

# Genito-Urinary System

*Chlamydia trachomatis,  
Ureaplasma and Gardnerella*

# Chlamydia

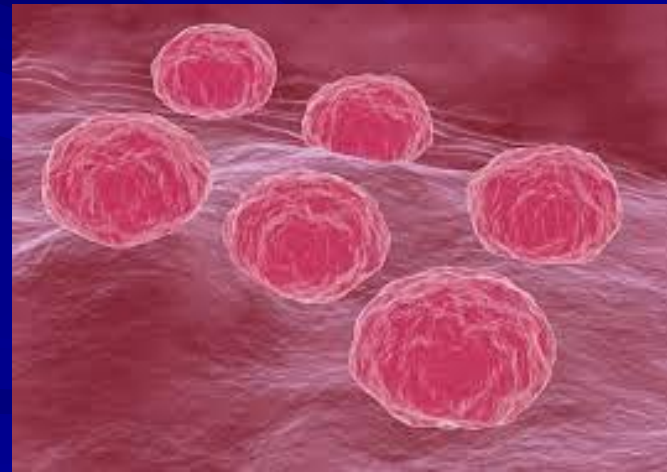
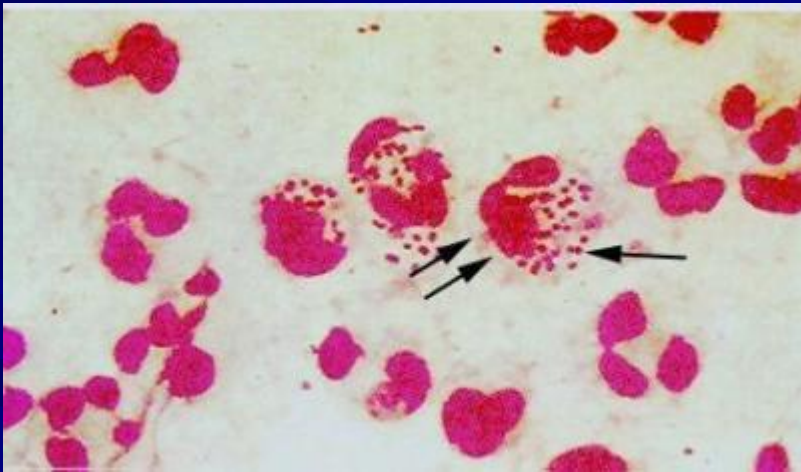
- Three of the nine species cause disease in humans.
  - Chlamydia trachomatis
    - is the most important human pathogen as a major cause of genital infection and conjunctivitis.
    - trachoma, is the leading preventable cause of blindness in the world.
      - Transmission direct contact
  - Chlamydophila pneumoniae
  - Chlamydophila psittaci
    - often infects birds



# *Chlamydia trachomatis*

## ■ *C. trachomatis*

- round cells between 0.3 and 1  $\mu\text{m}$  in diameter depending on the replicative stage.
- lack the peptidoglycan layer
- obligate intracellular parasites



# REPLICATIVE CYCLE

- Involves two forms of the organism:

## Elementary body (EB)

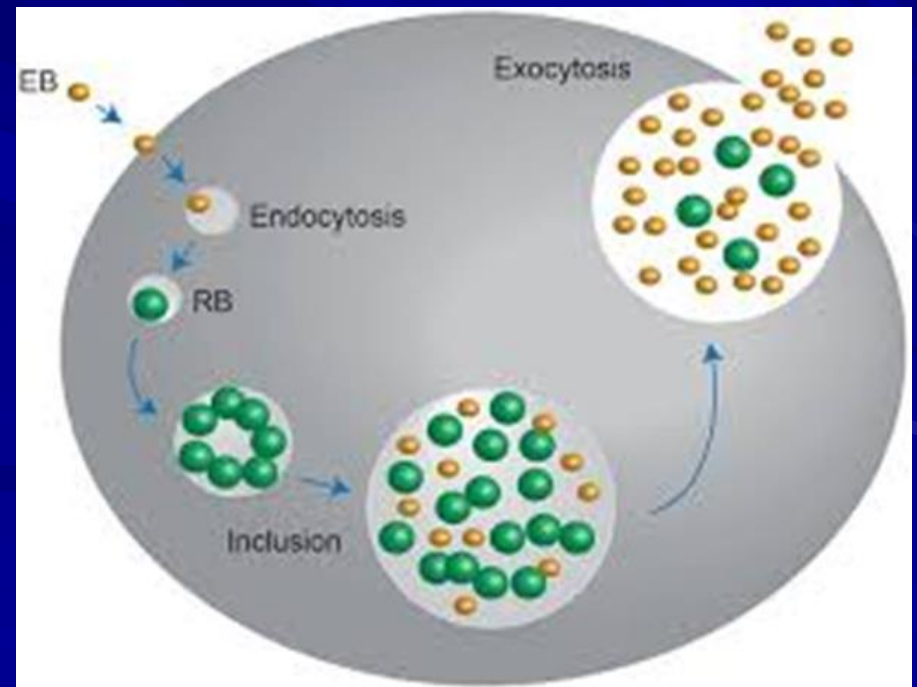
- a small, hardy metabolically inert infectious form



