
بسم الله الرحمن الرحيم

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Chlamydia

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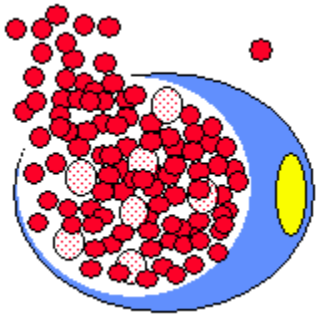
LECTURE OBJECTIVES

At the end of the session students should be able to

1. Describe important properties, pathophysiology, clinical features, and lab diagnosis of Chlamydia.

Chlamydia

- Obligate intracellular, non motile, **gram negative** bacteria; coccoid or rod shape.
- Contain LPS (endotoxin) but not peptidoglycan and there is no well characterized cell wall.
- Resemble bacteria except it cannot multiply outside living cells/ tissues
- Contain RNA, DNA, ribosome & other enzyme systems to synthesize protein, lipid, NA & vitamin (like bacte



- **host dependent for energy & nutrition,**
- Sensitive to most antibiotics & antiseptics,
- **A common cause of STIs** such as urethritis and cervicitis, as well as pneumonia, psittacosis, trachoma, and lymphogranuloma venereum.

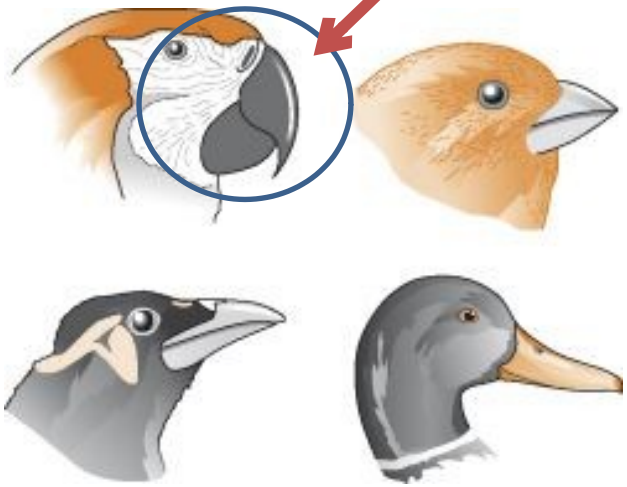
Epidemiology

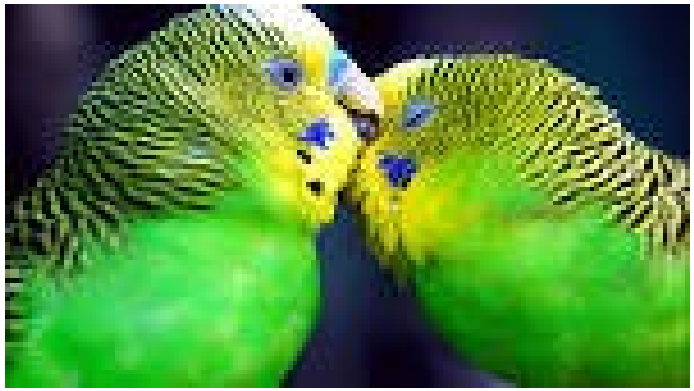
- In 2020, WHO estimated 374 million new infections with 1 of 4 STIs:
  - chlamydia (**129 million**),
  - gonorrhoea (82 million),
  - syphilis (7.1 million) and
  - trichomoniasis (156 million).

Pathogenesis

- Infect primarily epithelial cells of the mucous membranes of the lungs,
- inhabit
  - human genital tract & eyes (*C. trachomatis)*
  - human respiratory tract (*C. pneomoniae)*
  - Infect psittacin birds & others (*C. psittaci)*
- disseminated invasive infections are rare.
- The infection may be asymptomatic, with only rise of antibody titer or may be symptomatic with high fever and pneumonia.

psittacine birds





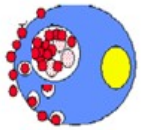
The species of medical importance are

1. *C. trachomatis* *(Human host)* **{A – K , L1, 2, 3}**
2. *C. pneumoniae* (Human *host*)
3. *C. psittaci* (non- human *host*)

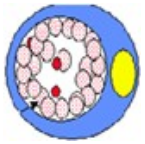
Life cycle_

Chlamydiae occur in **2 forms** :

