattctcta    180

```

-continued

```

agaggctcct cctacagcaa ttatgacgat gctgctgctg attacgagcc gataagaact 240
actgaaaata ttatgagag tattggtggc tctagaaca 279

```

```

<210> SEQ ID NO 161
<211> LENGTH: 79
<212> TYPE: PRT
<213> ORGANISM: Chlamydia trachomatis

```

```

<400> SEQUENCE: 161

```

```

Leu Asn Ser Leu Arg Gly Ser Ser Tyr Ser Asn Tyr Asp Asp Ala Ala
1          5          10          15
Ala Asp Tyr Glu Pro Ile Arg Thr Thr Glu Asn Ile Tyr Glu Ser Ile
20          25          30
Gly Gly Ser Arg Thr Ser Gly Pro Glu Asn Thr Ser Asp Gly Ala Ala
35          40          45
Ala Ala Ala Leu Asn Ser Leu Arg Gly Ser Ser Tyr Thr Thr Gly Pro
50          55          60
Arg Asn Glu Gly Val Phe Gly Pro Gly Pro Glu Gly Leu Pro Asp
65          70          75

```

```

<210> SEQ ID NO 162
<211> LENGTH: 237
<212> TYPE: DNA
<213> ORGANISM: Chlamydia trachomatis

```

```

<400> SEQUENCE: 162

```

```

ctcaattctc taagaggtc ctctacagc aattatgacg atgctgctgc tgattacgag 60
ccgataagaa ctactgaaaa tatttatgag agtattggtg gctctagaac aagtggccca 120
gaaaatacga gtgatgggtg agcagcagca gcactcaatt ctctaagagg ctctctctac 180
acaacagggc ctgtaacga ggggtgtatt gccctggac cggaaggact accagac 237

```

```

<210> SEQ ID NO 163
<211> LENGTH: 83
<212> TYPE: PRT
<213> ORGANISM: Chlamydia trachomatis

```

```

<400> SEQUENCE: 163

```

```

Ala Asp Tyr Glu Pro Ile Arg Thr Thr Glu Asn Ile Tyr Glu Ser Ile
1          5          10          15
Gly Gly Ser Arg Thr Ser Gly Pro Glu Asn Thr Ser Gly Gly Ala Ala
20          25          30
Ala Ala Leu Asn Ser Leu Arg Gly Ser Ser Tyr Ser Asn Tyr Asp Asp
35          40          45
Ala Ala Ala Asp Tyr Glu Pro Ile Arg Thr Thr Glu Asn Ile Tyr Glu
50          55          60
Ser Ile Gly Gly Ser Arg Thr Ser Gly Pro Glu Asn Thr Ser Asp Gly
65          70          75          80
Ala Ala Ala

```

```

<210> SEQ ID NO 164
<211> LENGTH: 249
<212> TYPE: DNA
<213> ORGANISM: Chlamydia trachomatis

```

```

<400> SEQUENCE: 164

```

-continued

```

gctgattacg agccgataag aactactgaa aatatttatg agagtattgg tggctctaga      60
acaagtggcc cagaaaatac gagtggtggt gcagcagcag cactcaattc tctaagaggc      120
tcttcctaca gcaattatga cgatgctgct gctgattacg agccgataag aactactgaa      180
aatatttatg agagtattgg tggctctaga acaagtggcc cagaaaatac gagtgatggt      240
gcagcagca                                                                    249

```

```

<210> SEQ ID NO 165
<211> LENGTH: 105
<212> TYPE: PRT
<213> ORGANISM: Chlamydia trachomatis

```

```

<400> SEQUENCE: 165

```

```

Gly Gly Ser Arg Thr Ser Gly Pro Glu Asn Thr Ser Gly Gly Ala Ala
1           5           10           15
Ala Ala Leu Asn Ser Leu Arg Gly Ser Ser Tyr Ser Asn Tyr Asp Asp
          20           25           30
Ala Ala Ala Asp Tyr Glu Pro Ile Arg Thr Thr Glu Asn Ile Tyr Glu
          35           40           45
Ser Ile Gly Gly Ser Arg Thr Ser Gly Pro Glu Asn Thr Ser Gly Gly
          50           55           60
Ala Ala Ala Ala Leu Asn Ser Leu Arg Gly Ser Ser Tyr Ser Asn Tyr
65           70           75           80
Asp Asp Ala Ala Ala Asp Tyr Glu Pro Ile Arg Thr Thr Glu Asn Ile
          85           90           95
Tyr Glu Ser Ile Gly Gly Ser Arg Thr
          100          105

```

```

<210> SEQ ID NO 166
<211> LENGTH: 315
<212> TYPE: DNA
<213> ORGANISM: Chlamydia trachomatis

```

```

<400> SEQUENCE: 166

```

```

ggtggctcta gaacaagtgg cccagaaaat acaagtgggtg gtgcagcagc agcactcaat      60
tctctaagag gctcctccta cagcaattat gacgatgctg ctgctgatta cgagccgata      120
agaactactg aaaatatatta tgagagtatt ggtggctcta gaacaagtgg cccagaaaat      180
acgagtgggtg gtgcagcagc agcactcaat tctctaagag gctcctccta cagcaattat      240
gacgatgctg ctgctgatta cgagccgata agaactactg aaaatatatta tgagagtatt      300
ggtggctcta gaacc                                                                315

```

```

<210> SEQ ID NO 167
<211> LENGTH: 164
<212> TYPE: PRT
<213> ORGANISM: Chlamydia trachomatis

```

```

<400> SEQUENCE: 167

```

```

Asp Asp Ile Asn Thr Asn Asn Gln Thr Asp Asp Ile Asn Thr Thr Asp
1           5           10           15
Lys Asp Ser Asp Gly Ala Gly Gly Val Asn Gly Asp Ile Ser Glu Thr
          20           25           30
Glu Ser Ser Ser Gly Asp Asp Ser Gly Ser Val Ser Ser Ser Glu Ser
          35           40           45

```

-continued

```

Asp Lys Asn Ala Ser Val Gly Asn Asp Gly Pro Ala Met Lys Asp Ile
 50          55          60

Leu Ser Ala Val Arg Lys His Leu Asp Val Val Tyr Pro Gly Glu Asn
 65          70          75          80

Gly Gly Ser Thr Glu Gly Pro Leu Pro Ala Asn Gln Thr Leu Gly Asp
      85          90          95

Val Ile Ser Asp Val Glu Asn Lys Gly Ser Ala Gln Asp Thr Lys Leu
      100        105        110

Ser Gly Asn Thr Gly Ala Gly Asp Asp Asp Pro Thr Thr Thr Ala Ala
      115        120        125

Val Gly Asn Gly Ala Glu Glu Ile Thr Leu Ser Asp Thr Asp Ser Gly
      130        135        140

Ile Gly Asp Asp Val Ser Asp Thr Ala Ser Ser Ser Gly Asp Glu Ser
      145        150        155        160

Gly Gly Val Ser

```

```

<210> SEQ ID NO 168
<211> LENGTH: 492
<212> TYPE: DNA
<213> ORGANISM: Chlamydia trachomatis

```

```

<400> SEQUENCE: 168

```

```

gatgacataa ataccaacaa ccaaactgat gatatcaata cgacagacaa agactctgac      60
ggagctgggtg gagtcaatgg cgatatatcc gaaacagaat cctcttcttg agatgattca    120
ggaagtgtct ctctctcaga atcagacaag aatgcctctg tcggaatga cggacctgct    180
atgaaagata tcctttctgc cgtgcgtaaa cacctagacg tcgtttaccc tggcgaaaat    240
ggcgggttcta cagaagggcc tctcccagct aaccaaactc tcggagacgt aatctctgat    300
gtagagaata aaggctccgc tcaggatata aaattgtcag gaaatacagg agctggggat    360
gacgatccaa caaccacagc tgctgtaggt aatggagcgg aagagatcac tctttccgac    420
acagattctg gtatcggaag tgatgtatcc gatacagcgt cttcatctgg ggatgaatcc    480
ggaggagtct cc                                     492

```

```

<210> SEQ ID NO 169
<211> LENGTH: 110
<212> TYPE: PRT
<213> ORGANISM: Chlamydia trachomatis

```

```

<400> SEQUENCE: 169

```

```

Ala Ser Ala Pro Asn Val Thr Val Ser Thr Ser Ser Ser Thr Gln
 1          5          10          15

Ala Thr Ala Thr Ser Asn Lys Thr Ser Gln Ala Val Ala Gly Lys Ile
      20          25          30

Thr Ser Pro Asp Thr Ser Glu Ser Ser Glu Thr Ser Ser Thr Ser Ser
      35          40          45

Ser Asp His Ile Pro Ser Asp Tyr Asp Asp Val Gly Ser Asn Ser Gly
      50          55          60

Asp Ile Ser Asn Asn Tyr Asp Asp Val Gly Ser Asn Asn Gly Asp Ile
      65          70          75          80

Ser Ser Asn Tyr Asp Asp Ala Ala Ala Asp Tyr Glu Pro Ile Arg Thr
      85          90          95

Thr Glu Asn Ile Tyr Glu Ser Ile Gly Gly Ser Arg Thr Ser

```

-continued

100	105	110	
<210> SEQ ID NO 170			
<211> LENGTH: 330			
<212> TYPE: DNA			
<213> ORGANISM: Chlamydia trachomatis			
<400> SEQUENCE: 170			
gcctccgccc ccaatgtaac tgtatcgacc tcctcttctt ccacacaagc cacagccact			60
tcgaataaaa ctcccaagc cggtgctgga aaaatcactt ctccagatac ttcagaaagc			120
tcagaaacta gctctacctc atcaagcgat catatcccta gcgattacga tgacgttggt			180
agcaatagtg gagatattag caacaactac gatgacgtag gtagtaacaa cggagatatc			240
agtagcaatt atgacgatgc tgctgctgat tacgagccga taagaactac tgaaaatatt			300
tatgagagta ttggtggctc tagaacaagt			330
<210> SEQ ID NO 171			
<211> LENGTH: 90			
<212> TYPE: PRT			
<213> ORGANISM: Chlamydia trachomatis			
<400> SEQUENCE: 171			
Ala Ala Ala Leu Asn Ser Leu Arg Gly Ser Ser Tyr Ser Asn Tyr Asp			
1 5 10 15			
Asp Ala Ala Ala Asp Tyr Glu Pro Ile Arg Thr Thr Glu Asn Ile Tyr			
20 25 30			
Glu Ser Ile Gly Gly Ser Arg Thr Ser Gly Pro Glu Asn Thr Ser Gly			
35 40 45			
Gly Ala Ala Ala Ala Leu Asn Ser Leu Arg Gly Ser Ser Tyr Ser Asn			
50 55 60			
Tyr Asp Asp Ala Ala Ala Asp Tyr Glu Pro Ile Arg Thr Thr Glu Asn			
65 70 75 80			
Ile Tyr Glu Ser Ile Gly Gly Ser Arg Thr			
85 90			
<210> SEQ ID NO 172			
<211> LENGTH: 270			
<212> TYPE: DNA			
<213> ORGANISM: Chlamydia trachomatis			
<400> SEQUENCE: 172			
gcagcagcac tcaattctct aagaggctcc tcctacagca attatgacga tgctgctgct			60
gattacgagc cgataagaac tactgaaaat atttatgaga gtattggtgg ctctagaaca			120
agtggcccg aaaatacgag tgggtgtgca gcagcagcac tcaattctct aagaggctcc			180
tcctacagca attatgacga tgctgctgct gattacgagc cgataagaac tactgaaaat			240
atttatgaga gtattggtgg ctctagaacc			270
<210> SEQ ID NO 173			
<211> LENGTH: 23			
<212> TYPE: PRT			
<213> ORGANISM: Chlamydia trachomatis			
<400> SEQUENCE: 173			
Lys Gly Gln Phe Ala Gly Leu Ser Lys Gly Ala Thr Phe Val Asp Phe			
1 5 10 15			

-continued

Gly Glu Phe Gly Met Gln Thr
20

<210> SEQ ID NO 174
<211> LENGTH: 69
<212> TYPE: DNA
<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 174

aaaggtcagt ttgctggatt gagtaaggga gcaacgtttg ttgacttcgg cgaatttgga 60
atgcagact 69

<210> SEQ ID NO 175
<211> LENGTH: 23
<212> TYPE: PRT
<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 175

Ala Ile Asn Arg Tyr Leu Lys Arg Lys Gly Lys Val Trp Ile Arg Val
1 5 10 15
Phe Pro Asp Lys Ser Val Thr
20

<210> SEQ ID NO 176
<211> LENGTH: 69
<212> TYPE: DNA
<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 176

ggatggatta ccagccgccca aattgaggca tgcaggggtg ctatcaacag atatttaaaa 60
cgtaaaggg 69

<210> SEQ ID NO 177
<211> LENGTH: 23
<212> TYPE: PRT
<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 177

Ile Arg Val Phe Pro Asp Lys Ser Val Thr Lys Lys Pro Ala Glu Thr
1 5 10 15
Arg Met Gly Lys Gly Lys Gly
20

<210> SEQ ID NO 178
<211> LENGTH: 69
<212> TYPE: DNA
<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 178

gctatcaaca gatatttaaa acgtaaaggg aaagtttgga ttcgagtttt cccagataag 60
agtgtaacg 69

<210> SEQ ID NO 179
<211> LENGTH: 23
<212> TYPE: PRT
<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 179

-continued

Asp Ala Leu Arg Arg Ala Ala Ala Lys Leu Gly Ile Arg Thr Arg Phe
1 5 10 15

Val Lys Arg Val Glu Arg Val
20

<210> SEQ ID NO 180
<211> LENGTH: 69
<212> TYPE: DNA
<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 180

attcgagttt tcccagataa gagtgaacg aaaaaacctg ctgaaactcg aatgggtaaa 60
ggtaaggga 69

<210> SEQ ID NO 181
<211> LENGTH: 23
<212> TYPE: PRT
<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 181

Asp Ala Leu Arg Arg Ala Ala Ala Lys Leu Gly Ile Arg Thr Arg Phe
1 5 10 15

Val Lys Arg Val Glu Arg Val
20

<210> SEQ ID NO 182
<211> LENGTH: 69
<212> TYPE: DNA
<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 182

gatgctttga gaagagctgc tgcaaagtta ggaattagaa cacgatttgt taagcgtgtg 60
gaaagggtg 69

<210> SEQ ID NO 183
<211> LENGTH: 28
<212> TYPE: PRT
<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 183

Pro Ile Pro Val Asn Phe Pro Leu Ser Ser Gly Lys His Asn Pro Thr
1 5 10 15

Ala Leu Ala Ala Pro Val Glu Ala Gly Ile Ile Phe
20 25

<210> SEQ ID NO 184
<211> LENGTH: 84
<212> TYPE: DNA
<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 184

cccattcctg ttaattttcc ttttaagctca ggcaaacaca accctacagc tttagcagct 60
cctgtcgaag ccgggataat attc 84

<210> SEQ ID NO 185
<211> LENGTH: 106
<212> TYPE: PRT
<213> ORGANISM: Chlamydia trachomatis

-continued

<400> SEQUENCE: 185

```

Pro Cys Leu Gly Trp Lys Met Thr Glu Ser Tyr Val Asn Lys Glu Glu
1      5      10      15
Ile Ile Ser Leu Ala Lys Asn Ala Ala Leu Glu Leu Glu Asp Ala His
20      25      30
Val Glu Glu Phe Val Thr Ser Met Asn Asp Val Ile Ala Leu Met Gln
35      40      45
Glu Val Ile Ala Ile Asp Ile Ser Asp Ile Ile Leu Glu Ala Thr Val
50      55      60
His His Phe Val Gly Pro Glu Asp Leu Arg Glu Asp Met Val Thr Ser
65      70      75      80
Asp Phe Thr Gln Glu Glu Phe Leu Ser Asn Val Pro Val Ser Leu Gly
85      90      95
Gly Leu Val Lys Val Pro Thr Val Ile Lys
100      105

```

<210> SEQ ID NO 186

<211> LENGTH: 321

<212> TYPE: DNA

<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 186

```

ccatgttttag gatggaagat gacagagtca tatgtaaaca aagaagaaat catctcttta      60
gcaaagaatg ctgcattgga gttggaagat gccacgtgg aagagttcgt aacatctatg      120
aatgacgtca ttgctttaat gcaggaagta atcgcgatag atatttcgga tatcattctt      180
gaagctacag tgcatcattt cggtggtcca gaggatctta gagaagacat ggtgacttcg      240
gattttactc aagaagaatt tttatctaac gttcccggtg cggtgggagg attagtcaaa      300
gtccctacag ttatcaaata g                                     321

```

<210> SEQ ID NO 187

<211> LENGTH: 159

<212> TYPE: PRT

<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 187

```

Arg Gln Pro Pro Phe Leu Phe Met Gly Arg Ala Asn Gln Gly Asn Tyr
1      5      10      15
Met Ser Glu His Val His Lys Glu Leu Leu His Leu Gly Glu Val Phe
20      25      30
Arg Ser Gln Arg Glu Glu Arg Ala Leu Ser Leu Lys Asp Val Glu Ala
35      40      45
Ala Thr Ser Ile Arg Leu Ser Ala Leu Glu Ala Ile Glu Ala Gly His
50      55      60
Leu Gly Lys Leu Ile Ser Pro Val Tyr Ala Gln Gly Phe Met Lys Lys
65      70      75      80
Tyr Ala Ala Phe Leu Asp Met Asp Gly Asp Arg Leu Leu Lys Glu His
85      90      95
Pro Tyr Val Leu Lys Ile Phe Gln Glu Phe Ser Asp Gln Asn Met Asp
100      105      110
Met Leu Leu Asp Leu Glu Ser Met Gly Gly Arg Asn Ser Pro Glu Lys
115      120      125
Ala Ile Arg Ser Trp Leu Asn Leu Gly Trp Ala Gly Val Phe Val Val

```

-continued

130	135	140	
Gly Ala Ala Cys Ile Trp Trp Leu Gly Asn Leu Phe Asn Leu Phe			
145	150	155	
 <210> SEQ ID NO 188			
<211> LENGTH: 480			
<212> TYPE: DNA			
<213> ORGANISM: Chlamydia trachomatis			
 <400> SEQUENCE: 188			
cgacagcctc ctttcctttt tatgggtaga gcaaaccagg ggaattacat gagcgaacat			60
gtccacaaag agttattaca tctaggggaa gtttttcgtt cgcaaagaga agaagagcg			120
ctttctctaa aagatgtaga agctgccaca tctattcggt tgtctgcatt agaggctata			180
gaagcaggac atctcgggaa attaatctct cctgtttatg cccaagggtt tatgaaaaaa			240
tacgcagctt ttttgatat ggatggggat agattgctga aagagcatcc ttatgtattg			300
aaaatttttc aggaattttc tgatcagaat atggacatgc tgettattt agaatccatg			360
ggaggaagaa attctcctga gaaagcgatc cgtagtgggt taaatctagg ctgggctgga			420
gtcttcgtcg taggtgcage ttgtatttgg tggttaggga atctattcaa ccttttctag			480
 <210> SEQ ID NO 189			
<211> LENGTH: 437			
<212> TYPE: PRT			
<213> ORGANISM: Chlamydia trachomatis			
 <400> SEQUENCE: 189			
Glu Phe Val Met Lys Lys Thr Ser Val Ile Asp Thr Ser Val Leu Ile			
1	5	10	15
Tyr Asp Pro Lys Ala Leu Ser Ser Phe Ser Asn Thr Arg Ile Ile Ile			
	20	25	30
Pro Phe Thr Val Ile Glu Glu Leu Glu Ser Cys Ala Lys Phe Arg Asp			
	35	40	45
Glu Ser Gly Lys Asn Ala Ser Arg Ala Leu Gly Asn Ile Arg Val Leu			
	50	55	60
Leu Glu Gln Ser Glu Arg Pro Ser Ser Gly Gln Ile Leu Leu Lys Asn			
	65	70	75
Gly Ser Glu Leu Cys Ile Glu Val Ser Pro Leu Val Asn Leu Ser Asn			
	85	90	95
His Lys Lys Gln Lys Lys His Leu Thr Leu Glu Leu Leu Gln Ile Ile			
	100	105	110
Ser Gln Arg Glu Ser Val Val Phe Val Thr Lys Ser Leu Gly Arg Arg			
	115	120	125
Val His Ala Glu Ala Leu Gly Ile Glu Ala Lys Asp Tyr Glu Asn Lys			
	130	135	140
Cys Val Ser Phe Gln Ser Leu Tyr Arg Gly His Arg Lys Leu Lys Val			
	145	150	155
Ala Asn Ser Thr Ile Glu Tyr Phe Tyr Lys Asp Gly Ser Ile Ala Phe			
	165	170	175
Pro Ser Asp Leu Ser Pro Leu Pro Ser Pro Asn Glu Tyr Phe Phe Leu			
	180	185	190
Ser Gly Asp Ser Asp Asn Tyr Ser Ala Val Gly Arg Tyr Ser Ser Lys			
	195	200	205

-continued

Asp	Asn	Lys	Ile	Leu	Ser	Leu	Lys	Pro	Ala	Pro	Glu	Lys	Ile	Trp	Gly
210						215					220				
Val	Lys	Pro	Leu	Asn	Ile	Glu	Gln	Arg	Cys	Ala	Leu	Asp	Leu	Leu	Leu
225				230					235					240	
Arg	Asp	Asp	Ile	Lys	Leu	Val	Thr	Leu	Met	Gly	Gln	Ala	Gly	Ser	Gly
			245					250						255	
Lys	Thr	Ile	Leu	Ala	Leu	Ala	Ala	Ala	Met	Tyr	Gln	Val	Phe	Glu	Lys
			260					265					270		
Pro	Lys	Tyr	Asn	Lys	Leu	Leu	Val	Ser	Arg	Pro	Ile	Ile	Pro	Met	Gly
		275					280					285			
Lys	Asp	Ile	Gly	Phe	Leu	Pro	Gly	Ile	Lys	Glu	Ala	Lys	Leu	Met	His
	290					295					300				
Trp	Met	Gln	Pro	Ile	Tyr	Asp	Asn	Met	Glu	Phe	Leu	Phe	Asp	Val	Asn
305					310				315						320
Asn	Met	Gly	Asp	Phe	Ser	Glu	Thr	Leu	His	Ser	Leu	Met	Glu	Thr	Lys
			325					330						335	
Lys	Leu	Glu	Met	Glu	Ala	Leu	Thr	Tyr	Ile	Arg	Gly	Arg	Ser	Leu	Pro
			340					345					350		
Lys	Val	Phe	Met	Ile	Ile	Asp	Glu	Ala	Gln	Asn	Leu	Thr	Pro	His	Glu
		355				360						365			
Ile	Lys	Thr	Ile	Ile	Ser	Arg	Ala	Gly	Lys	Gly	Thr	Lys	Ile	Val	Leu
	370					375					380				
Thr	Gly	Asp	Pro	Thr	Gln	Ile	Asp	Ser	Leu	Tyr	Phe	Asp	Glu	Asn	Ser
385					390					395					400
Asn	Gly	Leu	Thr	Tyr	Leu	Val	Gly	Lys	Phe	His	His	Leu	Pro	Leu	Tyr
			405					410						415	
Gly	His	Met	Phe	Met	Thr	Arg	Thr	Glu	Arg	Ser	Glu	Leu	Ala	Ala	Ala
			420					425					430		
Ala	Ala	Thr	Ile	Leu											
			435												

<210> SEQ ID NO 190

<211> LENGTH: 1314

<212> TYPE: DNA

<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 190

ttaaagaata gttgcagcag ctgcagctag ttcggaacgt tccgttcggg tcataaacat	60
atgtccatac aaaggtaaat ggtgaaactt tcctactagg taggtgagac cattggaatt	120
ttcatcaaaa tatagactgt ctatttgggt aggatcgccg gttaacacaa tttttgttcc	180
tttcccggtc cgagagatga ttgttttgat ttcattgggt gtgaggtttt gcgcctcgtc	240
gatgatcata aatacttttag gtagagagcg tcctcggatg taagtaagcg cttccatttc	300
gagttttttt gtttcatta aactatgcaa agttttctgaa aagtgcacca tattattcac	360
atcgaataaa aattccatgt tgtcatagat cggttgcac caatgcatga gcttcgcttc	420
ttttatacca ggaagaaatc caatgtcctt ccccatagga ataatgggtc tgctaactaa	480
gagtttggtt tatttagggt tctcaaacac ttggtacatt gctgccgcta aggccagtat	540
tgtctttccg gatccagctt gtcccacaa ggtcacaagt ttaatatcgt ctcttagtag	600
tagatctaga gcgcacgtgt gttctatggt caaaggcttg acaccccaaa tttttctctg	660
agcaggcttg agggatagga ttttggtatc ttttagagcta tagcgaccaa cagcgggaata	720

-continued

```

gttatcagag tcgccagaaa gaaaaaagta ttcgttagga gaaggtaaag gagatagatc   780
tgaaggggaag gcgatagagc catccttata gaaatattca attgtgctat tcgctacctt   840
tagttttctc tgtccacggg aaagggattg gaaagatacg catttatctt catagtcttt   900
agcttcgac cctagtgcct ccgcacggac tcgtctgccca agacttttgg ttacgaaaaac   960
aacagactct cgttgagaaa tgatttggag tagctctagc gtgagggtgt tttctgtttt  1020
cttggtgttt gaaagattga ctagaggaga gacttcaata cataactcgc tgcggttttt  1080
taataaaaatt tgaccagaag aggggtcttc cgactgctct agtaatacac gaatattgcc  1140
caatgctctg gaagcatttt tccctgattc atctcgaaac tttgcgcagg attccaattc  1200
ttcgattact gtaaaaggga taatgatgcg agtgtttaga aaagaggaaa ggccttagg  1260
atcgtaaatc aaaacgctgg tatcaataac agaggttttt ttcattacaa attc      1314

```

<210> SEQ ID NO 191

<211> LENGTH: 219

<212> TYPE: PRT

<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 191

```

Lys Lys Phe Leu Ser Cys Glu Arg Glu Tyr Ser Arg Gly Ser Met Ser
 1             5             10             15
Val Lys Val Ile Ser Pro Phe Ser Gln Asp Gly Val Gln Cys Phe Pro
      20             25             30
Lys Leu Phe Ile Ile Ser Ala Pro Ala Gly Ala Gly Lys Thr Thr Leu
      35             40             45
Thr His Met Leu Gln Arg Glu Phe Pro Asp Ala Phe Glu Lys Thr Val
      50             55             60
Ser Ser Thr Thr Arg Ser Ala Arg Pro Gly Glu Val His Gly Val Asp
      65             70             75             80
Tyr Leu Phe Val Ser Glu Asp Asp Phe Lys Gln Ser Leu Asp Arg Glu
      85             90             95
Asp Phe Leu Glu Trp Val Phe Leu Phe Gly Thr Tyr Tyr Gly Thr Ser
      100            105            110
Lys Ala Glu Ile Ser Arg Val Leu Gln Lys Gly Lys His Cys Ile Ala
      115            120            125
Val Ile Asp Val Gln Gly Ala Leu Ala Leu Lys Lys Gln Met Pro Ala
      130            135            140
Val Thr Ile Phe Ile Gln Ala Pro Ser Gln Glu Glu Leu Glu Arg Arg
      145            150            155            160
Leu Asn Ala Arg Asp Ser Glu Lys Asp Phe Gln Lys Lys Glu Arg Leu
      165            170            175
Glu His Ser Ala Val Glu Ile Ala Ala Ala Ser Glu Phe Asp Tyr Val
      180            185            190
Val Val Asn Asp Asp Leu Ile Thr Ala Tyr Gln Val Leu Arg Ser Ile
      195            200            205
Phe Ile Ala Glu Glu His Arg Met Ser His Gly
      210            215

```

<210> SEQ ID NO 192

<211> LENGTH: 660

<212> TYPE: DNA

<213> ORGANISM: Chlamydia trachomatis

-continued

<400> SEQUENCE: 192

```

aaaaagtttc tctcctgtga aagagagtat tcaagaggga gtatgtcagt aaaggttatt    60
tccccctttt ctcaagacgg ggttcaatgc ttcccaagc tttttatcat tagcgtcct    120
gctggagcag ggaagacaac actcacccat atgctacaaa gagagtttcc tgatgcattt    180
gagaagacgg tgcgtcaac gacacgttcg gctcgtccag gcgaagtgca tggcgtggat    240
tatttgtttg tatctgaaga tgactttaag caatctttag ataggggaaga ttttttgaa    300
tgggtctttt tatttgggac ttattacgga acgagtaagg cggagatttc tagagtcttg    360
caaaagggta agcactgtat agccgtgatt gatgtacaag gagctttggc tctgaagaag    420
caaatgccgg cagtcaatat tttattcaa gctccctctc aagaagaact tgagcgccgt    480
ttgaatgctc gggattcaga gaaagatttc cagaagaaag aaagattaga gcatagcgct    540
gtcgaaattg ctgccgctag cgaatttgat tatgttggtg ttaatgatga ttgattaca    600
gcatatcaag ttttaagaag tatttttata gctgaagaac ataggatgag tcatggctag    660

```

<210> SEQ ID NO 193

<211> LENGTH: 242

<212> TYPE: PRT

<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 193

```

Asn Thr Leu Val Ala Met Ala Leu Tyr Leu Leu Pro Asn Thr Leu Gly
1      5      10      15
Ser Lys Arg Ser Glu Asp Leu Pro Phe Ser Val Gly Glu Ile Val Arg
20     25     30
Asn Lys Ile Gln Gly Leu Ile Val Glu Ser Asp Arg Gly Gly Arg Leu
35     40     45
Phe Leu Ser Leu Trp Lys Val Glu Glu Pro His Arg Phe Pro Leu Ala
50     55     60
Val Met Ser Lys Asn Asp Thr Ser Val Lys Ala Cys Asp Phe Tyr Leu
65     70     75     80
Glu Pro Ile Leu Lys Lys Gln Glu Ser Trp Gly Val Ile Ser Asp Ala
85     90     95
Gly Leu Pro Cys Ile Ala Asp Pro Gly Ala Lys Leu Val Arg Arg Ala
100    105    110
Arg Thr Leu Gly Ile Pro Val His Ala Val Ser Gly Pro Cys Ser Ile
115    120    125
Thr Gln Ala Leu Met Leu Ser Gly Leu Pro Gly Gln Asn Phe Thr Phe
130    135    140
His Gly Tyr Leu Pro Gln Asn Pro Lys Glu Arg Ser Arg Tyr Leu Arg
145    150    155    160
Ser Cys Ser Gly Lys Ser His Thr Gln Ile Cys Ile Glu Thr Pro Tyr
165    170    175
Arg Asn Pro Tyr Thr Phe Asp Ala Leu Leu Asp Gln Leu Pro Asp His
180    185    190
Gly Glu Leu Cys Val Ala Ile Asp Leu Met Gly Asp Gln Glu Tyr Val
195    200    205
Ser Met Arg Ser Ile Ala Val Trp Asn Gln Ser Ser Asp Ile Glu Glu
210    215    220
Val Cys Glu Arg Leu Lys Lys Val Pro Ala Ile Phe Leu Phe Ile Thr

```

-continued

225	230	235	240
Ser Phe			
 <210> SEQ ID NO 194			
<211> LENGTH: 729			
<212> TYPE: DNA			
<213> ORGANISM: Chlamydia trachomatis			
 <400> SEQUENCE: 194			
aatacacttg tggctatggc gctgtatctt cttcccaata ctttaggtag taaaagatct	60		
gaggaccttc ctttttcggt tggagagatt gttcggaata aaatccaggg attaatagta	120		
gaaagtgatc gtgggtggcg gttattctta agtttatgga aagtagaaga gcctcatagg	180		
tttctcttgc cctgtatgag caagaatgac acttctgtta agccttggtga cttttattta	240		
gagcctattc tcaagaagca agagtcttgg ggcgtcattt ctgatgcagg gttgccttgt	300		
attgctgatc ctgggggctaa gttagtccga agagctcgga cattggggat tcccgtgcac	360		
gctgtatctg gcccttgctc gattacgcaa gcgttgatgc tctctggact accaggggcaa	420		
aatttcacat ttcattggtta tttgcccaca aatcctaaag aaagatctcg ttatttgcca	480		
agttgctccg ggaaatccca tacgcaaate tgtatagaga ctccgtaccg taatccatat	540		
acgtttgatg cgttattaga tcagcttccg gatcatggcg agccttggtg tgcgattgat	600		
ttaatgggag atcaagaata cgtttctatg cgaagcatag ccgatggaa tcaatcttct	660		
gatatcgaag aggtttgtga gcgtttgaaa aaagttccag ctatttttct atttattact	720		
tccttttga	729		
 <210> SEQ ID NO 195			
<211> LENGTH: 260			
<212> TYPE: PRT			
<213> ORGANISM: Chlamydia trachomatis			
 <400> SEQUENCE: 195			
Phe Val Lys Glu Ile Phe Phe Val Lys Thr His Asp Leu Ala Asp Thr			
1 5 10 15			
Trp Gln Leu Tyr Trp Ser Thr Lys Glu Ile His His Arg Asp Val Leu			
20 25 30			
Ile Glu Ser Tyr Leu Pro Leu Val Lys Asn Val Ala His Arg Leu Ala			
35 40 45			
Ser Gly Met Pro Ser His Val Lys Met Glu Asp Leu Tyr Ala Leu Gly			
50 55 60			
Val Glu Gly Leu Ile Arg Ala Val Glu Arg Phe Asp Pro Glu Lys Ser			
65 70 75 80			
Lys Arg Phe Glu Ser Tyr Ala Leu Phe Ile Ile Lys Ala Ala Ile Ile			
85 90 95			
Asp Gly Leu Arg Lys Gln Asp Trp Val Pro Arg Ser Val Tyr Gln Arg			
100 105 110			
Ala Asn Arg Leu Ala Asp Ala Met Asp Ser Leu Arg Gln Thr Leu Gly			
115 120 125			
Lys Glu Pro Thr Asp Gly Glu Leu Cys Glu Tyr Leu Asn Ile Ser Gln			
130 135 140			
Gln Glu Leu Ser His Trp Phe Ser Ser Ser Arg Pro Ala Leu Val Leu			
145 150 155 160			

-continued

[illegible]

```
<210> SEQ ID NO 196
<211> LENGTH: 783
<212> TYPE: DNA
<213> ORGANISM: Chlamydia trachomatis
```

<400> SEQUENCE: 196

tttgtaaaag	aaattttttt	tgtgaagact	cacgatctcg	cagatacttg	gcagctatat	60
tggtcgacaa	aagaaatcca	tcatagggat	gttttgatcg	aatcctacct	tcctttagta	120
aagaatgtag	cgcatcggct	tgcttcagga	atgccttctc	atgtaaagat	ggaagatcct	180
tatgctctgg	gggttgaagg	gttgattcgt	gctgtcgaac	gttttgatcc	agaaaaaagc	240
aagcgattcg	agagctatgc	tctttttatc	ataaaagctg	cgattattga	tggattgcgc	300
aaacaggatt	gggtaccacg	cagtgtttat	caaagagcca	atcgattagc	tgatgcgatg	360
gattctttga	gacagacttt	aggtaaaaga	cctactgatg	gagaactttg	tgagtatcta	420
aatatttcac	aacaagagtt	atcccatctg	ttttcctcct	ctagacctgc	tctagttcct	480
tctttacatg	atgattttct	ctgccaaagt	gacgatgagg	ggcttgcttt	agaagagcgc	540
atagcagatg	agcgagcgga	aaccggatag	gatgtcatca	gaaaaaaaga	agctattttct	600
attttgacag	aagctttgct	ggctcttgat	gaaaaaagagc	ggcagggttat	ggctctttat	660
tactatgatg	acttggtatt	aaaagaaatt	gggaagattt	taggagtgag	cgagtcccca	720
gtttctcaga	tacactccaa	agctttattg	aagttcacgag	gtacattgtc	cagtctgctt	780
tag						783