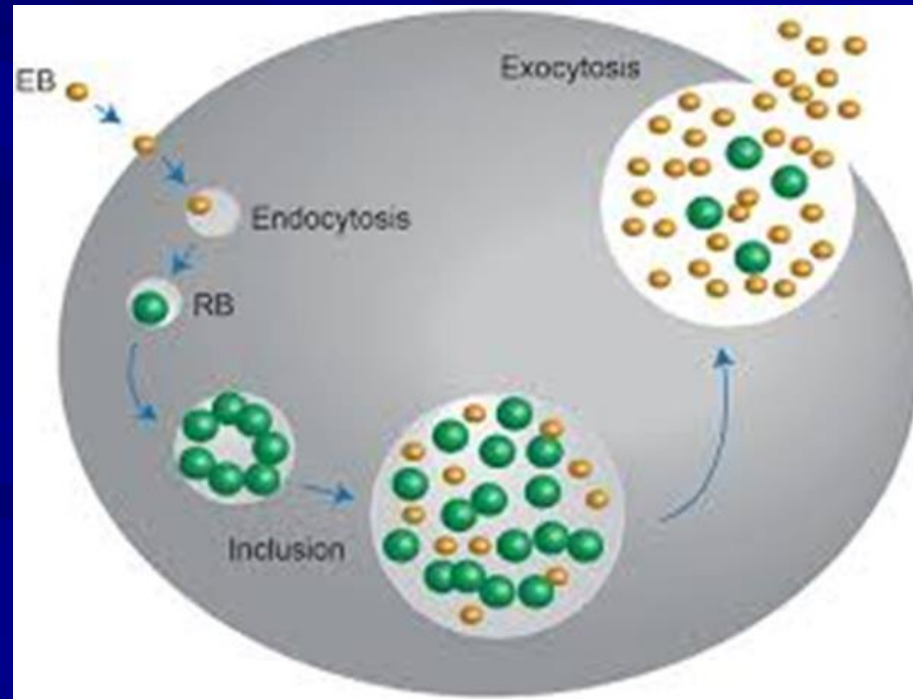
- a larger fragile intracellular replicative form termed the **Reticulate body (RB)**.
  - Star shape

# REPLICATIVE CYCLE

- The EB attaches to unknown receptors on the plasma membrane (usually columnar or transitional epithelial cells).
- It then enters the cell in an endocytotic vacuole and begins the process of converting to the replicative RB.



- As the RBs increase in number, the endosomal membrane expands by fusing with lipids of the Golgi apparatus eventually forming a **large inclusion body**. After 24 to 72 hours, the process reverses and the RBs reorganize and condense to yield multiple EBs.



- The endosomal membrane then either disintegrates or fuses with the host cell membrane, releasing the EBs to infect adjacent cells.
- *C. trachomatis* also inhibits apoptosis of epithelial cells, thus enabling completion of its replicative cycle.

# *Chlamydia trachomatis* Diseases

## EPIDEMIOLOGY

- *C. trachomatis* causes disease in several sites, including the conjunctiva and genital tract.
- It is the most common sexually transmitted disease.
- Humans are the sole reservoir.
- Neonatal conjunctivitis contracted from maternal genital infection (2 to 6% of newborn infants).



# PATHOGENESIS

## ■ Chlamydiae

- endocervix and upper genital tract of women,
- the urethra, rectum and conjunct. of both sexes.