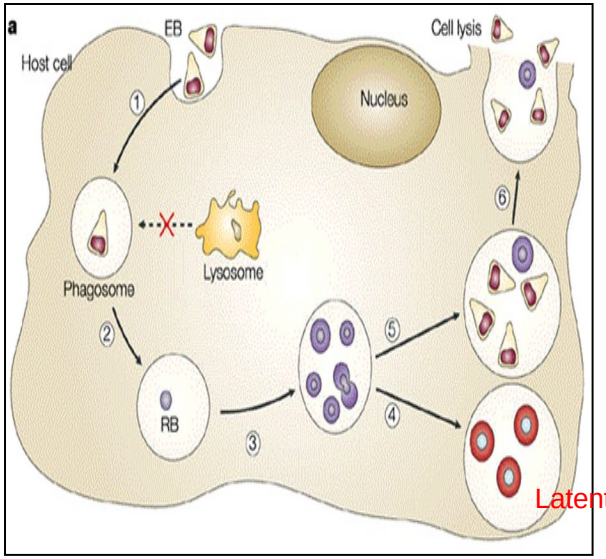
1. **Elementary body** – extracellula infective form (like spores)

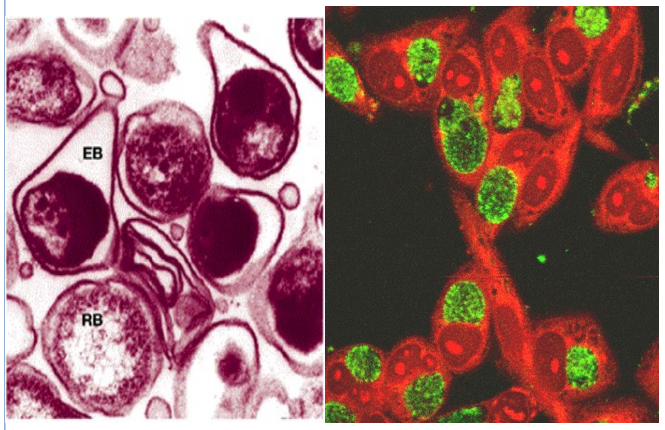


2. **Reticulate body** – intracellular, growing & replicative form



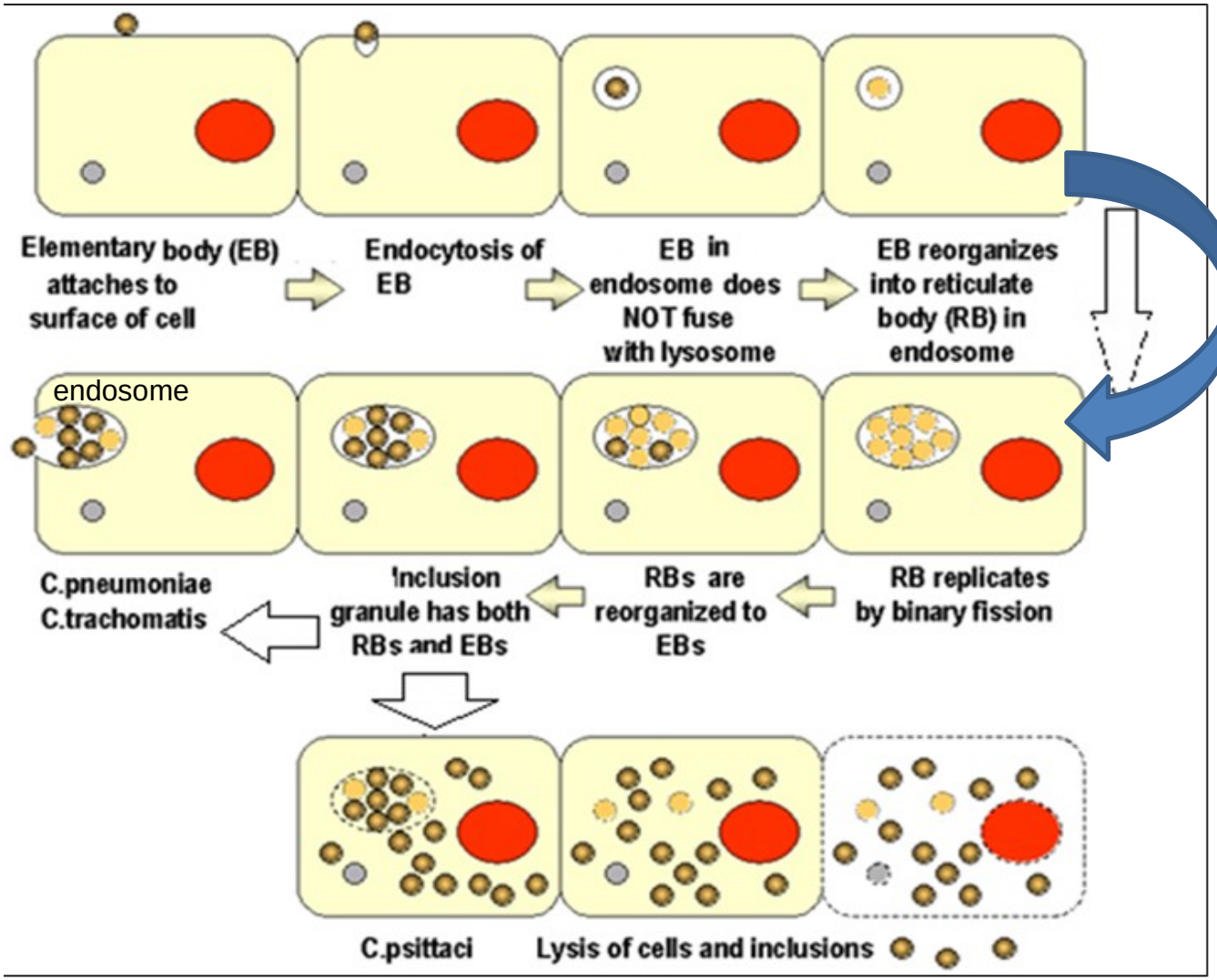
- Chlamydial micro colony within the host cell is called **Inclusion body**.
- Mature inclusion body contains 100 - 500 elementary bodies