```
<210> SEQ ID NO 197
<211> LENGTH: 483
<212> TYPE: PRT
<213> ORGANISM: Chlamydia trachomatis
```

<400> SEQUENCE: 197

Glu	Gly	Ser	Val	Ala	Pro	Asn	Thr	Asp	Ile	Gly	Leu	Ile	Gly	Leu	Ala
1				5					10					15	
Val	Met	Gly	Lys	Asn	Leu	Val	Leu	Asn	Met	Val	Asp	His	Gly	Phe	Ser
			20					25					30		
Val	Ser	Val	Tyr	Asn	Arg	Ser	Pro	Ala	Lys	Thr	Glu	Glu	Phe	Leu	Lys
			35				40					45			
Asp	His	Gly	Glu	Ser	Gly	Ala	Leu	Gln	Gly	Phe	Thr	Thr	Ile	Gln	Glu
	50					55					60				

-continued

Phe	Val	Gln	Ser	Leu	Lys	Arg	Pro	Arg	Lys	Ile	Met	Ile	Met	Ile	Lys	65	70	75	80
Ala	Gly	Ala	Pro	Val	Asp	Glu	Met	Ile	Ala	Ser	Leu	Leu	Pro	Phe	Leu	85	90	95	
Glu	Glu	Gly	Asp	Ile	Leu	Ile	Asp	Gly	Gly	Asn	Ser	Tyr	Tyr	Leu	Asp	100	105	110	
Ser	Glu	Gln	Arg	Tyr	Val	Asp	Leu	Lys	Lys	Glu	Gly	Ile	Leu	Phe	Val	115	120	125	
Gly	Met	Gly	Val	Ser	Gly	Gly	Glu	Glu	Gly	Ala	Arg	Lys	Gly	Pro	Ser	130	135	140	
Ile	Met	Pro	Gly	Gly	Asn	Ile	Asp	Ala	Trp	Pro	Ala	Ile	Ala	Pro	Ile	145	150	155	160
Phe	Gln	Ser	Ile	Ala	Ala	Gln	Val	Asp	Gly	Arg	Pro	Cys	Cys	Ser	Trp	165	170	175	
Ile	Gly	Thr	Gly	Gly	Ala	Gly	His	Phe	Val	Lys	Ala	Val	His	Asn	Gly	180	185	190	
Ile	Glu	Tyr	Gly	Asp	Ile	Gln	Leu	Ile	Cys	Glu	Thr	Tyr	Glu	Ile	Leu	195	200	205	
Lys	Thr	Arg	Leu	Asn	Leu	Ser	Leu	Glu	Gln	Ile	Gly	Asn	Ile	Phe	Phe	210	215	220	
Glu	Trp	Asn	Gln	Thr	Asp	Leu	Asn	Ser	Tyr	Leu	Ile	Gly	Ala	Ala	Ala	225	230	235	240
Ala	Val	Leu	Ile	Ala	Lys	Asp	Glu	Asn	Gly	Asn	Ala	Ile	Ala	Ser	Thr	245	250	255	
Ile	Leu	Asp	Val	Ala	Gly	Gln	Lys	Gly	Thr	Gly	Arg	Trp	Val	Ala	Glu	260	265	270	
Asp	Ala	Ile	Lys	Ala	Gly	Val	Pro	Met	Ser	Leu	Ile	Ile	Glu	Ser	Val	275	280	285	
Leu	Ala	Arg	Tyr	Leu	Ser	Thr	Trp	Lys	Glu	Val	Arg	Thr	Lys	Ala	Ala	290	295	300	
Gln	Glu	Phe	Pro	Gly	Ile	Pro	Leu	Leu	Cys	Gln	Pro	Pro	Gln	Glu	Ala	305	310	315	320
Ser	Ala	Phe	Ile	Glu	Asp	Val	Arg	Glu	Ala	Leu	Tyr	Ala	Ala	Lys	Ile	325	330	335	
Ile	Ser	Tyr	Ala	Gln	Gly	Phe	Met	Leu	Leu	Lys	Gln	Val	Ser	Gln	Asp	340	345	350	
Lys	Gly	Trp	Asp	Leu	Asn	Leu	Gly	Glu	Leu	Ala	Leu	Ile	Trp	Arg	Gly	355	360	365	
Gly	Cys	Ile	Ile	Gln	Ser	Ala	Phe	Leu	Asp	Lys	Ile	His	Gln	Gly	Phe	370	375	380	
Glu	Asn	Ser	Pro	Glu	Ala	His	Ser	Leu	Ile	Leu	Gln	Asp	Tyr	Phe	Lys	385	390	395	400
Lys	Val	Leu	Phe	Asp	Ser	Glu	Thr	Gly	Phe	Arg	Arg	Ala	Val	Leu	His	405	410	415	
Ala	Ile	Gly	Ser	Gly	Val	Ala	Ile	Pro	Cys	Leu	Ser	Ser	Ala	Leu	Ser	420	425	430	
Phe	Tyr	Asp	Gly	Tyr	Arg	Thr	Val	Asp	Ser	Ser	Leu	Phe	Leu	Val	Gln	435	440	445	
Gly	Leu	Arg	Asp	Tyr	Phe	Gly	Ala	His	Gly	Tyr	Glu	Arg	Arg	Asp	Cys	450	455	460	

-continued

Pro Arg Gly Glu Phe Tyr His Thr Asp Trp Leu Glu Thr Lys Lys Thr
 465 470 475 480

Phe Arg Val

<210> SEQ ID NO 198

<211> LENGTH: 1452

<212> TYPE: DNA

<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 198

```

gaggggtctg tggtccaaa tacagatatt gggttgattg gtttggccgt gatgggcaaa    60
aaccttgat tgaacatggt ggatcatggt ttttctgttt ctgtctataa ccgaagtccg    120
gcgaaaacag aagagtctct gaaagatcat ggagagagtg gagctctgca aggatttact    180
acgattcaag agtttgttca atctttgaag cgtcctcgta agatcatgat catgattaaa    240
gcgggagctc ctgttgatga aatgattgcc tcctgcttc ctttcttgga agagggagat    300
attctcatcg atggggggaa tagctattat ttagattctg agcaacgcta tgcgacctg    360
aaaaagaag gaattctatt tgttgggatg ggagtctctg gaggggaaga gggggctaga    420
aaagggcctt ccattatgcc cggaggggat atagatgctt ggctgcaat cgctctatc    480
tttcaatcca tagctgctca ggtggatgga cgacctgtt gctcttgat tggcacagga    540
ggtgcagggc attttgttaa ggctgttcac aatgggatcg aatacgggga tatccagtta    600
atttgtgaaa catatgagat tottaagact cgtcttaato tctctttaga gcagataggg    660
aatatctttt ttgaatggaa tcaaacgat ctgaatagct acctcattgg agcagcagcg    720
gccgttttaa tagcaaaaga tgagaatggc aatgcgattg cttctacgat tcttgatgtt    780
gctggacaga aggggactgg gcgttgggtc gcagaggacg ctattaaggc aggcgttcct    840
atgtccctaa ttattgaate ggtcttaget cgatacctt cgacttggaa agaagtgcgc    900
acaaaggcag ctcaagagtt tccagggatt cctcttctct gtcaacctcc acaagaagct    960
tctgccttca ttgaggatgt gcgagaggct ttgtatgcag ctaagattat cagttacgct   1020
caaggattta tgctgtgaa gcaggtctct caagataaag gatgggatct gaatttaggt   1080
gagtttagct tgatagggc tgggggttgc attatacaaa gtgccttttt agataaaatt   1140
catcaagggt ttgaaaatag tccagaagca cactctttga tattacaaga ttattttaa   1200
aaggttctgt ttgattcaga aacagggttc cggcgagctg ttttgcagtc tatcgatct   1260
gggtgtagct ttccttgctt atcttctgca ctatcttttt atgatggata tcgtacggtg   1320
gattcatctt tattcttagt gcaaggatta agagattact ttggagctca tggttatgag   1380
cgtcgagact gtctcgagg ggagttttat catacggatt ggctagaaac caagaaaact   1440
tttagagtat aa                                         1452

```

<210> SEQ ID NO 199

<211> LENGTH: 307

<212> TYPE: PRT

<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 199

Glu Arg Leu Phe Leu Ala Leu Arg Ala Asp Lys Arg Phe Val Ser Leu
 1 5 10 15

Ser Leu Leu Tyr Ile Ala Ile Met Ser Val Ile Thr Ile Leu Ala Arg
 20 25 30

-continued

Ser Ser Thr Met Phe Ala Gln Leu Gln Lys Asn Trp Glu Gly Leu Phe
 35 40 45
 Leu Asn Arg Asp Asn Ala Ile Ala Trp Ser Val Glu Asp Leu Cys Val
 50 55 60
 Asn Tyr Asp His Ser Asp Val Leu Cys His Ile Thr Phe Ser Leu Pro
 65 70 75 80
 Ala Gly Ala Met Ala Ala Ile Ile Gly Pro Asn Gly Ala Gly Lys Ser
 85 90 95
 Thr Leu Leu Lys Ala Ser Leu Gly Leu Ile Arg Ala Ser Ser Gly Gln
 100 105 110
 Ser Leu Phe Phe Gly Gln Arg Phe Ser Lys Val His His Arg Ile Ala
 115 120 125
 Tyr Met Pro Gln Arg Ala Ser Val Asp Trp Asp Phe Pro Met Thr Val
 130 135 140
 Leu Asp Leu Val Leu Met Gly Cys Tyr Gly Tyr Lys Gly Ile Trp Asn
 145 150 155 160
 Arg Ile Ser Thr Asp Asp Arg Gln Glu Ala Met Arg Ile Leu Glu Arg
 165 170 175
 Val Gly Leu Glu Ala Phe Ala Asn Arg Gln Ile Gly Lys Leu Ser Gly
 180 185 190
 Gly Gln Gln Gln Arg Ala Phe Leu Ala Arg Ser Leu Met Gln Lys Ala
 195 200 205
 Asp Leu Tyr Leu Met Asp Glu Leu Phe Ser Ala Ile Asp Met Ala Ser
 210 215 220
 Tyr Gln Met Val Val Asp Val Leu Gln Glu Leu Lys Ser Glu Gly Lys
 225 230 235 240
 Thr Ile Val Val Ile His His Asp Leu Ser Asn Val Arg Lys Leu Phe
 245 250 255
 Asp His Val Ile Leu Leu Asn Lys His Leu Val Cys Ser Gly Ser Val
 260 265 270
 Glu Glu Cys Leu Thr Lys Glu Ala Ile Phe Gln Ala Tyr Gly Cys Glu
 275 280 285
 Leu Glu Leu Leu Asp Tyr Thr Leu Lys Leu Ser Arg Gly Lys Tyr Gln
 290 295 300
 Gly Ser Cys
 305

<210> SEQ ID NO 200

<211> LENGTH: 924

<212> TYPE: DNA

<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 200

gaaagattgt ttcttgctct aagagcggac aaaagattcg tctcgctaag tctcctttat 60
 atagcgataa tgtctgtgat aactatttta gcacgttcca gcacaatggt cgcacaatta 120
 cagaagaatt gggaggagact gttcttgaat agagataatg caattgcttg gtcgtagag 180
 gatctttgtg ttaattatga tcaactcagac gtcttatgtc acattacttt ttctctgcct 240
 gcaggggcaa tggctgctat tattgggccg aatggagctg gtaaaagtac ttgcttaag 300
 gcttcttttag gactgattcg tgcttcttct ggccaaagct tgttcttttg tcagagattt 360
 tccaaggtag atcatagaat agcctatatg cctcaaagag cgagtgtgga ttgggatttc 420

-continued

```

ccaatgactg ttcttgatct cgtgttgatg ggggtgttacg gctataaagg aatatggaat    480
cgtatttcca ctgatgatcg tcaggaggct atgcgtattt tagagcgggt tggtttgaa    540
gcttttgcaa atcgtaaaat aggtaagctc tctggaggac aacaacagag agctttttta    600
gcgcggtcac taatgcaaaa agcagatttg tatctcatgg atgagctggt ctctgcgac    660
gatatggcct cttatcagat ggtttagatg gttttgcaag agcttaaaag cgaagggaag    720
actattgtgg tcattcatca tgatttgagt aatgtccgga agctttttga tcatgtgatt    780
ttattaaata agcatcttgt gtgctctgga agcgtagaag aatgcttgac taaagaagcc    840
atttttcagg cttatgggtg tgaacttgag cttttggatt acacactcaa attgtctaga    900
ggcaagtacc aaggatcgtg ctac                                     924

```

<210> SEQ ID NO 201

<211> LENGTH: 389

<212> TYPE: PRT

<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 201

```

Val Arg Gln Cys Arg Glu Tyr Glu Val Leu Leu Lys His Leu Ala Leu
1           5           10           15

Ile Gly Ser Thr Gly Ser Ile Gly Arg Gln Val Leu Gln Val Val Arg
20          25          30

Ser Ile Pro Asp Thr Phe Ile Ile Glu Thr Leu Ala Ala Tyr Gly Arg
35          40          45

Asn Gln Glu Ala Leu Ile Ser Gln Ile Arg Glu Phe Asn Pro Arg Val
50          55          60

Val Ala Val Arg Glu Glu Thr Thr Tyr Lys Glu Leu Arg Lys Leu Phe
65          70          75          80

Pro His Ile Glu Ile Leu Leu Gly Glu Glu Gly Leu Val Ser Val Ala
85          90          95

Thr Glu Pro Ser Val Thr Met Thr Ile Val Ala Ser Ser Gly Ile Asp
100         105         110

Ala Leu Pro Ala Val Ile Ala Ala Ile Arg Gln Lys Lys Thr Ile Ala
115         120         125

Leu Ala Asn Lys Glu Ser Leu Val Ala Ala Gly Glu Leu Val Thr Thr
130         135         140

Leu Ala Arg Glu Asn Gly Val Gln Ile Leu Pro Ile Asp Ser Glu His
145         150         155         160

Asn Ala Leu Phe Gln Cys Leu Glu Gly Arg Asp Ser Ser Thr Ile Lys
165         170         175

Lys Leu Leu Leu Thr Ala Ser Gly Gly Pro Leu Arg Asn Lys Ser Lys
180         185         190

Glu Glu Leu Gln Lys Val Ser Leu Gln Glu Val Leu Arg His Pro Val
195         200         205

Trp Asn Met Gly Pro Lys Ile Thr Val Asp Ser Ser Thr Leu Val Asn
210         215         220

Lys Gly Leu Glu Ile Ile Glu Ala Phe Trp Leu Phe Gly Leu Glu Ala
225         230         235         240

Val Glu Ile Glu Ala Val Ile His Pro Gln Ser Leu Val His Gly Met
245         250         255

Val Glu Phe Cys Asp Gly Thr Ile Leu Ser Val Met Asn Pro Pro Ser

```

-continued

260	265	270
Met Leu Phe Pro Ile Gln His Val	Leu Thr Phe Pro Glu Arg Ser Pro	
275	280	285
Ala Ile Gly Pro Gly Phe Asp Phe	Leu Ser Asn Arg Thr Leu Glu Phe	
290	295	300
Phe Pro Ile Asp Glu Asp Arg Phe	Pro Ser Val His Leu Ala Lys Arg	
305	310	315
Val Leu Leu Glu Lys Gly Ser Met	Gly Cys Phe Phe Asn Gly Ala Asn	
325	330	335
Glu Ala Leu Val His Arg Phe Leu	Ala Gly Glu Ile Ser Trp His Gln	
340	345	350
Ile Val Pro Lys Leu Gln Ala Leu	Val Asp Gln His Arg Val Gln Ser	
355	360	365
Cys Leu Ser Leu Glu Glu Ile Leu	Ser Val Asp Ala Glu Ala Arg Ala	
370	375	380
Arg Ala Gln Glu Cys		
385		

<210> SEQ ID NO 202
 <211> LENGTH: 1170
 <212> TYPE: DNA
 <213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 202

```

gtaaggcaat gtagagaata cgaggttctt ttgaagcatt tagcactgat aggggtcaaca    60
gggagtgattg gtagacaggt ttacaagta gtctgttcta ttcccgatac ttttattata    120
gaaactcttg ctgcgtatgg acggaatcaa gaagcattga tttctcagat tagagagttt    180
aatcctcgcg tggtagccgt tcgtgaagaa acaacttaca aggagctccg taagttatct    240
cctcatattg agattctttt aggagaagag gggttagttt ctggttgctac agaaccttct    300
gtaacaatga ccattgtagc ttcgtctggt atagatgctt taccagcagt cattgcagct    360
atccgacaga aaaagacaat agctttggct aataaagagt cgtagtggtc agctggagag    420
ttggttacca ctttggttag agagaatggt gtgcagatc ttcccatcga tagtgaacat    480
aacgcacttt tccagtgcct agaaggaaga gactcttcta ccattaaaaa attattgtta    540
acagcttctg gagggccgtt aaggaataaa tcaaaagaag aattacaaaa ggtctcttta    600
caagaggtct tgcgacaccc tggttggaat atggggccca aaattacagt agattcttct    660
accttagtaa ataaaggctt agaaattata gaagctttct ggctatttgg gctggaagct    720
gtagagatag aggcggtgat ccactctcaa agtcttggtc atggaatggt ggagttttgt    780
gatggaacga tcttttctgt gatgaatcct ccagtatgct tatttccaat acaacatgtt    840
ttgactttcc cagaacgtag ccttgcaata ggtccaggat tcgattttct ttcaaatcgc    900
actctagagt ttttccgat agatgaagat agattcccta gtgttcactc agcaaagcga    960
gtgcttcttg aaaaggggtc tatgggggtg tttttcaatg gcgccaatga ggctttgggt   1020
catcgatttt tagcaggcga gatttcttgg catcaaatag ttcctaaatt acaagctctt   1080
gtggatcagc atcgctgca atctgtttta tccttggaag aaattctatc ggtagatgct   1140
gaggccagag ctctgtctca agagtgttaa                                     1170

```

<210> SEQ ID NO 203

-continued

```

<211> LENGTH: 148
<212> TYPE: PRT
<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 203

Ser Leu Ser Ile Val Arg Phe Met Thr Lys Val Tyr Ala Asn Ser Ile
1             5             10             15
Gln Gln Glu Arg Val Val Asp Arg Ile Ala Leu Leu Glu Arg Cys Leu
20             25             30
Asp Pro Ser Asn Ser Leu Pro Thr Ala Lys Arg Leu Val Ala Val Ala
35             40             45
Val Ala Thr Ile Leu Ala Val Ala Leu Leu Val Val Ala Gly Leu Leu
50             55             60
Phe Ser Gly Val Leu Cys Ser Pro Val Ser Val Leu Ala Ala Ser Leu
65             70             75             80
Phe Phe Gly Val Gly Ala Phe Leu Leu Gly Gly Ala Leu Val Gly Gly
85             90             95
Val Leu Thr Thr Glu Ala Val Thr Arg Glu Arg Leu His Arg Ser Gln
100            105            110
Thr Leu Met Trp Asn Asn Leu Cys Cys Lys Thr Ala Glu Val Glu Gln
115            120            125
Lys Ile Ser Thr Ala Ser Ala Asn Ala Lys Ser Asn Asp Lys Thr Arg
130            135            140

Lys Leu Gly Glu
145

```

```

<210> SEQ ID NO 204
<211> LENGTH: 447
<212> TYPE: DNA
<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 204

agtctgtcga tagtgagggt tatgactaag gtttatgcga atagcattca gcaagagaga      60
gttgtggata ggatagctct tttagagaga tgcttagacc cgagtaattc attgccgaca      120
gcgaaaagat tgggtggcagt tgctgtggcc actatattgg ccgtcgtctct tctagtgtgt      180
gcgggcttgt tgttctctgg agtgctctgt agccctgttt ctgttttagc ggcattctta      240
ttcttcgggg taggagcttt ccttttagga ggagctttgg ttggaggagt gctgactaca      300
gaagctgtga ctagagagcg gttgcatcga tcacaaactt tgatgtggaa caacttatgc      360
tgtaaaacag cagaggttga gcagaaaatc tcgacagcta gtgcaaatgc caaaagcaat      420
gataagactc gaaaactcgg tgagtaa                                           447

```

```

<210> SEQ ID NO 205
<211> LENGTH: 249
<212> TYPE: PRT
<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 205

Pro Asn Gly Glu Met Met Lys Lys Arg Val Lys Arg Val Leu Phe Lys
1             5             10             15
Ile Ser Gly Glu Ala Leu Ser Asp Gly Asp Ser Ser Asn Arg Ile Ser
20             25             30
Glu Glu Arg Leu Ser Arg Leu Ile Ala Glu Leu Lys Val Val Arg Asn
35             40             45

```

-continued

Ala Asp Val Glu Val Ala Leu Val Ile Gly Gly Gly Asn Ile Leu Arg
50 55 60

Gly Leu Ser Gln Ser Gln Ser Leu Gln Ile Asn Arg Val Ser Ala Asp
65 70 75 80

Gln Met Gly Met Leu Ala Thr Leu Ile Asn Gly Met Ala Leu Ala Asp
85 90 95

Ala Leu Lys Thr Glu Asp Val Pro Asn Leu Leu Thr Ser Thr Leu Ser
100 105 110

Cys Pro Gln Leu Ala Glu Leu Tyr Asn Pro Gln Lys Ala Ser Asp Ala
115 120 125

Leu Ser Gln Gly Lys Val Val Ile Cys Thr Met Gly Ala Gly Ala Pro
130 135 140

Tyr Leu Thr Thr Asp Thr Gly Ala Ala Leu Arg Ala Cys Glu Leu Lys
145 150 155 160

Val Asp Val Leu Leu Lys Ala Thr Met His Val Asp Gly Val Tyr Asp
165 170 175

Gln Asp Pro Arg Glu Cys Ala Asp Ala Val Arg Tyr Asp His Ile Ser
180 185 190

Tyr Arg Asp Phe Leu Ser Gln Gly Leu Gly Ala Ile Asp Pro Ala Ala
195 200 205

Ile Ser Leu Cys Met Glu Ala Gly Ile Pro Ile Lys Met Phe Ser Phe
210 215 220

Ala Arg His Ser Leu Glu Glu Ala Val Phe Asn Thr Val Gly Thr Val
225 230 235 240

Ile Ser Ser Thr Glu Gly Gly Gln Leu
245

<210> SEQ ID NO 206
<211> LENGTH: 750
<212> TYPE: DNA
<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 206

```
tcataattgt cctccttcg tagaagatat cactgtacca acagtattaa agactgcctc 60
ctctaaagaa tgtctagcaa agctaaacat ctttatgggg attcctgctt ccatacacia 120
agatatggct gccggatcga tcgctcccaa tccttgggag agaaagtctc tgtaagaaat 180
atgatcgtag cttactgcat cagcgcatc acgaggatct tggteatata ccccatccac 240
gtgcatagtc gcttttagta aaacatcgac ctttaattca caggctcgca aagctgcacc 300
tgtgtccggt gttagataag gagctcctgc tcccatgggt catatcacia ctttaccctg 360
gcttagggcg tcagatgctt ttgctggatt gtataactct gctaaactgt ggcatgacaa 420
agtcgatgta aataaattgg gcacatcctc agtcttcaaa gcacccgcta gcgccattcc 480
attaatcaat gtcgctaaca ttcccatctg atcagccgaa acccgattaa tctgcaggct 540
ctggctttgt gagagggcgc ggaggatatt gccccaccg attaccagcg caacctcaac 600
atctgcattg cggacgaatt ttaattccgc aattaatcgg gagagtcttt cttcactaat 660
tctattgcta gaattccat cagaaagagc ctctccagag atcttgaata aaactcgttt 720
cactcgtttt ttcacatctc cgccatttgg 750
```

<210> SEQ ID NO 207

-continued

```

<211> LENGTH: 246
<212> TYPE: PRT
<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 207
Ser Asn Glu Gln Arg Ser Glu Val Pro Cys Leu Leu Ala Leu Pro Lys
1          5          10          15
Asp Pro Tyr Leu Val Arg Arg Met Lys Phe Phe Ser Leu Ile Tyr Lys
20          25          30
Asp Gln Glu Val Val Pro Asn Lys Lys Val Leu Ser Pro Asp Ala Tyr
35          40          45
Thr Ala Val Leu Thr Ala Gln Glu Leu Leu Glu Lys Thr Gln Glu Asp
50          55          60
Cys Glu Ala Tyr Thr Gln Asn Thr His Glu Glu Cys Ala Lys Leu Arg
65          70          75          80
Glu Glu Ala Lys Asn Gln Gly Phe Gln Glu Gly Ser Lys Ala Trp Ser
85          90          95
Lys Gln Leu Ala Phe Leu Ile Thr Glu Thr Gln Ala Met Arg Glu Gln
100         105         110
Ile Lys Ala Ser Leu Val Pro Leu Ala Ile Ala Ser Ile Lys Lys Ile
115         120         125
Ile Gly Lys Glu Leu Glu Thr Lys Pro Glu Thr Val Val Ser Ile Ile
130         135         140
Ser Glu Ser Leu Lys Asp Leu Thr Gln Asn Lys Arg Ile Val Ile His
145         150         155         160
Ile Asn Pro Gln Asp Leu Ala Ile Val Glu Gln His Arg Pro Glu Leu
165         170         175
Lys Lys Leu Val Glu Tyr Ala Asp Val Leu Leu Leu Ser Pro Lys Ala
180         185         190
Ser Val Ser Pro Gly Gly Cys Ile Ile Glu Thr Glu Thr Gly Ile Val
195         200         205
Asn Ala Gln Leu Asp Val Gln Leu Ala Ala Leu Glu Gln Ala Phe Ser
210         215         220
Ala Ile Leu Lys His Lys Lys Pro Ala Asp Ala Ser Thr Ile Asp Gln
225         230         235         240
Pro Gln Ser Lys Lys Asp
245

```

```

<210> SEQ ID NO 208
<211> LENGTH: 741
<212> TYPE: DNA
<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 208
agtaacgagc aaaggagcga ggttcctgc ctgttggett tgccaaagga tcctacctc      60
gtcagaagga tgaaattttt cagtttaata tataaagacc aagaggctcg ccctaataaa      120
aaagttctct ccccgacgc ctatactgcg gtgttaactg cccaagaact tctggagaaa      180
acacaagaag attgtgaagc ttatacacag aatactcatg aagaatgcgc aaagctaagg      240
gaagaggcta agaatcaagg cttccaggaa ggaagcaaag cttggagcaa acagctcgcc      300
tttcttatta cagaaacaca agcgatgcga gaacagatta aagcctccct cgtgccttta      360
gcgattgcta gcatcaaaaa gatcatcggc aaagaattag aaactaaacc agaaactgtg      420

```

-continued

```

gtttctatca ttccagagtc tttaaaagac ctcaacgcaga ataaacggat tgtcatccac 480
atcaatccctc aggatctcgc cattgtcgaa caacatcgtc ctgagttaaa aaaactcgtg 540
gaatatgcag atgtgctttt actctctccc aaagccagtg tatccctgg aggttgatc 600
attgaaacag agaccggaat tgtaaatgct cagcttgatg tgcaactcgc tgcctggaa 660
caagctttct ctgccatcct aaaacataaa aaacctgcgg acgcctctac aatagatcag 720
cctcaaagca agaaagacta g 741

```

```

<210> SEQ ID NO 209
<211> LENGTH: 254
<212> TYPE: PRT
<213> ORGANISM: Chlamydia trachomatis

```

```

<400> SEQUENCE: 209

```

```

Lys Lys Asn Gln Phe Ala Ile Lys Gln Leu Lys Lys Val Arg Ile Ser
1          5          10          15
Met Asn Ile Ser Gly Ser Ile Lys Gln Lys Leu Leu Gln Phe Leu Lys
20        25        30
Lys Gln Lys Ser Pro Glu Leu Leu Ala Thr Tyr Leu Phe Tyr Leu Glu
35        40        45
Gln Ser Leu His Leu Ser Pro Val Val Phe Val Arg Asp Lys Ile Ile
50        55        60
Phe Lys Ser Ala Glu Asp Ala Ile Gln Leu Leu Glu Ala Asp Lys Lys
65        70        75        80
Ile Trp Arg Glu Thr Glu Ile Gln Ile Ser Ser Gly Lys Pro Glu Val
85        90        95
Asn Glu Gln Thr Lys Arg Ile Tyr Ile Cys Pro Phe Thr Gly Lys Val
100       105       110
Phe Ala Asp Asn Val Tyr Ala Asn Pro Gln Asp Ala Ile Tyr Asp Trp
115       120       125
Leu Ser Ser Cys Pro Gln Asn Arg Glu Arg Gln Ser Gly Val Ala Val
130       135       140
Lys Arg Phe Leu Val Ser Asp Asp Pro Glu Val Ile Arg Ala Tyr Ile
145       150       155       160
Val Pro Pro Lys Glu Pro Ile Ile Lys Thr Val Tyr Ala Ser Ala Val
165       170       175
Thr Gly Lys Leu Phe His Ser Leu Pro Thr Leu Leu Glu Asp Phe Lys
180       185       190
Thr Ser Tyr Leu Arg Pro Met Thr Leu Glu Glu Val Gln Asn Gln Asn
195       200       205
Lys Phe Gln Leu Glu Ser Ser Phe Leu Thr Leu Leu Gln Asp Ala Leu
210       215       220
Glu Glu Glu Lys Ile Ala Glu Phe Val Glu Ser Leu Ala Asp Asp Thr
225       230       235       240
Ala Phe His Lys Tyr Ile Ser Gln Trp Val Asp Thr Glu Glu
245       250

```

```

<210> SEQ ID NO 210
<211> LENGTH: 765
<212> TYPE: DNA
<213> ORGANISM: Chlamydia trachomatis

```

```

<400> SEQUENCE: 210

```

-continued

```

ttactcttct gtatctaccc attggctaatt gtacttatga aacgctgtgt catccgcaag    60
gctttcgaca aactcagcga tcttttcctc ctctaaagca tcttgtaata gagtcaaaaa    120
tgagctttct aattggaact tattctgatt ttgtacttct tcgagagtca taggacgtaa    180
gtaagaagtt ttaaaatcct ccaagagagt tggtaaaactg tggaacaact tcctgtttac    240
tgcagaagca tagacagtct taatgattgg ttcttttggc ggaacaatgt aggctctgat    300
cacttcagga tcatcggata ctaaaaaacg ttgacagct acaccactct gacgctctct    360
attctgaggg caagaagaaa gccagtcata aatagcatcc tgagggtttg cgtagacgtt    420
atcagcaaaa accttcccag taaacggaca aatgtaaata cgctttgtct gctcattcac    480
ctctgggtta ccagaagaaa ttgaaatctc tgtttctctc cagatcttct tgtccgcctc    540
taacagctga atcgcatctt ctgcgctttt aaaaatgatt ttatcccgaa caaaaacaac    600
cggactcaag tgcaaagact gctctaaata aaacaagtac gttgctaaca attctgggga    660
tttttgcttt ttcaaaaact ggagaagttt ttgtttgata cttccagaaa tattcatact    720
tatacttact tttttcagtt gcttaatggc aaactgattc ttctt                    765

```

<210> SEQ ID NO 211

<211> LENGTH: 271

<212> TYPE: PRT

<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 211

```

Lys Gly Ala Arg Leu Pro Pro Leu Gln Gly Leu His Leu Val Ile Asn
1          5          10          15
Met Lys Thr Ile Ala Val Asn Ser Phe Lys Gly Gly Thr Ala Lys Thr
20        25        30
Ser Thr Thr Leu His Leu Gly Ala Ala Leu Ala Gln Tyr His Lys Ala
35        40        45
Arg Val Leu Leu Ile Asp Phe Asp Ala Gln Ala Asn Leu Thr Ala Gly
50        55        60
Leu Gly Leu Asp Pro Asp Cys Tyr Asp Ser Leu Ala Val Val Leu Gln
65        70        75        80
Gly Glu Lys Asn Ile Glu Glu Val Ile Arg Pro Ile Asp Ser Ser Gly
85        90        95
Leu Asp Leu Ile Pro Ala Asp Thr Trp Leu Glu Arg Val Glu Val Ser
100       105       110
Gly Ser Leu Ala Ala Asp Arg Tyr Ser His Glu Arg Leu Lys Ile Ile
115       120       125
Leu Ser Lys Ile Glu His Arg Tyr Asp Tyr Val Ile Ile Asp Thr Pro
130       135       140
Pro Ser Leu Cys Trp Leu Thr Glu Ser Ala Leu Ile Ala Ala Gln His
145       150       155       160
Ala Leu Ile Cys Ala Thr Pro Glu Phe Tyr Ser Val Lys Gly Leu Glu
165       170       175
Arg Leu Ala Thr Phe Ile Gln Gly Ile Ser Ser Arg His Pro Leu Asn
180       185       190
Ile Leu Gly Val Thr Leu Ser Phe Trp Asn Tyr Arg Gly Lys Asn Asn
195       200       205
Ala Ala Phe Thr Glu Leu Ile Gln Lys Thr Phe Pro Gly Lys Leu Leu
210       215       220

```

-continued

```

Asn Thr Arg Ile Arg Arg Asp Ile Thr Ile Ser Glu Ala Ala Ile His
225                230                235                240

Gly Lys Pro Val Phe Ser Thr Ala Pro Ser Ala Arg Ala Ser Glu Asp
                245                250                255

Tyr Leu Lys Leu Thr Glu Glu Leu Leu Phe Leu Leu Arg Asn Ile
                260                265                270

```

```

<210> SEQ ID NO 212
<211> LENGTH: 816
<212> TYPE: DNA
<213> ORGANISM: Chlamydia trachomatis

```

```

<400> SEQUENCE: 212

```

```

aaaggagcga ggcttcctcc cctacaaggg cttcacctcg tgataaacat gaaaacaatc      60
gctgttaata gtttcaaagg cggcacagca aaaacctcta caacctcca ttaggagacc      120
gcattagcgc aatatcataa agcacgcgtt ctactcatcg atttcgatgc acaagcgaat      180
cttacggcag gattaggcct agatcctgat tgttatgata gccttgctgt tgttctacaa      240
ggagaaaaaa acatagaaga ggtcatccgt cctattgatt cctcaggatt agatctcatc      300
cctgccgata cttgggttga acgtgtggaa gtctctggat ctttggtctg tgatcgttat      360
tctcatgaac gattaaagat tattctttct aagatagaac atcgatacga ctatgtcatt      420
atcgacacac ctctctcttt atgttggctc acagaatcag ctctaatcgc tgetcaacat      480
gcactcatct gcgctacacc agaattctat agtggttaaag gcttagaaaag gcttgccacc      540
tttattcaag ggatctcatc gcgacacct ctcaatattt taggagtcac gctatctttt      600
tggaattaca gagggaaaaa taacgcagcc ttcacagagc taattcaaaa aacgttcctt      660
gggaaacttc ttaacacgcg catcacgaga gatattacta tctcagaagc cgctatccat      720
gggaaacctg ttttctccac agccccctca gcgcgagcct cggaagacta tctaaaatta      780
actgaagaac tgctattttt gttaaggaac atctaa                                816

```

```

<210> SEQ ID NO 213
<211> LENGTH: 601
<212> TYPE: PRT
<213> ORGANISM: Chlamydia trachomatis

```

```

<400> SEQUENCE: 213

```

```

Val Phe Ile Leu Val Leu Gly Trp Phe Val Met Ser Ile Arg Gly Val
1             5             10            15

Gly Gly Asn Gly Asn Ser Arg Ile Pro Ser His Asn Gly Asp Gly Ser
20            25            30

Asn Arg Arg Ser Gln Asn Thr Lys Gly Asn Asn Lys Val Glu Asp Arg
35            40            45

Val Cys Ser Leu Tyr Ser Ser Arg Ser Asn Glu Asn Arg Glu Ser Pro
50            55            60

Tyr Ala Val Val Asp Val Ser Ser Met Ile Glu Ser Thr Pro Thr Ser
65            70            75            80

Gly Glu Thr Thr Arg Ala Ser Arg Gly Val Phe Ser Arg Phe Gln Arg
85            90            95

Gly Leu Val Arg Val Ala Asp Lys Val Arg Arg Ala Val Gln Cys Ala
100           105           110

