CHLAMYDIACEAE

- Two genera: *Chlamydia* and *Chlamydophila*

Important characteristics

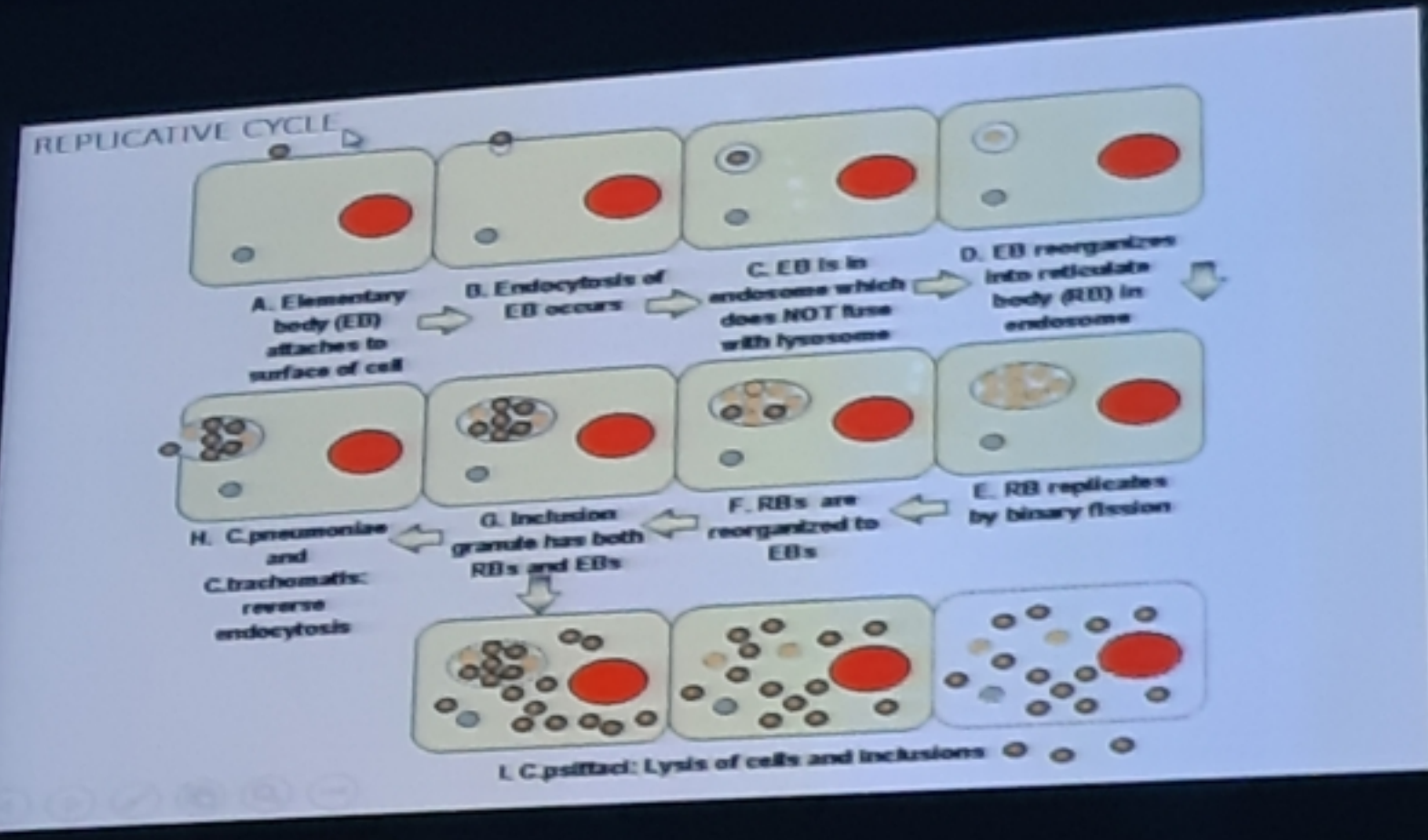
- contain both DNA and RNA (unlike viruses)
- susceptible to antibacterial agents
- obligate intracellular micro-organisms
- possess inner and outer membranes similar to those of gram-negative bacteria

Chlamydiaceae

Exist in 2 forms:

- metabolically inactive infectious forms **(elementary bodies [EBs])**
  - EBs are resistant to many harsh environmental factors
  - They are metabolically inert