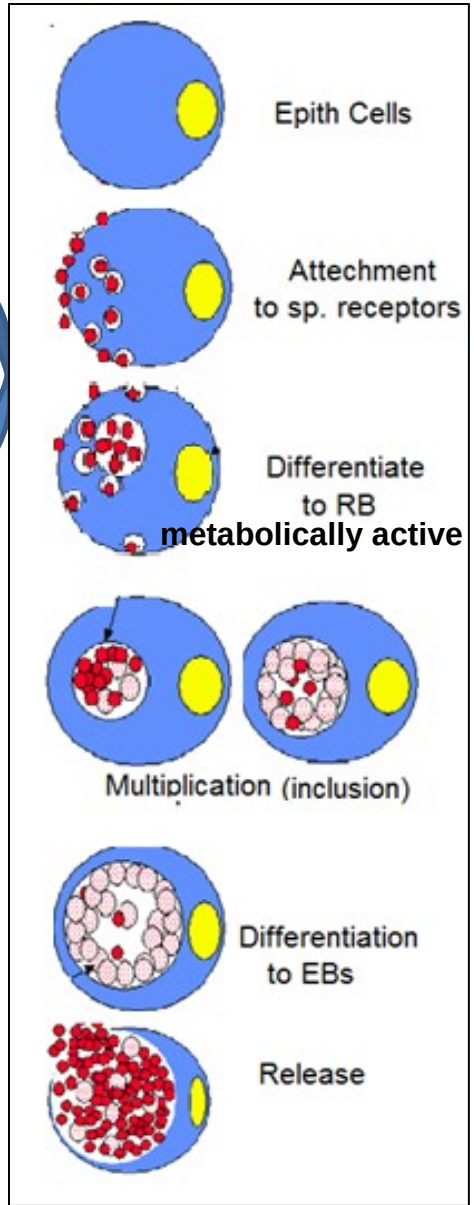




C. pneumoniae

The life cycle of *C. trachomatis* is 72 – 96 hours. They live within the host cells, survive and replicate, and results in the death of the cell.