Trp Ser Ser Val Ser Thr Arg Arg Ser Ser Ala Thr Arg Ala Ala Glu
115           120           125

```

Ser 130	Gly	Ser	Ser	Ser	Arg	Thr 135	Ala	Arg	Gly	Ala	Ser 140	Ser	Gly	Tyr	Arg
Glu 145	Tyr	Ser	Pro	Ser	Ala 150	Ala	Arg	Gly	Leu	Arg 155	Leu	Met	Phe	Thr	Asp 160
Phe	Trp	Arg	Thr	Arg 165	Val	Leu	Arg	Gln	Thr 170	Ser	Pro	Met	Ala	Gly 175	Val
Phe	Gly	Asn 180	Leu	Asp	Val	Asn	Glu	Ala 185	Arg	Leu	Met	Ala	Ala	Tyr	Thr
Ser	Glu	Cys 195	Ala	Asp	His	Leu	Glu 200	Ala	Asn	Lys	Leu	Ala 205	Gly	Pro	Asp
Gly	Val 210	Ala	Ala	Ala	Arg	Glu 215	Ile	Ala	Lys	Arg 220	Trp	Glu	Gln	Arg	Val
Arg 225	Asp	Leu	Gln	Asp	Lys 230	Gly	Ala	Ala	Arg	Lys 235	Leu	Leu	Asn	Asp	Pro 240
Leu	Gly	Arg	Arg	Thr 245	Pro	Asn	Tyr	Gln	Ser 250	Lys	Asn	Pro	Gly	Glu 255	Tyr
Thr	Val	Gly	Asn 260	Ser	Met	Phe	Tyr	Asp 265	Gly	Pro	Gln	Val	Ala	Asn	Leu
Gln	Asn 275	Val	Asp	Thr	Gly	Phe	Trp 280	Leu	Asp	Met	Ser	Asn 285	Leu	Ser	Asp
Val 290	Val	Leu	Ser	Arg	Glu	Ile 295	Gln	Thr	Gly	Leu	Arg 300	Ala	Arg	Ala	Thr
Leu 305	Glu	Glu	Ser	Met 310	Pro	Met	Leu	Glu	Asn 315	Leu	Glu	Glu	Arg	Phe	Arg 320
Arg	Leu	Gln	Glu	Thr 325	Cys	Asp	Ala	Ala	Arg 330	Thr	Glu	Ile	Glu	Glu 335	Ser
Gly	Trp	Thr	Arg 340	Glu	Ser	Ala	Ser	Arg 345	Met	Glu	Gly	Asp 350	Glu	Ala	Gln
Gly	Pro 355	Ser	Arg	Ala	Gln	Gln	Ala 360	Phe	Gln	Ser	Phe	Val 365	Asn	Glu	Cys
Asn 370	Ser	Ile	Glu	Phe	Ser	Phe 375	Gly	Ser	Phe	Gly	Glu 380	His	Val	Arg	Val
Leu 385	Cys	Ala	Arg	Val 390	Ser	Arg	Gly	Leu	Ala 395	Ala	Ala	Gly	Glu	Ala	Ile 400
Arg	Arg	Cys	Phe	Ser 405	Cys	Cys	Lys	Gly	Ser 410	Thr	His	Arg	Tyr	Ala 415	Pro
Arg	Asp	Asp	Leu	Ser 420	Pro	Glu	Gly	Ala 425	Ser	Leu	Ala	Glu 430	Thr	Leu	Ala
Arg	Phe 435	Ala	Asp	Asp	Met	Gly	Ile 440	Glu	Arg	Gly	Ala 445	Asp	Gly	Thr	Tyr
Asp 450	Ile	Pro	Leu	Val	Asp 455	Asp	Trp	Arg	Arg	Gly	Val 460	Pro	Ser	Ile	Glu
Gly 465	Glu	Gly	Ser	Asp 470	Ser	Ile	Tyr	Glu	Ile 475	Met	Met	Pro	Ile	Tyr	Glu 480
Val	Met	Asp	Met	Asp 485	Leu	Glu	Thr	Arg	Arg 490	Ser	Phe	Ala	Val	Gln 495	Gln
Gly	His 500	Tyr	Gln	Asp	Pro	Arg	Ala	Ser 505	Asp	Tyr	Asp	Leu 510	Pro	Arg	Ala
Ser	Asp 515	Tyr	Asp	Leu	Pro	Arg	Ser 520	Pro	Tyr	Pro	Thr 525	Pro	Pro	Leu	Pro

-continued

Pro	Arg	Tyr	Gln	Leu	Gln	Asn	Met	Asp	Val	Glu	Ala	Gly	Phe	Arg	Glu
530						535					540				
Ala	Val	Tyr	Ala	Ser	Phe	Val	Ala	Gly	Met	Tyr	Asn	Tyr	Val	Val	Thr
545					550					555					560
Gln	Pro	Gln	Glu	Arg	Ile	Pro	Asn	Ser	Gln	Gln	Val	Glu	Gly	Ile	Leu
				565					570					575	
Arg	Asp	Met	Leu	Thr	Asn	Gly	Ser	Gln	Thr	Phe	Arg	Asp	Leu	Met	Arg
			580					585					590		
Arg	Trp	Asn	Arg	Glu	Val	Asp	Arg	Glu							
		595					600								

<210> SEQ ID NO 214

<211> LENGTH: 1806

<212> TYPE: DNA

<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 214

```

gtttttatatt tagttttggg ttggtttgtt atgagcatca ggggagtagg aggcaacggg      60
aatagtcgaa tccttctctca taatggggat ggatcgaaac gcagaagtca aaatacgaag      120
ggtaataata aagttaaga tcgagtttgt tctctatatt catctcgtag taacgaaaat      180
agagaatctc cttatgcagt agtagacgtc agctctatga tcgagagcac cccaacgagt      240
ggagagacga caagagcttc gcgtggagtg ttcagtcgtt tccaaagagg ttagtacga      300
gtagctgaca aagtaagacg agctgttcag tgtgcgtgga gttcagctc tacaagaaga      360
tcgtctgcaa caagagccgc agaatccgga tcaagtagtc gtactgctcg tggtgcaagt      420
tctgggtata gggagtattc tccttcagca gctagagggc tgcgtcttat gttcacagat      480
ttctggagaa ctccgggtttt acgccagacc tctcctatgg ctggagtttt tgggaatctt      540
gatgtgaacg aggtcgtgtt gatggctgcg tacacaagtg agtgccgcca tcatttagaa      600
gcgaacaagt tggctggccc tgacggggta gcggccgccc gggaaattgc taaaagatgg      660
gagcaaagag ttagagatct acaagataaa ggtgctgcac gaaaattatt aaatgatcct      720
ttaggccgac gaacacctaa ttatcagagc aaaaatccag gtgagtatac tgtagggaat      780
tccatgtttt acgatgtgtc tcaggtagcg aatctccaga acgtcgacac tggtttttgg      840
ctggacatga gcaatctctc agacgttgta ttatccagag agattcaaac aggacttcga      900
gcacgagcta ctttgaaga atccatgccg atgttagaga atttagaaga gcgtttttaga      960
cgtttgcaag aaacttgtag tgccgctcgt actgagatag aagaatcggg atggactcga     1020
gagtccgcat caagaatgga aggcgatgag gcgcaaggac cttctagagc acaacaagct     1080
tttcagagct ttgtaaatga atgtaacagc atcgagttct catttgggag ctttggagag     1140
catgtgcgag ttctctgcgc tagagtatca cgaggattag ctgccgcagg agaggcgatt     1200
cgccgttgct tctcttggtg taaaggatcg acgcatcgct acgctcctcg cgatgaccta     1260
tctcctgaag gtgcatcggt agcagagact ttggctagat tcgcagatga tatgggaata     1320
gagcgagggtg ctgatggaac ctacgatatt cctttggtag atgattggag aagaggggtt     1380
cctagtattg aaggagaagg atctgactcg atctatgaaa tcatgatgcc tatctatgaa     1440
gttatggata tggatctaga aacacgaaga tcttttgctg tacagcaagg gcactatcag     1500
gacccaagag cttcagatta tgacctccca cgtgctagcg actatgattt gcctagaagc     1560
ccatatccta ctccaccttt gcctcctaga tatcagctac agaatatgga tgtagaagca     1620

```

-continued

```

gggttcctg aggcagttta tgcttctttt gtagcaggaa tgtacaatta ttagtgaca 1680
cagccgcaag agcgtattcc caatagtcag caggtggaag ggattctgcg tgatatgctt 1740
accaacgggt cacagacatt tagagacctg atgaggcggt ggaatagaga agtcgatagg 1800
gaataa 1806

```

```

<210> SEQ ID NO 215
<211> LENGTH: 416
<212> TYPE: PRT
<213> ORGANISM: Chlamydia trachomatis

```

```

<400> SEQUENCE: 215

```

```

Val Gln Phe Leu Phe Trp Ala Lys Asp Ile Gly Ser Lys Leu Ile Phe
1      5      10
Asn Leu Arg Ile Phe Glu Met Ser Lys Glu Thr Phe Gln Arg Asn Lys
20     25     30
Pro His Ile Asn Ile Gly Thr Ile Gly His Val Asp His Gly Lys Thr
35     40     45
Thr Leu Thr Ala Ala Ile Thr Arg Ala Leu Ser Gly Asp Gly Leu Ala
50     55     60
Asp Phe Arg Asp Tyr Ser Ser Ile Asp Asn Thr Pro Glu Glu Lys Ala
65     70     75     80
Arg Gly Ile Thr Ile Asn Ala Ser His Val Glu Tyr Glu Thr Ala Asn
85     90     95
Arg His Tyr Ala His Val Asp Cys Pro Gly His Ala Asp Tyr Val Lys
100    105    110
Asn Met Ile Thr Gly Ala Ala Gln Met Asp Gly Ala Ile Leu Val Val
115    120    125
Ser Ala Thr Asp Gly Ala Met Pro Gln Thr Lys Glu His Ile Leu Leu
130    135    140
Ala Arg Gln Val Gly Val Pro Tyr Ile Val Val Phe Leu Asn Lys Ile
145    150    155    160
Asp Met Ile Ser Glu Glu Asp Ala Glu Leu Val Asp Leu Val Glu Met
165    170    175
Glu Leu Val Glu Leu Leu Glu Glu Lys Gly Tyr Lys Gly Cys Pro Ile
180    185    190
Ile Arg Gly Ser Ala Leu Lys Ala Leu Glu Gly Asp Ala Ala Tyr Ile
195    200    205
Glu Lys Val Arg Glu Leu Met Gln Ala Val Asp Asp Asn Ile Pro Thr
210    215    220
Pro Glu Arg Glu Ile Asp Lys Pro Phe Leu Met Pro Ile Glu Asp Val
225    230    235    240
Phe Ser Ile Ser Gly Arg Gly Thr Val Val Thr Gly Arg Ile Glu Arg
245    250    255
Gly Ile Val Lys Val Ser Asp Lys Val Gln Leu Val Gly Leu Arg Asp
260    265    270
Thr Lys Glu Thr Ile Val Thr Gly Val Glu Met Phe Arg Lys Glu Leu
275    280    285
Pro Glu Gly Arg Ala Gly Glu Asn Val Gly Leu Leu Leu Arg Gly Ile
290    295    300
Gly Lys Asn Asp Val Glu Arg Gly Met Val Val Cys Leu Pro Asn Ser
305    310    315    320

```

-continued

Val Lys Pro His Thr Gln Phe Lys Cys Ala Val Tyr Val Leu Gln Lys
325 330 335

Glu Glu Gly Gly Arg His Lys Pro Phe Phe Thr Gly Tyr Arg Pro Gln
340 345 350

Phe Phe Phe Arg Thr Thr Asp Val Thr Gly Val Val Thr Leu Pro Glu
355 360 365

Gly Ile Glu Met Val Met Pro Gly Asp Asn Val Glu Phe Glu Val Gln
370 375 380

Leu Ile Ser Pro Val Ala Leu Glu Glu Gly Met Arg Phe Ala Ile Arg
385 390 395 400

Glu Gly Gly Arg Thr Ile Gly Ala Gly Thr Ile Ser Lys Ile Ile Ala
405 410 415

<210> SEQ ID NO 216

<211> LENGTH: 1251

<212> TYPE: DNA

<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 216

ttatgcaatg atcttagaaa tagttccagc accgattgta cgaccacctt cacgaatcgc 60

aaatctcata ccttcttcta aagccacagg gctaataaat tgcacttcaa actcaacgtt 120

atccccaggc atgaccatct caattccctc aggcagagtt accacacctg tgacgtctgt 180

tgtacggaag aagaattgag gtctatatcc tgtgaagaaa ggcttatgtc gtccaccttc 240

ttctttttgc aaaacgtaaa cagcacactt gaactgtgta tgaggtttaa cactgtttgg 300

caagcaaaca accattcctc ttccacatc gttcttacca atacctctga ggagcaatcc 360

aacgttctct cctgcacgac cttctgggag ttcttttctg aacatttcaa cccagtaac 420

aatcgtttct ttagtatctc taagaccgac caactgaact ttatcggaaa ctttaacaat 480

tccacgctca atacgtccag ttactacagt tcctcggtccg gagatagaga atacgtcctc 540

aataggcatt aagaaaggct tgtcaatttc tctttctgga gtagggatgt tatcatcgac 600

ggcttgcatt agctctcgaa ctttctctat gtatgcagca tccccttcca aagctttcag 660

agcagaacct ctgatgattg gacacccttt gtatcctttc tcttcaagaa gctcaaccaa 720

ctccatctca actaagtcga ccaattcagc gtcttcttcg gaaatcatgt caattttatt 780

gagaaaaaca acgatgtaag gaacccaac ttgtcttgcc aaaagaatat gctctttagt 840

ttgaggcata gctccgtctg ttgcagaaac tactagaata gccccgtcca tttgagctgc 900

accggtgatc atgtttttaa catagtcagc gtgaccaggg cagtccacgt gagcgtagtg 960

acgattagct gtttcgtact caacgtggga agcgttaatt gtaataccgc gagctttttc 1020

ttcaggagtg ttgtcaatag agctataatc acgaaaatca gccaacccat ctccagacaa 1080

cgcacgcgta atagcagctg tcaacgtagt cttaccatgg tcaacgtggc caatgggtccc 1140

tatgttgata tgaggcttat tacgttgaaa agtttctttt gacatctcaa aaatcctcaa 1200

attaaaaatt agtttgctac caatatcttt tgcccagaat aggaattgaa c 1251

<210> SEQ ID NO 217

```
<211> LENGTH: 616
```

```
<212> TYPE: PRT
```

<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 217

-continued

Thr	Ala	Ser	Ser	Lys	Glu	Arg	Phe	Met	Thr	Thr	Ala	Thr	Thr	Ser	Gln	1	5	10	15
Thr	Ala	Leu	Arg	Ser	Arg	Lys	Asp	Val	Pro	Leu	Ser	Asp	Cys	Trp	Asp	20	25	30	
Thr	Lys	Ser	Leu	Tyr	Ala	Ser	Arg	Glu	Val	Trp	Gln	Asp	Glu	Leu	Lys	35	40	45	
Lys	Val	Gly	Ala	Glu	Gly	Ala	Pro	Phe	Trp	Pro	His	Leu	Ser	Glu	Asn	50	55	60	
Asn	Phe	Asp	Ile	Lys	Gln	Pro	Ser	Ser	Leu	Arg	Glu	Leu	Leu	Thr	Thr	65	70	75	80
Val	Phe	Ser	Ile	Glu	Arg	Thr	Leu	Asp	Lys	Leu	Tyr	Val	Tyr	Ala	His	85	90	95	
Leu	Thr	Tyr	Asp	Glu	Asp	Ile	Ala	Asn	Gln	Glu	Ala	Ala	Ala	Asp	Leu	100	105	110	
Lys	Ser	Ile	Thr	Phe	Leu	Leu	Thr	Ser	Phe	Val	Glu	Glu	Ile	Ser	Trp	115	120	125	
Ile	Gln	Pro	Ala	Leu	Ile	Ala	Leu	Pro	Gln	Gln	Val	Val	Asn	Met	Leu	130	135	140	
Leu	Ala	Ser	Pro	Glu	Leu	Gln	Glu	Tyr	His	Phe	Tyr	Leu	Lys	Lys	Leu	145	150	155	160
Phe	Arg	Leu	Ala	Pro	His	Thr	Gly	Thr	Ser	Arg	Glu	Glu	Lys	Ile	Leu	165	170	175	
Ala	Ser	Ser	Phe	Pro	Ala	Leu	Glu	Val	Ala	Tyr	Lys	Thr	Phe	Ser	Ser	180	185	190	
Leu	Thr	Asp	Ser	Glu	Ile	Pro	Phe	Gly	Glu	Ala	Val	Asp	Ser	Glu	Gly	195	200	205	
Lys	Ser	His	Pro	Leu	Ser	His	Ala	Leu	Ala	Ser	Leu	Tyr	Met	Gln	Ser	210	215	220	
Thr	Asp	Arg	Glu	Leu	Arg	Lys	Asn	Thr	Tyr	Gln	Lys	Gln	Cys	Gln	Arg	225	230	235	240
His	His	Gly	Tyr	Arg	Leu	Ser	Leu	Ala	Asn	Leu	Leu	Asn	Gly	Lys	Ile	245	250	255	
Gln	Ala	His	Leu	Phe	Asn	Ala	Lys	Ala	Arg	Asp	Tyr	Asp	Ser	Cys	Leu	260	265	270	
Glu	Ala	Ala	Leu	Phe	Gln	Asn	Asp	Ile	Ser	Thr	Ser	Val	Val	Thr	Thr	275	280	285	
Leu	Ile	Asp	Thr	Val	Lys	Gln	His	Thr	His	Leu	Ile	Thr	Glu	Tyr	Phe	290	295	300	
Gln	Leu	Lys	Gln	Lys	Ala	Leu	Gly	Leu	Ser	Asp	Phe	His	Phe	Tyr	Asp	305	310	315	320
Val	Tyr	Ala	Pro	Leu	Val	Ala	Ser	Glu	Ala	Ser	Arg	His	Tyr	Ser	Tyr	325	330	335	
Gln	Glu	Ala	Val	Thr	Leu	Ile	Cys	Asp	Ser	Leu	Ser	Leu	Leu	Gly	Asn	340	345	350	
Asp	Tyr	Val	Glu	Thr	Leu	Arg	Lys	Gly	Leu	Thr	Ser	Asp	Gly	Trp	Val	355	360	365	
Asp	Lys	Tyr	Glu	Asn	Thr	Asn	Lys	Arg	Ser	Gly	Ala	Tyr	Ser	Ser	Gly	370	375	380	
Cys	Tyr	Asp	Ser	Lys	Pro	Tyr	Ile	Leu	Leu	Asn	Tyr	Thr	Gly	Thr	Leu	385	390	395	400

-continued

Tyr	Asp	Val	Ser	Val	Val	Ala	His	Glu	Gly	Gly	His	Ser	Met	His	Ser
				405					410					415	
Phe	Leu	Ser	His	Lys	His	Gln	Ser	Tyr	His	Glu	Ala	Gln	Tyr	Pro	Ile
			420					425					430		
Phe	Leu	Ala	Glu	Ile	Ala	Ser	Thr	Leu	Asn	Glu	Thr	Leu	Leu	Met	Glu
		435					440					445			
Phe	Leu	Leu	Lys	Gln	Ala	Pro	Ser	Lys	Glu	Glu	Lys	Ile	Ala	Ile	Leu
	450					455					460				
Ser	Arg	Ser	Leu	Asp	Thr	Val	Phe	Ala	Thr	Leu	Phe	Arg	Gln	Thr	Leu
465					470					475					480
Phe	Ala	Ala	Phe	Glu	Leu	Glu	Met	His	Ser	Ala	Ala	Glu	Gln	Gly	Leu
			485						490					495	
Pro	Leu	Thr	Glu	Glu	Phe	Phe	Ser	Gln	Ser	Tyr	Glu	Lys	Leu	Gln	Arg
			500					505					510		
Leu	Phe	Tyr	Gly	Asp	Cys	Ile	Thr	Phe	Asp	Glu	His	Ser	Cys	Ile	Glu
	515						520					525			
Trp	Ala	Arg	Ile	Pro	His	Phe	Tyr	Tyr	Asn	Phe	Tyr	Val	Tyr	Gln	Tyr
	530					535					540				
Ala	Thr	Gly	Ile	Ile	Ala	Ser	Leu	Cys	Phe	Ser	Glu	Arg	Ile	Leu	Ser
545					550				555					560	
Gly	Glu	Glu	Gly	Ala	Gln	Glu	Ala	Tyr	Leu	Thr	Phe	Leu	Arg	Ser	Gly
			565					570					575		
Gly	Ser	Asp	Phe	Pro	Ile	Glu	Ile	Leu	Lys	Lys	Ser	Gly	Leu	Asp	Met
	580							585					590		
Thr	Ser	Ser	Ala	Pro	Met	Leu	Lys	Ala	Phe	Ser	Tyr	Ile	Glu	Arg	Lys
	595					600					605				
Leu	Glu	Glu	Leu	Ala	Ser	Leu	Leu								
	610				615										

<210> SEQ ID NO 218

<211> LENGTH: 1851

<212> TYPE: DNA

<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 218

ttatagcaag ctactagtt cttccagctt ccgttcgatg taggaaaagg ctttaagcat	60
aggagctgat gaggtcatat ccaatccaga ttttttcaaa atttcgatag ggaaatcgga	120
tccgccgcta cgcaaaaatg tgagatatgc ttcttgagca ccttcttctc cagaaagaat	180
tctttcagaa aaacacaacg atgcaatgat tctgtggcg tattgataaa catagaagtt	240
gtagtagaaa tgaggaaatgc gagccattc gatacagcta tgttcataaa aagttatgca	300
atcgccataa aataggcgct gcagtttctc gtaactttga gagaagaatt cttcagttaa	360
tgggagacct tgttcggctg cagaatgcac ttccagctca aaagcagcaa atagtgtttg	420
tccgaataaa gttgcaaaaa cagtgtctag agagcgagaa agaatagcaa tcttctcttc	480
tttagacgga gcttgtttta gcagaaatc catcaatagg gtttcattga gggttgaggc	540
gatttcagct agaaaaatcg gatactgagc ttcataataa ctttgatggt tatgaactaa	600
gaatgagtgc atactatgac caccttcgtg cgcaactacc gatacgtcgt ataacgttcc	660
tgtataattg agaagaatgt aaggtttgct gtcataaacac ccagacgaat atgctcctga	720
gcgtttgtta gtattttcat atttatctac ccattccatcg gaagtggagac ctttgcgtag	780

-continued

```

agtctctaca taatcggtcc ctaaaaggga caagctatcg cagatcagag tgacagcttc 840
ttgataagaa taatggcgtg aagcttcgct agcgaccaac ggtgcataga catcatagaa 900
atggaaatcc gagagaccaa gagctttttg ttttaactga aaatactcag tgatcagggtg 960
tgtgtgttgt ttaacggtat caatgagcgt ggtaaccaca gaagtgtga tatcattctg 1020
aaatagtgtc gcttctaaac aagaatcata atcgcgagct tttgcattga atagatgggc 1080
ttgaattttg ccattcagta gattcgcgag agataaacga taccctgat ggcgttgaca 1140
ttgtttctga taagtgtttt tgcgtagctc ccgatctgta gattgcatgt atagagaagc 1200
tagagcgtga gaaaggggat gagatttacc ttcggagtcg acagcttccc caaaaggaat 1260
ttcagaatct gttaagctag aaaaagtttt ataggctact tccaatgcag ggaaagaaga 1320
tgctaggatt ttttcttctc gagaagtccc tgtgtcggga gctaaacgga atagtttttt 1380
caaatagaaa tggatttctt gaagtccggg agaggcta at agcatattaa ccacttgctg 1440
agggagggcg ataagggccg gttgaatcca agaaatttcc tctacaaatg atgtgagcaa 1500
gaaggtaata gatttcagat cagctgcggc ttcttgatc gcaatctct catcataagt 1560
aagatgagcg tatacataaa gtttatccaa agttctttca atagaaaaga ctgtgggttag 1620
cagctcacga agagaagaag gttgttttat atcaaaattg ttttcgctaa ggtgaggcca 1680
aaatggagct ccttcagcac ctactttttt taattcgtct tgccagactt cagcactcgc 1740
atacaaaactt ttcgtatccc agcagtcaga aagaggaaca tcttttctag agcgtaaagc 1800
tgtttgtgaa gtagtagcag tggtcatgaa tctctcctta gaggaagctg t 1851

```

<210> SEQ ID NO 219

<211> LENGTH: 1258

<212> TYPE: PRT

<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 219

```

Ser Leu Arg Arg Ala Arg Met Phe Lys Cys Pro Glu Arg Val Ser Ile
1          5          10          15

Lys Lys Lys Glu Asp Ile Leu Asp Leu Pro Asn Leu Val Glu Val Gln
20          25          30

Ile Lys Ser Tyr Lys Gln Phe Leu Gln Ile Gly Lys Leu Ala Glu Glu
35          40          45

Arg Glu Asn Ile Gly Leu Glu Glu Val Phe Arg Glu Ile Phe Pro Ile
50          55          60

Lys Ser Tyr Asn Glu Ala Thr Ile Leu Glu Tyr Leu Ser Tyr Asn Leu
65          70          75          80

Gly Val Pro Lys Tyr Ser Pro Glu Glu Cys Ile Arg Arg Gly Ile Thr
85          90          95

Tyr Ser Val Thr Leu Lys Val Arg Phe Arg Leu Thr Asp Glu Thr Gly
100         105         110

Ile Lys Glu Glu Glu Val Tyr Met Gly Thr Ile Pro Ile Met Thr Asp
115         120         125

Lys Gly Thr Phe Ile Ile Asn Gly Ala Glu Arg Val Val Val Ser Gln
130         135         140

Val His Arg Ser Pro Gly Ile Asn Phe Glu Gln Glu Lys His Ser Lys
145         150         155         160

Gly Asn Val Leu Phe Ser Phe Arg Ile Ile Pro Tyr Arg Gly Ser Trp
165         170         175

```

-continued

Leu Glu Ala Val Phe Asp Ile Asn Asp Leu Ile Tyr Ile His Ile Asp
 180 185 190
 Arg Lys Lys Arg Arg Arg Lys Ile Leu Ala Met Thr Phe Ile Arg Ala
 195 200 205
 Leu Gly Tyr Ser Thr Asp Ala Asp Ile Ile Glu Glu Phe Phe Ser Val
 210 215 220
 Glu Glu Arg Ser Leu Arg Leu Glu Lys Asp Phe Val Ala Leu Val Gly
 225 230 235 240
 Lys Val Leu Ala Asp Asn Val Val Asp Ala Asp Ser Ser Leu Val Tyr
 245 250 255
 Gly Lys Ala Gly Glu Lys Leu Ser Thr Ala Met Leu Lys Arg Ile Leu
 260 265 270
 Asp Ala Gly Val Gln Ser Leu Lys Ile Ala Val Gly Ala Asp Glu Asn
 275 280 285
 His Pro Ile Ile Lys Met Leu Ala Lys Asp Pro Thr Asp Ser Tyr Glu
 290 295 300
 Ala Ala Leu Lys Asp Phe Tyr Arg Arg Leu Arg Pro Gly Glu Pro Ala
 305 310 315 320
 Thr Leu Val Asn Ala Arg Ser Thr Ile Met Arg Leu Phe Phe Asp Ala
 325 330 335
 Lys Arg Tyr Asn Leu Gly Arg Val Gly Arg Tyr Lys Leu Asn Lys Lys
 340 345 350
 Leu Gly Phe Pro Leu Asp Asp Glu Thr Leu Ser Gln Val Thr Leu Arg
 355 360 365
 Lys Glu Asp Val Ile Gly Ala Leu Lys Tyr Leu Ile Arg Leu Arg Met
 370 375 380
 Gly Asp Glu Lys Thr Ser Ile Asp Asp Ile Asp His Leu Ala Asn Arg
 385 390 395 400
 Arg Val Arg Ser Val Gly Glu Leu Ile Gln Asn His Cys Arg Ser Gly
 405 410 415
 Leu Ala Arg Met Glu Lys Ile Val Arg Glu Arg Met Asn Leu Phe Asp
 420 425 430
 Phe Ser Ser Asp Thr Leu Thr Pro Gly Lys Ile Ile Ser Ala Lys Gly
 435 440 445
 Leu Val Ser Val Leu Lys Asp Phe Phe Ser Arg Ser Gln Leu Ser Gln
 450 455 460
 Phe Met Asp Gln Thr Asn Pro Val Ala Glu Leu Thr His Lys Arg Arg
 465 470 475 480
 Leu Ser Ala Leu Gly Pro Gly Gly Leu Asn Arg Glu Arg Ala Gly Phe
 485 490 495
 Glu Val Arg Asp Val His Ala Ser His Tyr Gly Arg Ile Cys Pro Ile
 500 505 510
 Glu Thr Pro Glu Gly Pro Asn Ile Gly Leu Ile Thr Ser Leu Ser Ser
 515 520 525
 Phe Ala Lys Ile Asn Glu Phe Gly Phe Ile Glu Thr Pro Tyr Arg Val
 530 535 540
 Val Arg Asp Gly Ile Val Thr Asp Glu Ile Glu Tyr Met Thr Ala Asp
 545 550 555 560
 Val Glu Glu Glu Cys Val Ile Ala Gln Ala Ser Ala Glu Leu Asp Glu
 565 570 575

-continued

Tyr	Asp	Met	Phe	Lys	Thr	Pro	Val	Cys	Trp	Ala	Arg	Tyr	Lys	Gly	Glu
			580					585					590		
Ala	Phe	Glu	Ala	Asp	Thr	Ser	Thr	Val	Thr	His	Met	Asp	Val	Ser	Pro
		595					600					605			
Lys	Gln	Leu	Val	Ser	Val	Val	Thr	Gly	Leu	Ile	Pro	Phe	Leu	Glu	His
	610					615					620				
Asp	Asp	Ala	Asn	Arg	Ala	Leu	Met	Gly	Ser	Asn	Met	Gln	Arg	Gln	Ala
625					630					635					640
Val	Pro	Leu	Leu	Lys	Thr	Glu	Ala	Ala	Ile	Val	Gly	Thr	Gly	Leu	Glu
				645					650					655	
Gly	Arg	Ala	Ala	Lys	Asp	Ser	Gly	Ala	Ile	Ile	Val	Ala	Gln	Glu	Asp
			660					665					670		
Gly	Val	Val	Glu	Tyr	Val	Asp	Ser	Tyr	Glu	Ile	Val	Val	Ala	Lys	Lys
		675					680					685			
Asn	Asn	Pro	Thr	Leu	Lys	Asp	Arg	Tyr	Gln	Leu	Lys	Lys	Phe	Leu	Arg
	690					695					700				
Ser	Asn	Ser	Gly	Thr	Cys	Ile	Asn	Gln	Thr	Pro	Leu	Cys	Ser	Val	Gly
705					710				715						720
Asp	Val	Val	Thr	His	Gly	Asp	Val	Leu	Ala	Asp	Gly	Pro	Ala	Thr	Asp
				725				730						735	
Lys	Gly	Glu	Leu	Ala	Leu	Gly	Lys	Asn	Val	Leu	Val	Ala	Phe	Met	Pro
			740				745					750			
Trp	Tyr	Gly	Tyr	Asn	Phe	Glu	Asp	Ala	Ile	Ile	Ile	Ser	Glu	Arg	Leu
		755					760					765			
Ile	Lys	Gln	Asp	Ala	Tyr	Thr	Ser	Ile	Tyr	Ile	Glu	Glu	Phe	Glu	Leu
	770					775					780				
Thr	Ala	Arg	Asp	Thr	Lys	Leu	Gly	Lys	Glu	Glu	Ile	Thr	Arg	Asp	Ile
785					790					795					800
Pro	Asn	Val	Ser	Glu	Glu	Val	Leu	Ala	Asn	Leu	Gly	Glu	Asp	Gly	Val
			805						810					815	
Val	Arg	Ile	Gly	Ala	Glu	Val	Lys	Pro	Gly	Asp	Ile	Leu	Val	Gly	Lys
			820					825				830			
Ile	Thr	Pro	Lys	Ser	Glu	Thr	Glu	Leu	Ala	Pro	Glu	Glu	Arg	Leu	Leu
		835					840					845			
Arg	Ala	Ile	Phe	Gly	Glu	Lys	Ala	Ala	Asp	Val	Lys	Asp	Ala	Ser	Leu
	850					855					860				
Thr	Val	Pro	Pro	Gly	Thr	Glu	Gly	Val	Val	Met	Asp	Val	Lys	Val	Phe
865					870					875					880
Ser	Arg	Lys	Asp	Arg	Leu	Ser	Lys	Ser	Asp	Asp	Glu	Leu	Val	Glu	Glu
			885					890					895		
Ala	Val	His	Leu	Lys	Asp	Leu	Gln	Lys	Glu	Tyr	Lys	Ser	Gln	Leu	Ala
			900					905					910		
Gln	Leu	Lys	Val	Glu	His	Arg	Glu	Lys	Leu	Gly	Ala	Leu	Leu	Leu	Asn
		915					920					925			
Glu	Lys	Ala	Pro	Ala	Ala	Ile	Ile	His	Arg	Arg	Ser	Ala	Asp	Ile	Leu
		930				935					940				
Val	Gln	Glu	Gly	Ala	Ile	Phe	Asp	Gln	Glu	Thr	Ile	Glu	Leu	Leu	Glu
945					950					955					960
Arg	Glu	Ser	Leu	Val	Asp	Leu	Leu	Met	Ala	Pro	Cys	Asp	Met	Tyr	Asp
			965					970					975		
Val	Leu	Lys	Asp	Ile	Leu	Ser	Ser	Tyr	Glu	Thr	Ala	Val	Gln	Arg	Leu

-continued

980					985					990						
Glu	Val	Asn	Tyr	Lys	Thr	Glu	Ala	Glu	His	Ile	Lys	Glu	Gly	Asp	Ala	
995					1000					1005						
Asp	Leu	Asp	His	Gly	Val	Ile	Arg	Gln	Val	Lys	Val	Tyr	Val	Ala		
1010					1015					1020						
Ser	Lys	Arg	Lys	Leu	Gln	Val	Gly	Asp	Lys	Met	Ala	Gly	Arg	His		
1025					1030					1035						
Gly	Asn	Lys	Gly	Val	Val	Ser	Lys	Ile	Val	Pro	Glu	Ala	Asp	Met		
1040					1045					1050						
Pro	Phe	Leu	Ala	Asn	Gly	Glu	Thr	Val	Gln	Met	Ile	Leu	Asn	Pro		
1055					1060					1065						
Leu	Gly	Val	Pro	Ser	Arg	Met	Asn	Leu	Gly	Gln	Val	Leu	Glu	Thr		
1070					1075					1080						
His	Leu	Gly	Tyr	Ala	Ala	Lys	Thr	Ala	Gly	Ile	Tyr	Val	Lys	Thr		
1085					1090					1095						
Pro	Val	Phe	Glu	Gly	Phe	Pro	Glu	Ser	Arg	Ile	Trp	Asp	Met	Met		
1100					1105					1110						
Ile	Glu	Gln	Gly	Leu	Pro	Glu	Asp	Gly	Lys	Ser	Tyr	Leu	Phe	Asp		
1115					1120					1125						
Gly	Lys	Thr	Gly	Glu	Arg	Phe	Asp	Ser	Lys	Val	Val	Val	Gly	Tyr		
1130					1135					1140						
Ile	Tyr	Met	Leu	Lys	Leu	Ser	His	Leu	Ile	Ala	Asp	Lys	Ile	His		
1145					1150					1155						
Ala	Arg	Ser	Ile	Gly	Pro	Tyr	Ser	Leu	Val	Thr	Gln	Gln	Pro	Leu		
1160					1165					1170						
Gly	Gly	Lys	Ala	Gln	Met	Gly	Gly	Gln	Arg	Phe	Gly	Glu	Met	Glu		
1175					1180					1185						
Val	Trp	Ala	Leu	Glu	Ala	Tyr	Gly	Val	Ala	His	Met	Leu	Gln	Glu		
1190					1195					1200						
Ile	Leu	Thr	Val	Lys	Ser	Asp	Asp	Val	Ser	Gly	Arg	Thr	Arg	Ile		
1205					1210					1215						
Tyr	Glu	Ser	Ile	Val	Lys	Gly	Glu	Asn	Leu	Leu	Arg	Ser	Gly	Thr		
1220					1225					1230						
Pro	Glu	Ser	Phe	Asn	Val	Leu	Ile	Lys	Glu	Met	Gln	Gly	Leu	Gly		
1235					1240					1245						
Leu	Asp	Val	Arg	Pro	Met	Val	Val	Asp	Ala							
1250					1255											

<210> SEQ ID NO 220

<211> LENGTH: 3777

<212> TYPE: DNA

<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 220