# IMMUNITY

- *C. trachomatis* infections do not reliably result in protection against reinfection

# CLINICAL ASPECTS

## Genital Infections

- The clinical spectrum of sexually transmitted infections with *C. trachomatis* is similar to that of *Neisseria gonorrhoeae*. *C. trachomatis*
  - cause urethritis and epididymitis in men
  - cervicitis, salpingitis, and a urethritis in women.

■ *C. trachomatis* urethritis

- dysuria
- a thin creamy urethral discharge.

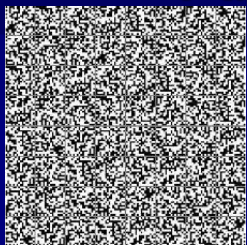
In contrast with *N.gonococcal* which cause sever pain along with thick purulent discharge

- Infections of the uterine cervix may produce vaginal discharge, usually asymptomatic.
- Ascending infection in the form of salpingitis and pelvic inflammatory disease.
- The scarring produced by chronic or repeated infection is an important cause of sterility and ectopic pregnancy.

- three strains of *C. trachomatis* cause Lymphogranuloma venereum LGV,
  - L1, L2, or L3.



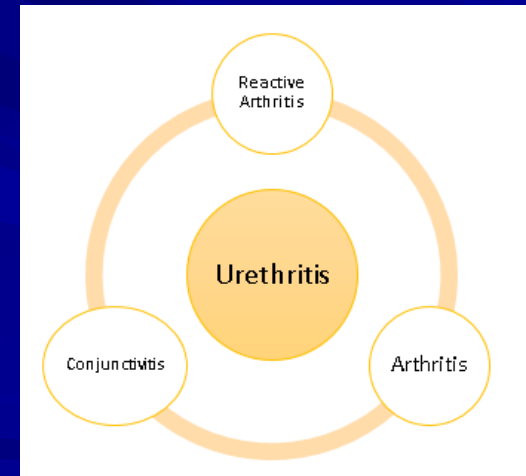
- It is characterized by
  - transient genital lesions
  - followed by multilocular suppurative involvement of the inguinal lymph nodes.
  - The primary genital lesion is usually a small painless ulcer or papule, which heals in a few days.
  - Abscesses, strictures, fistulas if chronic.



## Neonatal chlamydia

- More than 50% of all infants born to mothers excreting *C. trachomatis* during labor show evidence of infection during the first year of life.
- Most develop inclusion conjunctivitis, but 5 - 10% develop infant pneumonia syndrome.

- Conjunctivitis(trachoma)
- Urethritis
- Reactive arthritis (Ab attack the joint)
  - Reiter's syndrome
    - You cant see
    - You cant pee
    - You cant climb a tree



# DIAGNOSIS

- Epithelial cells from the site of infection are required for detection.
- For genital infections, **cervical specimens** are preferred in females and **urethral scrapings** in males.
- Isolation of *C. trachomatis* has been the “gold standard” for diagnosis.
  - It is achieved in cell culture .



- Ligase chain reaction (LCR) or polymerase chain reaction (PCR)
  - the most sensitive, most specific methods of diagnosis.
- Serodiagnostic methods have little use in diagnosis of chlamydial genital infection
  - difficulty of distinguishing current from previous infection.

<b>non-LGV C. trachomatis infection</b>	<b>Azithromycin</b>
<b>pregnant women and infants</b>	<b>Erythromycin</b>
<b>drug of choice for treating LGV</b>	<b>doxycycline</b>

tetracyclines, macrolides and some fluoroquinolones

Chlamydia coverage: Azithromycin (Zithromax), 1 g PO in a single dose or Doxycycline, 100 mg PO bid x 7 days

## Recommended treatment regimens for gonococcal infections: cervicitis, urethritis, proctitis

- **Single dose + chlamydia coverages (Azithromycin or Doxycycline)**
  - Cefixime (suprax) 400mg or ofloxacin 400mg or Cipro 500mg
  - Single large dose IM ceftriaxone 125mg
- Chlamydia coverage: Azithromycin (Zithromax), 1 g PO in a single dose or Doxycycline, 100 mg PO bid x 7 days

# *Ureaplasma and mycoplasma*

- Smallest free living bacteria
- Atypical bacteria
- No cell wall
- Cell membrane contain sterols
- No cell wall inhibitors
- No microscopic
- No stain
- No fixed shape
- Slow growing
- Many female asymptomatic carrier
- M hominis, M genitalium, Ureaplasma urealyticum (facultatively anaerobic)
- M pneumonia (aerobic)

# *Ureaplasma urealyticum*

- Cause genitourinary tract infections.
- highly pleomorphic,
  - may appear as coccoid bodies, filaments, and large multinucleoid forms.
- Ureaplasma is distinguished from Mycoplasma by its production of urease.