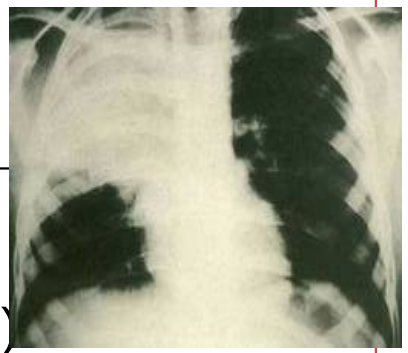


Transmission of Chlamydia

C. trachomatis 15 serotypes	close personal contact, secretions, tears
	STIs,
	Neonatal infections during delivery
C. pneumoniae 1 serotypes	aerosol
C. psittaci 1 serotypes	Inhaling birds feces

Pathogenicity

C. trachomatis *(Human host)*	A, B, C	Trachoma, blindness & scarring
	D–K	STIs, PID, cervicitis, urithritis, proctitis, conjunctivitis, pneumonia in neonates
	L1, L2, L3	lymphogranuloma venerum
		inclusion blenorrhoea
		cause reactive arthritis (Reiter's syndrome) (triad of arthritis, conjunctivitis and urethritis in young).
C. pneumoniae *(Human host)*		Pneumonia
C. psittaci (non- human *host*) 		Pneumonia, flue (psittacosis in man, ornithosis in birds)



TRACHOMA *(Chlamydia trachomatis A,B,C)*

Figure 3.26 Follicles and papillae on the superior tarsal conjunctiva in early active trachoma

- Inflammation of conjunctiva & cornea with follicles and papillae formation,
- Pain, watering & photophobia

- leading to scarring, opacity & blindness

L. venereum (LGV)

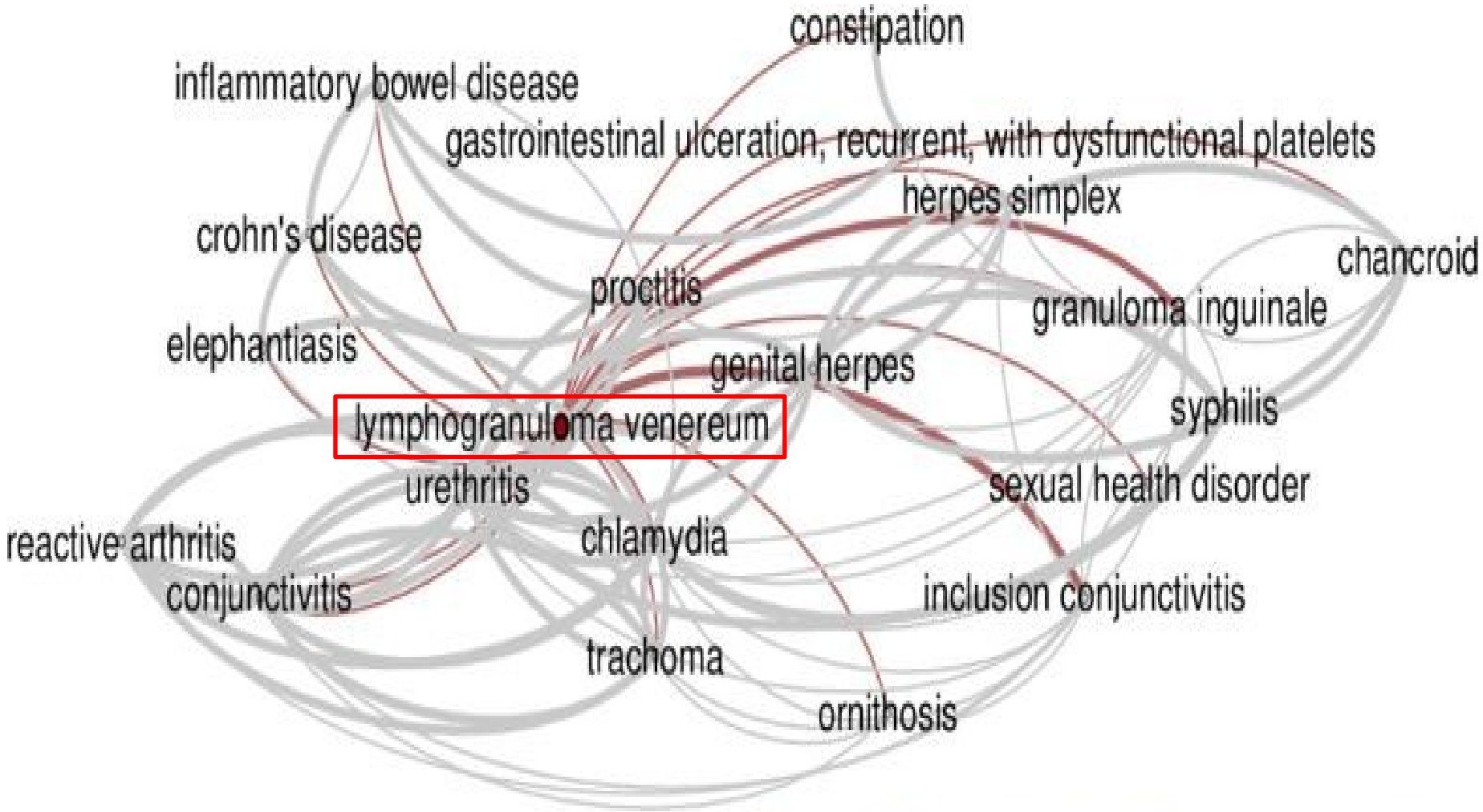
- is caused by 3 unique strains of *C trachomatis* L1, L2, L3.
- characterized by a small, often asymptomatic skin lesion, (boboes) followed by regional lymphadenopathy (in the groin or pelvis).
- if is acquired by anal sex, it may manifest as severe proctitis.
- Without treatment, LGV may cause obstruction of lymphatics and chronic swelling of genital tissues.

