



University of Jordan
Faculty of Medicine



Medical Committee
The University of Jordan

Introduction to Microbiology

Title :

Chlamydia-Mycoplasma-Legionella Groups

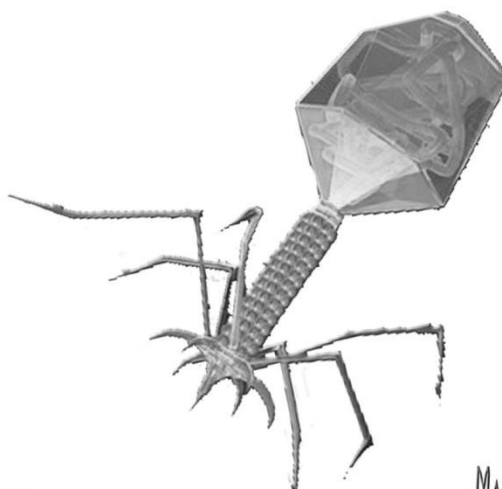
Professor:

Dr. Asem Al-Shehabi

: 27

☐ Slides
☐ Handout
☒ Sheet

Done by: *Batool Wahdani*



Price:

Designed by:
Wassem Kamal

M.D. Class of 2018

groups/Doctor2012
http://medstudygroup.weebly.com

Chlamydia-Mycoplasma-Legionella Groups

Chlamydia group slide #4:

Characteristics:

- A type of bacteria associated with respiratory tract infection
- obligate intracellular small pathogen (like viruses) more than opportunistic, because it's not widely spread as part of the normal respiratory flora and if there's often a case of chlamydia it's associated with infection (and in the first cases detected it was often associated with other cases).
- Cannot be cultured on an artificial media; require tissue culture MacConkey tissue culture (similar to viruses in that).
- It's not considered 100% gram negative bacteria because it can't be demonstrated in gram stain.
- Growth cycle: most bacteria reproduce through (binary fission) but chlamydia has a special morphological growth cycle with two main elements:
 - 1- Elementary bodies: small circular bodies considered as infectious particles.
 - 2- Inclusion bodies: Chlamydia reproduces inside these bodies and once the inclusion bodies mature, the compartments (small divisions) will be released as elementary bodies.This growth cycle is only found in chlamydia.

Chlamydia has two types: 1- Chlamydia trachomatis 2- Chlamydia pneumonia

1- Chlamydia trachomatis:

- Found in the genital tract and associated with Nonspecific urethritis/ Nonspecific gonococcal urethritis.
 - It's nonspecific because this infection isn't associated with discharging of pussy fluids like in gonorrhea. It has inflammatory reactions that might develop few amounts of puss discharge.
 - This disease is hard to be recognized and only recognized if there's a complication like: in women (Cervicitis and Vaginitis (but it's less)) and in Men (Prostatitis).
- It's associated with asymptomatic infection and IF there are signs or symptoms it's not easily recognized.
- Detection: requires culture through a very difficult method or PCR (Polymerase chain reaction) to detect the presence of specific DNA.
- Newborns with chlamydial conjunctivitis: if an infected pregnant woman gives birth, the baby will be infected especially in his eyes (neonatal conjunctivitis). If it's not treated within a small period it will affect the cornea and produce Trachoma (blindness). Each year above one million cases.
- Its diseases are considered the most common sexually transmitted diseases (more common than Nisseria Gonorrhea) in western countries (USA, European countries) and each year above 100 million cases. It's rare in Arab countries.
- It's a cause of Infertility
- It's a cause of pneumonia in newborns and it's a fatal disease.

2- Chlamydia pneumonia:

- Found mainly in respiratory tract.
- Develops Atypical Pneumonia
 - Atypical: because the infected person suffers from a dry cough, pain, fever but it's not associated with a productive sputum (بلغم) or accumulation of fluids in lungs. As a result the health condition of the infected person will slowly deteriorate.
 - It's not easily recognized because there are many other organisms that might cause atypical pneumonia.
- Diagnosis:
 - **In the past:** serological test to demonstrate the presence of a specific antibody and this is only useful to indicate the presence of just asymptomatic infection colonization.
 - **Recently:** Polymerase Chain Reaction (PCR) which is very specific and easily done
- Treatment: No vaccine, but it's susceptible to erythromycin.

Mycoplasma group slide #6:

Characteristics:

- The smallest type of bacteria.
- It's not considered gram negative bacteria because it can't be demonstrated in gram stain.
- Its cell wall consists mainly of protein structure with some glucose and there's a **thick** lipid bilayer membrane to support the cytoplasm of bacteria to grow in artificial media. It can be cultured in a special culture medium and doesn't need tissue culture.

Mycoplasma has three main types:

1- M. pneumonia 2-M.hominis/M.genitalium 3-Legionella pneumophila

1- M. pneumonia:

- Obligate human pathogen always associated atypical Pneumonia (not associated with productive cough, just a dry cough with no sputum).
- Produces slight inflammatory reaction (exactly like Chlamydia): cough and fever (not high).
- More common in young adults than elderly or young children (it's not known why).
- Might be demonstrated as Pharyngitis, Bronchitis, and Pneumonia.
- Common in a swinging weather (hot, cold, warm) such as in winter. So, it's not common all the yearlong.
- Rarely found as single cases but rather as outbreaks. (In Jordan very few cases).