# MANIFESTATIONS

- one half of cases of nongonococcal, nonchlamydial urethritis in men may be caused by *U. urealyticum*.
- In women, *Ureaplasma* has been shown to cause chorioamnionitis and postpartum fever.
  - The organism has been isolated from 10% of women with the latter syndrome.
- **Pain, discharge, and itching of the genital area**

# DIAGNOSIS AND TREATMENT

- **Tetracycline** is the treatment of choice because it is also active against *Chlamydia*,
- *protein synthesis inhibitors (tetracyclines and macrolides), as well as, bactericidal agents that inhibit DNA replication (fluoroquinolones).*

## ■ Bacterial vaginosis (BV),

– formerly known as nonspecific vaginitis, was named because bacteria are the etiologic agent in this infection and an associated inflammatory response is lacking.

## ■ BV is the most common cause of vaginitis.

Non-infectious vaginitis is often caused by an allergic reaction or an irritation from vaginal sprays, vaginal deodorants, spermicidal products, soaps, condoms if there is an allergy to latex



# PATHOGENESIS

- Vaginal flora becomes altered, causing an increase in the local pH.
- This may result from a reduction in the H<sub>2</sub>O<sub>2</sub> producing lactobacilli.

alteration in the vaginal ecology It is **overgrowth**

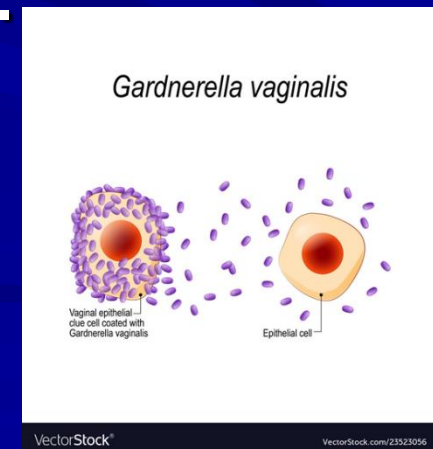
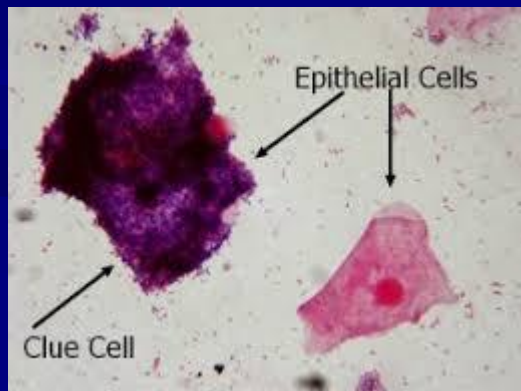
# *Gardnerella vaginalis*

## ■ *G. vaginalis*

- facultatively anaerobic
- gram-variable rod.
- one of the organisms responsible for bacterial vaginosis.

# Gardnerella vaginalis

- It is associated microscopically with clue cells,
  - epithelial cells covered in bacteria.
- Although BV is not considered a sexually transmitted disease,
- sexual activity has been linked to development of this infection.



# CLINICAL ASPECTS

## MANIFESTATIONS

- Symptoms of infection typically include a gray, thin, and homogeneous vaginal discharge that is adherent to the vaginal mucosa, associated with a "musty" or "fishy" odor.



# CLINICAL ASPECTS

## MANIFESTATIONS

- there is little vulvar or vaginal irritation associated with this infection,
- the pungent odor is usually the chief complaint.

# DIAGNOSIS

- A wet mount preparation of physiologic saline mixed with vaginal secretions should be examined under low- and high-power objectives.
- The characteristic "clue cells" are identified as numerous stippled or granulated epithelial cells.
- Cultures are seldom necessary to establish a diagnosis.

## TREATMENT

- The treatment of choice for *G. vaginalis* is oral metronidazole, 500 mg twice daily for 6 days.
- The drug is contra-indicated during early pregnancy and lactation.