```

ttaagcatct actaccatag ggcgaaacatc aagccctaga ccttgcatct ctttaatacaa    60
aacgttgaac gactcaggcg ttccagaacg aagtaagttt tctcctttca cgattgatcc    120
gtagatacga gttcttcccg aaacatcgct ggacttaaca gtcagaatct cttgtaacat    180
atgagctacc ccatacgect ctaaagccca tacctccatt tcccgaatc tctgtectcc    240
catctgcgct ttacctccaa gaggttgctg cgtaacgaga gagtaaggtc ctatagaacg    300
agcgtggatc ttatcagcaa ttaagtgact caatttcaac atgtagatgt atccaacgac    360

```

-continued

cactttgcta	tcgaaacgct	ctccggtttt	accatcaaat	aggtaagact	taccatcttc	420
gggcaatccc	tgctctatca	tcatatccca	aatacgagac	tctgggaacc	cttcaaagac	480
cggagttttc	acatagatac	ctgcagtttt	tgacagatat	cctaaatgtg	tctctaaaac	540
ctgtccaagg	ttcattcgag	aaggcacccc	taacgggttc	aaaatcatct	gtactgtttc	600
accgttagct	aagaaaggca	tgtctgcttc	tggaacaatc	ttggaaacca	ctcccttggt	660
tccgtgacgt	ccagccattt	tatccccaac	ttgaagtttt	cgcttggaag	ccacgtaaac	720
tttaacttgt	cggataaact	catgatctaa	gtcagcatca	ccttctttta	tgtgctcagc	780
ttcggtttta	taattgactt	ccaaacgctg	aacagctggt	tcatagctag	aaagaatata	840
tttcaaaaca	tcatacatgt	cacaaggagc	catcagcaaa	tcaactagcg	actctctttc	900
taagagtctg	atagtctctt	gatcaaaaat	agcaccttct	tgaacaaaaa	tatctgccga	960
acgacggtgt	ataatcgctg	caggagcttt	ttcattgagc	aatagagccc	ccagttttct	1020
tctatgttct	actttcaatt	gagctaactg	actcttatat	tctttctgta	gaccccttaag	1080
atgcacagct	tcttcaacca	gttcacatc	gctcttgga	aagcgatcct	ttctgctgaa	1140
tactttgaca	tccattacga	ctccttctgt	accaggagga	accgttagag	aggcatcttt	1200
tacgtccgcc	gccttctctc	caaaaatagc	tcgcaacaaa	cgctcttcag	gagctagtgc	1260
cgtctcagat	ttcggagtga	ttttaccgac	aagaatatct	cccggcttga	cttcagcccc	1320
aatacggacg	acaccatctc	ctccgagatt	tgccaaaacc	tcttcagaaa	cgtaggaat	1380
atctctagta	atttcttctt	taccgagttt	tgtatctcga	gctgttaact	caaattcttc	1440
tatgtaaata	gaagtgtacg	catcttgttt	aatcaacctc	tcggagatga	taatcgcatc	1500
ttcgaagtta	taccgtacc	aaggcatgaa	ggctactaat	acgtttttac	caagagccaa	1560
ttcccttta	tcggttgctg	ggccatccgc	taaaacatct	ccatgcgtaa	ccacatctcc	1620
cacagaacac	aaaggagttt	ggttgatgca	tgttcgggag	ttggatctta	agaatttttt	1680
aagctgataa	cgactcttaa	gcgttggtt	attcttcttc	gctacgacaa	tctcatagct	1740
atctacgtat	tcgactaccc	catcttctct	agccacaata	atagctccag	aatctttggc	1800
agcacgccct	tctaattccag	ttccaacaat	agcagcttcc	gttttcaata	atggtacagc	1860
ctgcggtgc	atgttcgatc	ccataagagc	tcggtttagca	tcgtcgtggt	ccaagaaagg	1920
aatcagcccc	gtaaccacag	ataccagctg	ttttggagaa	acgtccatat	gcgtaaccgt	1980
acttggtgctg	gcttcaaaaag	cctctccttt	gtatctagcc	cagcatacgg	gagttttaaa	2040
catatcatac	tcactgagct	ccgcagaagc	ctgagcaatg	acacactctt	cttcaacatc	2100
tgtgtgcata	tactcaattt	catctgtcac	gatgccatcg	cgcacgacac	gataaggagt	2160
ctctatgaat	ccaaattcat	tgatcttagc	aaaggaagac	agtgaagtaa	tcaacccaat	2220
gtttggtcct	tcaggagtct	caattggaca	aattctacca	tagtggttg	cgtgaacgtc	2280
tcgaacttca	aaccagctc	tttctctatt	caatccccc	ggctcctaatg	ctgacagacg	2340
acgcttgctg	gtcaattctg	cgacagggtt	tgtctgatcc	ataaactgag	ataattgaga	2400
acggctgaag	aaatctttca	ggacactgac	taacccttta	gcagaaataa	tctttctctg	2460
agttagggtta	tcagaagaga	aatcaagag	attcattctt	tctcgaacga	tcttttccat	2520
tctagccaat	ccagaacgac	agtgattctg	aattagttct	ccaacagagc	gaactcgtcg	2580
gtttgccaaa	tggtaaatat	catcgataga	tgtcttctca	tcgccattc	gcaaacgaat	2640

-continued

```

caaatatttc aacgcgcga taacatcttc ttttctcaaa gtcacttgag ataatgtttc 2700
gtcgtctaata gggaatccta attttttatt taatttataa cgtccaacgc ggcctaaatt 2760
atagcgttta gcacgaaga ataagcgcac aattgtggat cgagcattaa ctaaagtgtc 2820
aggctctect ggtcgtaate tgcgataaaa atctttaaga gcagcttcgt aagaatccgt 2880
aggatctttt gcgagcatct taataattgg gtgattttca tctgcgcaa cagcaatctt 2940
caaagattgg actcccgcat ctaagatgag ttttagcata gcagtactta gcttctctcc 3000
agctttcccg taaactaatg aagaatccgc atcaactacg ttatcagcta aaactttacc 3060
aactaacgcg acaaaaatct tctctaaacg taaggaacgc tcctctacag aaaagaactc 3120
ttcaataata tctgcatctg ttgaatatcc taaagctcgg ataaacgtca tagctaaaat 3180
ctttctgcga cgttttttcc tatcaatatg gatatagata aggtcattaa tgtcgaagac 3240
agcttctaac caacttctc gataaggaat aattctaaaa gaaaataaaa catttccttt 3300
agaatgtttt tctgtttcaa aattgattcc tggagaacgc tggacttgag aaacaacgac 3360
tctctctgcc ccattaataa taaaggttcc cttatcagtc atgatgggga tggttcccat 3420
atagacttct tcttctttta tcccgtttc atcagttaaa cggaaacgaa cctttaaagt 3480
aacactatag gtgattcccc gacgaataca ctctctctgg gagtatttgg gcaactctaa 3540
gttataagag aggtactcta aaatcgtagc ttcattataa gacttgatag ggaaaatttc 3600
tctgaagact tcttctaaac caatgttttc tcgctcttca gcaagcttcc cgatttgaag 3660
aaactgctta tacgacttga tttgaacttc gacaagatta ggaagatcta aaatatcttc 3720
tttctttttg atgctgaccg gctccgggca cttgaacatg cgagctctcc taagact 3777

```

<210> SEQ ID NO 221

<211> LENGTH: 250

<212> TYPE: PRT

<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 221

```

Asn Arg Gly Leu Ile Arg Thr Phe Phe Ala Ser Gly Tyr Val Glu Ser
1           5           10          15
Arg Lys Glu Met Met Glu Val Phe Met Asn Phe Leu Asp Gln Leu Asp
20          25          30
Leu Ile Ile Gln Asn Lys His Met Leu Glu His Thr Phe Tyr Val Lys
35          40          45
Trp Ser Lys Gly Glu Leu Thr Lys Glu Gln Leu Gln Ala Tyr Ala Lys
50          55          60
Asp Tyr Tyr Leu His Ile Lys Ala Phe Pro Lys Tyr Leu Ser Ala Ile
65          70          75          80
His Ser Arg Cys Asp Asp Leu Glu Ala Arg Lys Leu Leu Leu Asp Asn
85          90          95
Leu Met Asp Glu Glu Asn Gly Tyr Pro Asn His Ile Asp Leu Trp Lys
100         105         110
Gln Phe Val Phe Ala Leu Gly Val Thr Pro Glu Glu Leu Glu Ala His
115         120         125
Glu Pro Ser Glu Ala Ala Lys Ala Lys Val Ala Thr Phe Met Arg Trp
130         135         140
Cys Thr Gly Asp Ser Leu Ala Ala Gly Val Ala Ala Leu Tyr Ser Tyr
145         150         155         160

```


-continued

Glu Ser Gln Ile Pro Arg Ile Ala Arg Glu Lys Ile Arg Gly Leu Thr
165 170 175

Glu Tyr Phe Gly Phe Ser Asn Pro Glu Asp Tyr Ala Tyr Phe Thr Glu
180 185 190

His Glu Glu Ala Asp Val Arg His Ala Arg Glu Glu Lys Ala Leu Ile
195 200 205

Glu Met Leu Leu Lys Asp Asp Ala Asp Lys Val Leu Glu Ala Ser Gln
210 215 220

Glu Val Thr Gln Ser Leu Tyr Gly Phe Leu Asp Ser Phe Leu Asp Pro
225 230 235 240

Gly Thr Cys Cys Ser Cys His Gln Ser Tyr
245 250

<210> SEQ ID NO 222
 <211> LENGTH: 753
 <212> TYPE: DNA
 <213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 222

```
ttaataagat tgatgacaac tacaacaagt tcttgatcc aaaaaagaat ctaaaaagcc    60
atacaagat tgcgttactt cttgcgatgc ctctaacact ttatcagcgt catctttgag    120
aagcatctca atgagcgctt tttcttctct agcatgccgc acatccgctt cttcatgttc    180
tgtgaaatat gcatagtctt caggattgga aaatccaaag tactcagtca atccacgaat    240
tttctctcta gcgatacgtg gaatttgact ctcataagaa taaaagcag ccactcctgc    300
agctaaagaa tctcctgtac accaccgcat gaaagtagct actttcgctt ttgctgcttc    360
actaggctca tgagcctcta actcttctgg agtaactcct agagcaaaca caaactgctt    420
ccacaaatca atatgattag ggtaaccggt ctcttcatcc atcaagttat ctaacaataa    480
cttacgcgcc tctaaatcat cgcaacgact atgaatcgca gataaatatt taggaaaggc    540
tttgatatgt aaataatagt ctttggcata cgcttgaat tgctcttttag taagctcccc    600
cttcgaccat ttcacataaa atgtgtgttc tagcatatgc ttattttgaa taattaaatc    660
taactgatct aaaaaattca taaacacctc catcatttct tttcttgact ccacgtaacc    720
gcttgcaaaa aaggtccgta taagtcctct gtt                                753
```

<210> SEQ ID NO 223
 <211> LENGTH: 1462
 <212> TYPE: PRT
 <213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 223

Gly Ile Ile Leu Pro Ser Lys Ile Val Phe Gln Glu Ser Met Ala Asn
1 5 10 15

Pro Ser Thr Pro Ser Phe Asn His Ser Asp Leu Ser Leu Gln Gly Arg
20 25 30

Leu Arg Ala Ser Ser Gln Gln Cys Thr Gln Ala Gly Gln Gly Asp Pro
35 40 45

Gln Pro Leu Ser Pro Glu Ser Arg Gly Leu Thr Ser Asn Phe Ser Thr
50 55 60

Arg Arg Asp Leu Ile Asp Val Val Glu Glu Ser Ile Glu Thr Ala Lys
65 70 75 80

Gly Ser Glu Leu Lys Lys Leu Arg Ile Tyr Glu Ile Ala Leu Lys Ile

-continued

85								90				95			
Leu	Thr	Ile	Ile	Gly	Ala	Ala	Ile	Leu	Phe	Ala	Val	Pro	Leu	Cys	Met
100								105				110			
Leu	Leu	Gly	Val	Pro	Leu	Trp	Ile	Pro	Ile	Val	Thr	Cys	Ile	Gly	Val
115								120				125			
Gly	Ile	Ala	Phe	Ser	Ile	Ala	Lys	Gly	Cys	Leu	Gln	Lys	Arg	Cys	Gln
130								135				140			
Gln	Ile	Arg	Glu	Glu	Tyr	Arg	Ala	Leu	His	Leu	Tyr	His	Arg	Tyr	Leu
145								150				155			
Leu	Ser	Asn	Lys	Asp	Ser	Ile	Asp	Gly	Thr	Leu	Leu	Ser	Arg	Phe	Asp
165								170				175			
Ile	Arg	Phe	Arg	Lys	Ala	Glu	Glu	Lys	Leu	His	Gly	Leu	Asp	Leu	Asp
180								185				190			
Lys	Arg	Glu	Ala	Asn	His	Pro	Leu	Glu	Ala	Asp	Lys	Arg	Tyr	Asp	Phe
195								200				205			
Ala	Gly	Leu	Ala	His	Gln	Arg	Tyr	Gln	Val	Asp	Ala	Ala	Leu	Gly	Ile
210								215				220			
Ser	Ser	Ser	Gln	Asp	Ala	Phe	Trp	Arg	Gly	Val	Ala	Gln	Gln	Val	Lys
225								230				235			
Ser	Val	Lys	Asp	Asp	Val	Val	Leu	Gly	Asp	Lys	Ala	Ser	Thr	Asp	Leu
245								250				255			
Tyr	Pro	Ile	Ala	Gln	Gln	Ala	Leu	Gln	Ala	Ala	Gly	Val	Gly	Phe	Ser
260								265				270			
Gly	Ala	Ala	Gly	Lys	Glu	Ser	Leu	Leu	Asp	Leu	Ala	Lys	Ser	Leu	Ser
275								280				285			
Ser	Leu	Phe	Ala	Trp	Gly	Ser	Gln	Val	Gly	Lys	Asp	Ser	His	Glu	Ala
290								295				300			
Leu	Gln	Gln	Tyr	Gln	Met	Arg	Phe	Leu	Ser	Ser	Pro	Ile	Leu	Ala	Thr
305								310				315			
Trp	Cys	Gly	Ala	Gly	Phe	Ser	Ala	Ser	Ala	Gln	Asp	Phe	Val	Leu	Lys
325								330				335			
Gly	Glu	Asn	Ile	Leu	Asp	Ile	Ala	Ser	Glu	Asn	His	Thr	Lys	Met	Gln
340								345				350			
Asn	Ala	Ile	Lys	Arg	Val	Gln	Leu	Val	Ser	Val	Leu	Gly	Lys	Met	Arg
355								360				365			
Asn	Trp	Lys	Glu	Lys	Ile	Asp	Thr	Leu	Ile	Gln	Asn	Lys	Asn	Leu	Asp
370								375				380			
Gln	Asp	Ser	Leu	Arg	Lys	Leu	Tyr	Gln	Asp	Ile	Glu	Lys	Ala	Met	His
385								390				395			
Lys	Val	Cys	Ile	Glu	Asp	Gly	Val	Ser	Thr	Ser	Ile	Gln	Thr	Gln	Val
405								410				415			
Arg	Lys	Val	Thr	Gln	Lys	Tyr	Leu	Arg	Gln	Asp	Leu	Gln	Glu	Leu	Leu
420								425				430			
Asn	Lys	Lys	Ala	Pro	Leu	Asn	Glu	Ser	Asp	Leu	Ser	Lys	Met	Gln	Lys
435								440				445			
Gly	Ile	Ser	Ser	Cys	Ala	Asn	Leu	Val	Val	Thr	Leu	Leu	Glu	Ser	Gln
450								455				460			
Leu	Gly	Thr	Ser	Gly	Gln	Thr	Pro	Ile	Lys	Glu	Val	Glu	Glu	Ser	Ile
465								470				475			
Tyr	Arg	Asp	Leu	Ile	Ala	Thr	Ile	Leu	Gln	Met	Gly	Ser	Ala	Ala	Gly
485								490				495			

Gly	Val	Thr	Pro	Leu	Val	Asp	Gly	Val	His	Lys	Ala	Ile	Arg	Glu	Gly
			500				505						510		
Lys	Ala	Leu	Arg	Ser	Glu	Leu	Ser	Arg	Ala	Met	Ser	Leu	His	Pro	Arg
			515				520						525		
Gln	Ser	Phe	Leu	Gly	Val	Gln	Ser	Ala	Val	Glu	Lys	Leu	Gln	Ala	Phe
			530				535						540		
Ile	Arg	Asp	Pro	Lys	Trp	Gly	Ala	Ser	Ala	Val	His	Thr	Ser	Ala	Glu
			545				550						555		
Glu	Thr	Leu	Ala	Gln	Lys	Gln	Lys	Phe	Val	Ser	Asp	Leu	Thr	Arg	Ile
			565				570						575		
Gln	Thr	Ser	Leu	Ala	Asp	Trp	Arg	Glu	Arg	Tyr	Gly	Leu	Phe	Glu	Glu
			580				585						590		
Thr	Lys	Leu	Asn	His	Ile	Val	Ser	Thr	Asp	Phe	Val	Ser	Arg	Thr	Glu
			595				600						605		
Ala	Phe	Leu	Asp	Thr	Leu	Lys	Asn	Val	Ala	Glu	Ala	Cys	Ser	Leu	Glu
			610				615						620		
Gln	Ala	Val	Ala	Glu	Leu	Lys	Asp	Cys	Glu	Asp	Ala	Met	Lys	Ala	Asp
			625				630						635		
Leu	Thr	His	Val	Glu	Gln	Lys	Met	Asn	Pro	Thr	Glu	Ile	Glu	Ser	Ala
			645				650						655		
Arg	Glu	Glu	Phe	Lys	Arg	Leu	Met	Glu	Glu	Leu	Ala	Gly	Ile	Gln	Glu
			660				665						670		
Gln	Leu	Glu	Gln	Ile	Ala	Gln	Pro	Ile	Tyr	Glu	Glu	Gly	Val	Ser	Gly
			675				680						685		
Glu	Arg	Leu	Leu	Leu	Asn	Thr	Val	Phe	Phe	His	Pro	Glu	Val	Leu	Arg
			690				695						700		
Lys	Lys	Val	Gln	Ala	Lys	Glu	Ala	Ser	Leu	Glu	Ala	Leu	Thr	Lys	Gly
			705				710						715		
Glu	Gln	Pro	Ser	Pro	Thr	Lys	Lys	Lys	Thr	Leu	Lys	Gln	Leu	Ser	Glu
			725				730						735		
Gly	Cys	Glu	Tyr	Phe	Ser	Ser	Leu	Val	Ser	Lys	Ile	Asn	Ala	Leu	Lys
			740				745						750		
Thr	Ile	Leu	Glu	Gly	Ser	Arg	Gly	Lys	Lys	Ile	Ala	Ser	Gln	Asp	Ile
			755				760						765		
Arg	Gln	Leu	Ile	Gly	Leu	Thr	Asp	Glu	Leu	Ala	Leu	Glu	Leu	Ser	Ser
			770				775						780		
Phe	Gln	Gln	Asp	Ser	Leu	Glu	Ser	Leu	Leu	Tyr	Gly	Leu	Glu	Gly	Leu
			785				790						795		
Ser	Ile	Pro	Ala	Ala	Ser	Ile	Glu	Gln	Lys	Lys	Gly	Ser	Pro	Lys	Ser
			805				810						815		
Ser	Ser	Ile	Ala	Glu	Lys	Val	Val	Tyr	Ala	Ser	His	Gln	Arg	Val	His
			820				825						830		
Asn	Gly	Val	Lys	Ala	Lys	Val	Asn	Arg	Thr	Leu	Glu	Ala	Phe	Ser	Gln
			835				840						845		
Leu	Ile	Lys	Gly	Leu	Arg	Gly	Ser	Leu	Arg	Asn	Ala	Met	Ile	Thr	Lys
			850				855						860		
Ala	Val	Val	Ala	Ala	Val	Leu	Ser	Val	Ala	Phe	Ser	Cys	Leu	Ala	Ile
			865				870						875		
Ala	Leu	Phe	Ser	Val	Gln	Leu	Thr	Trp	Leu	Pro	Ile	Met	Leu	Cys	Val
			885				890						895		

-continued

Leu	Ala	Leu	Val	Leu	Glu	Ala	Ile	Pro	Ser	Ala	Leu	Ser	Ile	Trp	Val
		900						905					910		
Glu	Lys	Arg	Asn	Trp	Lys	Tyr	Glu	Val	Ala	Ser	Leu	Ala	Lys	Gln	Leu
		915					920					925			
Val	Ser	Asp	Gly	Arg	Lys	Leu	Pro	Tyr	Pro	Asp	Leu	Gly	Asp	Gln	Asn
		930				935						940			
Ile	Lys	His	Leu	Glu	Lys	Ile	Arg	Asp	Val	Tyr	Gly	Leu	Asp	Gly	Val
945					950					955					960
Ala	Glu	Leu	Arg	Val	Ala	Glu	Ala	Ala	Leu	Leu	Gly	Val	Gln	Lys	Leu
			965						970					975	
Pro	Glu	Glu	Gln	Lys	Gln	Glu	Ser	Leu	Lys	Ser	Ala	Val	Lys	Ala	Leu
			980					985					990		
Arg	Ala	Asp	Ala	Lys	Val	Leu	Asn	Lys	Lys	Phe	Lys	Lys	Leu	Pro	Glu
		995					1000						1005		
Ser	Tyr	Gln	Pro	Gln	His	Ser	Glu	Val	Thr	Gly	Val	Gln	Gly	Val	
	1010					1015						1020			
Thr	Glu	Gln	Glu	Ser	Arg	Asp	Asp	Val	Leu	Val	Ala	Gln	Asp	Met	
	1025					1030						1035			
Ala	Ala	Ile	Glu	Glu	Leu	Gln	Asp	Gln	Tyr	His	Ala	Ala	Cys	Leu	
	1040					1045						1050			
Gln	Phe	Glu	Ser	Val	Ser	Thr	Arg	Phe	Leu	Ala	Glu	Gln	Arg	Lys	
	1055					1060						1065			
Ala	Lys	Phe	Leu	Glu	Glu	Leu	Leu	Val	Gln	Lys	Arg	Arg	Asp	Val	
	1070					1075						1080			
Ser	His	Leu	Ser	His	Gln	Glu	Ala	His	Tyr	Thr	Gln	Val	Val	Ser	
	1085					1090						1095			
His	Leu	Lys	Glu	Leu	Ile	Ser	Met	Arg	Lys	Gly	Ala	Ser	Thr	Gln	
	1100					1105						1110			
His	Ala	Ser	Lys	Glu	Glu	Ile	Ser	Thr	Lys	Met	Arg	Glu	Leu	Leu	
	1115					1120						1125			
Ser	Leu	Asp	Asp	Gln	Leu	Leu	Lys	Ala	His	Thr	Ala	Gln	Asp	Val	
	1130					1135						1140			
Asn	Arg	Asp	Asn	Ser	Ile	Asn	Gly	Gln	Leu	Gln	Gln	Gln	Phe	Lys	
	1145					1150						1155			
Lys	Leu	Ser	Glu	Glu	Gly	Ser	Leu	Gln	Lys	Val	Lys	Ala	Leu	Leu	
	1160					1165						1170			
Glu	Leu	Asn	Met	Cys	Leu	Gly	Asn	Ala	Gly	Gln	Thr	Leu	Tyr	His	
	1175					1180						1185			
Ser	Arg	Leu	Lys	Arg	Glu	Val	Phe	Glu	Ala	Ser	Leu	Ser	Gly	Thr	
	1190					1195						1200			
Ser	Arg	Gln	Leu	Leu	Gln	Tyr	Gly	Glu	Asp	Leu	Phe	Ala	Ser	Tyr	
	1205					1210						1215			
Asp	Gly	Ser	Asp	Arg	Ser	Ala	Leu	Leu	Arg	Phe	Val	Leu	Gly	Ser	
	1220					1225						1230			
Gly	Tyr	Glu	Met	Ile	Ser	Glu	Ala	Ser	Ser	Glu	Leu	Lys	Ser	Leu	
	1235					1240						1245			
Arg	Lys	Arg	Trp	Lys	Arg	Ser	Ala	Ser	Gln	Ala	Ala	Ile	Ala	Pro	
	1250					1255						1260			
Glu	Asp	Tyr	Glu	Lys	Val	Cys	Arg	Val	Leu	Glu	Arg	Phe	Leu	Lys	
	1265					1270						1275			
Ala	Arg	Asp	Ser	Leu	Arg	Pro	Lys	Leu	Gly	Leu	Pro	Leu	Gly	Lys	

-continued

1280	1285	1290
Ser Ser Asp Ala Thr Val	Gly Leu Gln His Gln Ile Arg Asp Asn	
1295	1300	1305
Gln Arg Val Lys Ala Arg	Val Thr Ala Cys Tyr Gln Glu Ser Cys	
1310	1315	1320
Arg Asn Val Leu Gln His	Leu Glu Asp Trp Val Arg Lys Thr Arg	
1325	1330	1335
Gln Glu Ser Ala Glu Cys	Gln Lys Val Glu Thr Lys Ile Arg Glu	
1340	1345	1350
Phe Cys Gln Lys Ala Gly	Ser Lys Glu Asn Leu Ala Glu Ser Thr	
1355	1360	1365
Glu Met Leu Phe Ser Ser	Leu Glu Glu Asp Leu Asn Lys Ile Pro	
1370	1375	1380
Leu Asp Val Leu Arg Ala	Ile Leu Arg Ser Leu Ser Ser Lys Val	
1385	1390	1395
Leu His Ile Arg Asp Gln	Lys Leu Glu Leu Glu Lys Leu Glu Glu	
1400	1405	1410
Gln Phe Ala Lys Thr Asn	Ala Ile Val Lys Ala Lys Glu Ala Glu	
1415	1420	1425
Phe Glu Lys Asn Gly Glu	Val Trp His Asn Gln Tyr Gln Met Leu	
1430	1435	1440
Lys Ser Gln Met Glu Lys	Leu Glu Ser Gln Lys Arg Arg Leu Thr	
1445	1450	1455
Asp Lys Lys Glu		
1460		

<210> SEQ ID NO 224
 <211> LENGTH: 4389
 <212> TYPE: DNA
 <213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 224

```

gggtataatac ttcttcaaaa aatagttttt caggaaagta tggcgaatcc gtctacaccc      60
tcattcaatc attccgacct ttctttacaa ggtcgtttaa gagcttcaag tcagcaatgt      120
acgcaggctg gacaagggga cctcaacct ttgagtcag agtcagagg cttgacctca      180
aacttttcta ctggcgaga ttttaattgat gttgtagagg agtctataga gactgctaag      240
ggcagcgagc ttaaaaaact tcgaatatat gagattgctc taaagattct tacaattatt      300
ggagccgcga ttctcttcgc tgttctcttt tgtagttgc tcggtgtacc tttatggatt      360
cctattgtaa cgtgtatcgg ttaggaatt gcttttagta tcgccaaagg atgcttacag      420
aaaagatgct agcagattcg agaagaatat cgtgctctac atctctatca tcgctatcta      480
ctttccaaca aagattccat tgatgggact cttttgagtc gcttcgatat ccgttttcga      540
aaagcggaag agaaattaca cgggtagat cttgataaaa gagaggctaa tcatccacta      600
gaagcggaca agagatatga ttttgccggg ttggctcacc aacgctacca ggtggatgca      660
gctcttgga tctctagtag ccaagacgct ttttgagag gggttgctca gcaggtaaaa      720
tctgttaagg acgatgttgt tttaggggat aaggcgagta cagatctgta ccgatagcg      780
caacaggctc tacaagcagc gggggtaggt ttctctggcg ctgcagggaa agagtctttg      840
ttggatctag caaaatcttt atccagtctg tttgcgtggg gttctcaagt cggcaaagac      900

```

-continued

tctcacgaag ctttacagca atatcaaatg cgttttttaa gtagtcccat cttagetacg	960
tgggtgtggg ctgggttttc cgcactctgt caggattttg ttcttaaagg tgagaatato	1020
ttagatattg ctagtgtaaa tcatacgaag atgcagaatg ctatcaaacg tgtgcagcta	1080
gtttccgttt taggcaaaat gagaaattgg aaagagaaga ttgataccct aatccaaaac	1140
aaaaatcttg atcaagactc tctacgaaaa ctgtaccaag acattgaaaa agctatgcat	1200
aaggtttgta tcgaagatgg ggtttccact tctatacaga ctcagggtgcg taaggtcaca	1260
caaaaatatt tacgacaaga tttacaagag cttcttaata agaaagcacc attaaatgaa	1320
agcgatcttt ctaaaatgca aaaaggcatt agttcgtgtg ctaatcttgt tgtcacactc	1380
ttagaaagcc agttaggaac ttcggggcag actcctataa aagaagtcga agagagtatt	1440
taccgagact tgatcgctac tattttaca atgggaagtg cggcaggagg agtgacacca	1500
ttagttgatg gtgtacataa agctattaga gaaggaaaag ctttacgtag cgaacttagc	1560
cgggctatgt ctttacatcc aagacaatct ttctaggggg tgcaatctgc tgtagagaag	1620
ttgcaagcat ttatccgaga tcctaagtgg ggagcatcgg cagtgcatac ctctgctgaa	1680
gagactctag cgcaaaaaca gaagtttgtt tctgatctta cgcgcatacc aacgagccta	1740
gcagactgga gagaacgtta cgggctattt gaagagacaa aactgaatca tatttgtgtc	1800
acggactttg tatcgagaac agaagctttt ctatataccc tgaaaaacgt tgctgaagca	1860
tgttctctgg agcaagctgt tgcagagctc aaagattgtg aggatgctat gaaagcagat	1920
ctcactcatg ttgagcaaaa aatgaatcct acagagatag agtctgcaag agaagagttt	1980
aagcgggtga tggaagagct agctgggtatt caagagcagc tagaacagat cgtcaacct	2040
atztatgaag aaggggttaag cgggtgaacgt cttctactta atacagtctt ctttcatcca	2100
gaagtattac gtaagaaagt tcaagcaaaa gaagcctcgt tagaggcttt aacaaaaggc	2160
gaacagcctt ctccaacgaa gaagaaaacg ttgaagcagc tttctgaagg atgtgagtac	2220
ttctctagtc ttgtaagcaa gattaatgcg ctttaagacaa tattagaagg ttctagaggc	2280
aagaaaattg cgtcccaaga tatacgacag ctgattggat tgactgatga gcttgctcta	2340
gagttgtcct ctttccaaca ggattcttta gagagtttgc tctatggatt agaggggtta	2400
agcattccag ctgcttctat agaacagaag aaaggatctc ctaagtcttc ttctatagca	2460
gagaaggtgg tgtatgcttc tcatcagcgt gtccataatg gggtaaaagc gaaagtgaat	2520
cgcacattag aagcattttc acagctgatac aaaggcttac gaggatcttt acgtaatgcg	2580
atgatcacta aagctgttgt agcggcggtt ctctctgtag ctttttctcg cctagcgatt	2640
gogctcttct ctgtgcagct tacatggctt cctattatgc tctgctttt agcttttgta	2700
ttggaagcta tcccttctgc tttatctatt tgggtggaga aaagaaactg gaaatatgag	2760
gttgctctct tagcgaagca gttagtctcg gatggaagaa agcttctcta tccagatttg	2820
ggggatcaaa atatcaagca tctagagaag attcgagatg tttatgggct ggatggtgtt	2880
gcagaattac gggtagctga agcagcttta ttaggagttc agaaacttc tgaagagcaa	2940
aaacaagaat ctttaaaaag tgctgttaaa gcattgcggg cggatgcgaa ggttcttaat	3000
aagaaattta agaagcttc tgagtcatat cagcctcaac actctgaagt cacaggagtc	3060
caaggtgtaa cgaacaaga aagcagggat gacgttttgg tagcacaaga tatggctgcc	3120
atagaagaat tgcaagacca gtatcatgca gcttgcttgc aatttgagtc tgtgagtacg	3180

-continued

```

cgatttttag ccgaacacgcg taaagctaag tttctggaag agctgttagt tcaaaaacgt 3240
cgagatgtgt cccatttato tcatcaagaa gctcattata ctcaagtagt cagtcatttg 3300
aaagagctca tctcaatgag aaagggagca tctactcaac acgcttctaa agaagagatt 3360
tctacaaaaa tgagagagct gttgtcttta gatgatcaac ttctaaaagc tcatacagct 3420
caagatgtga accgggataa tagcataaac ggtcaactgc aacagcagtt taaaaagtta 3480
tctgaagaag gaagcctaca aaaagtaaaa gctctgctag aactaaatat gtgttttaggt 3540
aatgctgggc aaacccttta tcattcaagg ctaaagagag aggttttcga agcatctctc 3600
tctggaacct ctgcgcaact tcttcaatac ggtgaagatc tgtttgcac cttacgatgga 3660
agtgatcgat cggctcttct acggtttggt ttaggatccg gatatgagat gatcagtgag 3720
gccagctctg agctgaagtc tctacgcaaa cgttggaata gaagcgcttc tcaagccgca 3780
attgctcctg aagattatga gaaagtctgc agagtgttag aacgttttct taaagcgca 3840
gacagtctgc gtcgaagtt aggtttacct ctggttaaga gctcagatgc taccgttggt 3900
ttacaacatc aaatacgaga taatcaacga gttaaagctc gagtaaccgc ttgtttacca 3960
gagagttgca gaaatgtttt acagcattta gaagattggg tgcggaaaaa gcgacaggag 4020
tcggcagaat gtcaaaaagt agaacaataa atacgcgagt tctgcaaaaa agccggatct 4080
aaggagaatc ttgctgaatc tacagagatg ctattttcta gcttagaaga agatttgaat 4140
aaaatactc tagatgtttt gcgtgctatt ttacgatctt tgtcttctaa agttcttcat 4200
attagggatc aaaagttaga acttgaaaag ttagaagagc agtttgcgaa gacaaatgct 4260
attgtaaaag ccaaggaagc tgagttcgag aagaatggg aagtgtggca taatcagtat 4320
cagatgctaa aaagtcagat ggagaagctg gagtctcaga aaagaagact gacagataag 4380
aaagaataa 4389

```

<210> SEQ ID NO 225

<211> LENGTH: 200

<212> TYPE: PRT

<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 225

```

Lys Cys Gly Lys Met Ser Thr Thr Ile Ser Gly Asp Ala Ser Ser Leu
1      5      10      15
Pro Leu Pro Thr Ala Ser Cys Val Glu Ile Lys Ser Thr Ser Ser Ser
20     25     30
Thr Lys Gly Asn Thr Cys Ser Lys Ile Leu Asp Ile Ala Leu Ala Ile
35     40     45
Val Gly Ala Leu Val Val Val Ala Gly Val Leu Ala Leu Val Leu Cys
50     55     60
Ala Ser Asn Val Ile Phe Thr Ala Ile Gly Ile Ala Ala Leu Ile Ile
65     70     75     80
Gly Ser Ala Cys Val Gly Ala Gly Ile Ser Arg Leu Met Cys Arg Ser
85     90     95
Ser Tyr Ala Ser Leu Glu Ala Lys Asn Val Leu Ala Glu Gln Arg Leu
100    105    110
Arg Asn Leu Ser Glu Glu Lys Asp Ala Leu Val Ser Val Ser Phe Ile
115    120    125
Asn Lys Met Phe Leu Arg Gly Leu Thr Asp Asp Leu Gln Ala Leu Glu
130    135    140

```

-continued

Ala Lys Ala Ile Glu Val Glu Ile Asp Cys Leu Asp Arg Leu Glu Lys
145 150 155 160

Asn Glu Gln Ala Leu Leu Ser Asp Val Arg Leu Val Leu Ser Ser Tyr
165 170 175

Thr Arg Trp Leu Asp Ser Ala Glu Lys Glu Lys Ala Ala Leu Lys Ala
180 185 190

Ser Ile Asp Ala Asn Gln Ala Ser
195 200

<210> SEQ ID NO 226

<211> LENGTH: 603

<212> TYPE: DNA

<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 226

```
ctaagaagct tggtagcgt ctatagatgc tttaagagca gctttttcct tttcagcaact    60
atccaacccat cttgtgtagc tagataaaac taagcgacaca tcggacaata aagcttgctc    120
atttttctct aatctgtcca aacaatcaat ctcaacttct attgccttag cttccaaagc    180
ttggagatcg tccgtaagac ctgcagaaaa catcttatta atgaaagaga cggagaccaa    240
agcgctccttc tcttctgaaa gattacgcaa acgttgctca gccaaaacat tttttgcttc    300
taagctagca taagaggatc gacacataag acgagatatt cccgcaccca cacaagcaga    360
tccaataatt aatgcagcaa tacctattgc agtaaatatg acattgctag cgcacaaaac    420
caaagctaatt accccagcga caacaactaa agcgctacg atagctaaag ctatatccaa    480
aattttggaa caagtattcc cttttgttga agacgaagta gattttatct ctacgcagga    540
agctgttggc aatggttaaag aagaagcgtc tccgctaata gtagtactca tttttccaca    600
ttt                                                    603
```

<210> SEQ ID NO 227

<211> LENGTH: 120

<212> TYPE: PRT

<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 227

Phe Thr Glu Gly Asn Met Val His Ser Val Tyr Asn Ser Leu Ala Pro
1 5 10 15

Glu Gly Phe Ser Gln Val Ser Ile Gln Pro Ser Gln Ile Pro Thr Ser
20 25 30

Lys Lys Val Met Ile Ala Ile Met Thr Leu Phe Ala Leu Thr Ala Ile
35 40 45

Ala Ala Ile Val Leu Ser Ile Val Thr Val Cys Gly Gly Phe Pro Phe
50 55 60

Leu Leu Ala Ala Leu Asn Thr Val Thr Ile Gly Ala Cys Val Ser Leu
65 70 75 80

Pro Val Phe Thr Cys Ile Ala Thr Thr Leu Leu Leu Leu Cys Leu Arg
85 90 95

Asn Ile Glu Leu Leu Ala Arg Pro Gln Val Phe Thr Leu Ser Thr Gln
100 105 110

Phe Ser Pro Thr Lys Pro Gln Glu
115 120

-continued

<210> SEQ ID NO 228

<211> LENGTH: 363

<212> TYPE: DNA

<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 228

```

ttcacagagg gaaatatggt tcattctgta tacaattcat tggctccaga aggttttagc      60
caagtctcta ttcaaccagc tcagattcca accagcaaaa aagtaatgat tgcgataatg      120
actctttttg cactcacagc cattgcagca atagtccttt ccacggttac agttttgtgga      180
gggttttcctt ttcttcttgc tgcacttaac accgtaacta ttggtgcatg cgtatccttg      240
ccggtattca ctgcatagc  tacaacgtta ttacttcttt gtctecgtaa tatcgaaactc      300
ctagccagac cgcaagtatt taccctctcc actcaattca gcccaacaaa acctcaagaa      360
tag                                                                    363

```

<210> SEQ ID NO 229

<211> LENGTH: 130

<212> TYPE: PRT

<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 229