- metabolically active, noninfectious forms **(reticulate bodies [RBs])**


REPLICATIVE CYCLE
A. Elementary body (EB) attaches to surface of cell
B. Endocytosis of EB occurs
C. EB is in endosome which does NOT fuse with lysosome
D. EB reorganizes into reticulate body (RB) in endosome
E. RB replicates by binary fission
F. RBs are reorganized to EBs
G. Inclusion granule has both RBs and EBs
H. C.pneumoniae and C.trachomatis: reverse endocytosis
I. C.psittaci: Lysis of cells and inclusions

- 3 important species
  - *Chlamydia trachomatis*
  - *Chlamydophila pneumoniae*
  - *Chlamydophila psittaci*

Chlamydophila pneumoniae

- Spread via respiratory secretions
- Human pathogen, No animal reservoir
- Causes bronchitis, pneumonia, sinusitis, atypical pneumonias
- 50% of people have serologic evidence
- A significant cause of acute exacerbations of asthma

- Diagnosis – serology, PCR, cell cultures
- Treatment- Macrolides (erythromycin, azithromycin , clarithromycin), tetracycline, doxycycline, or levofloxacin administered for 10 to 14 days

Chlamydophila psittaci

- Infects wild & domestic birds
- Human infection: inhalation of organism in dried infected bird droppings
- The incubation period is about 10 days
- Presentation ranges from an 'influenza-like' syndrome fever,sore throat,photophobia to a severe illness (pneumonia)
- Diagnosis – serology (ELISA)
- Rx – tetracycline/ doxycycline/ erythromycin
  - Proper control of importation or handling of psittacine birds
  - Occupational hazard-use PPE

Chlamydia trachomatis

- Divided into several Serovars (antigenic difference– major outer membrane protein)
  - A, B, C.....Primarily conjunctiva
  - D-K.....Primarily urogenital tract
  - L1, L2, L3 .....Inguinal lymph nodes

Clinical manifestations

1. Trachoma:

- Ass. with serotypes A, B, C
- Chronic, inflammatory granulomatous process of the eye surface, leading to corneal ulceration, scarring, and blindness.
- Active trachoma, characterized by the presence of lymphoid follicles on the conjunctiva and intermittent shedding of chlamydiae
- Is primarily a disease of children.
- Blindness can occur as a complication

- .....Trachoma

- Spread by transfer of infected discharge from eye of infected person by hands, clothing, towels