2- M.hominis/M.genitalium:

M.hominis

- Part of our oral flora and it's not so significant.
- Might be associated with other organisms in causing ulceration in oral cavity (especially gum).
- Diagnosis: aspirated Sputum

M.genitalium

- Related to the genital tract (considered part of genital flora) and it's often associated with nonspecific urethritis. Rarely associated with complications like saplengitis leading to infertility.
- Diagnosis: collect urine samples and look for the presence of the DNA of mycoplasma by PCR (more accurate and specific than urine culture which is a more difficult method to recognize these bacteria).
- Treatment: No vaccine, but it's susceptible to erythromycin.(Considered a sexually transmitted disease although it's part of genital flora)

3-Legionella pneumonphila/ Legionnaires' disease (المحاربين القدماء) slide #7:

- In 1976 in California there was a meeting for retired soldiers and in this meeting they recognized the developing of disease related to respiratory tract.
- It's present in water and animals and fish.
- Not susceptible to penicillin or erythromycin.
- Similar to gram negative bacteria (but not considered) and it can be demonstrated as Coccobacilli by special stain.
- Facultative anaerobic and can grow on artificial media prepared especially for it.
- Can survive in a wide range of temp. Between 0 and up to 80; which means it can be transmitted in hot/cold water and air condition system (in contrast to most types of bacteria, which don't survive such broad range of temperatures).
- Found in hot/cold water, wet soil and can survive for a long period.
- May affect any person who has an immunodeficiency especially elderly people (high mortality).
- Intracellular and can manage to survive in monocytes and macrophages.
- Clinical Feature:
 - sudden high fever and dry cough
 - associated with gastrointestinal symptoms (vomiting, stomach discomfort, and diarrhea).
 - Pain in the muscles of the body which may affect respiratory system and produce shortness of breath also
 - Might cause renal failure and affect kidneys
 - May result in death.
- Diagnosis: Special Culture Media, Blood sputum culture, serological test to detect a specific antibody, PCR for DNA
- Treatment: No vaccine, use of antibiotics.

Spirochetes Group slide #8, 9, 10:

Characteristics:

- A type of bacteria with spiral morphology (as the name indicates).
- Large group of bacteria related to the environment. Found in water, animals and humans. (Might cause infection in humans or animals)
- Not easily demonstrated by gram stain due to the lack of cell wall, but we use a special stain like silver stain. It's difficult to culture especially the pathogenic type.
- We use dark field microscopy to recognize motion and motility and counting colonies which might help in their identification.
- Longer than all types of bacteria and range between 5-20 micro meter.

Spirochetes Group:

1- Treponema species 2- Treponema palladium 3- Borrelia Burgdorferi 4-Borrelia species

5- Lymphospiral disease

1- Treponema species:

- Nonpathogenic.
- Found in Oral cavity.
- Part of the normal flora of the oral cavity but with no significance unless associated with other organisms

2- Treponema palladium:

A causative agent of Syphilis (a sexually transmitted disease/ Venereal disease)

- Three stages of infection:
 - 1st stage: Developing of Ulcerations on the extra genitalia (easily recognized in males but difficult in females). These Ulcerations (known as chancre) is a form of mild inflammatory reaction in dermis and subcutaneous tissue which might be recognized or not : we might only recognize the presence of erythema (redness). It may disappear after 1 week and you would think that you recovered but instead it moved to a second stage.
 - 2nd stage: the infection will develop in more subcutaneous tissue and it will be associated with allergic reaction. It's a chronic infection and might cause more damage.
The 1st and 2nd stages are successfully treated with antimicrobial drugs. (It's easy to cure the patient in these stages).
 - 3rd stage: it's more related to neurological reaction and might affect any part of the body including the liver / central nervous system / kidneys, in the form of meningitis / hepatitis/ nephritis etc.. This may result at the end in a severe damage of the central nervous system.

- Some infected people (not everyone only a small portion) might respond by developing a specific antibody which might prevent the dissemination of the disease.
- Congenital Syphilis: if an infected pregnant woman gives birth the baby will be infected. It's not recognized in the first months or even for a year. It might affect bones, oral cavity and CNS.
- Diagnosis: easy in 1st stage but difficult in 2nd and 3rd
 - 1st stage is recognized by chancre ulcerations in the genitalia, but in order to confirm that it's Syphilis we have to prove that by direct field microscopy, or you have to wait for two weeks to demonstrate a +ve serological reaction.
 - The serological test is done in two stages: first a screening test known as VDRL (venereal disease research laboratory), this is a screening test not confirmatory test and if it's positive we have to move to the second type: Fluorescent Trep. Antibody-Test (FTA).
- There is no proof that Treponema Pallidum can be cultured in vitro.
- Treatment: No vaccine.

3- Borrelia Burgdorferi (Lyme disease)

- Lyme disease is well known in certain countries especially in USA, where they have wild animals and pets.
- It's transmitted by a kind of insect known as TICKS which live on the skin of certain animals- wild animals & rabbits (also in their blood) - and then they leave animals' skin and start attacking humans especially on the neck.
- In humans it may result in large erythema lesions which is the first sign and then associated with multiple skin lesions. It might affect CNS and might cause Lyme disease which affects the heart and other parts and produce Arthritis.

4- Borrelia species:

- It's related more to animals and rarely found in humans but it might be transmitted to humans through human lice (insect).
- In humans it causes Fever (low or high), Severe Headache, sepsis, Common Relapses, chills; and it requires treatment with a specific antibody. (not common in our community)

5- Liptospiral diseases:

- Zoonosis: Related to animals (recognized more in animals than in human)
- it might reach humans oral cavity through direct contact and cause Weil's disease: Jaundice, high fever, affect the liver, produce vasculitis and bleeding (damage in blood vessels especially in skin and oral cavity which if found can help the disease to be recognized, or through fever from unknown origin).
- This disease is rare in our country.
- Diagnosis: Serological Tests, Special culture.

Don't forget to check the slides 😊