L. venereum (LGV)

Epidemiology

- LGV occurs sporadically in the US but is endemic in parts of Africa, India, Southeast Asia, South America, and the Caribbean (particularly in homosexuals men).

hical network of the top 20 diseases related to Lymphogranuloma Vene



Screening:

- Prevent and control chlamydia infection in susceptible people through early detection and treatment of asymptomatic infection.

Diagnosis

- **Nucleic acid amplification tests (NAAT),**
  a) polymerase chain reaction (PCR),
  b) transcription mediated amplification (TMA), and
  c) DNA strand displacement amplification (SDA)

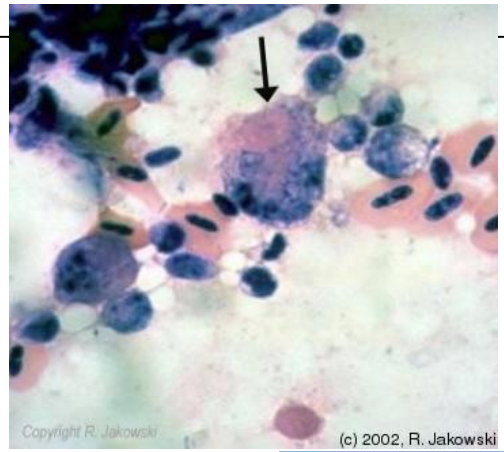
NAAT for chlamydia may be performed on **swab samples** from cervix (women) or urethra (men), / or on self-collected vaginal swabs, or on voided urine

Lab Diagnosis

- **Direct Smears for inclusion or Elementary bodies**
  - **Giemsa,** Castaneda stains.
  - Immunofluorescent staining
- **Isolation on cell culture**

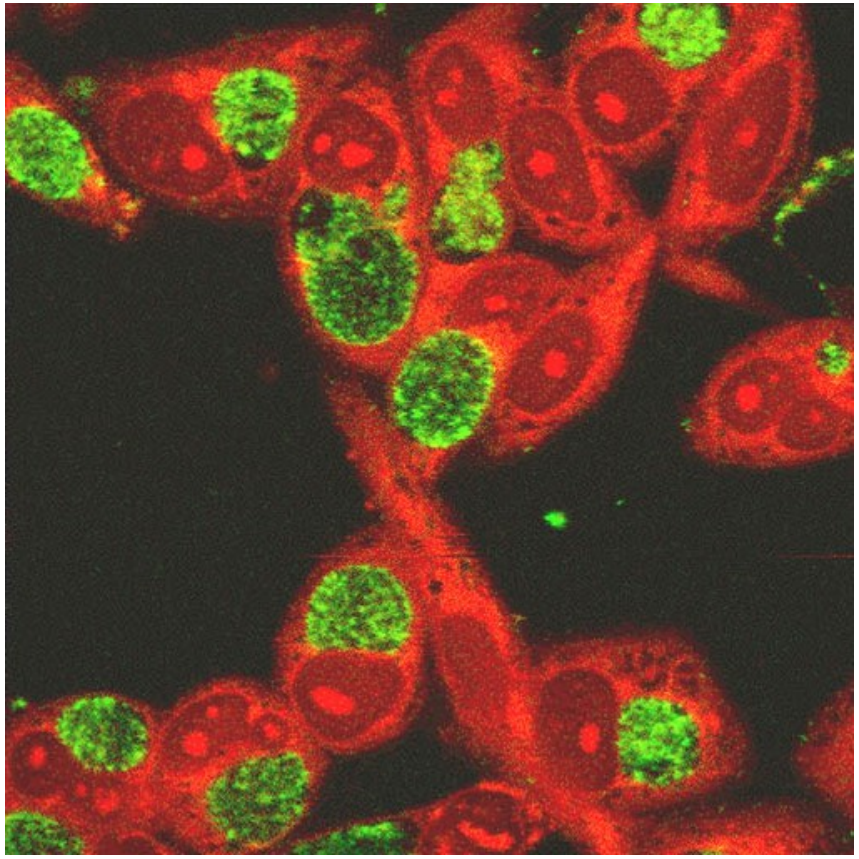
  (STIs, lymphogranuloma venerum),
- **Antichlamydial-ab Test** on blood & tears.
- In LGV, **Complement fixation test** & specific **microimmunoflourescent test**
- **ELISA** – best for screening large number of specimens, detects chlamydia LPS Ag