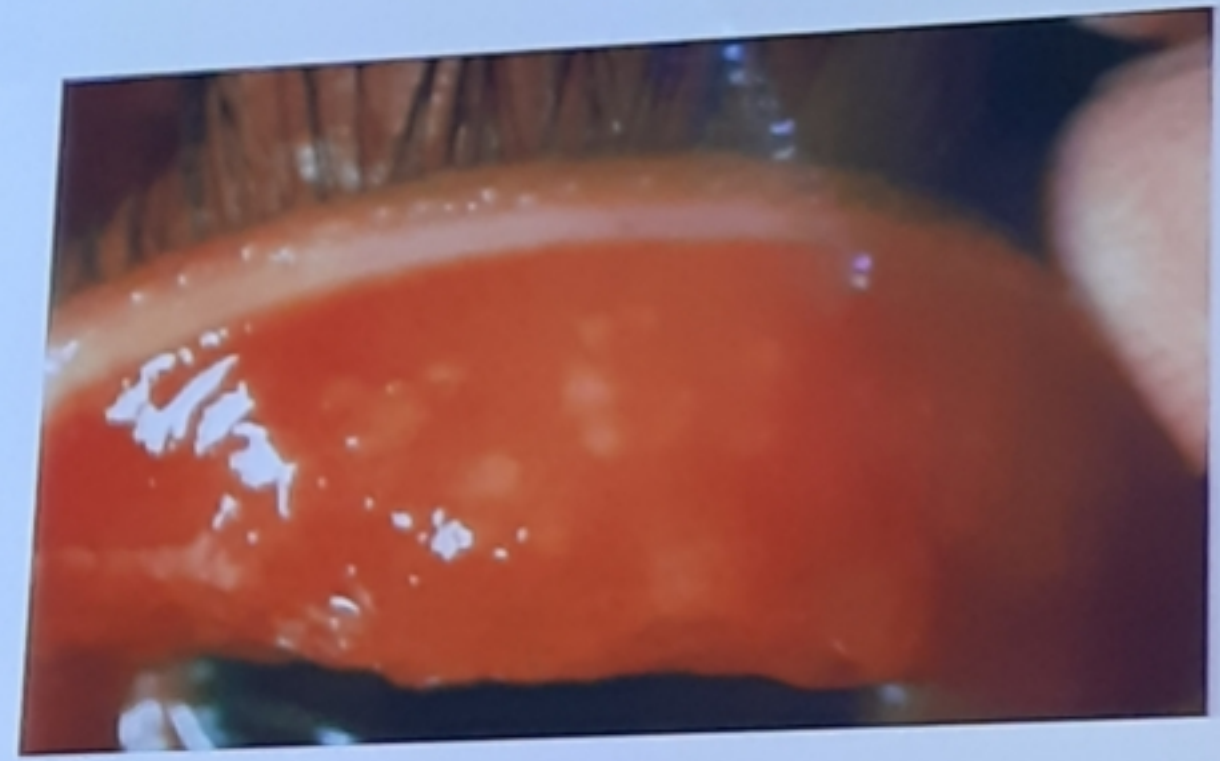
- Flies important carriers

- Poverty, overcrowding, poor personal hygiene, inadequate water.... enhance spread

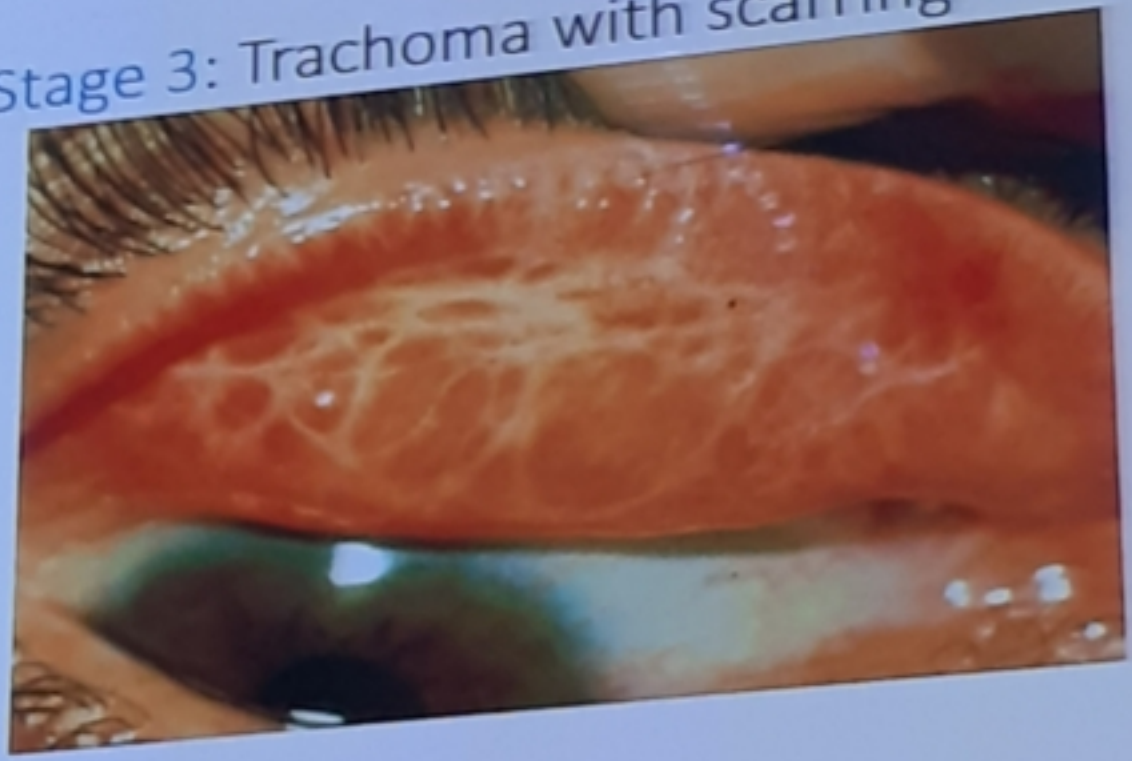
Stage 1: Trachoma infection: small bumps under the eye lid

Follicles Under the eyelid.