```

Ser Cys Cys Leu Gln Gly Val Leu Leu Tyr Arg Leu Asp Ile Ala Asp
1           5           10          15
Phe Arg Val Trp Val Ser Ile Gly Val Ser Glu Gln Glu Arg His Tyr
20          25          30
Pro Gln Pro Val Leu Val Ser Leu Ser Leu Phe Phe Lys Glu Glu Pro
35          40          45
Lys Ala Cys Ser Thr Asp Lys Val Ser Asp Ser Val Cys Tyr Ala Glu
50          55          60
Leu Val Ser Leu Ile Glu Glu Val Ala Thr Asn Asn Pro Cys Ala Leu
65          70          75          80
Ile Glu Arg Leu Ala Lys Val Leu Leu Glu Lys Ile Glu Lys Ala Leu
85          90          95
Ala Gly Gln Val Ser Arg Ile Asp Leu Arg Val Ser Lys Glu Arg Pro
100         105         110
Pro Ile Pro Asp Leu Leu Ser Pro Val Ser Phe Ser Ile Ser Arg Glu
115        120        125
Val Pro
130

```

<210> SEQ ID NO 230

<211> LENGTH: 393

<212> TYPE: DNA

<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 230

```

tcatggcacc tctctactta tgctgaaact tacaggactg agtagatctg ggatcggagg      60
acgctcttcta cttactcgca agtcaatcct agaaacttgt ccagccaaaag ccttttctat      120
tttttccagc aaaaccttag ctaaacgttc aattaaagca caaggattat tcgttgcaac      180
ttcttcaata agagaacaaa gctctgcata acacacgcta tcagagactt tgcctgtgga      240
acaagccttt ggctcttctt taataaaaaag agataaagaa acaagaacgg gctgcggata      300
atgccgttct tgttctgaga ctctataga  taccacaaacg cgaaaatccg ctatatctaa      360

```

-continued

acgatacaac aacactcctt gtaggcagca aga

393

<210> SEQ ID NO 231

<211> LENGTH: 569

<212> TYPE: PRT

<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 231

Met Pro Lys Gln Ala Asp Tyr Thr Trp Gly Ala Lys Lys Asn Leu Asp
1 5 10 15
Thr Ile Ala Cys Leu Pro Glu Asp Val Lys Gln Phe Lys Asp Leu Leu
20 25 30
Tyr Ala Met Tyr Gly Phe Thr Ala Thr Glu Glu Glu Pro Thr Ser Glu
35 40 45
Val His Pro Gly Ala Ile Leu Lys Gly Thr Val Val Asp Ile Ser Lys
50 55 60
Asp Phe Val Val Val Asp Val Gly Leu Lys Ser Glu Gly Val Ile Pro
65 70 75 80
Met Ser Glu Phe Ile Asp Ser Ser Glu Gly Leu Thr Val Gly Ala Glu
85 90 95
Val Glu Val Tyr Leu Asp Gln Thr Glu Asp Asp Glu Gly Lys Val Val
100 105 110
Leu Ser Arg Glu Lys Ala Thr Arg Gln Arg Gln Trp Glu Tyr Ile Leu
115 120 125
Ala His Cys Glu Glu Gly Ser Ile Val Lys Gly Gln Ile Thr Arg Lys
130 135 140
Val Lys Gly Gly Leu Ile Val Asp Ile Gly Met Glu Ala Phe Leu Pro
145 150 155 160
Gly Ser Gln Ile Asp Asn Lys Lys Ile Lys Asn Leu Asp Asp Tyr Val
165 170 175
Gly Lys Val Cys Glu Phe Lys Ile Leu Lys Ile Asn Val Asp Arg Arg
180 185 190
Asn Val Val Val Ser Arg Arg Glu Leu Leu Glu Ala Glu Arg Ile Ser
195 200 205
Lys Lys Ala Glu Leu Ile Glu Gln Ile Thr Ile Gly Glu Arg Arg Lys
210 215 220
Gly Ile Val Lys Asn Ile Thr Asp Phe Gly Val Phe Leu Asp Leu Asp
225 230 235 240
Gly Ile Asp Gly Leu Leu His Ile Thr Asp Met Thr Trp Lys Arg Ile
245 250 255
Arg His Pro Ser Glu Met Val Glu Leu Asn Gln Glu Leu Glu Val Ile
260 265 270
Ile Leu Ser Val Asp Lys Glu Lys Gly Arg Val Ala Leu Gly Leu Lys
275 280 285
Gln Lys Glu His Asn Pro Trp Glu Asp Ile Glu Lys Lys Tyr Pro Pro
290 295 300
Gly Lys Arg Val Arg Gly Lys Ile Val Lys Leu Leu Pro Tyr Gly Ala
305 310 315 320
Phe Ile Glu Ile Glu Glu Gly Ile Glu Gly Leu Ile His Val Ser Glu
325 330 335
Met Ser Trp Val Lys Asn Ile Val Asp Pro Asn Glu Val Val Asn Lys
340 345 350

-continued

Gly Asp Glu Val Glu Val Val Val Leu Ser Ile Gln Lys Asp Glu Gly
 355 360 365
 Lys Ile Ser Leu Gly Leu Lys Gln Thr Lys His Asn Pro Trp Asp Asn
 370 375 380
 Ile Glu Glu Lys Tyr Pro Ile Gly Leu Arg Val Thr Ala Glu Ile Lys
 385 390 395 400
 Asn Leu Thr Asn Tyr Gly Ala Phe Val Glu Leu Glu Pro Gly Ile Glu
 405 410 415
 Gly Leu Ile His Ile Ser Asp Met Ser Trp Ile Lys Lys Val Ser His
 420 425 430
 Pro Ser Glu Leu Phe Lys Lys Gly Asn Thr Val Glu Ala Val Ile Leu
 435 440 445
 Ser Val Asp Lys Glu Ser Lys Lys Ile Thr Leu Gly Val Lys Gln Leu
 450 455 460
 Thr Pro Asn Pro Trp Asp Glu Ile Glu Val Met Phe Pro Val Gly Ser
 465 470 475 480
 Asp Ile Ser Gly Val Val Thr Lys Ile Thr Ala Phe Gly Ala Phe Val
 485 490 495
 Glu Leu Gln Asn Gly Ile Glu Gly Leu Ile His Val Ser Glu Leu Ser
 500 505 510
 Glu Lys Pro Phe Ala Lys Ile Glu Asp Val Leu Ser Ile Gly Asp Lys
 515 520 525
 Val Ser Ala Lys Val Ile Lys Leu Asp Pro Asp His Lys Lys Val Ser
 530 535 540
 Leu Ser Ile Lys Glu Phe Leu Val His Gly Gly Asp Ala Gly His Asp
 545 550 555 560
 Ala Glu Glu Glu Ser Ser Asp Arg Asp
 565

<210> SEQ ID NO 232

<211> LENGTH: 1710

<212> TYPE: DNA

<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 232

```

ctagtctctg tcagaagatt cttcttcgcg atcgtgacca gcatctcccc catgaacaag    60
gaactcttta atagaaagag aaactttctt gtgatctggg tctagcttga taacttttagc    120
agaaactttg tctccaatag agagaacatc ttcaatttta gcaaaagggt tctctgaaaag    180
ctcggatata tggatcagtc cttcgatacc attttgcaac tcaacgaaag ctccgaaagc    240
cgtaatttta gttactacgc cagagatatc acttccgaca gggaacataa cttcaatctc    300
atcccatgga ttaggagtta attgtttcac gcccaaagtg atttttttgc tttctttgtc    360
tacagacaga ataactgctt cgacgggtatt accttttttg aagagctctg aaggatggga    420
aactttttta atccaactca tgtcagagat atggatcaaa ccttcgattc ctggctccaa    480
ctcaacgaaa gctccgtagt ttgtcagatt tttaatttct gctgttacgc ggaggccgat    540
aggatatatt tcttcaatgt tatccaagg attgtgtttt gtttgtttga gaccgagaga    600
gatttttctt tcactttttt ggatagaaa aacaactact tcgacttcat cacttttgtt    660
gaccacttca ttaggatcta caatgtttct aaccaagac atctctgaaa cgtgaataag    720
gccttcaatt ccttcttcga tttcaataaa tgctccataa ggaaggaggt taacaatttt    780

```

-continued

```

tccgcgaaca cgttttctcg gaggatattt cttctcaata tcttcccaag gattatgctc   840
tttttgtttg aggccaagag ctacgcgacc tttttcttta tcaacgctaa ggatgatgac   900
ttccaattct tggttgagtt caaccatttc ggatgggtga cgaatgcggt tccatgtcat   960
gtctgtaatg tggagtaggc cgtcaatgcc atcaagatcc aagaatactc cgaaatctgt  1020
gatattctta acgatacctt tgcgacgctc accgatagtg atttgctcga tcaactctgc  1080
tttcttagaa atgcgttcag cttcgagaag ttctcttcta gatacaacaa cgttccgacg  1140
atctacgttg attttgagaa ttttgaactc acaaaccttg cctacgtaat catctaagtt  1200
cttgatcttc ttattgtcta tttgggatcc tggaagggaag gcttcacatac caatatctac  1260
gatcaaacca cccttaactt ttcgggtaat ttgtccctta acaatagaac cttcctcgca  1320
gtgagcaaga atgtattccc attgtcgttg tcttggtgct tttctctggg ataaaaacaac  1380
ttttccttcg tcactctcag tttggtctag gtaaaacttcg acttcggctc cgacagttaa  1440
accttctgaa gagtcgataa actcagacat aggaataact ccctcagatt ttaagccgac  1500
atctacaaca acaagtctt tgccttatgc aacaactgta ccttttagga tcgcaccagg  1560
atgtacttcg ctagtgggtt cttcttctgt cgcgggtgaag ccatacatcg cgtagagaag  1620
gtctttaaat tgtttaacgt cttctggtaa gcaagctatc gtatcgagat tcttttttgc  1680
tccccaagta taatcagctt gttttgcat                                     1710

```

<210> SEQ ID NO 233

<211> LENGTH: 334

<212> TYPE: PRT

<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 233

```

Leu Phe Phe Ile Arg Arg Glu Arg Ala Thr Val Glu Leu Leu Pro His
1             5             10             15
Glu Lys Gln Val Val Glu Tyr Glu Lys Thr Ile Ala Glu Phe Lys Glu
20            25            30
Lys Asn Lys Glu Asn Ser Leu Leu Ser Ser Ser Glu Ile Gln Lys Leu
35            40            45
Asp Lys Arg Leu Asp Arg Leu Lys Glu Lys Ile Tyr Ser Asp Leu Thr
50            55            60
Pro Trp Glu Arg Val Gln Ile Cys Arg His Pro Ser Arg Pro Arg Thr
65            70            75            80
Val Asn Tyr Ile Glu Gly Met Cys Glu Glu Phe Val Glu Leu Cys Gly
85            90            95
Asp Arg Thr Phe Arg Asp Asp Pro Ala Val Val Gly Gly Phe Ala Lys
100           105           110
Ile Gln Gly Gln Arg Phe Met Leu Ile Gly Gln Glu Lys Gly Cys Asp
115           120           125
Thr Lys Ser Arg Met His Arg Asn Phe Gly Met Leu Cys Pro Glu Gly
130           135           140
Phe Arg Lys Ala Leu Arg Leu Ala Lys Met Ala Glu Lys Phe Gly Leu
145           150           155           160
Pro Ile Ile Phe Leu Val Asp Thr Pro Gly Ala Phe Pro Gly Leu Thr
165           170           175
Ala Glu Glu Arg Gly Gln Gly Trp Ala Ile Ala Thr Asn Leu Phe Glu
180           185           190

```

-continued

Leu Ala Arg Leu Ala Thr Pro Ile Ile Val Ile Val Ile Gly Glu Gly
 195 200 205
 Cys Ser Gly Gly Ala Leu Gly Met Ala Ile Gly Asp Val Val Ala Met
 210 215 220
 Leu Glu His Ser Tyr Tyr Ser Val Ile Ser Pro Glu Gly Cys Ala Ser
 225 230 235 240
 Ile Leu Trp Lys Asp Pro Lys Lys Asn Ser Asp Ala Ala Ala Met Leu
 245 250 255
 Lys Met His Gly Glu Asp Leu Lys Gly Phe Ala Ile Val Asp Ala Val
 260 265 270
 Ile Lys Glu Pro Ile Gly Gly Ala His His Asn Pro Ala Ala Thr Tyr
 275 280 285
 Arg Ser Val Gln Glu Tyr Val Leu Gln Glu Trp Leu Lys Leu Lys Asp
 290 295 300
 Leu Pro Val Glu Glu Leu Leu Glu Lys Arg Tyr Gln Lys Phe Arg Thr
 305 310 315 320
 Ile Gly Leu Tyr Glu Thr Ser Ser Glu Ser Asp Ser Glu Ala
 325 330

<210> SEQ ID NO 234
 <211> LENGTH: 1005
 <212> TYPE: DNA
 <213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 234

```

ttatgcctca gaatcgcttt cagaagaagt ttcatataga cctatcggtc ggaatttctg    60
atatcgtttt tctagcaact cttctaccgg taaatctttc aatttaagcc attcttgaag    120
gacatatctt tgaacactac gatattgtgc cgcaggattg tgatgagccc cacctatggg    180
ttctttgatc actgcgtcca caatagcaaa tcccttaaga tcctctccat gcatttttaa    240
catggcagca gcatcgctgt tctttttagg atctttccat aaaatagaag cacacccttc    300
aggagaaatt acagaataat acgagtgttc tagcatcgct acaacatctc ctatagccat    360
tcttagagcg cctcctgaac atccttcacc aatcacaatt acaatgattg gggtagctaa    420
tctagctaac tcaataaagt ttgtcgcaat agcccaacct tgacctcttt ctctggctgt    480
taatccaggg aaagctccag gggatatcaac gagaaagata attggcaaac cgaatttctc    540
tgccatttta gctaagcgta gagcctttct aaagccttcg ggacaaagca tcccgaagtt    600
acgatgcatg cgagattttg tgtcgcaacc cttttcttgc cctataagca tgaaacgctg    660
cccttgaatc tttgcgaacc ctccgacaac tgcaggatca tctcggaacg ttcatctcc    720
acaaagtctt acaaactctt cgcacattcc ttcgatataa ttcactgttc taggtctcga    780
aggatgtcga caaatttgta ctctttccca aggggtgaga tcggaataaa ttttttcttt    840
taatctatct aaacgcttat ccaatttttg aatctctgaa gaagaaagca ggetgttttc    900
tttatTTTTT tctttaaact cggcgatcgt tttttcgtat tcgacaacct gtttttcatg    960
aggaagtagt tccaccgtag cagctccctt tcttataaaa aagag                          1005
  
```

<210> SEQ ID NO 235
 <211> LENGTH: 355
 <212> TYPE: PRT
 <213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 235

-continued

Gly Ile Phe Met His Ile Ala Val Leu Gly Ala Gly Tyr Ala Gly Leu
 1 5 10 15
 Ser Val Thr Trp His Leu Leu Leu Tyr Thr Gln Gly Arg Ile Ser Val
 20 25 30
 Asp Leu Phe Asp Pro Thr Pro Ile Gly Ser Gly Ala Ser Gly Leu Ser
 35 40 45
 Ser Gly Leu Leu His Gly Phe Thr Gly Lys Lys Ala Ile Lys Pro Pro
 50 55 60
 Leu Ala Asn Leu Gly Ile Thr Thr Thr His Ser Leu Ile Thr Lys Ala
 65 70 75 80
 Ser Leu Ser Ile Gly Glu Pro Ile Val Thr Ser Asn Gly Ile Leu Arg
 85 90 95
 Pro Ala Ala Ser Gln Glu Gln Ala Thr Ile Phe Met Gln Arg Ala Gln
 100 105 110
 Glu Phe Pro Asp Glu Thr Glu Trp Trp Asp Lys Ala Arg Cys Glu Ile
 115 120 125
 Thr Val Pro Gly Met Val Ile Ala Asp Gly Leu Gly Ala Leu Tyr Ile
 130 135 140
 Lys His Gly Val Thr Ile Asp Asn Asp Lys Tyr Ile Ser Gly Leu Trp
 145 150 155 160
 Asn Ala Cys Ala Ser Leu Gly Thr Gln Tyr Tyr Asp Glu Leu Ile Asp
 165 170 175
 Asp Ile Ser Ala Ile Ala Glu Phe Tyr Asp His Ile Ile Val Thr Pro
 180 185 190
 Gly Ala Asn Ala Asp Ile Leu Pro Glu Leu Lys His Leu Pro Leu Ser
 195 200 205
 Lys Val Lys Gly Gln Leu Val Glu Ile Ala Trp Pro Ala Glu Ile Pro
 210 215 220
 Met Pro Pro Phe Ser Ile Asn Gly Pro Lys Tyr Met Val Ala Asp Thr
 225 230 235 240
 Thr Arg Asn Thr Cys Ile Leu Gly Ala Thr Phe Glu His Asn Gln Pro
 245 250 255
 Asp Ala Thr Pro Asp Ala Gln Val Ala Tyr Gln Glu Ile Met Pro Pro
 260 265 270
 Ile Leu Ala Leu Phe Pro Gly Leu Lys Asp Ala Gln Val Leu Asn Tyr
 275 280 285
 Tyr Ala Gly Met Arg Ser Ser Ser Pro Thr His Leu Pro Met Ile Ser
 290 295 300
 Arg Val Gln Glu Lys Leu Trp Tyr Leu Gly Gly Leu Gly Ser Lys Gly
 305 310 315 320
 Leu Leu Tyr His Gly Leu Leu Gly Asp Met Leu Ala Gln Ala Leu Leu
 325 330 335
 Arg Asp Ser Thr Ala Tyr Ile Ala Lys Glu Phe Leu Tyr Thr Pro Glu
 340 345 350
 Gly Ala Ala
 355

<210> SEQ ID NO 236

<211> LENGTH: 1068

<212> TYPE: DNA

<213> ORGANISM: Chlamydia trachomatis

-continued

<400> SEQUENCE: 236

```

ggtattttta tgcacatagc ggttttggga gcgggatacg caggattatc tgtgacttgg      60
catcttctcc ttatacaca aggacgaatt agcgttgatc tcttgaccc aacctctatt      120
ggatctggag cctcaggcct atcttctggc cttcttcatg gctttacagg gaaaaaagct      180
atcaagcctc cgctagcaaa tctagggatc accacaaccc attctctcat taccaaagcg      240
agcctttcta taggggagcc catcgtgaca tccaatggga tctcctgccc tgcagcctct      300
caggaacagg ccactatttt catgcaaga gcacaggagt tccccgatga aacggagtgg      360
tgggataaag ctcggtgtga aattacagtt cctggaatgg tcattgccga tggactcgga      420
gccctttaca ttaaacatgg ggtaaccatt gataatgata aatatatcag cggtttatgg      480
aatgcctgtg ctageccttg aacacaatat tacgatgagc tgatcgatga catttcagca      540
atcgttgagt tttatgatca cattattgta actcctggag cgaacgcaga tattctccct      600
gagcttaaac accttccccct atctaaagta aaaggtcagc tcgtagaaat tgcttggcca      660
gctgagatcc ctatgccacc attcagcatc aatggcccta aatatatggt tgctgataca      720
acaagaaata cttgtatatt gggagcaact ttcgagcaca accaaccaga tgccactcca      780
gatgctcaag ttgcctatca ggaaatcatg cctccgatec tagctctttt cctggacttt      840
aaagacgctc aagtccttaa ttattacgct ggtatgcgct catcgagccc cactcattta      900
cccatgatca gtcgcgtaca agaaaaattg tggtatttag gaggtttggg atccaaaggt      960
cttctatacc atgggctttt aggagatatg ctgcccagg ctctattacg ggattccacg     1020
gcatatatag ctaaggagtt tctctacact ccagagggag cagcctaa                     1068

```

<210> SEQ ID NO 237

<211> LENGTH: 490

<212> TYPE: PRT

<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 237

```

Asn Asn Met Gly Ile Ala His Thr Glu Trp Glu Ser Val Ile Gly Leu
 1             5             10             15

Glu Val His Val Glu Leu Asn Thr Glu Ser Lys Leu Phe Ser Pro Ala
 20             25             30

Arg Asn His Phe Gly Asp Glu Pro Asn Thr Asn Ile Ser Pro Val Cys
 35             40             45

Thr Gly Met Pro Gly Ser Leu Pro Val Leu Asn Lys Asp Ala Val Arg
 50             55             60

Lys Ala Val Leu Phe Gly Cys Ala Val Glu Gly Asp Val Ala Leu Phe
 65             70             75             80

Ser Arg Phe Asp Arg Lys Ser Tyr Phe Tyr Pro Asp Ser Pro Arg Asn
 85             90             95

Phe Gln Ile Thr Gln Tyr Glu His Pro Ile Val Arg Gly Gly Cys Ile
100            105            110

Arg Ala Val Val Glu Gly Glu Lys Thr Phe Glu Leu Ala Gln Thr
115            120            125

His Leu Glu Asp Asp Ala Gly Met Leu Lys His Phe Gly Asp Phe Ala
130            135            140

Gly Val Asp Tyr Asn Arg Ala Gly Val Pro Leu Ile Glu Ile Val Ser
145            150            155            160

```

```
<210> SEQ ID NO 238
<211> LENGTH: 1473
<212> TYPE: DNA
<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 238

aataatatgg gcatagcaca tactgaatgg gagtctgtga tcggtctgga agttcacggt      60
gaattgaata ccgaatccaa attatttagt cccgcacgta atcattttgg tgatgaaccc      120
aacacgaaca tttctctctg atgcacaggg atgccaggat ctcttcgggt cttgaataag      180
```


-continued

```

gatgctgtgc gtaaagctgt tttgttcggc tgcgctgtag agggggatgt cgttttattt    240
agccgttttg atagaaaatc ctatttttat cctgacagcc caagaaactt tcagatcacc    300
caatacagagc atcctatcgt aagagggtgga tgtattcgtg ctgtagtaga aggagaagag    360
aaaacctttg agctagcgca gacacatcta gaagatgatg cggggatggt aaaacatttt    420
ggggattttg ctggtgtaga ctataacaga gcaggggttc cgtaattga gattgtttcc    480
aagccttgta tgtttagtgc agaggatgct gttgcatacg ccaatgcttt ggtatccatc    540
ctcggctaca taggtatttc cgattgtaat atggaagaag gttctatccg ttctgatgtg    600
aatatttctg ttgcgcctcg aggaagtagg gagcttagaa ataaggtaga gatcaaaaac    660
atgaactcat ttacctttat ggcacaagct ttggaagctg aaaaacgtcg tcagattgaa    720
gagtatctta gctatcccaa tgaggatcca aaaaaagttg ttctgcagc gacttatcgt    780
tggggtcctg aaaagaaaaa aacgggtctg atgcgtctca agaacgagc cgaagattat    840
atgtattttg tagagccgga tcttctctgt ttgcagatca ccgagactta tattgatgag    900
gtgcgtcaaa cattaccaga gctacctcat agtaaatata tgcgttacat tacagacttt    960
gatatcgctg aagatttagc aatgattctt gttggtgatc gacatacggc tcatttcttt   1020
gaaacagcaa ctatgtcttg taagaactat cgtgctcttt cgaattggat cacagtcgaa   1080
tttgccggcc gttgtaaagc tagaggggaag acgctgccat tcacggggat tcttctcgaa   1140
tgggtagcgc aattggtgaa cttcatagat cgtggagtga tcacagggaa aatcgtaaa   1200
gaaattgcag atagaatggt ctcttctttt ggggaaagcc cagaagatat tttgcgtaga   1260
catccttcgt tgttacctat gacggacgac catgcgctac gcgctatcgt taaagagggtg   1320
gttgctcaaa ataccgcgtc tgtagcggat tacaagaacg ggaaagctaa agctttgggc   1380
tttttggttg gacagatcat gaagcgaaca gaagggaag ctctctctaa gcgagtaaac   1440
gaattgctat tagcagctat gcgagatatg taa                                1473

```

<210> SEQ ID NO 239
 <211> LENGTH: 121
 <212> TYPE: PRT
 <213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 239

```

Pro Tyr Val Ser Trp Met Ser Met Ala Ser Lys Lys Gln Thr Ser Trp
1          5          10          15
Phe Arg Tyr Met Glu Glu Cys Val Ile Arg Ser Trp Trp Leu Ile Leu
20        25        30
Cys Leu Leu Gly Gly Gly Phe Val Tyr Asp Arg Ala Ile Ser Gln Leu
35        40        45
Cys Thr Gln Glu Leu Arg Leu Gln Gln Arg Met Phe His Leu Lys Ser
50        55        60
His Leu Lys Glu Ala Leu Glu Lys Gln Gln Glu Leu Ser Thr His Leu
65        70        75        80
Ala Ser Trp Asp Asp Pro Lys Val Ile Glu Leu Ala Leu Ile His Lys
85        90        95
Leu Gly Leu Val Pro Lys Gly Tyr Glu Lys Ile Cys Phe Gln Asn Ser
100       105       110
Gln Lys Thr Lys Arg Asn His Arg Lys
115       120

```

-continued

<210> SEQ ID NO 240
 <211> LENGTH: 366
 <212> TYPE: DNA
 <213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 240

```

ttattttcga tgatttcttt tcgttttttg agagttctgg aagcagattt tttcataacc      60
tttaggcacc aaacctagtt tatgaataag tgctagctca ataactttcg gatcatccca      120
agaagctaga tgggtgctca actcttgctg tttctcgaga gcttctttta aatgggattt      180
taaatgaaac atgcgctgct gtaatcgcac ctcttggtga catagttggg agatggctct      240
gtcatagaca aaaccacctc caagaagaca aagaataagc caccaagaac gaatgacaca      300
ttcttcata tacctgaacc aagaagtctg tttcttactt gccatactca tccaggaaac      360
ataggg                                           366
  
```

<210> SEQ ID NO 241
 <211> LENGTH: 342
 <212> TYPE: PRT
 <213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 241

```

Ile Thr Thr Ile Ala Asn Thr Tyr Met Thr His Lys Ile Ser Val Leu
1          5          10          15
His Gln Asp Lys Lys Phe Asp Phe Ser Leu Arg Pro Lys Lys Leu Thr
20         25         30
Glu Phe Cys Gly Gln Lys Gln Leu Lys Glu Arg Leu Asp Leu Phe Leu
35         40         45
Arg Ala Ala Val Gln Arg Asn Glu Val Pro Gly His Cys Leu Phe Tyr
50         55         60
Gly Pro Pro Gly Leu Gly Lys Thr Ser Leu Ala His Ile Met Ala Asn
65         70         75         80
Thr Ile Gly Lys Gly Leu Val Ile Ala Ser Gly Pro Gln Leu Leu Lys
85         90         95
Pro Ser Asp Leu Ile Gly Leu Leu Thr Gly Leu Gln Glu Gly Asp Ile
100        105        110
Phe Phe Ile Asp Glu Ile His Arg Met Gly Lys Ala Ala Glu Glu Tyr
115        120        125
Leu Tyr Pro Ala Met Glu Asp Phe Lys Val Asp Ile Thr Leu Asp Ser
130        135        140
Gly Pro Gly Ala Arg Ser Val Arg Leu Asp Leu Ala Pro Phe Thr Leu
145        150        155        160
Val Gly Ala Thr Thr Arg Ala Gly Met Leu Ser Glu Pro Leu Arg Thr
165        170        175
Arg Phe Ala Phe Thr Gly Arg Val Asp Tyr Tyr Thr Asp Glu Asp Leu
180        185        190
Val Ser Ile Leu Ser Arg Ser Ser Gln Leu Leu Ala Ile Glu Ala Asn
195        200        205
Gln Glu Thr Leu Leu Glu Ile Ala Arg Arg Ala Arg Gly Thr Pro Arg
210        215        220
Leu Ala Asn Asn Leu Leu Arg Trp Val Arg Asp Phe Ala Gln Met Arg
225        230        235        240
  
```

-continued

Glu Gly Asn Cys Ile Asn Ser Ala Val Ala Glu Lys Ala Leu Ala Met
 245 250 255
 Leu Leu Ile Asp Asn Leu Gly Leu Asn Glu Ile Asp Ile Lys Leu Leu
 260 265 270
 Ser Val Met Ile Asp Phe Tyr Gln Gly Gly Pro Val Gly Met Lys Thr
 275 280 285
 Leu Ala Met Ala Val Gly Glu Asp Val Arg Thr Leu Glu Asp Met Tyr
 290 295 300
 Glu Pro Phe Leu Ile Leu Lys Gly Leu Val Gln Arg Thr Ala Arg Gly
 305 310 315 320
 Arg Val Ala Thr Pro Leu Ala Tyr Glu His Leu Asn Arg Asn Pro Lys
 325 330 335
 Asp Arg Trp Gly Glu Glu
 340

<210> SEQ ID NO 242
 <211> LENGTH: 1029
 <212> TYPE: DNA
 <213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 242

ataactacta ttgcgaatac ttatatgact cataaaattt ctgttttaca tcaggataaa 60
 aagtttgatt tttctttaag gccaaagaaa ctaacagagt tttgtgggca aaaacaattg 120
 aaagaacgat tggatttatt tottcagact gctgtccagc ggaatgaagt ccccgacat 180
 tgtttatttt atgggtcccc aggtttgggt aagaacttcgc tagcacatat tatggctaac 240
 acgataggaa aaggcttggg aattgcttcc gggccgcagt tgttaaagcc ttccgatctc 300
 ataggactat tgaccgggtc acaagaggga gatatttttt tcacgatga aatccatcgc 360
 atggggaaag ctgctgaaga gtatctctat cctgccatgg aagattttta agtagatatt 420
 accttggtt cagggtcccg agctcgtca gtgcgtctcg atttagctcc atttactttg 480
 gtaggtgcga ccaactgcgc tggaatgtta agcgcgcctt tgcgtacgcg ttttgccttt 540
 actgggcgtg tagattacta tactgatgaa gatcttgttt ccattcttct tcgttctctc 600
 cagttgctcg ccatagaagc caatcaggaa actctattag agattgctag aagggtcga 660
 gggacaccac gtttggttaa taatttactt cgatgggtgc gtgattttgc tcaaatgcga 720
 gagggaaatt gtattaatag cgccgtagca gaaaaagctt tagctatggt attaatagat 780
 aacttagggt taaacgagat tgacattaag cttctctccg tgatgattga tttttatcaa 840
 ggaggccccg ttggaatgaa aacgctcgca atggcggtag ggaagatgt cagaactctg 900
 gaagatatgt acgagccctt tttgattttg aagggtttgg ttcagcgaac cgcaagagga 960
 cgggttgcaa cccctttggc atatgaacat cttaacagga accctaagga caggtgggga 1020
 gaagaataa 1029

<210> SEQ ID NO 243
 <211> LENGTH: 382
 <212> TYPE: PRT
 <213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 243

Ile Leu Thr Arg Met Asn Gly Lys Thr Pro Leu Ala Leu Tyr Ile His
 1 5 10 15

-continued

Ile	Pro	Phe	Cys	Ser	Lys	Lys	Cys	His	Tyr	Cys	Ser	Phe	Tyr	Thr	Ile
			20					25					30		
Pro	Tyr	Lys	Glu	Glu	Leu	Met	Arg	Ser	Tyr	Cys	Glu	Ala	Val	Ile	Lys
		35					40					45			
Glu	Gly	Leu	Lys	Lys	Leu	Ala	Pro	Leu	Arg	Cys	Ser	His	Tyr	Ile	Asp
	50					55					60				
Thr	Val	Phe	Phe	Gly	Gly	Gly	Thr	Pro	Ser	Leu	Val	Pro	Pro	Ala	Leu
	65				70					75					80
Ile	Gln	Asp	Ile	Leu	Val	Ala	Leu	Glu	Ala	Gln	His	Ala	Thr	Glu	Ile
				85					90					95	
Thr	Leu	Glu	Ala	Asn	Pro	Glu	Asn	Leu	Ser	Leu	Glu	Tyr	Ile	Gln	Ala
			100					105					110		
Leu	Ala	Leu	Thr	Ser	Ile	Asn	Arg	Ile	Ser	Ile	Gly	Val	Gln	Thr	Phe
		115					120					125			
Asn	Asp	Pro	Leu	Leu	Lys	Leu	Leu	Gly	Arg	Thr	His	Ser	Ser	Ser	Lys
	130					135					140				
Ala	Ile	Glu	Ala	Phe	Met	Leu	Cys	Ser	Gln	Tyr	Gly	Phe	Ser	Asn	Val
	145				150					155					160
Ser	Ala	Asp	Leu	Ile	Tyr	Gly	Leu	Pro	Thr	Gln	Ser	Ile	Ser	Asp	Phe
			165						170					175	
Ile	Val	Asp	Leu	His	Gln	Ala	Ile	Ser	Leu	Pro	Ile	Gln	His	Ile	Ser
			180					185					190		
Ile	Tyr	Asn	Leu	Thr	Ile	Asp	Pro	His	Thr	Ser	Phe	Tyr	Lys	His	Arg
		195					200					205			
Lys	Arg	Ile	Leu	Pro	Ser	Ile	Ala	Asp	Asp	Asp	Ser	Leu	Ala	Glu	Met
	210					215					220				
Ala	Leu	Ala	Ala	Glu	Glu	Leu	Leu	Glu	Asn	Gln	Gly	Phe	Thr	Arg	Tyr
	225				230					235					240
Glu	Leu	Ala	Ser	Tyr	Ala	Lys	Asn	Gln	Ala	Ala	Ser	Lys	His	Asn	Thr
			245					250						255	
Tyr	Tyr	Trp	Thr	Ala	Lys	Pro	Phe	Leu	Gly	Leu	Gly	Val	Ser	Ala	Ser
			260					265					270		
Gln	Tyr	Leu	His	Gly	Ile	Arg	Ser	Lys	Asn	Leu	Ser	Arg	Ile	Ser	His
		275					280					285			
Tyr	Leu	Arg	Ala	Ala	His	Gln	His	Leu	Pro	Thr	Leu	Glu	Ser	Met	Glu
	290					295					300				
Glu	Leu	Pro	Pro	Asn	Glu	Arg	Ile	Lys	Glu	Thr	Leu	Ala	Leu	Arg	Leu
	305				310					315					320
Arg	Leu	Cys	Asp	Pro	Ile	Pro	Phe	Gly	Val	Phe	Pro	Gln	Glu	Leu	Ile
			325						330					335	
Asp	Glu	Ile	Leu	Met	His	Pro	Ser	Ile	Gly	Ser	Leu	Phe	Thr	Lys	Asp
		340						345					350		
Asp	Lys	Ala	Phe	Ser	Leu	Asn	Lys	Lys	Gly	Arg	Leu	Phe	His	Asp	Ser
		355					360					365			
Ile	Ala	Glu	Glu	Ile	Met	Ala	Ser	Ser	Phe	Ser	Phe	Ser	Lys		
	370					375					380				

<210> SEQ ID NO 244

<211> LENGTH: 1149

<212> TYPE: DNA

<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 244

-continued

```

ttattttgaa aatgaaaaag aagaagccat gatttcttct gctatagaat catgaaaaag    60
acgccctttt ttatttaatg aaaaagcttt gtcaccccta gtaaatagag aacctataga    120
cgggtgcatt aatatttcgt ctatgagttc ctgagggaaa actccaaagg ggatggggtc    180
gcagagacgg aggcgcaaag ctagagtctc tttaatgcgt tcgtttggag ggagctcttc    240
catagactct aaagtcggta gatgttgatg cgcagctcgt aagtaatgcg agatcctaga    300
aaggtttttg gatcgaaatgc catggagata ttgtgaggca gaaactccta atcctaagaa    360
aggcttagct gtccagtagt aggtattgtg tttagaagcc gcttggtttt ttgcatagga    420
agcaagttca tagcagtaga atccttgatt ctctagtagc tcttcggctg ctagtgccat    480
ctcagctagg gagtgcgtcat ctgctatgga tggaagaata cgtttacggt gtttgtaaaa    540
ggagggtgta ggggtctatag ttagattata aatagagatg tggtggattg ggagagaaat    600
agcttggtga agatcaacaa taaaatcact aatcgactgt gtaggagggc cataaataag    660
gtctgcagac acattagaaa atccgtattg ggagcagagc ataaaggctt caatcgcttt    720
agatgaagag tgtgtgcgtc ctatgagctt aagtagggga tcattgaatg tttgtacgcc    780
aatgctaagt cgattgatcg aggtcaaggc gagagcctgg atatactcca gagaaagatt    840
ttcagggttt gcttcaagag tgattttctgt ggcatgctga gctctagag ctacgagaat    900
atcttgaatc aaagcagggg gaactaaaga aggagtcctt cctccaaaga atactgtatc    960
aatatagtga gaacaacgta gaggggctag tttttttagc cctctttaa tgacagcttc   1020
acaataagag cgcattaact cttctttata cgggacgta tagaaactac aataatgaca   1080
tttcttcgag cagaaaggga tatgtatgta aagagctaag ggagtcttac cattcattcg   1140
cgtcaggat                                     1149

```

<210> SEQ ID NO 245

<211> LENGTH: 169

<212> TYPE: PRT

<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 245