- **Giemsa Stain:** Elementary body & the Reticulate body stains blue in cytoplasm
- **Lugol's iodine:** rapid & simple screening method for ocular infections, stains glycogen matrix of *C. trachomatis*
- **Immunoflurescent staining:** more sensitive & specific, by using monoclonal Abs. Used for ocular, cervical or urethral specimens.



Chlamydia - DifQuik stain showing an initial body

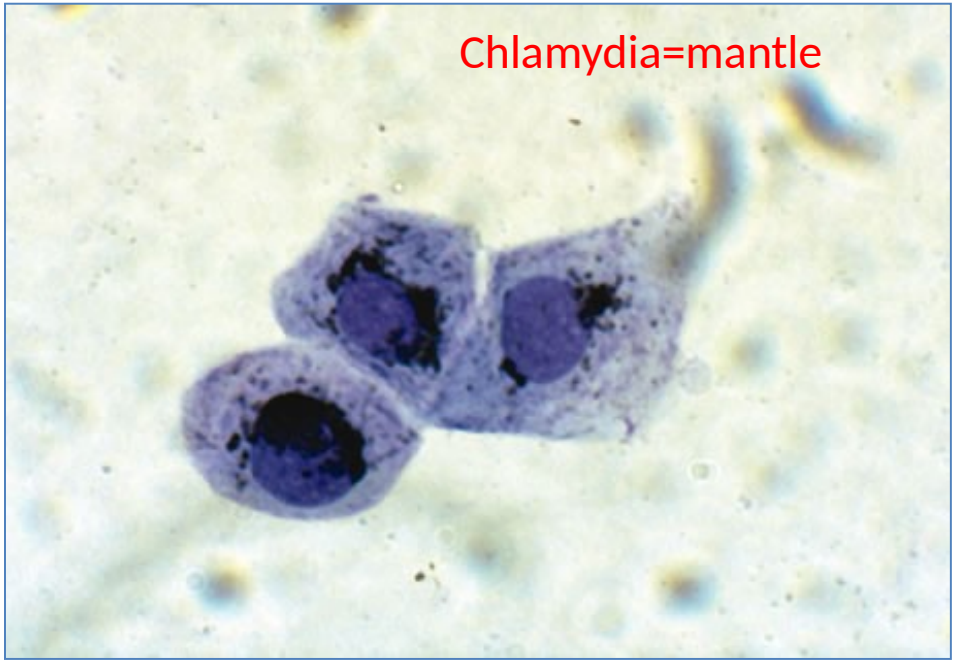
Pap smear showing *C. trachomatis* (H&E stain



IF staining

Giemsa stain.

Typical perinuclear intracytoplasmic inclusion bodies of *Chlamydia* in conjunctival cytology preparation: (Photo courtesy of Dr. Morton Smith)



Treatment

- Local application of antibiotics
- Oral administration - **Tetracycline** or **Doxycycline** for several weeks
- Single dose **Azithromycin**
- No vaccine for *C. trachomatis* or *N. gonorrhoeae*.

Prevention

- mass education & chemotherapy
- Modification of sexual behavior and
- Treatment of the patient and their contacts; to control disease in the community.


Thank You