Stage 2: Follicles, inflammation,

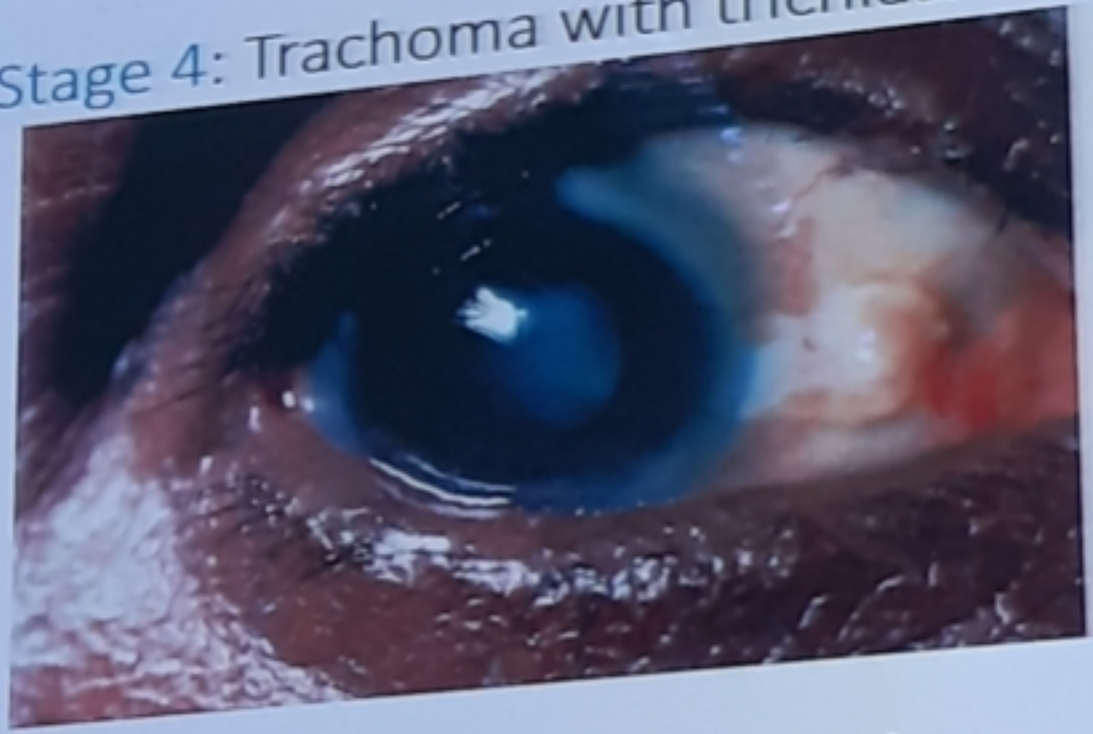


Stage 3: Trachoma with scarring



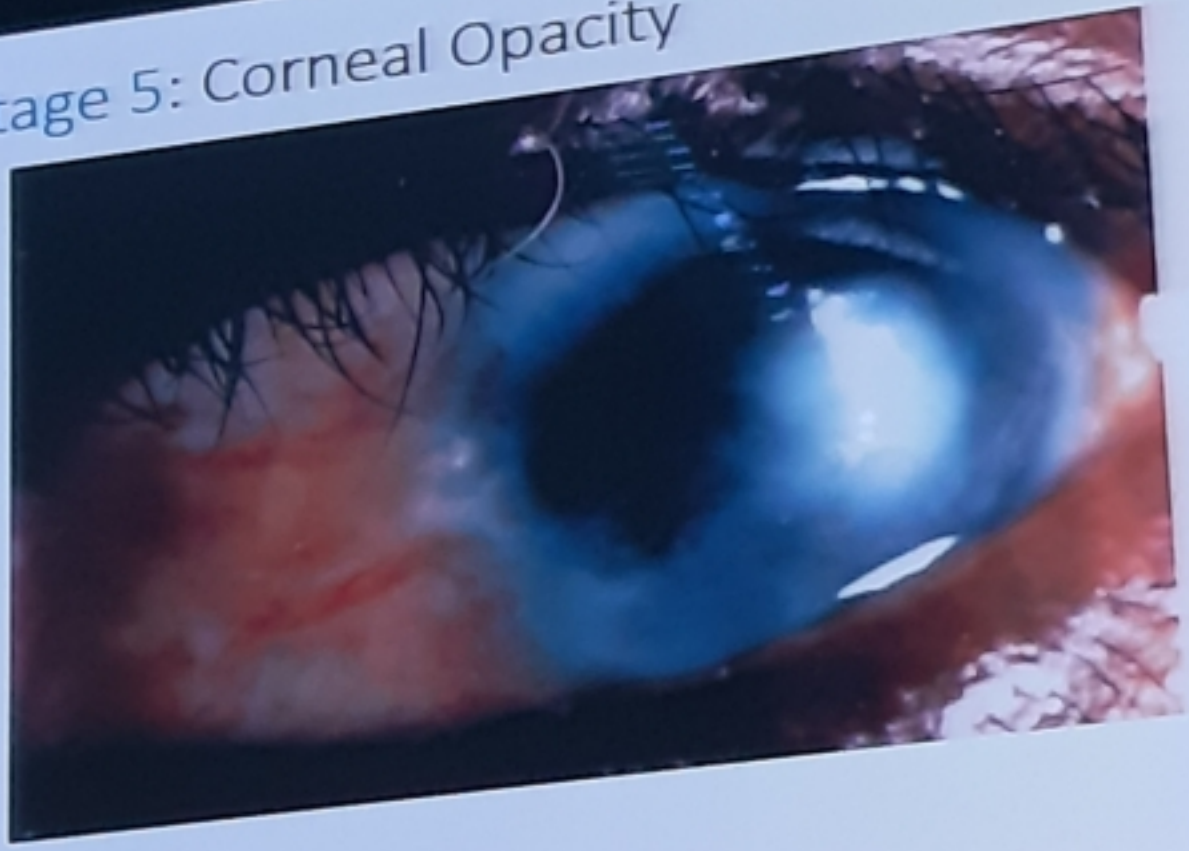
- Scar tissue forms.
- Eyelid is difficult to turn for examination

Stage 4: Trachoma with trichiasis



Eyelids turn in towards the cornea

Stage 5: Corneal Opacity



- Corneal Scarring
- Bacteria/Virus enters damaged cornea

2. Adult inclusion conjunctivitis:

- Most prevalent in sexually active young people, being spread from genitalia to the eye.... *poor hygiene
- Presents with mucopurulent discharge, dermatitis, corneal infiltrates
- There is corneal vascularization in chronic disease

3. Neonatal conjunctivitis

- Infection is acquired from the mother during birth.
- Acute process characterized by a mucopurulent discharge.
- Develops in infants around 14 days after birth.
- Presents as a swelling of the eyelids and orbit and a purulent infiltration of the conjunctiva

(opthamia neonatorum)

- A substantial proportion of these infants develop chlamydial pneumonia about 6 weeks after birth

4. Genital infection (men)

- *C. trachomatis* serovars D-K are responsible for about 30% of cases of non-specific urethritis in men.
- The infection can be asymptomatic, with infected men serving as a reservoir of infection.
- In symptomatic patients, varying amounts of mucopurulent discharge are produced.
- Occasionally this progresses to epididymitis or prostatitis
- It is likely that chronic chlamydial epididymitis may eventually lead to occlusion of the tube and infertility due to azoospermia.

Genital infection: Infection in women

- In symptomatic women, *C. trachomatis* serovars D-K cause mucopurulent cervicitis and urethritis.
- Not only a risk to their sexual partners or offspring, but also to themselves, as ascending infection frequently occurs.
- This results first in an endometritis followed by infection of the fallopian tubes to cause acute salpingitis.

...genital tract infection in women

- Collectively, endometritis and salpingitis are known as *pelvic inflammatory disease*, which is largely caused by *C. trachomatis*.

- Chlamydial pelvic infection may lead to further abdominal involvement and the formation of pelvic adhesions, perihepatitis and peri-appendicitis.

5. Lymphogranuloma venereum (LGV)

- Genital tract infection with *C. trachomatis* serovars L1-L3
- Usually begins with a genital ulcer followed by lymphadenopathy of the regional lymph nodes.
- Buboes are seen if infection persists, can spread to the gastrointestinal and genito-urinary tracts, causing strictures and, in rare cases, peno-scrotal elephantiasis.