```

Glu Ala Ser Lys Leu Ala Leu Arg Gly Phe Pro Val Ser Ile Ile Glu
1           5           10          15
Gln Asp Tyr Leu Arg Met Lys Ser Glu Arg Leu Lys Lys Leu Glu Ser
20          25          30
Glu Leu His Asp Leu Thr Gln Trp Met Gln Leu Gly Leu Val Pro Lys
35          40          45
Lys Glu Ile Glu Arg His Gln Glu Glu Ile Arg Leu Leu Glu Ser Lys
50          55          60
Ile Leu Glu Glu Lys Glu Arg Leu Gln Leu Leu Lys Glu Ser Gly Glu
65          70          75          80
Ile Lys Glu Tyr Val Thr Pro Arg Arg Thr Pro Ala Lys Thr Ile Tyr
85          90          95
Pro Asp Gly Pro Ser Val Ser Asp Val Glu Phe Val Glu Ser Ser Asp
100         105         110
Thr Glu Val Asp Leu Asp Ala Gly Asp Thr Ile Glu Ile Asp Leu Gly
115         120         125
Asp Glu Ala Arg Glu Glu Ser Gly Asn Glu Leu Asp Tyr Ser Ser Glu
130         135         140

```

-continued

Asp Asp Glu Asp Pro Phe Ser Asp Arg Asn Arg Trp Arg Arg Gly Gly
145 150 155 160

Ile Ile Asp Pro Asp Ala Asn Glu Trp
165

<210> SEQ ID NO 246
<211> LENGTH: 510
<212> TYPE: DNA
<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 246

```

ttaccattca ttgcgctcag gatctatgat gcctcctcgg cgccaacgat tgcgatcaact    60
gaaaggatcc tcactgtctt cactagagta gtcgagttcg ttcccgcttt cttctcttgc    120
ctcatcacct aggtcaatct caattgtgtc accggcatcg agatccactt ctgtatccga    180
ggattctaca aactcaacgt ctgaaacgct ggggccatct gggtaaatgg ttttagctgg    240
agttcttcga ggggttacgt actctttgat ctcaccgctt tctttgagaa gttgtagacg    300
ttctttctct tcaaggattt tgctttctag cagacggatt tcttctgggt gtctctcgat    360
ttctttttta ggaacaaggc caagttgcat ccactgggta agatcatgaa gctctgattc    420
taattttttt aaacgctcac ttttcattcg taaatagtcg tggtctatga ttgaaaccgg    480
aaacccctcg agagccaatt tacttgcttc    510

```

<210> SEQ ID NO 247
<211> LENGTH: 277
<212> TYPE: PRT
<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 247

```

Leu Ser Glu Asp Leu Leu Lys Ile Asp Asn Leu Val Val Ser Val Lys
1      5      10      15
Asp Ser Asn Gln Arg Leu Val Asn His Leu Ser Leu Thr Ile Lys Arg
20     25     30
Cys Gln Ser Met Ala Leu Val Gly Glu Asn Gly Ser Gly Lys Thr Thr
35     40     45
Val Ser Lys Ala Val Leu Gly Phe Leu Pro Asp Asn Cys Tyr Ile Gln
50     55     60
Ser Gly Arg Ile Leu Tyr Ser Ser Thr Asp Ile Thr Arg Leu Ser Arg
65     70     75     80
Arg Gln Leu Gln Thr Ile Arg Gly Lys Lys Ile Ala Thr Ile Phe Gln
85     90     95
Asn Ala Met Gly Thr Leu Thr Pro Ser Met Arg Val Gly Ala Gln Ile
100    105    110
Val Glu Thr Leu Arg His His Phe Asp Met Ser Lys Glu Glu Ala Phe
115    120    125
Ser Lys Ala Arg Glu Leu Leu Glu Ser Val His Ile Glu Ser Pro Asp
130    135    140
Arg Cys Leu Gln Leu Tyr Pro Phe Glu Leu Ser Gly Gly Met Cys Gln
145    150    155    160
Arg Val Ser Ile Ala Ile Ala Leu Ala Thr Asn Pro Glu Leu Ile Ile
165    170    175
Ala Asp Glu Pro Ser Thr Ala Leu Asp Ser Ile Ser Gln Ala Gln Val
180    185    190

```

-continued

Leu Arg Val Leu Thr Gln Ile His Gln Asn His Ser Thr Ala Leu Leu
 195 200 205

Leu Ile Thr His Asn Leu Ala Leu Val Ser Glu Leu Cys Glu Glu Met
 210 215 220

Ala Ile Ile Arg Tyr Gly Glu Ile Val Glu Gln Gly Pro Val Gln Glu
 225 230 235 240

Leu Leu His Ser Pro Ser His Pro Tyr Thr Gln Gln Leu Ile Arg Ala
 245 250 255

Ile Pro Lys Ile Pro Ser Pro Ser Tyr Leu Ser Pro Lys Glu Pro Leu
 260 265 270

Ala Thr Thr Ala Tyr
 275

<210> SEQ ID NO 248
 <211> LENGTH: 831
 <212> TYPE: DNA
 <213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 248

```

ttgtctgaag atttattaaa aattgataat ctagtctgtct ccgtaaaaga ttccaatcaa    60
cgattagtca atcacttgtc gctcactatc aagcgatgcc aaagtatggc acttgtagga    120
gaaaaatggtt cggggaaaaac aaccgtttct aaagcagttt tgggggtttct ccccgataat    180
tgttacatcc aatctggaag aatcctttac tccagcacag atattacacg cttatctcgt    240
agacaacttc aaacaatccg cggaagaaa atcgcaacta ttttccaaaa tgccatggga    300
acctgactc cttctatgct tgtaggagct caaattgtag aaaccttaag acatcatttc    360
gatatgtcta aagaagaagc tttctctaaa gcaagagaac tgcttgagag tgtacacatc    420
gaatctcctg atcgatgcct acaattatat ccctttgagc tttagcggtgg catgtgtcaa    480
cgagttagca ttgctattgc tctggcaacc aatccggaac tcattattgc agatgaacct    540
tcaacagcgc tagattctat tatcccaggct caggtattgc gtgtactgac acaaattcac    600
caaaaccatt ctacagctct actactcatc actcataatt tagctttagt atctgaactg    660
tgtgaagaaa tggccattat acgctatggg gagatcgttg agcaaggtcc tgtgcaagag    720
ctactgcact ctccgtctca tccttatacc cagcaactga tccgcgctat tcctaaaatt    780
cctagtcccta gctatctttc acctaaagaa cctcttgcaa caaccgcgta t          831
  
```

<210> SEQ ID NO 249
 <211> LENGTH: 340
 <212> TYPE: PRT
 <213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 249

Met His Pro Leu Thr Leu Asn Ile Ala Ser Glu Glu Thr Thr Glu Ala
 1 5 10 15

Arg Val Phe His Val Ile Glu Asn Phe Gly Asn Ser Phe Cys Ile Asp
 20 25 30

Leu Leu Lys Lys Met Leu Leu Ile Arg Glu Phe Glu Ile Arg Gly Glu
 35 40 45

Glu Ala Tyr Leu Glu Gly Leu Val Gly Gly Phe Tyr His Ser Tyr Ile
 50 55 60

Gly Gln Glu Ala Val Ala Thr Ala Ala Ile Ala Cys Thr Gly Lys Asp
 65 70 75 80

-continued

His Trp Phe Phe Ser Ser Tyr Arg Cys His Gly Val Ala Leu Leu Leu
 85 90 95
 Asp Ile Pro Leu Arg Gln Leu Ala Ala Glu Leu Leu Gly Lys Glu Thr
 100 105 110
 Gly Cys Ala Leu Gly Arg Gly Gly Ser Met His Met Cys Gly Asp Arg
 115 120 125
 Leu Pro Gly Gly Phe Gly Ile Val Gly Gly Gln Ile Pro Leu Ala Ala
 130 135 140
 Gly Ala Ala Phe Ser Met Lys Tyr Gln Asn Ser Ser Ser Ile Ser Met
 145 150 155 160
 Cys Phe Ile Gly Asp Gly Ala Val Ala Gln Gly Val Phe His Glu Thr
 165 170 175
 Leu Asn Phe Val Ala Leu His Ser Leu Pro Leu Met Leu Ile Ile Glu
 180 185 190
 Asn Asn Gly Trp Ser Met Gly Thr Ala Leu His Arg Ala Ile Ala Lys
 195 200 205
 Gln Pro Ile Ala Glu Ser Gln Ala Ile Ser Tyr Gly Leu Ser Ser Ile
 210 215 220
 Thr Leu Asn Gly Phe Asp Leu Phe Asn Ser Leu Ile Gly Phe Arg Glu
 225 230 235 240
 Ala Tyr His His Met Gln Gln Thr Gly Ser Pro Ile Ile Val Glu Ala
 245 250 255
 Leu Cys Ser Arg Phe Arg Gly His Ser Ile Ser Asp Pro Asn Leu Tyr
 260 265 270
 Arg Ser Lys Glu Glu Met Gln Cys Leu Leu Lys Arg Asp Pro Ile Leu
 275 280 285
 Phe Ala Lys Glu Trp Leu Ile Arg Ala Asn Val Leu Ser Glu Asp Asp
 290 295 300
 Phe Lys Asp Leu Arg Gln Thr Ser Lys Thr Ala Val Leu Glu Ala Val
 305 310 315 320
 Ala Gln Ala Arg Leu Asp Pro Glu Pro Ala Val Ala Thr Leu Glu Glu
 325 330 335
 Gly Val Tyr Ala
 340

<210> SEQ ID NO 250
 <211> LENGTH: 1020
 <212> TYPE: DNA
 <213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 250

atgcacctc tgactctcaa catagcttct gaggaacta cagaagcccg agtttttcat 60
 gttattgaaa acttcggaaa ttctttctgc attgaccttt tgaaaaaat gctactcatt 120
 cgcaatttg agattcgagg agaagaggcc tatttagaag gccttggtgg aggattttat 180
 cactcttata tcggtcaaga agctggtgct acagcagcta ttgcttgac agggaaagac 240
 cactggtttt ttctctctta tcgttgctac ggagtagctc tgctgctgga tatcccttta 300
 cgacaactgg cagcagaact tctagggaaa gaaacagggt gtgctttagg acgaggcgga 360
 tctatgcata tgtgtggtga tcgtcttctc ggaggttttg gtatcgttgg tggacaaatt 420
 cctctggctg caggtgcagc attttctatg aagtacaaa actcatcttc tatacttatg 480

-continued

```

tggtttattg gagatggagc tgtagctcaa ggagtcttcc atgaacacatt aaattttgta 540
gcgcttcact cccctccctt aatgctcatt attgaaaaca atggatggag tatgggaaca 600
gccttacata gagccattgc taaacagcct atagcagaat cccaagcgat ttcttatggt 660
ctttcttcga tcactttgaa tggattcgat ttatttaatt cgcttatagg atttagagaa 720
gcttatcacc acatgcaaca aacagggtct cctattatcg tagaggcgct atgttctcga 780
tttagaggac actctatttc cgatcctaatt ttatatcgct ctaaagagga aatgcaatgt 840
cttctcaaaa gagatcctat cctttttgca aaagaatggc tcattcgtgc gaatgtccta 900
tccgaagatg attttaaaga tttgcgtcaa acaagcaaaa cagctgtcct agaagcagtc 960
gctcaagctc gtcttgatcc agaaccagct gtagctactt tagaagaggg ggtctatgcc 1020

```

<210> SEQ ID NO 251

<211> LENGTH: 328

<212> TYPE: PRT

<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 251

```

Met Pro Asn Phe Val Thr Leu Glu Ile Arg Glu Ala Ile Arg Gln Ala
1           5           10           15
Ile Asp Glu Glu Met Thr Arg Asp Pro Asn Val Cys Ile Leu Gly Glu
20          25          30
Glu Val Ala Glu Tyr Asn Gly Ala Tyr Lys Val Thr Lys Asn Leu Leu
35          40          45
Asp Lys Trp Gly Pro Thr Arg Val Ile Asp Thr Pro Ile Ser Glu Ala
50          55          60
Ala Phe Ser Gly Ile Gly Ile Gly Ala Ala Leu Thr Gly Leu Arg Pro
65          70          75          80
Ile Ile Glu Phe Met Ser Trp Asn Phe Ser Leu Val Ala Ala Asp Gln
85          90          95
Ile Ile Ser His Ala Ala Lys Met Tyr Tyr Met Thr Gly Gly Lys Phe
100         105         110
Ala Val Pro Ile Val Phe Arg Gly Ala Asn Gly Ala Ala Ala Gln Val
115         120         125
Ser Cys Gln His Ser His Cys Ile Glu Ala Leu Tyr Ala Asn Ile Pro
130         135         140
Gly Leu Ile Val Ile Ala Pro Ser Thr Pro Ala Asp Ala Lys Gly Leu
145         150         155         160
Leu Lys Ser Ala Ile Arg Asp Asn Asn Pro Val Leu Phe Leu Glu Asn
165         170         175
Glu Leu Asp Tyr Asn Leu Lys Gly Glu Val Pro Ser Glu Glu Tyr Leu
180         185         190
Ile Pro Ile Gly Lys Ala Arg Ile Val Gln Glu Gly Lys Asp Leu Thr
195         200         205
Ile Ile Ser His Ser Arg Met Val Ser Ile Val Glu Gln Ala Ala Lys
210         215         220
Thr Ala Lys Gln Arg Trp Gly Leu Ser Ile Glu Thr Ile Asp Leu Arg
225         230         235         240
Thr Ile Lys Pro Leu Asp Val Ala Thr Leu Leu Thr Ser Val Lys Lys
245         250         255
Thr Gly Asn Cys Leu Val Val Glu Glu Gly His Tyr Phe Cys Gly Ile
260         265         270

```

-continued

Ser Ser Glu Val Ile Thr Thr Ile Thr Glu His Ile Phe Asp Tyr Leu
 275 280 285

Asp His Pro Pro Leu Arg Val Cys Gln Lys Glu Thr Pro Met Pro Tyr
 290 295 300

Asn Lys Thr Leu Glu Met Ala Thr Leu Pro Asn Ile Asn Arg Ile Leu
 305 310 315 320

Asp Ala Ile Glu Lys Ile Met Arg
 325

<210> SEQ ID NO 252
 <211> LENGTH: 984
 <212> TYPE: DNA
 <213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 252

```

atgcctaatt ttgttacct cgaaatccga gaggtatta gacaagctat tgatgaagaa      60
atgaccagag atcctaacgt ctgtatccta ggagaggagg tcgctgaata taatggtgct    120
tataaagtta ctaaaaacct cttagataaa tggggaccca ctcgagttat tgatacacc    180
attagcgaag ctgctttctc tggaattgga atcggagcag cgctaactgg acttcgccca    240
attattgaat ttatgagctg gaacttctct ctagtgtctg ctgatcaaat catttctcat    300
gcagcaaaaa tgtattatat gactggaggg aaatttgctg ttctatcgt ttttagaggg    360
gctaattggag ctgctgcgca agtctcttgc caacattctc attgtattga agctctttat    420
gccaatattc ctggttaaat tgtcattgct ccatcaactc cagccgatgc aaagggactt    480
cttaaatctg ctattcggga taacaacccc gttctattct tagaaaatga attagactac    540
aatcttaagg gagagggtccc ttcagaagaa tacctgatcc ccattgggaa agctcgtatc    600
gttcaagaag gaaaagattt aacaatcatt tcgcatagcc gcattggttc tategttgag    660
caagctgcta aaacagcaaaa acaacgatgg ggactctcta ttgaaacat tgacttacga    720
acgatcaaac ctttgatgtg tgccactctc ctacttctg tcaaaaaaac aggggaattgt    780
cttgctgctg aagaagggca ttatttttgt ggtatatctt cggaagtgat tacgacgatt    840
acagaacata tttttgacta cctagatcat cctcctctac gagtctgtca aaaagaaacg    900
cctatgccat ataataaaac tctagagatg gcgactctcc caaatattaa ccgcatcctg    960
gatgccattg aaaaaattat gagg                                           984
  
```

<210> SEQ ID NO 253
 <211> LENGTH: 199
 <212> TYPE: PRT
 <213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 253

Met Phe Ser Gly Ile Ile Gln Glu Val Ala Arg Val Asp Leu Ile His
 1 5 10 15

His Leu Arg Asp Ser Met Glu Ile Gly Val Phe Ala Arg Lys Leu Ile
 20 25 30

Asp Val Val Pro Gly Ser Ser Phe Ser Val Asp Gly Ile Cys Leu Thr
 35 40 45

Leu Val Lys Arg Gln Tyr Glu Leu Leu Phe Phe Asp Val Thr Glu Glu
 50 55 60

Thr Met Ala Trp Thr Thr Ile Lys Asp Tyr Thr Val Gly Thr Met Val

-continued

65	70	75	80
Asn Leu Glu Arg Ser Val Arg Leu Gly Asp Glu Ile Gly Gly His Phe	85	90	95
Val Ser Gly His Val Cys Gly Ile Gly Thr Ile Ile Ala Ile Glu Lys	100	105	110
Ser Tyr Met Phe Phe Lys Ala Pro Ala Asn Leu Val Pro Tyr Ile Leu	115	120	125
Glu Lys Gly Phe Ile Ala Ile Asp Gly Ile Ser Leu Thr Ile Ala Arg	130	135	140
Val Lys Gly Asp Ile Phe Ser Val Ser Leu Ile Pro Glu Thr Arg Ala	145	150	155
Arg Thr Ser Leu Gly Tyr Lys Gln Val Gly Ala His Val Asn Met Glu	165	170	175
Pro Asp Met Met Thr Lys Met Gln Val Asp Thr Ile Met Arg Phe His	180	185	190
Ala Glu Lys Glu Ile Ser Lys	195		

<210> SEQ ID NO 254
 <211> LENGTH: 597
 <212> TYPE: DNA
 <213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 254

atgttttcag gcattattca agaagtcgca cgggtagatc ttattcacca tctcagggat	60
tccatggaga ttggagtttt tgctcgcaag ttgatcgatg tggttccggg gagtagcttc	120
tctgtcgatg gcatatgttt gactctggtc aaacgacagt acgaattact cttttttgat	180
gtgactgaag aaaccatggc ttggactacc atcaaagatt atacgggtggg aaccatggta	240
aatttagaac gtcggttcg attaggagat gaaataggag gacattttgt ctctgggcat	300
gtctgtggga taggcactat tattgtctata gagaaatcct atatgttttt taaggctcca	360
gctaatttag tgccttatat tttagagaaa ggcttcattg ctattgatgg catcagtttg	420
acaattgcac gagttaaagg ggacatcttt tcagttagtt tgattccgga gactcgagcg	480
cgcacctcat tgggttataa acaggtgggt gctcacgtga atatggagcc tgatatgatg	540
acaaaaatgc aggtggacac aattatgcgt ttccatgccg aaaaagagat cagcaaa	597

<210> SEQ ID NO 255
 <211> LENGTH: 107
 <212> TYPE: PRT
 <213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 255

Met Glu Pro Tyr Ala Val Ile Gln Thr Gly Asn Lys Gln Tyr Gln Val	1	5	10	15
Arg Lys Gly Asp Val Ile Asp Val Glu Leu Leu Asp Gly Ile Ser Glu	20	25	30	
Glu Asn Lys Glu Val Leu Phe Gln Asp Val Leu Phe Thr Phe Asp Gly	35	40	45	
Glu Lys Ala Ser Val Gly Ala Pro Thr Val Gly Asn Ala Val Val Lys	50	55	60	
Gly Glu Leu Val Ser Phe Val Arg Gly Glu Lys Val Val Ala Tyr Lys	65	70	75	80

-continued

Tyr Lys Lys Arg Lys Asn Tyr His Lys Lys Ile Gly His Arg Gln Asn
85 90 95

Tyr Leu Arg Val Lys Ile Ser Asp Leu Val Met
100 105

<210> SEQ ID NO 256

<211> LENGTH: 321

<212> TYPE: DNA

<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 256

atggagcctt acgctgtaac tcagactgga aataagcaat accaggttcg caaaggtgac 60
gttatagacg tcgaactgtt ggatgggatt tctgaagaga acaagaagt cctttttcaa 120
gatgtattat ttacttttga cggagaaaaa gcttcggttg gtgctccaac agttggcaac 180
gctgtagtga aaggagaatt agtttctttc gttcgcggag aaaaggttgt ggcttacaag 240
tacaaaaaac gtaagaatta tcacaagaaa atcggccatc gtcaaaatta ccttcgggtg 300
aagattagcg atttggttat g 321

<210> SEQ ID NO 257

<211> LENGTH: 369

<212> TYPE: PRT

<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 257

Met Thr Thr Leu Pro Ala Arg Ile Leu Pro Lys Ser Ala Cys Leu Lys
1 5 10 15
Thr Leu Phe Asp Asp Tyr Leu Ser Gly Ala Arg Leu Ser Glu Glu Gln
20 25 30
Ala Leu Gln Leu Leu Leu Val Asp Ala Glu Asp Gln Gln Ala Leu Trp
35 40 45
Ser Phe Ala Asp Leu Ile Arg Ala Asn Arg Val Gly Asp Thr Val Phe
50 55 60
Tyr Ser Ser Thr Leu Tyr Leu Tyr Pro Thr Asn Phe Cys Gln Phe Asn
65 70 75 80
Cys Thr Phe Cys Ser Phe Tyr Ala Lys Pro Gly Asn Pro Thr Gly Trp
85 90 95
Phe Phe Thr Pro Asp Gln Leu Val Gln Ser Ile Lys Glu Asn Pro Ser
100 105 110
Pro Ile Thr Glu Thr His Ile Val Ala Gly Cys Tyr Pro Ser Cys Asn
115 120 125
Leu Ala Tyr Tyr Glu Glu Leu Phe Ser Lys Ile Lys Gln Asn Phe Pro
130 135 140
Asp Leu His Ile Lys Ala Leu Ser Ala Ile Glu Tyr Asp Tyr Leu Ser
145 150 155 160
Lys Leu Asp Asn Leu Pro Val Lys Glu Val Met Gln Arg Leu Arg Ile
165 170 175
Ala Gly Leu Asp Ser Ile Pro Gly Gly Gly Ala Glu Ile Leu Val Asp
180 185 190
Glu Val Arg Glu Thr Leu Ser Arg Gly Arg Leu Ser Ser Gln Gly Phe
195 200 205
Leu Glu Ile His Glu Thr Ala His Ser Leu Gly Ile Pro Ser Asn Ala
210 215 220

-continued

Thr Met Leu Cys Tyr His Arg Glu Thr Pro Ala Asp Ile Met Thr His
 225 230 235 240
 Met Ser Lys Leu Arg Ala Leu Gln Asp Lys Thr Ser Gly Phe Lys Asn
 245 250 255
 Phe Ile Leu Leu Lys Phe Ala Ser Glu Asn Asn Ala Leu Gly Lys Arg
 260 265 270
 Leu His Lys Met Thr Ser Arg His Ser Ile Pro Pro Ala Thr Ile Ile
 275 280 285
 Ala Val Ala Arg Leu Phe Leu Asp Asn Ile Pro Asn Ile Lys Ala Leu
 290 295 300
 Trp Asn Tyr Leu Gly Leu Asp Val Ala Leu His Leu Leu Ser Cys Gly
 305 310 315 320
 Ala Asn Asp Leu Ser Ser Thr His Gln Gly Glu Lys Val Phe Arg Met
 325 330 335
 Ala Ser Ser Gln Glu Pro Ile Arg Met Asp Ile Glu Gly Met Ser His
 340 345 350
 Leu Ile Ile Gln His Gly Arg Ile Pro Cys Leu Val Asn Ser Lys Thr
 355 360 365

Val

<210> SEQ ID NO 258
 <211> LENGTH: 1107
 <212> TYPE: DNA
 <213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 258

atgacgactc ttccagctcg aatcctacct aaaagcgcat gtcttaaaac tttatttgat 60
 gactatttat ctggagcgcg tctttctgaa gaacaagctt tacaattact tctcgttgat 120
 gctgaggatc aacaagcttt atggagcttt gctgatctta ttcgtgccaa tcgtgttggt 180
 gacacagttt tctactcgtc gaccctttat ttatacccta caaactcttg tcagtttaac 240
 tgtacgtttt gttctttcta tgccaaacca gggaacccta caggatgggt ctttactcca 300
 gatcaactcg tacaatctat aaaagaaaac ccttctccca ttacagaaac gcatattgta 360
 gcaggatgct acccctcttg taatcttgct tactatgaag agctctcttc caaaattaag 420
 caaaatttcc cagatctaca tattaagcgc ctctcagcta tcgagtatga ttatctgtca 480
 aaattagaca atctcccagt taaagaagtc atgcaacgct tgcgtatcgc tggccttgat 540
 tctattcctg gtgggggtgc tgagatctta gtcgatgaag tccgagagac cctctcgcca 600
 ggcagattat cttcccaagg attcttagag atccatgaaa cagcgcattc cttaggaatc 660
 cctagcaatg ctaccatgct gtgctacat cgagagactc ctgcagatat aatgacacat 720
 atgagtaaac tgcgcgctct tcaagacaaa acttctggct ttaagaattt tatectctc 780
 aaatttgctg cagagaataa tgcttttaga aagcgtctac acaaaatgac ttcaagacac 840
 tcgattcctc ctgcaactat tattgcagtt gctcgactat tccagacaa catcccta 900
 attaaagctc tatggaatta tttaggcttc gacgttgctc tacacttggt atcatgcgga 960
 gccaatgatt tgtcttccac tcaccaagga gaaaaggat ttccaatggc ctcttcccaa 1020
 gagcctatc gtatggatat tgaagggatg tcccatctca taatacaaca tggctcgtatc 1080
 ccatgcttag tcaattccaa gaccggt 1107

-continued

```

<210> SEQ ID NO 259
<211> LENGTH: 377
<212> TYPE: PRT
<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 259

Met Ser Asp Ser Ser His Asn Leu Leu Tyr Asn Lys Phe Glu Leu Pro
1      5      10      15
Glu Ser Val Lys Met Ser Pro Val Glu Gly Ala Val Gly Gly Ile Asp
20      25      30
Lys Val Ala Arg Phe Val Ala Asp Pro Leu Glu Lys Gly Met Gly His
35      40      45
Thr Leu Gly Ser Ala Leu Arg Arg Ala Leu Leu Ile Gly Leu Glu Ala
50      55      60
Pro Ala Ile Val Ser Phe Ser Met Thr Gly Val Leu His Glu Tyr Met
65      70      75      80
Ala Val Glu Gly Ile Ile Glu Asp Val Thr Asn Ile Val Leu Asn Leu
85      90      95
Lys Gly Ser Leu Leu Lys Lys Tyr Pro Leu Gln Asp Cys Glu Gly Gly
100     105     110
Arg Cys Ser Gln Lys Leu Arg Ala Thr Ile Ser Ile Asp Ala Ser Asp
115     120     125
Leu Ala Ala Ala Gly Gly Gln Lys Glu Val Thr Leu Gly Asp Leu Leu
130     135     140
Gln Glu Gly Thr Phe Glu Ala Val Asn Pro Glu His Val Ile Phe Thr
145     150     155     160
Val Thr Arg Pro Met Gln Leu Glu Val Met Leu Arg Val Ala Phe Gly
165     170     175
Arg Gly Tyr Ser Pro Ser Glu Arg Ile Val Leu Glu Glu Arg Gly Met
180     185     190
Asn Glu Ile Val Leu Asp Ala Ala Phe Ser Pro Val Val Leu Val Asn
195     200     205
Tyr Phe Val Glu Asp Thr Arg Val Gly Gln Asp Thr Asp Phe Asp Arg
210     215     220
Leu Val Leu Gln Val Glu Thr Asp Gly Arg Val Ala Pro Lys Glu Ala
225     230     235     240
Val Ala Phe Ala Thr Gln Ile Leu Ser Lys His Phe Ser Val Phe Glu
245     250     255
Lys Met Asp Glu Lys Arg Ile Val Phe Glu Glu Ala Ile Ser Val Glu
260     265     270
Lys Glu Asn Lys Asp Asp Ile Leu His Lys Leu Val Leu Gly Ile Asn
275     280     285
Glu Ile Glu Leu Ser Val Arg Ser Thr Asn Cys Leu Ser Asn Ala Asn
290     295     300
Ile Glu Thr Ile Gly Glu Leu Val Ile Met Pro Glu Pro Arg Leu Leu
305     310     315     320
Gln Phe Arg Asn Phe Gly Lys Lys Ser Leu Cys Glu Ile Lys Asn Lys
325     330     335
Leu Lys Glu Met Lys Leu Glu Leu Gly Met Asp Leu Ser Gln Phe Gly
340     345     350
Val Gly Leu Asp Asn Val Lys Glu Lys Met Lys Trp Tyr Ala Glu Lys
355     360     365

```

-continued

Ile Arg Ser Ser Lys Asn Thr Lys Gly
 370 375

<210> SEQ ID NO 260
 <211> LENGTH: 1131
 <212> TYPE: DNA
 <213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 260

```

atgtcggata gttcacacaa tttactttat aacaaatttg agttgcctga atcgggtgaag    60
atgtctcctg tggaaggggc tgttggcggc attgataaag tagctcgatt tgttcagat    120
cccttggaag aagggatggg gcacaccttg ggaagcgctt tgcgacgtgc tctgttaatc    180
ggcttggaag ctctctctat tgtctctttc tctatgacag gagttttgca cgaatatatg    240
gcggtagagg ggatcattga agatgttacc aatatcgttt tgaatttgaa aggttcgttg    300
cttaaaaagt atcctctaca agattgtgaa ggtggaagat gctctcaaaa gttacgagct    360
acgattttcta ttgatgcac cagatttagct gccgctggtg ggcagaagga agttacttta    420
ggagatttgc tacaagaagg aacttttgaa gcggtcaatc ctgagcacgt aatttttacg    480
gtcacgcgtc caatgcaact tgaggttatg ttgcgagttg cttttggtag aggatactct    540
ccttctgaaa gaatcgttct tgaagaaaga ggcataaatg agatcgtttt agatgcggca    600
ttctctcctg ttgttctggt taactatttt gttgaagaca cccgctgttg acaagataca    660
gatttcgata gtttagtggt gcaagtggaa accgatggtc gtgtggctcc taaagaagct    720
gtagcttttg ctacacagat tttgagtaag catttttctg ttttcgaaaa aatggacgag    780
aagagaatcg tttttgagga agcaatctct gtagagaaag aaaacaaaga cgatattctt    840
cataaattgg ttttaggcat taatgagata gaactttctg tacgatctac aaattgttta    900
tctaatagca atatcgaaac gataggggaa ttggtaatta tgccagagcc tcgtctgtta    960
caatttagaa atttcgggaa gaagtctctc tgcgagatta agaataaact gaaagaaatg   1020
aaattagagt taggcataga cctcagccag tttggtgttg gtctggataa cgttaaagaa   1080
aaaatgaagt ggtatgccga gaaaattcgg tcgagtaaaa ataccaaggg a           1131

```

<210> SEQ ID NO 261
 <211> LENGTH: 165
 <212> TYPE: PRT
 <213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 261

```

Met Thr Leu Ser Arg Asn Ser His Lys Glu Asp Gln Leu Glu Glu Lys
1      5      10      15

Val Leu Val Val Asn Arg Cys Cys Lys Val Val Lys Gly Gly Arg Lys
20     25     30

Phe Ser Phe Ser Ala Leu Ile Leu Val Gly Asp Arg Lys Gly Arg Leu
35     40     45

Gly Phe Gly Phe Ala Lys Ala Asn Glu Leu Thr Asp Ala Ile Arg Lys
50     55     60

Gly Gly Asp Ala Ala Arg Lys Asn Leu Val Ser Ile Asn Ser Leu Glu
65     70     75     80

Gly Gly Ser Ile Pro His Glu Val Leu Val Asn His Asp Gly Ala Glu
85     90     95

```

-continued

Leu Leu Leu Lys Pro Ala Lys Pro Gly Thr Gly Ile Val Ala Gly Ser
100 105 110

Arg Ile Arg Leu Ile Leu Glu Met Ala Gly Val Lys Asp Ile Val Ala
115 120 125

Lys Ser Leu Gly Ser Asn Asn Pro Met Asn Gln Val Lys Ala Ala Phe
130 135 140

Lys Ala Leu Leu Thr Leu Ser Cys Lys Asp Asp Ile Met Lys Arg Arg
145 150 155 160

Ala Val Ile Asn Asp
165

<210> SEQ ID NO 262
<211> LENGTH: 495
<212> TYPE: DNA
<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 262

```

atgacgctat caagaaattc tcataaggaa gatcagctgg aagagaaggt tctcgtcgtc      60
aaccgtgtgt gtaaggttgt taaaggaggg cgtaagttaa gtttttctgc gcttatttta      120
gttggcgata gaaaagggcg tttaggcttc ggatttgcca aagctaacga gctaactgat      180
gccatccgta aaggtggaga tgctgctcga aaaaatcttg tctctatcaa ttctcttgag      240
ggaggatcta ttctctcatga gggtcttgtc aatcatgatg gagcagagct tctgttaaaa      300
cctgctaagc caggaaccgg aatcggtgca ggatctcgta ttcggttgat ttagagatg      360
gccggggtaa aggacatcgt agcaaagagt ttaggatcca ataactctat gaatcaggtt      420
aaagcggctt ttaaagccct cctgacactc tcttgtaaag atgatattat gaaaaggaga      480
gccgttatca atgat                                           495

```

<210> SEQ ID NO 263
<211> LENGTH: 123
<212> TYPE: PRT
<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 263

Met Glu Ser Ser Leu Tyr Lys Lys Thr Ser Gly Lys Ala Arg Arg Ala
1 5 10 15

Leu Arg Val Arg Lys Ala Leu Lys Gly Cys Ser Leu Lys Pro Arg Leu
20 25 30

Ser Val Val Lys Thr Asn Lys His Val Tyr Val Gln Leu Ile Asp Asp
35 40 45

Val Glu Gly Lys Thr Leu Ala Ser Ile Ser Thr Leu Ala Lys Val Ala
50 55 60

Lys Thr Ser Gly Leu Thr Arg Lys Asn Gln Asp Asn Ala Lys Ala Leu
65 70 75 80

Gly Ile Lys Ile Ala Glu Leu Gly Lys Gly Leu Gln Val Asp Arg Val
85 90 95

Val Phe Asp Arg Gly Ala His Lys Tyr His Gly Val Val Ala Met Val
100 105 110

Ala Asp Gly Ala Arg Glu Gly Gly Leu Gln Phe
115 120

<210> SEQ ID NO 264
<211> LENGTH: 369

-continued

<212> TYPE: DNA

<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 264

```

atggaaagct ctttatataa gaaaacttcg gggaaagctc gtagagcttt aagagtgcgg      60
aaagccttaa agggatgttc tttaaagccc agattatccg ttgtaaagac aaataagcat      120
gtttatgtgc agctgattga tgatgttgaa gggaaaaactt tagcatctat ttcaactttg      180
gctaaggttg caaaaacttc tggattaact agaaaaaatc aggataatgc caaagctttg      240
ggaataaaaa ttgctgaatt agggaaaggc cttcaagtag atcgagttgt ttctgatcga      300
ggagctcata agtatcatgg tgtagtagct atggttgctg atggagccag agagggtgga      360
ttacagttt                                     369

```

<210> SEQ ID NO 265

<211> LENGTH: 183

<212> TYPE: PRT

<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 265

```

Met Ser Arg Lys Ala Arg Asp Pro Ile Val Leu Pro Gln Gly Val Glu
1          5          10          15
Val Ser Ile Gln Asn Asp Glu Ile Ser Val Lys Gly Pro Lys Gly Ser
20        25        30
Leu Thr Gln Val Leu Ala Lys Glu Val Glu Ile Ala Val Lys Gly Asn
35        40        45
Glu Val Phe Val Thr Pro Ala Ala His Val Val Asp Arg Pro Gly Arg
50        55        60
Ile Gln Gly Leu Tyr Trp Ala Leu Ile Ala Asn Met Val Lys Gly Val
65        70        75        80
His Thr Gly Phe Glu Lys Arg Leu Glu Met Ile Gly Val Gly Phe Arg
85        90        95
Ala Ala Val Gln Gly Ser Leu Leu Asp Leu Ser Ile Gly Val Ser His
100       105       110
Pro Thr Lys Met Pro Ile Pro Thr Gly Leu Glu Val Ser Val Glu Lys
115       120       125
Asn Thr Leu Ile Ser Ile Lys Gly Ile Asn Lys Gln Leu Val Gly Glu
130       135       140
Phe Ala Ala Cys Val Arg Ala Lys Arg Pro Pro Glu Pro Tyr Lys Gly
145       150       155       160
Lys Gly Ile Arg Tyr Glu Asn Glu Tyr Val Arg Arg Lys Ala Gly Lys
165       170       175
Ala Ala Lys Thr Gly Lys Lys
180

```

<210> SEQ ID NO 266

<211> LENGTH: 549

<212> TYPE: DNA

<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 266

