

Protocol bacteriology(microbial disease and immunology)

[Health & Medicine](#)



**ASSIGN
BUSTER**

1. Differential diagnosis (of possible bacteria) You should include at least 6 most relevant bacteria that can cause signs and symptoms given in the case study and rationale for including each of them (1 sentence maximum for each).

- a. *Mycobacterium tuberculosis* – It is the causative agent of tuberculosis, which can be a multi-organ disease.
- b. *Chlamydia pneumoniae* – The biphasic presentation, as well as the fever, cough and eye discharge symptoms may indicate concurrent pneumonia and eye infection by the organism.
- c. *Toxoplasma gondii* – A protozoan, which when infects humans, usually the immunocompromised one, causes a variety of symptoms, including malaise, fever, cough, and eye symptoms.
- d. *Francisella tularensis* – Causes the disease called Tularemia, which also presents with pulmonary and eye symptoms.
- e. *Mycoplasma pneumoniae* – *Mycoplasma* infections can present with generalized pain, fever, cough, sore throat, headache, chills, and conjunctivitis.
- f. *Streptococcus pneumoniae* – Infects the lungs from the nasopharynx to cause pneumonia, and by direct extension reaches the eyes to cause conjunctivitis
(Mimms, et al. 2005; Nairn and Helbert, 2002; Prescott, Harley and Kline, 2005)

2. Etiology (Out of the possible bacteria given under differential diagnosis which one of them is the most likely cause of the disease and why

(maximum 100 words).

Organism: *C. pneumoniae*

Reason: The biphasic presentation, as well as the fever, cough and eye discharge symptoms may indicate concurrent pneumonia and eye infection by the organism.

(Nairn and Helbert, 2002)

3. How will you identify this bacterium? There is no need to give the details of the methods but you must include the nature and rationale for each test and the order in which they should be done (if appropriate, you should also give the expected results for each test.)

a. Cell culture of oropharyngeal swabs, to grow the bacteria in mediums that only *C. pneumoniae* can grow.

b. PCR assay of pharyngeal swab, bronchoalveolar lavage or eye discharge to detect *C. pneumoniae* -specific DNA.

c. Micrommunofluorescence, in which IgM titer should exceed 1: 16 or a 4-fold increase in IgG titer. This detects ongoing infection.

(Mimms, et al. 2005)

4. Pathogenesis of the disease (including the virulence factors) Maximum 500 words .

From respiratory secretions of an infected host, bacterial cells travel airborne, attach to the outer membrane of uninfected host cells, and subsequently get engulfed to replicate. The infected host cell then releases the matured inclusions to infect adjacent cells. The bacterial cells then spread hematogenously to infect other organs, such as the eyes (Roitt, 1998).

5. Epidemiology, Treatment and Prevention.

In the US, the number of cases of *C pneumoniae* pneumonia is approximately 300, 000 cases per year, causing 10-20% of community-acquired pneumonia (CAP) cases. Antibiotics such as doxycycline, macrolides, telithromycin, and fluoroquinolones can be used to treat the infection, while Azithromycin can be used as prophylaxis (Prescott, Harley and Kline, 2005).

References

- Mimms, C. A., Dockrell H. M., Goering R. V., Roitt, I., Wakelin, D and Zuckerman, M. (2005) *Medical Microbiology* 3rd Edition. Mosby, London.
- Nairn R and Helbert M (2002) *Immunology for Medical Students*, Mosby.
- Prescott, L., Harley, J. P. and Klein, D. A. (2005) *Microbiology*, 6th Edition, W. C. B./McGraw-Hill.
- Roitt, I (1998). *Essential Immunology*. 9th ed. Oxford: Blackwell Scientific Publications.