Site of infection	Disease	Organism (serovars)
Eye	Trachoma	*C. trachomatis* (A, B, Ba, C)
	Inclusion conjunctivitis	*C. trachomatis* (D-K)
	Ophthalmia neonatorum	*C. trachomatis* (D-K)
Genital tract		
Male	Non-specific urethritis, proctitis, epididymitis	*C. trachomatis* (D-K)
Female	Cervicitis, urethritis, endometritis, salpingitis, PID, perihepatitis, peri-appendicitis, infertility with tubal occlusion	*C. trachomatis* (D-K)
	Abortion, premature birth	*C. trachomatis* (D-K)[a]
Male and female	Lymphogranuloma venereum	*C. trachomatis* (L1-L3)
Respiratory tract	Neonatal atypical pneumonia	*C. trachomatis* (D-K)
	Pharyngitis, bronchitis, pneumonia	*Ch. pneumoniae*
	Psittacosis	*Ch. psittaci*
Chronic diseases	Atherosclerosis, coronary disease	*Ch. pneumoniae*[a]
	Stroke, Alzheimer's disease	*Ch. pneumoniae*[b]

LABORATORY DIAGNOSIS

- Microscopy
  - Microscopic examination of clinical specimen for Cytoplasmic inclusion bodies
  - *C. trachomitis* inclusion bodies contain glycogen, can visualize by staining with iodine, giemsa, fluorescent antibody staining or hybridization with a DNA probe.

...Laboratory Diagnosis

- Antigens can be detected in exudates or urine by ELISA.

- Pathogen can be grown in cell cultures eg
  - Chicken embryo yolk sac
  - McCoy cell lines

TREATMENT

- LGV – doxycycline; aspirate buboes
- Genital & ocular – azithromycin, doxycycline
- Newborn conjunctivitis and pneumonia should be treated with erythromycin for 10 to 14 days

CONTROL

- Antibiotic prophylaxis- oral azithromycin
- Public education: hygiene
- Tracing and treating partners in genital tract infections.

DIRTY FACES AND FLIES CAUSE TRACHOMA

FIGHT TRACHOMA BY WASHING YOUR FACE

Sudan Trachoma Control Program

TAKE HOME ASSIGNMENT:

- Discuss the FITZ-Hugh-Curtis syndrome and Reiter's syndrome in relation to chlamydial infections

- What are potential complications of chlamydial genitourinary infections?

MYCOPLSAMAS

OUTLINE

- Important Properties
- Antigenic Properties
- Pathogenesis and Epidemiology
- Laboratory Diagnosis
- Treatment

MYCOPLSAMAS

Important Properties

- Family Mycoplasmaceatea
- Genera: *Mycoplasma, Ureaplsama.*
- can grow in cell free culture media.
- multiply by binary fission.
- They lack a cell wall
- Only bacteria that contain cholesterol in the cell membrane

Antigenic Properties

- Mycoplasmas have glycolipids- can account for the neurological manifestations of *M. pneumoniae* infection.

- Alter the I antigens on RBCs: stimulate anti-I antibodies (cold agglutinins)- autoimmune response and damage to erythrocytes.

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Panasonic

MYCOPLSAMAS

PATHOGENESIS AND EPIDEMIOLOGY

Respiratory and Urogenital

- Respiratory Infections

M. pneumoniae

- Common cause of atypical pneumonia.
- Transmitted by respiratory droplets.
- Ciliary motion is inhibited and necrosis of the epithelium occurs.

It produces hydrogen peroxide which contributes to damage by respiratory tract cells.

MYCOPLSAMAS

Urogenital Infections

- *M. hominis:* pelvic inflammatory disease, acute pyelonephritis.

- *Ureaplasma urealyticum:* nongonoccocal urethritis.

- Has been associated with premature birth, preterm rupture of membranes, placental inflammation etc

MYCOPLSAMAS

LABORATORY DIAGNOSIS

- Serologic testing
- Culture of specimen for primary isolation.
- Use of specific DNA probes.

MYCOPLSAMAS

TREATMENT

- ** **Resistant to antibiotics which interfere with bacterial cell wall synthesis** **
- *M.pneumoniae* – tetracyclines/ quinolones/ macrolides
- *U.urealyticum* –use doxycycline, azithromycin, streptomycin