```

atgtctcgta aagctcgaga ccctattgtg cttcctcaag gcgtagaggt ctctattcaa      60
aatgatgaaa tctcagtgaag aggtcctaaa gggctctttga cgcaggtatt ggctaaagaa      120
gttgagattg ccgttaaagg taatgaggtg tttgttactc ctgcggctca cgttgtagat      180

```

-continued

```

agacctggtc gtatacaagg gctttattgg gccttaatatg caaatatggt caaaggtgtc 240
catactggat ttgagaagcg tttagaaatg atcggagtcg gcttcagagc tgcagtacaa 300
gggtccttgt tagatctgtc aataggggtt tctcacccta caaaaatgcc tattcctacg 360
ggattagaag tctctgttga gaaaaacaca ttgatctcca ttaaaggat caataagcag 420
ttagtggag aatttgcggc ttgtgttcgt gcaaaacgcc ctccagaacc atacaaaggt 480
aaaggaattc gttacgaaaa cgaatatgtt cgtcgtagg ctgggaaagc agcgaaaact 540
ggtaaaaaa 549

```

```

<210> SEQ ID NO 267
<211> LENGTH: 180
<212> TYPE: PRT
<213> ORGANISM: Chlamydia trachomatis

```

```

<400> SEQUENCE: 267

```

```

Met Ser Arg Leu Lys Lys Leu Tyr Thr Glu Glu Ile Arg Lys Thr Leu
1          5          10          15
Gln Asp Lys Phe Gln Tyr Glu Asn Val Met Gln Ile Pro Val Leu Lys
20          25          30
Lys Ile Val Ile Ser Met Gly Leu Ala Glu Ala Ala Lys Asp Lys Asn
35          40          45
Leu Phe Gln Ala His Leu Glu Glu Leu Ala Val Ile Ser Ser Gln Lys
50          55          60
Pro Leu Val Thr Arg Ala Arg Asn Ser Ile Ala Gly Phe Lys Leu Arg
65          70          75          80
Glu Gly Gln Gly Ile Gly Ala Lys Val Thr Leu Arg Gly Ile Arg Met
85          90          95
Tyr Asp Phe Met Asp Arg Phe Cys Asn Ile Val Ser Pro Arg Ile Arg
100         105         110
Asp Phe Arg Gly Phe Ser Cys Lys Gly Asp Gly Arg Gly Cys Tyr Ser
115         120         125
Phe Gly Leu Asp Asp Gln Gln Ile Phe Pro Glu Val Asp Leu Asp Arg
130         135         140
Val Lys Arg Ser Gln Gly Met Asn Ile Thr Trp Val Thr Thr Ala Gln
145         150         155         160
Thr Asp Ala Glu Cys Leu Thr Leu Leu Glu Cys Met Gly Leu Arg Phe
165         170         175
Lys Lys Ala Gln
180

```

```

<210> SEQ ID NO 268
<211> LENGTH: 540
<212> TYPE: DNA
<213> ORGANISM: Chlamydia trachomatis

```

```

<400> SEQUENCE: 268

```

```

atgagcaggt taaaaaaact atatactgaa gagataagaa agactcttca agataagttt 60
cagtatgaaa atgtaatgca aatccctgtt cttaagaaga tcgtaataag catggggcct 120
gcagaggctg caaaggataa aaaccttttc caggctcatt tagaggaatt ggcggttatc 180
tctagtcaaa aaccttttgt aacaagagct agaaactcta tcgcaggctt caagttacga 240
gagggtcagg gcacgcggagc aaaagtcact ctacgtggaa tccgtatgta tgactttatg 300

```

-continued

```

gaccgttttt gcaatattgt ctccccaaga attcgagact ttagaggatt ctcttgtaaa 360
ggagatggac gaggatgtta ttcccttggt ttagatgatc agcaaattctt tcctgaagtt 420
gatttagatc gtgttaaacg atctcaggga atgaatatta cttgggtaac tacagcacia 480
accgatgcgg agtgccttac cttgtagag tgtatgggct tgcgtttcaa gaaggtcaa 540

```

```

<210> SEQ ID NO 269
<211> LENGTH: 130
<212> TYPE: PRT
<213> ORGANISM: Chlamydia trachomatis

```

```

<400> SEQUENCE: 269

```

```

Val Thr Thr Glu Ser Leu Glu Thr Leu Val Glu Gln Leu Ser Gly Leu
1          5          10          15
Thr Val Leu Glu Leu Ser Gln Leu Lys Lys Leu Leu Glu Glu Lys Trp
20        25        30
Asp Val Thr Ala Ala Ala Pro Val Val Ala Val Ala Gly Ala Ala Ala
35        40        45
Ala Gly Asp Ala Pro Ala Ser Ala Glu Pro Thr Glu Phe Ala Val Ile
50        55        60
Leu Glu Asp Val Pro Ser Asp Lys Lys Ile Gly Val Leu Lys Val Val
65        70        75        80
Arg Glu Val Thr Gly Leu Ala Leu Lys Glu Ala Lys Glu Met Thr Glu
85        90        95
Gly Leu Pro Lys Thr Val Lys Glu Lys Thr Ser Lys Ser Asp Ala Glu
100       105       110
Asp Thr Val Lys Lys Leu Gln Glu Ala Gly Ala Lys Ala Val Ala Lys
115       120       125
Gly Leu
130

```

```

<210> SEQ ID NO 270
<211> LENGTH: 390
<212> TYPE: DNA
<213> ORGANISM: Chlamydia trachomatis

```

```

<400> SEQUENCE: 270

```

```

gtgacaacag aaagtttggg aacttttagta gaacagttga gcggcttgac ggtgcttgaa 60
ttgtctcagc ttaaaaaatt attggaagaa aagtgggacg ttactgctgc cgtcctgtga 120
gtagctgttg ctgggtgctgc tgccgctggt gatgctcctg cttctgcaga gcctacagag 180
tttctgttaa ttctggaaga cgctccttct gataagaaaa tcgggggttct gaaagttggt 240
agagaagtta ctggattagc ttgaaagaa gctaaagaaa tgactgaagg attacctaag 300
acgggttaaag aaaaaacttc taaaagtgat gcagaagaca ctgttaagaa gttacaagaa 360
gccggtgcta aggctgttgc taaagggtcg 390

```

```

<210> SEQ ID NO 271
<211> LENGTH: 123
<212> TYPE: PRT
<213> ORGANISM: Chlamydia trachomatis

```

```

<400> SEQUENCE: 271

```

```

Met Pro Thr Ile Asn Gln Leu Ile Arg Lys Lys Arg Gln Ser Gly Ala
1          5          10          15

```

-continued

Thr Arg Lys Lys Ser Pro Ala Leu Gln Lys Ser Pro Gln Lys Arg Gly
 20 25 30
 Val Cys Leu Gln Val Lys Thr Lys Thr Pro Lys Lys Pro Asn Ser Ala
 35 40 45
 Leu Arg Lys Val Ala Trp Val Arg Leu Ser Asn Gly Gln Glu Val Ile
 50 55 60
 Ala Tyr Ile Gly Gly Glu Gly His Asn Leu Gln Glu His Ser Ile Val
 65 70 75 80
 Leu Val Gln Gly Gly Arg Val Lys Asp Leu Pro Gly Val Arg Tyr His
 85 90 95
 Ile Val Arg Gly Ala Leu Asp Cys Ala Ala Val Lys Asn Arg Lys Gln
 100 105 110
 Ser Arg Ser Arg Tyr Gly Ala Lys Arg Pro Lys
 115 120

<210> SEQ ID NO 272
 <211> LENGTH: 369
 <212> TYPE: DNA
 <213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 272

```

atgccgacga ttaatcagtt aatacgtaag aagcgtcagt ctggcgcaac tagaaagaaa      60
tctccagctt tacaaaagtc tcctcagaaa agaggggtct gtcttcaggt aaaaactaaa      120
actccgaaga aacctaaact agctttgcgt aaggttgctt gggttcgttt gtctaattga      180
caagaggtaa ttgcctacat cgggtggagag ggtcataatt tgcaggagca cagcatcggt      240
ttagtccaag gcggaagagt taaggatttg ccaggggtgc gttatcacat cgtccgaggt      300
gctttagatt gtgctgccgt aaaaaataga aaacagagcc gttctcgcta cggcgcaaa      360
cgctctaag                                     369
  
```

<210> SEQ ID NO 273
 <211> LENGTH: 202
 <212> TYPE: PRT
 <213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 273

Met Leu Asp Leu Leu Lys Ile Ser Val Thr Gly Asp Pro Ser Ser Gly
 1 5 10 15
 Lys Thr Glu Ala Cys Gln Val Phe Glu Asp Leu Gly Ala Tyr Val Ile
 20 25 30
 Ser Ala Asp Lys Val Ser His Ser Phe Leu Val Pro Tyr Thr Ser Val
 35 40 45
 Gly Gln Arg Ile Ile Asp Leu Leu Gly Pro Glu Ile Ile Ile Glu Asn
 50 55 60
 Thr Leu Ser Arg Lys Ala Ile Ala Glu Lys Val Phe Gly Asn Arg Asp
 65 70 75 80
 Leu Leu Leu Ser Leu Glu Glu Ile Leu His Pro Glu Val Cys Arg Phe
 85 90 95
 Val Glu Glu Lys Tyr Ala His Val Val Gln Glu Gln Lys Tyr Pro Leu
 100 105 110
 Phe Ile Ala Glu Phe Pro Leu Leu Tyr Glu Ile Gln Tyr Ala Asp Trp
 115 120 125

-continued

Phe Asp Gln Val Ile Leu Ile Ser Ala Asp Thr Gly Ile Arg Lys Glu
130 135 140

Arg Phe Leu Lys Lys Thr Gly Gly Ser Asp Thr Ser Phe Asp Leu Arg
145 150 155 160

Cys Ala Arg Phe Ser Ser Leu Glu Glu Lys Ile Leu Arg Ala Asp Val
165 170 175

Val Ile Glu Asn Asn Gly Thr Lys Glu Glu Phe Arg Arg Lys Val Lys
180 185 190

Gln Cys Phe Lys Ala Leu Lys Gly Thr Ile
195 200

<210> SEQ ID NO 274
 <211> LENGTH: 606
 <212> TYPE: DNA
 <213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 274

```

atgctagatt tattgaagat ttctgttaca ggagatccct cttcagggaa aactgaggcg      60
tgtcagggttt ttgaagattt gggagcttat gtaattagtg ctgataaagt ttctcatagt      120
ttccttgttc cttataccctc agtgggtcaa cgtataattg atcttttggg tccagagata      180
atcatagaga atactcttag tagaaaggcc attgctgaaa aagtttttgg taaccgggat      240
ttattgctgt ctttagaaga gattttgcat ccggaagtgt gtcgttttgt tgaggaaaaa      300
tatgcgcacg tggttcagga acaaaagtat cctctgttta ttgcggaatt tcctctgttg      360
tatgagattc agtatcgga ttggtttgat caggttattt taatttctgc agatacaggt      420
atacgcaaag agcgttttct taaaaaaact ggaggttcgg acaccagttt cgatcttcgg      480
tgtgcacgct tttcttcttt agaagaaaaa atcctgcgag cggatgtggt catagagaat      540
aatggaacga aagaagaatt tcgtcgcaaa gtaaaacaat gttttaaggc tttaaaggga      600
acaata                                           606
  
```

<210> SEQ ID NO 275
 <211> LENGTH: 72
 <212> TYPE: PRT
 <213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 275

Met Gly Ala Lys Lys Asn Leu Leu Ala Glu Leu Arg Glu Lys Ser Ser
1 5 10 15

Glu Glu Leu Asp Glu Phe Ile Arg Asp Asn Lys Lys Ala Leu Phe Ala
20 25 30

Leu Arg Ala Glu Ala Ala Leu Gln Asn Lys Val Val Lys Thr His Gln
35 40 45

Phe Ser Leu Tyr Lys Lys Ser Ile Ala Arg Ala Leu Thr Ile Lys Gln
50 55 60

Glu Lys Lys Asp Arg Val His Gly
65 70

<210> SEQ ID NO 276
 <211> LENGTH: 216
 <212> TYPE: DNA
 <213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 276

-continued

```

atgggagcaa aaaagaattt attagcggag cttagagaga agagctctga agagttggat    60
gagtttattc gtgataataa aaaagctctc ttcgctttgc gtgcggaagc tgctttacag    120
aataaagttg tgaaaactca tcagttttct ctgtataaga aaagcattgc tcgtgctcta    180
acaataaaac aagaaaaaaa ggatagagtc catggc                                216

```

```

<210> SEQ ID NO 277
<211> LENGTH: 111
<212> TYPE: PRT
<213> ORGANISM: Chlamydia trachomatis

```

```

<400> SEQUENCE: 277

```

```

Met Phe Lys Ala Thr Ala Arg Tyr Ile Arg Val Gln Pro Arg Lys Ala
1      5      10      15
Arg Leu Ala Ala Gly Leu Met Arg Asn Arg Ser Val Val Glu Ala Gln
20     25     30
Gln Gln Leu Ser Phe Ser Gln Met Lys Ala Gly Arg Cys Leu Lys Lys
35     40     45
Val Leu Asp Gly Ala Ile Ala Asn Ala Glu Ser Asn Glu Asn Ile Lys
50     55     60
Arg Glu Asn Leu Cys Val Leu Glu Val Arg Val Asp Val Gly Pro Met
65     70     75     80
Phe Lys Arg Met Lys Ser Lys Ser Arg Gly Gly Arg Ala Pro Ile Leu
85     90     95
Lys Arg Thr Ser His Leu Thr Val Ile Val Gly Glu Arg Gly Gln
100    105    110

```

```

<210> SEQ ID NO 278
<211> LENGTH: 333
<212> TYPE: DNA
<213> ORGANISM: Chlamydia trachomatis

```

```

<400> SEQUENCE: 278

```

```

atgtttaaag cgacagcccg atacatacgg gttcagccaa gaaaggctcg tttagctgca    60
ggattgatga gaaaccgtag tggtgttgaa gctcaacagc aactcagctt ttctcagatg    120
aaggctggaa gatgccttaa aaaagtgttg gatggcgcta ttgcaaatgc agagtccaat    180
gaaaatataa aacgtgaaaa tctttgcgtt ctagaagttc gggttgatgt cggcccaatg    240
ttcaaaagaa tgaagtctaa gagtcgtggg ggaagagccc cgattttgaa ggcacagagt    300
catctaactg tgattgttgg cgagagaggg cag                                333

```

```

<210> SEQ ID NO 279
<211> LENGTH: 111
<212> TYPE: PRT
<213> ORGANISM: Chlamydia trachomatis

```

```

<400> SEQUENCE: 279

```

```

Met Lys Asp Pro Tyr Asp Val Val Lys Arg His Tyr Val Thr Glu Lys
1      5      10      15
Ala Lys Met Leu Glu Gly Leu Ser Leu Gly Asp Gly Glu Gly Lys Lys
20     25     30
Lys Gly Ser Phe Cys Lys Asp Pro Lys Tyr Ile Phe Ile Val Ala Gly
35     40     45
Asp Ala Thr Lys Pro Met Ile Ala Glu Ala Ile Glu Ala Ile Tyr Ser
50     55     60

```

-continued

Ala Lys Gly Val Lys Val Lys Lys Val Asn Thr Met Cys Val Lys Pro
65 70 75 80

Gln Pro Thr Arg Ile Phe Arg Gly Arg Arg Lys Gly Arg Thr Ala Gly
85 90 95

Phe Lys Lys Ala Ile Val Thr Phe Val Asp Gly His Ser Ile Gly
100 105 110

<210> SEQ ID NO 280

<211> LENGTH: 333

<212> TYPE: DNA

<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 280

atgaaagatc cttatgatgt tgtcaaaaga cattatgtga ccgagaaggc aaagatgttg 60
gaaggtttga gtctcggaga cggagaaggt aaaaagaaag gcagtttctg caaagatcct 120
aagtacatat ttattgttgc tggggacgcc acgaagccta tgattgctga agccatagaa 180
gcaatttatt ctgctaaagg tgtgaaggtt aaaaaagtaa acaccatgtg tgttaaacct 240
caacctacaa gaatattccg aggccgaaga aaaggaagaa ccgcagggtt taagaaggct 300
attgtgactt ttgttgatgg tcactctatt ggt 333

<210> SEQ ID NO 281

<211> LENGTH: 243

<212> TYPE: PRT

<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 281

Met Lys Ile Thr Pro Ile Lys Thr Arg Lys Val Phe Ala His Asp Ser
1 5 10 15

Leu Gln Glu Ile Leu Gln Glu Ala Leu Pro Pro Leu Gln Glu Arg Ser
20 25 30

Val Val Val Val Ser Ser Lys Ile Val Ser Leu Cys Glu Gly Ala Val
35 40 45

Ala Asp Ala Arg Met Cys Lys Ala Glu Leu Ile Lys Lys Glu Ala Asp
50 55 60

Ala Tyr Leu Phe Cys Glu Lys Ser Gly Ile Tyr Leu Thr Lys Lys Glu
65 70 75 80

Gly Ile Leu Ile Pro Ser Ala Gly Ile Asp Glu Ser Asn Thr Asp Gln
85 90 95

Pro Phe Val Leu Tyr Pro Lys Asp Ile Leu Gly Ser Cys Asn Arg Ile
100 105 110

Gly Glu Trp Leu Arg Asn Tyr Phe Arg Val Lys Glu Leu Gly Val Ile
115 120 125

Ile Thr Asp Ser His Thr Thr Pro Met Arg Arg Gly Val Leu Gly Ile
130 135 140

Gly Leu Cys Trp Tyr Gly Phe Ser Pro Leu His Asn Tyr Ile Gly Ser
145 150 155 160

Leu Asp Cys Phe Gly Arg Pro Leu Gln Met Thr Gln Ser Asn Leu Val
165 170 175

Asp Ala Leu Ala Val Ala Ala Val Val Cys Met Gly Glu Gly Asn Glu
180 185 190

Gln Thr Pro Leu Ala Val Ile Glu Gln Ala Pro Asn Met Val Tyr His
195 200 205

-continued

Ser His Pro Thr Ser Arg Glu Glu Tyr Cys Ser Leu Arg Ile Asp Glu
210 215 220

Thr Glu Asp Leu Tyr Gly Pro Phe Leu Gln Ala Val Thr Trp Ser Gln
225 230 235 240

Glu Lys Lys

<210> SEQ ID NO 282
<211> LENGTH: 729
<212> TYPE: DNA
<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 282

```
atgaaaataa ctccgatcaa aacacgtaaa gtatttgcac atgattcgct tcaagagatc 60
ttgcaagagg ctttgcggcc tctgcaagaa cggagtgtgg tagttgtctc ttcaaagatt 120
gtgagtttat gtgaaggcgc tgctcgatgat gcaagaatgt gcaaagcaga gctgataaaa 180
aaagaagcgg atgcttattt gttttgtgag aaaagcggga tatatctaac gaaaaaagaa 240
ggatatttga ttcttctctg agggattgat gaatcgaata cggaccagcc ttttgtttta 300
tattcctaaag atattttggg atcgtgtaat cgcacggag aatggttaag aaattatttt 360
cgagtgaag agctaggcgt aatcattaca gatagccata ctactccaat gcggcgtgga 420
gtactgggta tcgggctgtg ttggtatgga ttttctccat tacacaacta tataggatcg 480
ctagattggt tcggctgctc cttacagatg acgcaaagta atcttgtaga tgccttagca 540
gttcggcgtg ttgtttgtat gggagagggg aatgagcaaa caccgttagc ggtgatagag 600
caggcaccta atatggtcta ccattcacat cctacttctc gagaagagta ttgttctttg 660
cgcatagatg aaacagagga cttatacgga ctttttttgc aagcgggttac gtggagtcaa 720
gaaaagaaa 729
```

<210> SEQ ID NO 283
<211> LENGTH: 450
<212> TYPE: PRT
<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 283

```
Met Thr Ser Trp Asn Phe Val Cys Leu Ser Leu Gly Ser Asn Leu Gly
1 5 10 15
Asn Arg His Glu His Ile Arg Arg Ala Tyr Ala Ser Leu Lys Lys Ala
20 25 30
Gly Ile Arg Asn Leu Lys Ser Ser Val Ile Leu Glu Thr Lys Ala Leu
35 40 45
Leu Leu Glu Gly Ala Pro Lys Glu Trp Asp Leu Pro Tyr Phe Asn Ser
50 55 60
Val Val Ile Gly Glu Thr Gln Leu Ser Pro Asp Glu Leu Ile Glu Glu
65 70 75 80
Ile Lys Met Ile Glu Ser Arg Phe Gly Gln Asp Ala Ser Leu Lys Trp
85 90 95
Gly Pro Arg Pro Ile Asp Ile Asp Val Leu Phe Tyr Gly Asp Glu Ala
100 105 110
Phe Ser Tyr His Ser Asp Lys Cys Thr Ile Pro His Pro Lys Val Leu
115 120 125
Glu Arg Pro Phe Leu Leu Ser Met Ile Ala Ser Leu Cys Pro Tyr Arg
```


-continued

130				135				140							
Arg	Phe	Arg	Leu	Glu	Gly	Ser	Ser	Cys	Asn	Gly	Lys	Thr	Phe	Ala	Glu
145				150						155					160
Leu	Ala	Ala	Ile	Tyr	Pro	Leu	Thr	Glu	Glu	Asp	Ala	Leu	Gly	Ser	Phe
			165							170				175	
Gly	Ser	Ala	Thr	Gln	Ile	Met	Gly	Ile	Val	Asn	Ile	Thr	Asp	Asn	Ser
			180							185				190	
Ile	Ser	Asp	Thr	Gly	Leu	Phe	Leu	Glu	Ala	Arg	Arg	Ala	Ala	Ala	His
		195					200							205	
Ala	Glu	Arg	Leu	Phe	Ala	Glu	Gly	Ala	Ser	Ile	Ile	Asp	Leu	Gly	Ala
	210					215					220				
Gln	Ala	Thr	Asn	Pro	Arg	Val	Lys	Asp	Leu	Gly	Ser	Val	Glu	Gln	Glu
	225				230					235					240
Trp	Glu	Arg	Leu	Glu	Pro	Val	Leu	Arg	Leu	Leu	Ala	Glu	Arg	Trp	Gly
			245						250					255	
Ala	Ala	Gln	Gln	Cys	Pro	Asp	Val	Ser	Ile	Asp	Thr	Phe	Arg	Pro	Glu
			260						265					270	
Ile	Ile	Arg	Arg	Ala	Val	Glu	Val	Phe	Pro	Ile	Arg	Trp	Ile	Asn	Asp
		275					280							285	
Val	Ser	Gly	Gly	Ser	Leu	Glu	Met	Ala	His	Leu	Ala	Lys	Glu	Phe	Gly
		290				295					300				
Leu	Arg	Leu	Leu	Ile	Asn	His	Ser	Cys	Ser	Leu	Pro	Pro	Arg	Pro	Asp
	305				310					315				320	
Cys	Val	Leu	Ser	Tyr	Glu	Glu	Ser	Pro	Ile	Glu	Gln	Met	Leu	Arg	Trp
			325						330					335	
Gly	Glu	Ser	Gln	Leu	Glu	Gln	Phe	Ala	Gln	Val	Gly	Leu	Asp	Thr	Ser
			340						345					350	
Trp	Gln	Val	Val	Phe	Asp	Pro	Gly	Ile	Gly	Phe	Gly	Lys	Thr	Pro	Val
		355					360							365	
Gln	Ser	Met	Leu	Leu	Met	Asp	Gly	Val	Lys	Gln	Phe	Lys	Arg	Val	Leu
	370					375					380				
Glu	Cys	Pro	Val	Leu	Ile	Gly	His	Ser	Arg	Lys	Ser	Cys	Leu	Ser	Met
	385				390					395				400	
Leu	Gly	Arg	Phe	Asn	Ser	Asn	Asp	Arg	Asp	Trp	Glu	Thr	Ile	Gly	Cys
			405						410					415	
Ser	Val	Ser	Leu	His	Asp	Arg	Gly	Val	Asp	Tyr	Leu	Arg	Val	His	Gln
			420						425					430	
Val	Glu	Gly	Asn	Arg	Arg	Ala	Leu	Ala	Ala	Ala	Ala	Trp	Ala	Gly	Met
		435					440							445	
Phe	Val														
	450														

<210> SEQ ID NO 284

<211> LENGTH: 1350

<212> TYPE: DNA

<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 284

atgactagtt ggaattttgt ttgtttaagt ttgggttcca atttaggtaa ccggcatgag 60

catataagac gcgcttatgc aagtttaaag aaggctggga tccgaaattt aaaaagttct 120

gtgattttag agacgaaggc tttgttgta gaaggggctc cgaaagaatg ggatcttcct 180

-continued

tattttaact	ctgtgggttat	tggggaaaacg	cagctatctc	cagacgagtt	gattgaagaa	240
atcaagatga	tagaaagtcg	ttttggacaa	gatgcttctt	tgaaatgggg	gcctcgaccg	300
attgatattg	atgtgctttt	ctatggagac	gaagcttttt	cttatcatag	tgacaaatgt	360
acaatcccac	atcctaaggt	attagaaaga	ccttttcttc	tttctatgat	agcttcttta	420
tgtccgtatc	tgcgtttccg	tttggaaagg	tcttcttgta	atgggaaaac	gtttgcagag	480
cttgctgcta	tttatccatt	gacggaggag	gatgcgttag	gcagtttcgg	ttctgtacc	540
caaattatgg	gtattgttaa	tattacggat	aactcgatct	cgatacagg	attgtttctg	600
gaggcgagaa	gagccgcagc	ccatgctgag	agactctttg	cagaaggagc	ttctattatt	660
gatttagggg	cgcaagcaac	caatcctcgt	gtaaaagatt	taggaagcgt	agaacaagag	720
tggggagcgtc	tagaacctgt	tttgcgttta	ttagcggagc	ggtggggggc	tgctcaacaa	780
tgccctgatg	tatctatcga	tacatttcgt	ccagagatta	ttcgacgagc	tgttgaagta	840
tttccgattc	gttggatcaa	tgatgtttct	ggaggctctt	tggaaatggc	tcattttggcg	900
aaggagtttg	ggctacggct	attaataaat	cattcgtggt	cgctgcctcc	aagaccagat	960
tgtgtacttt	cttatgaaga	atctcctatt	gagcaaatgt	tgcgttgggg	agagtctcag	1020
ttagaacaat	ttgctcaagt	aggtttagat	acaagttggc	aagttgtttt	cgatccagga	1080
ataggatttg	ggaagactcc	cgttcagtcg	atgtttattg	tggaaggagt	aaagcagttt	1140
aaacgtgttt	tagagtgtcc	tgtattaata	ggccattcta	gaaaatcgtg	tttgagtatg	1200
ttgggccgat	ttaatatgaa	cgatcgtgat	tgggaaacga	tcggctgttc	tgtatctctt	1260
catgatcgag	gagttgatta	tctacgcgtg	catcaggttg	aaggtaacag	acgtgcctta	1320
gccgctgctg	cttgggctgg	tatgttttga				1350

```
<210> SEQ ID NO 285
<211> LENGTH: 209
<212> TYPE: PRT
<213> ORGANISM: Chlamydia trachomatis
```

<400> SEQUENCE: 285

Met	Ala	Arg	Tyr	Cys	Gly	Pro	Lys	Asn	Arg	Ile	Ala	Arg	Arg	Phe	Gly
1				5					10					15	
Ala	Asn	Ile	Phe	Gly	Arg	Gly	Arg	Asn	Pro	Leu	Leu	Arg	Lys	Pro	Asn
			20					25					30		
Pro	Pro	Gly	Gln	His	Gly	Met	Gln	Arg	Lys	Lys	Lys	Ser	Asp	Tyr	Gly
		35					40					45			
Leu	Gln	Leu	Glu	Glu	Lys	Gln	Lys	Leu	Lys	Ala	Cys	Tyr	Gly	Met	Ile
	50					55					60				
Leu	Glu	Lys	Gln	Leu	Val	Lys	Ala	Tyr	Lys	Glu	Val	Val	Asn	Lys	Gln
65					70					75					80
Gly	Asn	Val	Ala	Gln	Met	Phe	Leu	Glu	Lys	Phe	Glu	Cys	Arg	Leu	Asp
			85					90					95		
Asn	Ile	Val	Tyr	Arg	Leu	Gly	Phe	Ala	Lys	Thr	Ile	Phe	Ala	Ala	Gln
			100					105					110		
Gln	Leu	Val	Ser	His	Gly	His	Val	Leu	Val	Asn	Gly	Lys	Lys	Val	Asp
	115						120					125			
Arg	Arg	Ser	Phe	Phe	Val	Arg	Pro	Gly	Met	Gln	Ile	Ser	Leu	Lys	Glu
	130					135					140				
Lys	Ser	Lys	Arg	Leu	Ala	Ile	Val	Thr	Glu	Ser	Leu	Glu	Asn	Lys	Asp

-continued

145	150	155	160
Gln Ser Ser Leu Pro Ala Tyr Leu Ser Leu Asp Lys Ala Ala Phe Lys			
	165	170	175
Gly Glu Leu Val Val Ala Pro Glu Leu Asp Gln Ile Ala Ser Gln Leu			
	180	185	190
Pro Leu Pro Val Asn Val Ser Val Ile Cys Glu Phe Leu Ser His Arg			
	195	200	205

Thr

<210> SEQ ID NO 286
 <211> LENGTH: 627
 <212> TYPE: DNA
 <213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 286

atggcgagat attgtggccc taaaaacaga atagcgagac gttttggagc taacatcttt	60
gggagaggtc gaaacccttt gctgagaaag cccaatcctc cgggtcagca cggcatgcaa	120
agaaaaaaga aatctgacta cggcttacag ttagaagaaa agcaaaaatt aaaagcttgc	180
tacggaatga tcttagagaa gcaattgggt aaagcttaca aagaggttgt aaataagcaa	240
ggaaacgttg cgcaaatgtt cctagagaaa ttgagtgc gtttgacaa tatcgtctat	300
agactaggat tcgcaaaaac gatctttgct gctcaacaat tggtttctca tgggcacgta	360
ttggtgaacg gaaaaaaggt agatagacgc tcgttcttcg ttcgtcctgg aatgcagatc	420
tctttgaaag aaaaatcaaa aagattagct atcggtacag aatctttaga gaacaaagat	480
caaagctctc ttctgccta tctatctttg gataaagcag cttttaaagg agagttgggt	540
gttgctccag aactggatca aatcgcttct caacttcctt taccagtaaa cgtttctgtt	600
attgtgagt ttctatccca cagaaca	627

<210> SEQ ID NO 287
 <211> LENGTH: 227
 <212> TYPE: PRT
 <213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 287

Met Ala Gly Pro Lys His Val Leu Leu Val Ser Glu Asn Trp Asp Leu	
1	15
Phe Phe Gln Thr Lys Glu Leu Leu Asn Pro Glu Glu Tyr Arg Cys Thr	
20	30
Ile Gly Gln Gln Tyr Lys Gln Glu Leu Ser Ala Asp Leu Val Val Cys	
35	45
Glu Tyr Ser Leu Leu Pro Arg Glu Val Arg Ser Pro Lys Ser Leu Lys	
50	60
Gly Ser Phe Val Leu Val Leu Leu Asp Phe Phe Asp Glu Glu Thr Ser	
65	80
Val Asp Leu Leu Asp Arg Gly Phe Trp Tyr Leu Ile Gln Pro Ile Thr	
85	95
Pro Arg Ile Leu Lys Ser Ala Ile Ser Leu Phe Leu Ser Gln His Ser	
100	110
Leu His Ser Val Pro Glu Ser Ile Arg Phe Gly Pro Asn Val Phe His	
115	125
Val Leu Lys Leu Thr Val Glu Thr Pro Glu Gly Ser Val His Leu Thr	

-continued

130	135	140	
Pro Ser Glu Ser Gly Ile Leu Lys Arg Leu Leu Ile Asn Lys Gly Gln			
145	150	155	160
Leu Cys Leu Arg Lys His Leu Leu Glu Glu Ile Lys Asn His Ala Lys			
	165	170	175
Ala Ile Val Ala Arg Asn Val Asp Val His Ile Ala Ser Leu Arg Lys			
	180	185	190
Lys Leu Gly Ala Tyr Gly Ser Arg Ile Val Thr Leu Arg Gly Val Gly			
	195	200	205
Tyr Leu Phe Ser Asp Asp Gly Asp Lys Lys Phe Ser Gln Gln Asp Thr			
	210	215	220
Lys Leu Ser			
225			

<210> SEQ ID NO 288
 <211> LENGTH: 681
 <212> TYPE: DNA
 <213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 288

atggcagggc ctaaaccatgt gttactagta agtgaaaatt gggatttatt ttttcaaaca	60
aaagaattgc ttaatcctga agagtatcgg tgcactattg ggcagcaata taaacaagaa	120
ctgtccgcag acttggttgt ctgcgaatat tcattgcttc caagagaggt tcgtttctcca	180
aaatctttaa aaggtagttt tgttttagtt ctttttagatt tttttgatga agaaactagt	240
gttgatcttt tggatcggtg tttttggtat ttaattcagc ctattactcc tagaatttta	300
aaatccgcaa tcagcttggt tctttctcag cattcgctac attctgttcc ggaaagtatt	360
cgttttgggc ctaatgtatt tcatgtattg aagctcacag tagaaactcc agaaggaggt	420
gttcatttaa caccatcgga gtctggtatt ttgaaacgac ttcttattaa caaaggacaa	480
ctttgtttac gaaaacatct tcttgaagaa attaagaatc atgccaaagc gattgtagca	540
aggaatgtag acgtacacat agcttcttta aggaaaaagt taggagctta tggaagtaga	600
attgtcacct tacgaggtgt tgggtatcta ttttcagatg atggagataa aaaattctct	660
caacaagata caaagctttc t	681

<210> SEQ ID NO 289
 <211> LENGTH: 192
 <212> TYPE: PRT
 <213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 289

Met Arg Arg Leu Gly Val Trp Val Leu Leu Leu Leu Ala Ser Gly Ala	
1	15
Ala Ser Leu Pro Ala Ile Gly Ala Trp Cys Trp Arg Gln Arg Thr Ala	
	30
Glu Ala Trp Glu Asn Leu Leu Ile Asp Met Arg Asp Phe Gln Ser Lys	
	45
Arg Glu Arg Ser Ser Gln Val Ala Ile Lys Asn Ala Arg Leu Lys Ala	
	60
Ala His Lys Gln Ala Ser Phe Pro Asn Trp Ile Ala Gln Gly Glu Asn	
65	80
Leu Val Phe Leu Asn Lys Glu Arg Asp Ala Leu Ala Lys Leu Pro Ala	

-continued

85										90										95									
Thr	Ala	Trp	Val	Val	Arg	Ser	Arg	Ala	Val	Lys	Asp	Arg	Lys	Ala	Phe														
			100					105						110															
Leu	Glu	Asp	Asn	Arg	Leu	Ser	Trp	Gln	Glu	Gln	Thr	Leu	Gly	Glu	Lys														
		115					120					125																	
Ser	Thr	Leu	Phe	Ser	Phe	Gln	Lys	Glu	Leu	Gln	Ile	Asp	Asp	Glu	Asp														
	130					135					140																		
Ile	Pro	Val	Leu	Leu	Gly	Leu	Phe	Asp	Pro	Lys	Tyr	Thr	Gln	Ile	Pro														
145					150					155					160														
Ile	Val	Phe	Leu	Ser	Tyr	Trp	Glu	Met	Thr	Lys	Gln	Val	Ser	Ser	Leu														
			165					170						175															
Gly	Asn	Glu	Val	Trp	Val	Val	His	Ala	Glu	Ala	Trp	Gly	Arg	Cys	Val														
		180					185						190																

<210> SEQ ID NO 290
 <211> LENGTH: 576
 <212> TYPE: DNA
 <213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 290

atgcgacgct taggagtatg ggtgctgtta ctattagcga gtggggctgc ttctcttctc	60
gcaataggag catggtgttg gcgtcagcgt acagcagagg cttgggaaaa tttactcatc	120
gatatgagag attttcagtc taaacgagag cgatcttctc aggtagcaat caagaatgcg	180
cggctgaaag cagcgcataa acaagcgagt ttccccaatt ggattgcca aggagagaat	240
ctcgttttct tgaataagga gcgagatgct ctagctaaac ttctgcaac agcctgggtg	300
gtgagaagtc gtgcagtaaa ggatcggaag gctttcttag aagataaccg cttgtcatgg	360
caggagcaga ctttaggaga gaaaagcacg ctgttttctt tccaaaaga gctccaaata	420
gatgacgagg acattcctgt attattagga ttgtttgata ctaagtatac ccaataaccc	480
attgttttct tttcttactg ggaaatgacg aagcaggtgt catcattagg aaatgaggtg	540
tgggtcggtc acgcggaggc ttggggacga tgtgtg	576

<210> SEQ ID NO 291
 <211> LENGTH: 178
 <212> TYPE: PRT
 <213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 291

Met	Lys	Asn	Ile	Val	Glu	Gln	Lys	Arg	Cys	Leu	Arg	Arg	Glu	Gly	Leu
1			5					10					15		
Ala	Lys	Arg	Glu	Gln	Leu	Ser	Val	Gln	Arg	Arg	Asp	Glu	Ala	Ala	Arg
		20					25					30			
Glu	Leu	Met	His	Phe	Val	Met	Gln	Thr	Ile	Pro	Gln	Gly	Phe	Val	Leu
	35					40					45				
Ser	Tyr	Ile	Pro	Phe	Arg	Ser	Glu	Leu	Asp	Val	Arg	Gly	Ile	Asn	Ala
	50				55					60					
Trp	Leu	Ala	Gln	Glu	Asn	Arg	Leu	Leu	Leu	Pro	Lys	Met	Gln	Gly	Met
65				70					75				80		
Asp	Ile	Val	Pro	Ile	Ala	Leu	Pro	Phe	Thr	Lys	Ile	Glu	Ser	Leu	Tyr
		85					90					95			
Ser	Pro	Lys	Asp	Leu	Asn	Arg	Ile	Glu	Gly	Glu	Glu	Ile	Glu	Ala	Gln
		100				105						110			

-continued

Gln Ile Ala Ala Ala Leu Ile Pro Ala Ile Val Phe Asp Gln Asn Lys
 115 120 125

Phe Arg Leu Gly Tyr Gly Gly Gly Tyr Tyr Asp Arg Phe Leu Ser Lys
 130 135 140

Tyr Pro Tyr Ile Trp Thr Ile Gly Val Gly Phe Lys Glu Gln Leu Leu
 145 150 155 160

Ala Tyr Leu Pro Arg Glu Glu Tyr Asp Val Pro Leu Asp Gln Leu Tyr
 165 170 175

Leu Thr

<210> SEQ ID NO 292
 <211> LENGTH: 534
 <212> TYPE: DNA
 <213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 292

atgaaaaaca ttgtagagca gaaacgttgt ttgcgacgag aagggttagc gaagcgcgag 60
 cagctttctg tccagcgcag agatgaagca gctcgtgagc tgatgcattt tgttatgcag 120
 acaattccgc aaggctttgt gttatcctat attccttttc gctcagagtt ggatgttcga 180
 gggatcaatg catggttagc gcaagagaac cgactcctcc tacctaaaat gcaagggatg 240
 gatatcggtc cgatagctct tccttttacc aagatagaga gtctgtattc tcctaaagat 300
 ttgaatcgga tagaaggaga agagatcgag gcacaacaga ttgcagcggc cttgattcct 360
 gcgatagtct ttgatcagaa caagtttcgt ttaggatatg gcggaggcta ctatgatcgt 420
 tttttgtcta agtatccgta tatttggaca ataggcgtgg gatttaaaga gcagctgttg 480
 gcgtatcttc caagggaaga gtatgatggt cccttagatc agttatatct cact 534

<210> SEQ ID NO 293
 <211> LENGTH: 184
 <212> TYPE: PRT
 <213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 293

Met Lys Glu Ile Tyr Tyr Glu Ile Ala Arg Thr Glu Ser Thr Asn Thr
 1 5 10 15

Thr Ala Lys Glu Gly Leu Ser Leu Trp Asp Pro Tyr Ala Leu Thr Val
 20 25 30

Ile Thr Thr Arg Glu Gln Thr Ala Gly Arg Gly Lys Phe Gly Arg Val
 35 40 45

Trp His Ser Thr Asp Gln Asp Leu Leu Ala Ser Phe Cys Phe Phe Leu
 50 55 60

Ser Val Asn Asn Val Asp Ser Ala Leu Leu Phe Arg Ile Gly Thr Glu
 65 70 75 80

Ala Val Met Arg Leu Gly Glu Ser Leu Gly Ile Gln Glu Ala Val Met
 85 90 95

Lys Trp Pro Asn Asp Val Leu Val Gln Gly Lys Lys Leu Ser Gly Val
 100 105 110

Leu Cys Glu Thr Ile Pro Val Lys Thr Gly Thr Cys Val Ile Ile Gly
 115 120 125

Ile Gly Val Asn Gly Asn Val Gly Ala Asp Glu Leu Leu Gly Ile Asp
 130 135 140

-continued

Gln Pro Ala Thr Ser Leu Gln Glu Leu Ile Gly Arg Pro Val Asp Met
 145 150 155 160

Glu Glu Gln Leu Lys Arg Leu Thr Lys Glu Ile Lys His Leu Ile Gln
 165 170 175

Thr Leu Pro Leu Trp Gly Arg Glu
 180

<210> SEQ ID NO 294
 <211> LENGTH: 552
 <212> TYPE: DNA
 <213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 294

