**LESSON 10.
Microbiology diagnosis of diseases, caused by *Chlamydiae* and *Mycoplasma***

**LESSON PLAN:**

Pathogenic chlamydia, classification, morpho-biological characteristics.

 Chlamydia trachomatis, serotypes, characteristics of diseases caused by individual serotypes, pathogenesis. Microbiological diagnostics.

 Chlamydia psittaci - the causative agent of ornithosis. Pathogenesis of the disease in man. Microbiological diagnostics.

 Chlamydia pneumonia, its role in human pathology. Pathogenesis and microbiological diagnosis of the disease caused by it.

• Pathogenic mycoplasmas, morpho-biological characteristics.

 Mycoplasma genus, morpho-biological characteristics, classification. Pathogenicity factors. Human diseases. Microbiological diagnostics.

 Ureaplasmas, morpho-biological characteristics. Role in urogenital infections and pregnancy pathology. Microbiological diagnostics.

***MYCOPLASMA PNEUMONIAE***

**Trigger Words**

No cell wall, person-to-person, tracheobronchitis

**Biology and Virulence**

ᑏᑏ The smallest free-living bacterium; able to pass through 0.45-μm pore filters

ᑏᑏ Absence of cell wall and a cell membrane containing sterols are unique among bacteria

ᑏᑏ Slow rate of growth (generation time, 6 hours); strict aerobe

ᑏᑏ P1 adhesin protein binds to base of cilia on epithelial cells, leading to eventual loss of ciliated epithelial cells

ᑏᑏ Stimulates migration of inflammatory cells and release of cytokines

**Epidemiology**

ᑏᑏ Worldwide disease with no seasonal incidence (in contrast to disease caused by most respiratory pathogens)

ᑏᑏ Primarily infects children between ages 5 and 15 years, but all populations susceptible to disease

ᑏᑏ Transmitted by inhalation of aerosolized droplet

**Diseases**

ᑏᑏ Strict human pathogen

ᑏᑏDiagnostic Tests for *Mycoplasma*

*pneumoniae*

 Microscopy Test is not useful because organisms do not have a cell wall and do not stain with conventional reagents

 Culture Test is slow (2 to 6 weeks before positive diagnosis) and insensitive; it is not available in most laboratories

 Molecular diagnosis

 Polymerase chain reaction–based amplification assays, with excellent sensitivity; specificity is not well defined

**SEROLOGY**

Complement fixation Antibody titers versus glycolipid antigens peak in 4 weeks and persist for 6 to 12 months;poor sensitivity and specificity; rarely used

Today Enzyme immunoassays Multiple assays are available, with varying sensitivityand specificity; assays directed versus

P1 adhesin protein may be most specific Cold agglutinin Sensitivity and specificity poor, with crossreactions with other respiratory pathogens

(e.g., Epstein-Barr virus, cytomegalovirus,

adenovirus); test commonly used but not

recommended

**Treatment, Prevention, and Control**

ᑏᑏ Drug of choice is erythromycin, doxycycline, or newer fluoroquinolones

ᑏᑏ Immunity to reinfection is not lifelong, and vaccines have proved ineffective

**Important Mycoplasmataceae**

****

***CHLAMYDIA TRACHOMATIS***

**Trigger Words**

Intracellular bacteria, elementary and reticulate bodies, trachoma, infant pneumonia, urethritis, LGV, person to

person

**Biology and Virulence**

ᑏᑏ Small gram-negative rods

ᑏᑏ Strict intracellular parasite of humans

ᑏᑏ Two distinct forms: infectious elementary bodies and noninfectious reticulate bodies

ᑏᑏ Lipopolysaccharide antigen shared by *Chlamydia* and *Chlamydophila* species

ᑏᑏ Major outer membrane proteins are species specific

ᑏᑏ Two biovars associated with human disease: trachoma and LGV

ᑏᑏ Infects nonciliated columnar, cuboidal, and transitional epithelial cells

ᑏᑏ Prevents fusion of phagosome with cellular lysosomes

**Epidemiology**

ᑏᑏ Most common sexually transmitted bacteria in United States

ᑏᑏ Ocular trachoma primarily in North and sub-Saharan Africa, the Middle East, South Asia, South America

ᑏᑏ LGV highly prevalent in Africa, Asia, and South America

**Diseases**

ᑏᑏ Pathologic effects of trachoma caused by repeated infections

**Diagnosis**

ᑏᑏ Culture is highly specific but relatively insensitive

ᑏᑏ Antigen tests (direct fluorescent antibody, enzyme-linked immunosorbent assay) are relatively insensitive

ᑏᑏ Molecular amplification tests are the most sensitive and specific tests currently available

**Treatment, Prevention, and Control**

ᑏᑏ Treat LGV with doxycycline or erythromycin

ᑏᑏ Treat ocular or genital infections with azithromycin or doxycycline

ᑏᑏ Treat newborn conjunctivitis or pneumonia with erythromycin

ᑏᑏ Safe sex practices and prompt treatment of patient and sexual partners help control infections

**Organism and Historical Derivation**

*Chlamydia - chlamydis,* a cloak

*C. trachomatis - trachomatis,* of trachoma or rough (the disease trachoma is characterized by rough granulations on the conjunctival surfaces that lead to chronic inflammation and blindness)

*C. pneumoniae - pneumoniae,* pneumonia

*C. psittaci - psittacus,* a parrot (disease associated with birds)

**Differentiation of *Chlamydia* That Cause Human Disease**

****

***Chlamydia pneumoniae***

**Respiratory infections:** can range from asymptomatic or mild disease to severe atypical pneumonia requiring hospitalization

**Atherosclerosis:** *C. pneumoniae* has been associated with inflammatory plaques in blood vessels; the etiologic role in this

disease is controversial

***Chlamydia psittaci***

**Respiratory infections:** can range from asymptomatic colonization to severe bronchopneumonia with localized infiltration of

inflammatory cells, necrosis, and hemorrhage

Clinical Spectrum of *Chlamydia trachomatis* Infections

****

***Chlamydia trachomatis***

**Trachoma:** chronic inflammatory granulomatous process of eye surface, leading to corneal ulceration, scarring, pannus formation, and blindness

**Adult inclusion conjunctivitis:** acute process with mucopurulent discharge, dermatitis, corneal infiltrates, and corneal vascularization in chronic disease

**Neonatal conjunctivitis:** acute process characterized by a mucopurulent discharge

**Infant pneumonia:** after a 2- to 3-week incubation period, the infant develops rhinitis, followed by bronchitis with a characteristic dry cough

**Urogenital infections:** acute process involving the genitourinary tract with characteristic mucopurulent discharge; asymptomatic infections common in women

**Lymphogranuloma venereum:** a painless ulcer develops at the site of infection that spontaneously heals, followed by inflammation and swelling of lymph nodes draining the area, then progression to systemic symptoms

**Time course of *Chlamydia psittaci* infection.**

****