```

atgaaagaaa tctattatga aatagcacgt acggaatcaa cgaatacgac agcaaaagag    60
gggctttctt tgtgggatcc ctatgctctc acagtgatca cgaccagaga acaaacggcg    120
ggaagaggga aatttggaag ggtctggcac tccacagatc aagatctttt ggcttcgttt    180
tggttctttt taagtgtgaa taatgtggac agtgctttgt tatttcgtat agggacagaa    240
gccgtgatgc gtctcgggga atcgtttaggc attcaagaag ctgtcatgaa atggcctaac    300
gacgtgtagg ttcaggggaa aaaactttca ggagtgttgt gtgagaccat ccctgttaag    360
actggaacgt gtgtcattat tggtatcggg gtgaatggta atgtgggtgc tgatgaattg    420
ctaggtattg atcagcctgc aacgtctctc caggaattga tagggaggcc tgtagatatg    480
gaagaacagc ttaagcggct caccgaaagaa atcaagcatc ttatccagac gctaccgtta    540
tgggggcgag aa                                                    552
  
```

<210> SEQ ID NO 295
 <211> LENGTH: 221
 <212> TYPE: PRT
 <213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 295

```

Met Lys Lys Phe Ile Tyr Lys Tyr Ser Phe Gly Ala Leu Leu Leu Leu
 1          5          10          15

Ser Gly Leu Ser Gly Leu Ser Ser Cys Cys Ala Asn Ser Tyr Gly Ser
 20          25          30

Thr Leu Ala Lys Asn Thr Ala Glu Ile Lys Glu Glu Ser Val Thr Leu
 35          40          45

Arg Glu Lys Pro Asp Ala Gly Cys Lys Lys Lys Ser Ser Cys Tyr Leu
 50          55          60

Arg Lys Phe Phe Ser Arg Lys Lys Pro Lys Glu Lys Thr Glu Pro Val
 65          70          75          80

Leu Pro Asn Phe Lys Ser Tyr Ala Asp Pro Met Thr Asp Ser Glu Arg
 85          90          95

Lys Asp Leu Ser Phe Val Val Ser Ala Ala Ala Asp Lys Ser Ser Ile
100          105          110

Ala Leu Ala Met Ala Gln Gly Glu Ile Lys Gly Ala Leu Ser Arg Ile
115          120          125

Arg Glu Ile His Pro Leu Ala Leu Leu Gln Ala Leu Ala Glu Asp Pro
130          135          140

Ala Leu Ile Ala Gly Met Lys Lys Met Gln Gly Arg Asp Trp Val Trp
145          150          155          160

Asn Ile Phe Ile Thr Glu Leu Ser Lys Val Phe Ser Gln Ala Ala Ser
  
```

-continued

165	170	175
Leu Gly Ala Phe Ser Val Ala Asp Val Ala Ala Phe Ala Ser Thr Leu		
180	185	190
Gly Leu Asp Ser Gly Thr Val Thr Ser Ile Val Asp Gly Glu Arg Trp		
195	200	205
Ala Glu Leu Ile Asp Val Val Ile Gln Asn Pro Ala Ile		
210	215	220

<210> SEQ ID NO 296
 <211> LENGTH: 663
 <212> TYPE: DNA
 <213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 296

```

atgaaaaagt ttatctataa gtatagcttt ggagctctct tgttgctctc cgggctctcc    60
ggattgagca gctgttgccg caactcttat ggatcgactc ttgcaaaaaa tacagccgag    120
ataaaagaag aatctgttac acttcgcgag aagccggatg cgggctgtaa aaagaaatct    180
tcttggtact tgagaaaatt tttctcgcgc aagaaaccta aagagaagac agagcctgtg    240
ttgccgaact ttaagtctta cgcagatcca atgacagatt ccgaaagaaa agacctttct    300
ttcgtagtat ctgctgctgc tgataagtct tctattgctt tggctatggc tcagggggaa    360
attaaaggcg cattatcgcg tattagagag atccatctct ttgcattggt acaagctctt    420
gcagaagatc ctgctttaat tgctggaatg aaaaagatgc aaggacggga ttgggtctgg    480
aatatcttta tcacagaatt aagcaaagtt ttttctcaag cagcatcttt aggggctttc    540
agcgttgccg acgttgccgc gttcgcgtcg accttaggat tagactcggg gaccgttacc    600
tcaattgttg atggggaaaag gtgggctgag ctgatcgatg tcgtgattca gaacctgct    660
ata
  
```

<210> SEQ ID NO 297
 <211> LENGTH: 229
 <212> TYPE: PRT
 <213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 297

Met His Ser Leu Ala Val Phe Gln Glu Ile Phe Asn Arg Tyr Thr Glu
1 5 10 15
Lys Pro Tyr Pro Ala Thr Ser Thr Leu Val Pro Leu Tyr Phe Pro Glu
20 25 30
Glu Pro Leu Thr Phe Ser Glu Asp Leu Ser Pro Ser Thr Ala Pro Ile
35 40 45
Leu Asn Pro Pro Gly Leu Glu Pro Gln Ala Leu Pro Val Glu Thr Pro
50 55 60
Lys Asp Pro Val Thr Thr Ser Ile Pro Pro Pro Ser His Pro Lys Glu
65 70 75 80
Ser Lys His Ser Trp Ala Cys Val Pro Ile Tyr Pro Gly Leu Ser His
85 90 95
Glu Glu Leu Leu Lys Glu Asn Tyr Pro Ala Leu Lys Arg Tyr Ile Gln
100 105 110
Arg Pro Ala Arg Ala Ser Cys Gly Ile Phe Val His Glu Ser Gln Glu
115 120 125
Tyr Glu Ile Leu Phe Phe Asn Arg Leu Ala Lys Ile Leu Ser Gln Lys

-continued

130	135	140	
Ile Phe Pro Thr Arg Leu Val Leu Phe His Gln Lys Thr Leu Ser Asp			
145	150	155	160
Phe Ser His Ser Pro His Pro Phe Cys Leu Ala Pro Leu Pro Thr Ile			
	165	170	175
Arg Tyr Lys Asn Ser Gln Val Asn Tyr His Tyr Pro Val Leu His Asp			
	180	185	190
Lys Val Thr Cys Ile Pro Ile Tyr Ser Ser Ser Gln Tyr Glu Lys Asp			
	195	200	205
Ser Ala Leu Lys Arg Asp Leu Trp Thr Leu Leu Thr Ser Leu Ser Ala			
	210	215	220
Ser Met Gln Lys Ser			
225			

<210> SEQ ID NO 298
 <211> LENGTH: 687
 <212> TYPE: DNA
 <213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 298

atgcattcac ttgctgtttt tcaagaaatt ttaatacgct acacagaaaa gccctacccc	60
gccacgtcta cactgggtccc actatatatt ccagaagaac ctcttacctt ttccgaggac	120
ttatctccat ccacggctcc tattcttaatt cccccaggct tagaacgca agctcttcg	180
gtagaaactc ccaaagacct tggtacaact tctattcccc caccttccca tctaaagaa	240
tccaaacact cctgggcctg tggtcctatt taccctggac tctctcatga agaactactg	300
aaagaaaatt atcctgcttt aaaacgttat attcaacgac ctgcaagggc ctcatgtggc	360
atttttgtcc atgaatctca ggaatatgag attcttttct ttaatcgctt agctaaaatt	420
ctttcacaga aaatttttcc tactgcctc gttcttttcc accaaaaaac ttgtctgat	480
tttagtcatt ccctcatcc tttttgtttg gcgcccttac caacaatcag gtataaaat	540
tcgcaagtga actatactta tctgttttg cagcataaag taacctgcat acccatatat	600
tcctcttccc aatatgaaaa agattcagca ttaaaaagag atttatggac cctactcacc	660
agcctttccg cctctatgca gaagtc	687

<210> SEQ ID NO 299
 <211> LENGTH: 112
 <212> TYPE: PRT
 <213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 299

Met Lys Lys Lys Thr Gly Gln Leu Tyr Glu Gly Ala Tyr Val Phe Ser	
1	15
Val Thr Leu Ser Glu Asp Ala Arg Arg Lys Ala Leu Glu Lys Val Thr	
	30
Ser Gly Ile Thr Asn Tyr Gly Gly Glu Val Leu Lys Ile His Asp Gln	
	45
Gly Arg Lys Lys Leu Ala Tyr Thr Ile Arg Gly Ala Arg Glu Gly Tyr	
	60
Tyr Tyr Phe Ile Tyr Phe Thr Val Ala Pro Glu Ala Ile Ala Glu Leu	
65	80
Trp Arg Glu Tyr His Leu Asn Glu Asp Leu Leu Arg Phe Met Thr Leu	

-continued

	85	90	95	
Lys Ala Ser Ala Val Lys Glu Val Leu Glu Phe Ala Thr Leu Pro Glu				
	100	105	110	

<210> SEQ ID NO 300
 <211> LENGTH: 336
 <212> TYPE: DNA
 <213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 300

atgaaaaaaaa aaacaggcca actttatgag ggagcctatg tttttagcgt gacgttaagt	60
gaagacgcta gacgtaaggc tttagaaaaa gttacttctg ggatcaccaa ttatggtggc	120
gaagttctga aaattcatga tcagggggcg aaaaagttag cttacacaat tcgtggtgct	180
agagaaggct attactactt tatttatttc acagtagccc cagaagctat cgcagagttg	240
tggagagagt atcatttaaa cgaagatctt cttcgattca tgactcttaa agcaagcgct	300
gtgaaagaag ttttagaatt cgctacattg ccagaa	336

<210> SEQ ID NO 301
 <211> LENGTH: 193
 <212> TYPE: PRT
 <213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 301

Leu Trp Phe Phe Leu Gly Ser Pro Ser Ala Ile Thr Asn Phe Ser Arg	
1 5 10 15	
Val Asp Val Ala Leu Asn Leu Arg Ile Asn Arg Gln Ile Arg Ala Pro	
20 25 30	
Arg Val Arg Val Ile Gly Ser Ala Gly Glu Gln Leu Gly Ile Leu Ser	
35 40 45	
Ile Lys Glu Ala Leu Asp Leu Ala Lys Glu Ala Asn Leu Asp Leu Val	
50 55 60	
Glu Val Ala Ser Asn Ser Glu Pro Pro Val Cys Lys Ile Met Asp Tyr	
65 70 75 80	
Gly Lys Tyr Arg Tyr Asp Val Thr Lys Lys Glu Lys Asp Ser Lys Lys	
85 90 95	
Ala Gln His Gln Val Arg Ile Lys Glu Val Lys Leu Lys Pro Asn Ile	
100 105 110	
Asp Asp Asn Asp Phe Leu Thr Lys Ala Lys Gln Ala Arg Ala Phe Ile	
115 120 125	
Glu Lys Gly Asn Lys Val Lys Val Ser Cys Met Phe Arg Gly Arg Glu	
130 135 140	
Leu Ala Tyr Pro Glu His Gly Tyr Lys Val Ile Gln Arg Met Cys Gln	
145 150 155 160	
Gly Leu Glu Asp Ile Gly Phe Val Glu Ser Glu Pro Lys Leu Asn Gly	
165 170 175	
Arg Ser Leu Ile Cys Val Ile Ala Pro Gly Thr Leu Lys Thr Lys Lys	
180 185 190	

Lys

<210> SEQ ID NO 302
 <211> LENGTH: 579
 <212> TYPE: DNA
 <213> ORGANISM: Chlamydia trachomatis

-continued

<400> SEQUENCE: 302

```

ttgtggtttt ttttaggctc tccgtcagcg attactaatt ttagcagggt agatgtggct    60
ttaaacctaa gaataaatag gcagatacga gtcctagggt tacgtgtaat aggttccgca    120
ggagagcagc taggcatatt gagtataaaa gaggccttag atttagccaa ggaagctaatt    180
ttagaccttg ttgaggttgc ttcaaaactca gagcctcccg tgtgcaaaat catggactat    240
gggaagtatc gttacgacgt aactaaaaaa gaaaaagata gtaagaaagc acagcaccaa    300
gtacgtatca aagagggttaa gcttaagcct aatatcgatg ataacgactt tcttacgaaa    360
gcaaagcaag ctagagcctt tattgagaaa ggaataaaag taaagggttc ttgtatgttt    420
cgggggagcag agttggcetta tcccgaacac ggggtataagg ttattcaaag aatgtgtcag    480
ggcttagagg acataggtttt tggtgagtca gagcctaaac tgaatggcgg ttctttgatc    540
tgtgttattg ctccgggaac actaaaaact aagaaaaaa                    579

```

<210> SEQ ID NO 303

<211> LENGTH: 123

<212> TYPE: PRT

<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 303

```

Met Val Arg Ala Thr Gly Ser Val Ala Ser Arg Ser Arg Arg Lys Arg
1           5           10          15
Val Leu Lys Gln Ala Lys Gly Phe Trp Gly Asp Arg Lys Gly His Phe
20          25          30
Arg Gln Ser Arg Ser Ser Val Met Arg Ala Met Ala Phe Asn Tyr Met
35          40          45
His Arg Lys Asp Arg Lys Gly Asp Phe Arg Ser Leu Trp Ile Thr Arg
50          55          60
Leu Ser Val Ala Ser Arg Ile His Gly Leu Ser Tyr Ser Arg Leu Ile
65          70          75          80
Asn Gly Leu Lys Gln Ala Gly Ile His Leu Asn Arg Lys Met Leu Ser
85          90          95
Glu Met Ala Ile His Asp Pro Gln Gly Phe Ala Val Val Ala Thr Gln
100         105         110
Ala Lys Leu Ala Leu Glu Ala Ala Val Gln Gly
115         120

```

<210> SEQ ID NO 304

<211> LENGTH: 369

<212> TYPE: DNA

<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 304

```

atggtaaagag caactgggtc agtagcttct agatcgcgtc gtaaacgcgt tttaaaacaa    60
gcaaaaggat tctggggaga tagaaaggga cactttcgtc aaagtcggtc ctctgttatg    120
cgggctatgg cttttaacta catgcaccga aaagatcgta aaggtgattt tcgaagcctt    180
tggatcactc gtttgagtgt ggcttcagga attcatggat tgtcttacag ccgtttgatc    240
aatggtctca aacaagctgg tattcattta aatagaaaaa tgttgtctga gatggctatt    300
catgaccctc aagggtttgc tgtagtagct acccaagcta aactcgcttt ggaagcagct    360
gttcaggga
369

```

-continued

```

<210> SEQ ID NO 305
<211> LENGTH: 342
<212> TYPE: PRT
<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 305

Met Thr Ile Gln Glu Glu Leu Glu Ala Val Lys Gln Gln Phe Ser Cys
1          5          10          15

Asp Val Ser Leu Ala His Ser Ser Lys Asp Leu Phe Asp Val Lys Val
          20          25          30

Lys Tyr Leu Gly Lys Lys Gly Ile Phe Arg Gly Phe Ala Asp Gln Leu
          35          40          45

Arg Lys Tyr Pro Ile Glu Gln Lys Ala Thr Val Gly Ala Ser Ile Asn
          50          55          60

Ala Cys Lys Gln Tyr Val Glu Glu Val Leu Leu Glu Arg Gly Lys Ala
65          70          75          80

Val Leu Ala Lys Glu Glu Ala Glu Glu Phe Leu Lys Glu Lys Ile Asp
          85          90          95

Ile Ser Leu Pro Gly Ser Glu Glu Ala Ala Leu Gly Gly Lys His Val
          100         105         110

Ile Lys Lys Val Leu Asp Asp Val Val Asp Ile Phe Val Arg Phe Gly
          115         120         125

Phe Cys Val Arg Glu Ala Pro Asn Ile Glu Ser Glu Lys Asn Asn Phe
          130         135         140

Ser Leu Leu Asn Phe Glu Glu Asp His Pro Ala Arg Gln Met Gln Asp
145         150         155         160

Thr Phe Tyr Leu Asp Pro Thr Thr Val Leu Arg Thr His Thr Ser Asn
          165         170         175

Val Gln Ser Arg Glu Leu Ala Arg Asn Lys Pro Pro Val Arg Ile Val
          180         185         190

Ala Pro Gly Glu Cys Phe Arg Asn Glu Asp Val Ser Ala Arg Ser His
          195         200         205

Val Ile Phe His Gln Val Glu Ala Phe Cys Val Asp Lys Asp Ile Ser
          210         215         220

Phe Ser Asp Leu Thr Ser Met Leu Ala Gly Phe Tyr His Ile Phe Phe
225         230         235         240

Gly Arg Lys Val Glu Leu Arg Phe Arg His Ser Tyr Phe Pro Phe Val
          245         250         255

Glu Pro Gly Ile Glu Val Asp Ile Ser Cys Glu Cys His Gly Ala Gly
          260         265         270

Cys Ser Leu Cys Lys His Ala Gly Trp Leu Glu Val Ala Gly Ala Gly
          275         280         285

Met Ile His Pro Asn Val Leu Arg Lys Ala Ser Ile Asp Pro Glu Glu
          290         295         300

Tyr Ser Gly Tyr Ala Leu Gly Met Gly Ile Glu Arg Leu Ala Met Leu
305         310         315         320

Lys Tyr Gly Ile Ser Asp Ile Arg Leu Phe Ser Glu Asn Asp Leu Arg
          325         330         335

Phe Leu Arg Gln Phe Ser
          340

```

-continued

```

<210> SEQ ID NO 306
<211> LENGTH: 1026
<212> TYPE: DNA
<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 306

atgacaattc aagaggaact tgaggctggt aaacagcagt ttagttgtga tgtaagcctt    60
gcgcatctct ctaaagatct ttctgatgtg aaagtaaaat acctgggaaa gaagggaatc    120
tttcgagggt ttgctgatca gttgaggaag taccctatag agcagaaaagc gactgttggc    180
gtctccatta acgcttgtaa gcaatacgtg gaggaagttt tactcgagag aggcaaggcc    240
gttttggtta aagaagaagc agaagagttc cttaaggaga agatagatat cagttttacct    300
ggtagcgaag aagctgctct tggtggttaag catgttatca agaaagtcct tgatgatgtt    360
gtagatatct ttgttcgctt tggattttgt gttcgggaag ctccataat cgaaagtga    420
aaaaacaatt ttctctctct taatttcgaa gaagatcatc ctgctcgaca gatgcaggat    480
actttctatt tggatcccac cacggtcttg cgtacgcaca cgtcgaatgt gcagtctcgg    540
gagttagcga gaaacaacc tcctgttaga attgtcgctc caggagagtg ttcccgtaat    600
gaagacgttt ctgcgcgttc gcatgtgatt ttccaccaag tagaggcttt ctgcgtagat    660
aaagatattt ctttttcaga cttgacatcg atgttggcag ggttttacca tatctctctt    720
ggagcgaag tggagtgtcg gtttagacac agctatttcc cttttgtcga gccagggatc    780
gaggtagaca ttctctgtga atgcatgga gccggatgtt ctttgtgtaa gcatgctggt    840
tggttggaag ttgctggagc aggaatgatt catccgaatg tcttgcgtaa ggcaagcatt    900
gatccagaag agtattctgg gtatgccttg gggatgggta tagagcgtct cgcgatgctc    960
aagtacggta ttccgatat tcgattgttt agtgagaacg atttgcgggt ttacggcaa    1020
ttttct                                           1026

```

```

<210> SEQ ID NO 307
<211> LENGTH: 92
<212> TYPE: PRT
<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 307

Met Lys Glu Glu Ile Leu Ala Leu Leu Asp His Leu Tyr Thr Glu Gln
1           5           10          15

Glu Arg Arg Leu Met Ser Leu Gly Thr Thr Ile Val Pro Gly Leu Thr
20          25          30

Lys Glu Asp Leu Leu Gln Pro Met Asp Tyr Asp Glu Leu Glu Glu Asn
35          40          45

Pro Ser Phe Arg Phe Glu Glu Gly Val Leu Asn Gly Ile Gly Glu Thr
50          55          60

Arg Ala Ala Leu Tyr Ser Phe Phe Ser Asp Leu Glu Asp Ser Phe Cys
65          70          75          80

Val Glu Ser Ser Ser Asp Thr Ser Leu Cys Lys Asp
85          90

```

```

<210> SEQ ID NO 308
<211> LENGTH: 276
<212> TYPE: DNA
<213> ORGANISM: Chlamydia trachomatis

<400> SEQUENCE: 308

```

-continued

atgaaggaag aaattctcgc gctacttgat catttatata cggagcagga aagacgatta	60
atgtcgctag ggacgacgat tgttcttgga ttgacgaaag aggatctttt acagcctatg	120
gattatgatg aacttgagga gaacctctct tttagatttg aagaaggagt tttgaatgga	180
ataggagaga ctgcagccgc attatattct tttttttctg atctagaaga ctcccttttgc	240
gtggagtctt ctacgcatac gagcctctgt aaggat	276

1. Use of a substantially pure polypeptide, which comprises an amino acid sequence selected from

(a) SEQ ID NO. 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31, 33, 35, 37, 39, 41, 43, 45, 47, 49, 51, 53, 55, 57, 59, 61, 63, 65, 67, 69, 71, 73, 75, 77, 79, 81, 83, 85, 87, 89, 91, 93, 95, 97, 99, 101, 103, 105, 107, 109, 111, 113, 115, 117, 119, 121, 123, 125, 185, 187, 189, 191, 193, 195, 197, 199, 201, 203, 205, 207, 209, 211, 213, 215, 217, 219, 221, 223, 225, 227, 229, 231, 233, 235, 237, 239, 241, 243, 245, 247, 249, 251, 253, 255, 257, 259, 261, 263, 265, 267, 269, 271, 273, 275, 277, 279, 281, 283, 285, 287, 289, 291, 293, 295, 297, 299, 301, 303, 305, 307 or

(b) an immunogenic portion, e.g. a T-cell or B-cell epitope, of any one of the sequences in (a), or

(c) an amino acid sequence analogue having at least 70% sequence identity to any one of the sequences in (a) or (b) and at the same time being immunogenic, or the nucleic acid encoding for polypeptides in (a), (b) or (c), for preparing a pharmaceutical composition for preventing, treating or diagnosing infections caused by a bacteria from the *Chlamydia* species.

2. Use according to claim 1, where the immunogenic portion is selected from SEQ ID NO. 127, 129, 131, 133, 135, 137, 139, 141, 143, 145, 147, 149, 151, 153, 155, 157, 159, 161, 163, 165, 167, 169, 171, 173, 175, 177, 179, 181, 183.

3. Use according to claim 1, where the polypeptide is lipidated so as to allow a self-adjuvating effect of the polypeptide.

4. Use according to claim 1, where the polypeptide is fused to a fusion partner.

5. Use according to claim 4, where the fusion partner comprises a

(a) a polypeptide derived from a chlamydia species, such as CT812, CT579, CT587, Cap, CT713, CT442 or MOMP or

(b) at least one immunogenic portion, e.g. a T-cell or B-cell epitope, of any of such polypeptides in (a).

6. Use according to claim 1, where the nucleic acid sequences encoding for polypeptides in (a) have the following corresponding sequences: SEQ ID NO 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56, 58, 60, 62, 64, 66, 68, 70, 72, 74, 76, 78, 80, 82, 84, 86, 88, 90, 92, 94, 96, 98, 100, 102, 104, 106, 108, 110, 112, 114, 116, 118, 120, 122, 124, 126, 186, 188, 190, 192, 194, 196, 198, 200, 202, 204, 206, 208, 210, 212, 214, 216, 218, 220, 222, 224, 226, 228, 230, 232, 234, 236, 238, 240, 242, 244, 246, 248, 250, 252, 254, 256, 258, 260, 262, 264, 266, 268, 270, 272, 274, 276, 278, 280, 282, 284, 286, 288, 290, 292, 294, 296, 298, 300, 302, 304, 306, 308 and the nucleic acid sequences encoding for the immunogenic por-

tions in (b) have the following sequences: SEQ ID NO. 128, 130, 132, 134, 136, 138, 140, 142, 144, 146, 148, 150, 152, 154, 156, 158, 160, 162, 164, 166, 168, 170, 172, 174, 176, 178, 180, 182, 184.

7. A substantially pure polypeptide selected from SEQ ID NO. 127, 129, 131, 133, 135, 137, 139, 141, 143, 145, 147, 149, 151, 153, 155, 157, 159, 161, 163, 165, 167, 169, 171, 173, 175, 177, 179, 181, 183.

8. A nucleic acid fragment selected from SEQ ID NO. 128, 130, 132, 134, 136, 138, 140, 142, 144, 146, 148, 150, 152, 154, 156, 158, 160, 162, 164, 166, 168, 170, 172, 174, 176, 178, 180, 182, 184 which encodes the polypeptide according to claim 7.

9. A pharmaceutical composition for preventing, treating or diagnosing infections caused by a bacteria from the *Chlamydia* species, comprising a substantially pure polypeptide, which comprises an amino acid sequence selected from

(a) SEQ ID NO. 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31, 33, 35, 37, 39, 41, 43, 45, 47, 49, 51, 53, 55, 57, 59, 61, 63, 65, 67, 69, 71, 73, 75, 77, 79, 81, 83, 85, 87, 89, 91, 93, 95, 97, 99, 101, 103, 105, 107, 109, 111, 113, 115, 117, 119, 121, 123, 125, 185, 187, 189, 191, 193, 195, 197, 199, 201, 203, 205, 207, 209, 211, 213, 215, 217, 219, 221, 223, 225, 227, 229, 231, 233, 235, 237, 239, 241, 243, 245, 247, 249, 251, 253, 255, 257, 259, 261, 263, 265, 267, 269, 271, 273, 275, 277, 279, 281, 283, 285, 287, 289, 291, 293, 295, 297, 299, 301, 303, 305, 307 or

(b) an immunogenic portion, e.g. a T-cell or B-cell epitope, of any one of the sequences in (a); and/or

(c) an amino acid sequence analogue having at least 70% sequence identity to any one of the sequences in (a) or (b) and at the same time being immunogenic or the nucleic acid encoding for (a), (b) or (c).

10. A pharmaceutical composition according to claim 9, where the immunogenic portion is selected from SEQ ID NO. 127, 129, 131, 133, 135, 137, 139, 141, 143, 145, 147, 149, 151, 153, 155, 157, 159, 161, 163, 165, 167, 169, 171, 173, 175, 177, 179, 181, 183.

11. A pharmaceutical composition according to claim 9, where the polypeptide is lipidated so as to allow a self-adjuvating effect of the polypeptide.

12. A pharmaceutical composition according to claim 9, where the polypeptide is fused to a fusion partner.

13. A pharmaceutical composition according to claim 12, where the fusion partner comprises a

(a) a polypeptide derived from a chlamydia species, such as CT812, CT579, CT587, Cap, CT713, CT442 or MOMP or

(b) at least one immunogenic portion, e.g. a T-cell or B-cell epitope, of any of such polypeptides in (a), or the nucleic acid encoding herefor.

14. A pharmaceutical composition according to claim 9 where the nucleic acid sequences encoding for polypeptides in (a) have the following corresponding sequences: SEQ ID NO. 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56, 58, 60, 62, 64, 66, 68, 70, 72, 74, 76, 78, 80, 82, 84, 86, 88, 90, 92, 94, 96, 98, 100, 102, 104, 106, 108, 110, 112, 114, 116, 118, 120, 122, 124, 126, 186, 188, 190, 192, 194, 196, 198, 200, 202, 204, 206, 208, 210, 212, 214, 216, 218, 220, 222, 224, 226, 228, 230, 232, 234, 236, 238, 240, 242, 244, 246, 248, 250, 252, 254, 256, 258, 260, 262, 264, 266, 268, 270, 272, 274, 276, 278, 280, 282, 284, 286, 288, 290, 292, 294, 296, 298, 300, 302, 304, 306, 308 and the nucleic acid sequences encoding for the immunogenic portions in (b) have the following sequences: SEQ ID NO. 128, 130, 132, 134, 136, 138, 140, 142, 144, 146, 148, 150, 152, 154, 156, 158, 160, 162, 164, 166, 168, 170, 172, 174, 176, 178, 180, 182, 184.

15. A pharmaceutical composition according to claim 9, which is in the form of a vaccine.

16. A pharmaceutical composition according to claim 9, which is in the form of a diagnostic reagent.

17. A vaccine according to claim 15 for immunizing against or treating infections caused by a bacteria from the *Chlamydia* species.

18. A vaccine according to claim 17, where the *Chlamydia* species is *C. trachomatis*.

19. A pharmaceutical composition according to claim 9, characterized in that said vaccine or pharmaceutical composition can be used prophylactically in a subject not infected with a bacterium from the *Chlamydia* species to prevent such infections, or therapeutically in a subject already infected with a bacterium from the *Chlamydia* species to treat such infections.

20. A diagnostic reagent according to claim 16, for diagnosing infections with a *Chlamydia* species.

21. A diagnostic reagent according to claim 20, where the *Chlamydia* species *C. trachomatis*.

22. A monoclonal or polyclonal antibody which is specifically reacting with a diagnostic reagent according to claim 20 in an immunoassay or a specific binding fragment of said antibody.

23. A method for diagnosing previous or ongoing infection with a bacterium from the *Chlamydia* species, said method comprising contacting a sample, e.g. a blood sample comprising mononuclear cells (e.g. T-lymphocytes), with a diagnostic reagent according to claim 20 in order to detect a positive reaction, e.g. proliferation of the cells or release of cytokines such as IFN- γ .

24. A method for diagnosing previous or ongoing infection with a bacterium from the *Chlamydia* species said method comprising

(a) contacting a sample, e.g. a blood sample, with an antibody according to claim 22 in order to detect a positive reaction in case of infection

25. A method of diagnosing previous or ongoing infection with a bacterium from the *Chlamydia* species in a subject comprising:

(a) contacting a diagnostic reagent according to claim 20 with a bodily fluid of the subject;

(b) detecting binding of an antibody to said polypeptide, said binding being an indication that said subject is infected by a bacterium from the *Chlamydia* species.

26. A method of diagnosing previous or ongoing infection with a bacterium from the *Chlamydia* species, comprising intradermally injecting or applying to the skin a diagnostic reagent according to claim 20, a positive skin response at the location of injection or applying being indicative of an infection with a bacterium from the *Chlamydia* species.

27. A method for treating or preventing an infection of a bacterium from the *Chlamydia* species, comprising administering the vaccine according to claim 19 to a mammal.

* * * * *

专利名称(译)	用于疫苗和诊断用途的沙眼衣原体抗原		
公开(公告)号	US20090304722A1	公开(公告)日	2009-12-10
申请号	US11/577868	申请日	2005-10-11
[标]申请(专利权)人(译)	THEISEN MICHAEL OLSEN ANJA LEAH ROBERT FOLLMANN FRANK JENSEN KLAUS ANDERSEN PETER		
申请(专利权)人(译)	THEISEN MICHAEL OLSEN ANJA LEAH ROBERT FOLLMANN FRANK JENSEN KLAUS ANDERSEN PETER		
当前申请(专利权)人(译)	THEISEN MICHAEL OLSEN ANJA LEAH ROBERT FOLLMANN FRANK JENSEN KLAUS ANDERSEN PETER		
[标]发明人	THEISEN MICHAEL OLSEN ANJA LEAH ROBERT FOLLMANN FRANK JENSEN KLAUS ANDERSEN PETER		
发明人	THEISEN, MICHAEL OLSEN, ANJA LEAH, ROBERT FOLLMANN, FRANK JENSEN, KLAUS ANDERSEN, PETER		
IPC分类号	A61K39/118 A61K38/16 A61K31/7088 C07K14/00 C07H21/04 C07K16/00 G01N33/53 A61P31/04		
CPC分类号	C07K14/295 A61K39/118 A61P31/04 A61P37/04		
优先权	200401633 2004-10-25 DK 200501069 2005-07-19 DK		
其他公开文献	US8889142		
外部链接	Espacenet USPTO		

摘要(译)

本发明涉及来自沙眼衣原体的抗原，其被来自感染衣原体的个体的特异性抗体识别，或者可以诱导来自相同个体的T细胞分泌 γ -干扰素。T细胞反应性抗原存在于全细胞裂解物中，并且通过SDS-PAGE测定具有5-12,16-20,25-35和58-74kDa的表观分子量。本发明的抗原可用于疫苗，也可用作诊断组合物。

Figure 1

