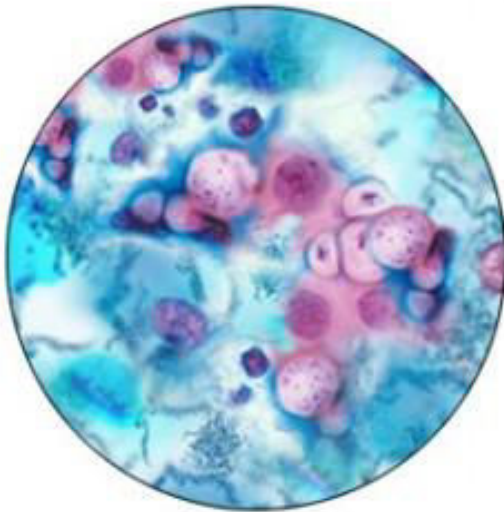


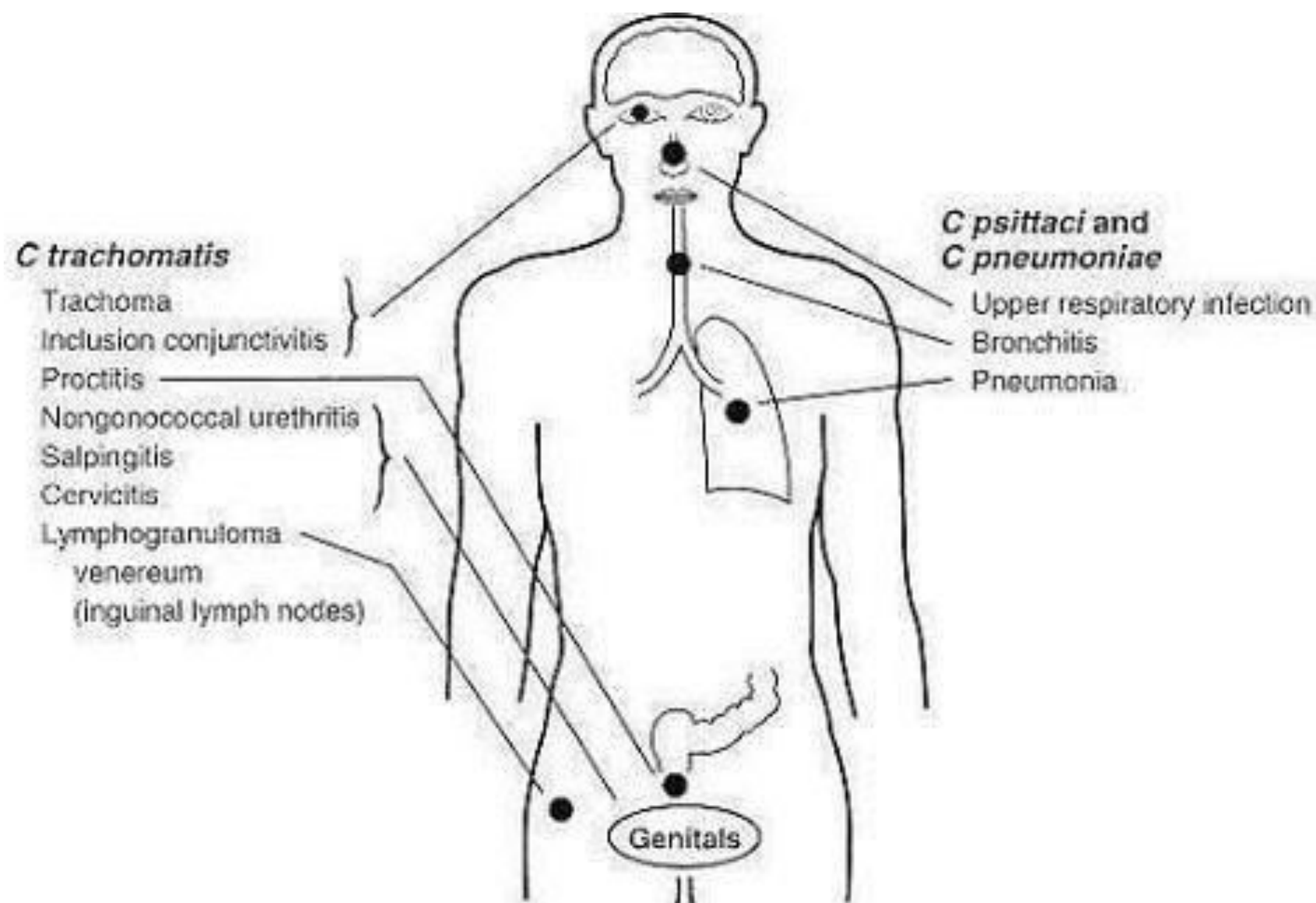
Chlamydia trachomatis

Chlamydia Trachomatis Bacteria



Overview

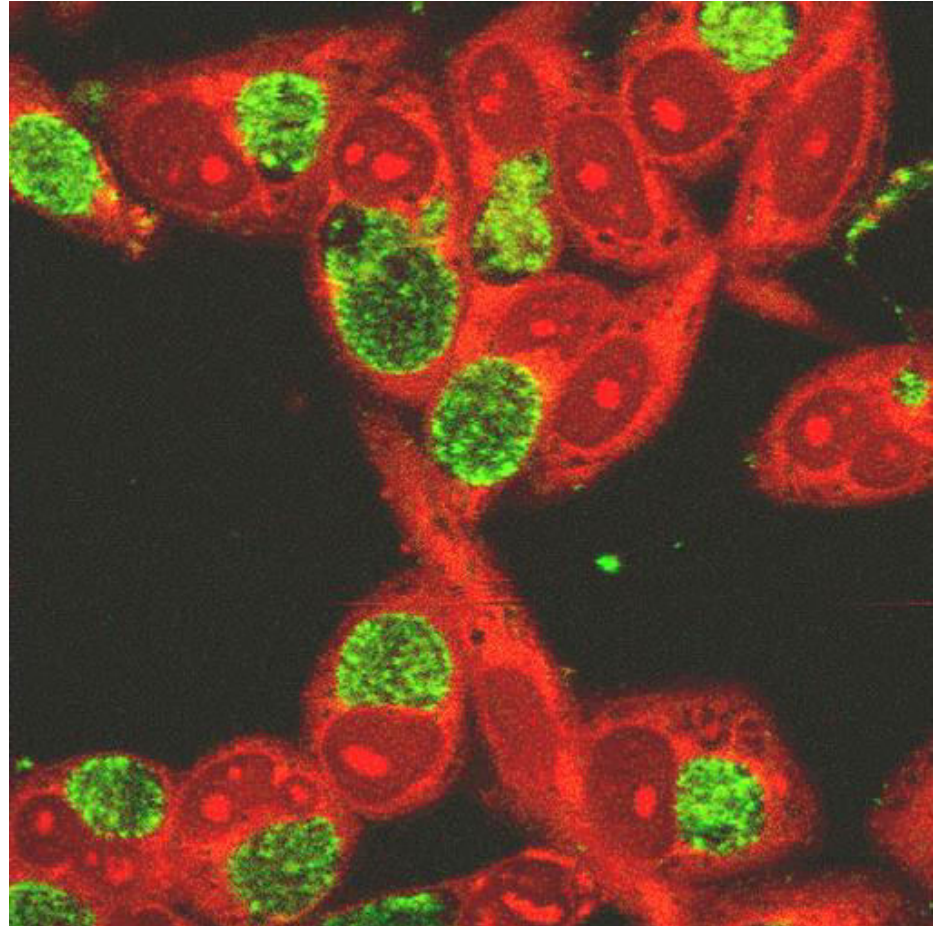
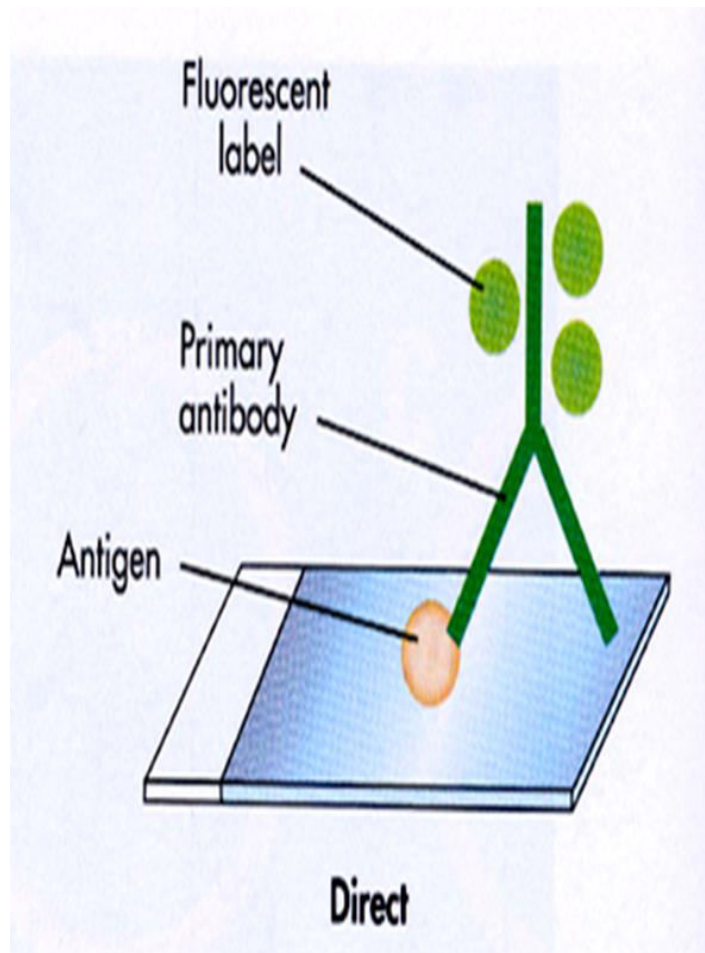
- Small obligate intracellular bacteria.
- Cannot produce its own ATP & NAD⁺.
- Human pathogens:
 - ✓ *Chlamydia trachomatis*.
 - ✓ *Chlamydophila psittaci*.
 - ✓ *Chlamydophila pneumoniae*.



Characteristics of *Chlamydiae trachomatis*

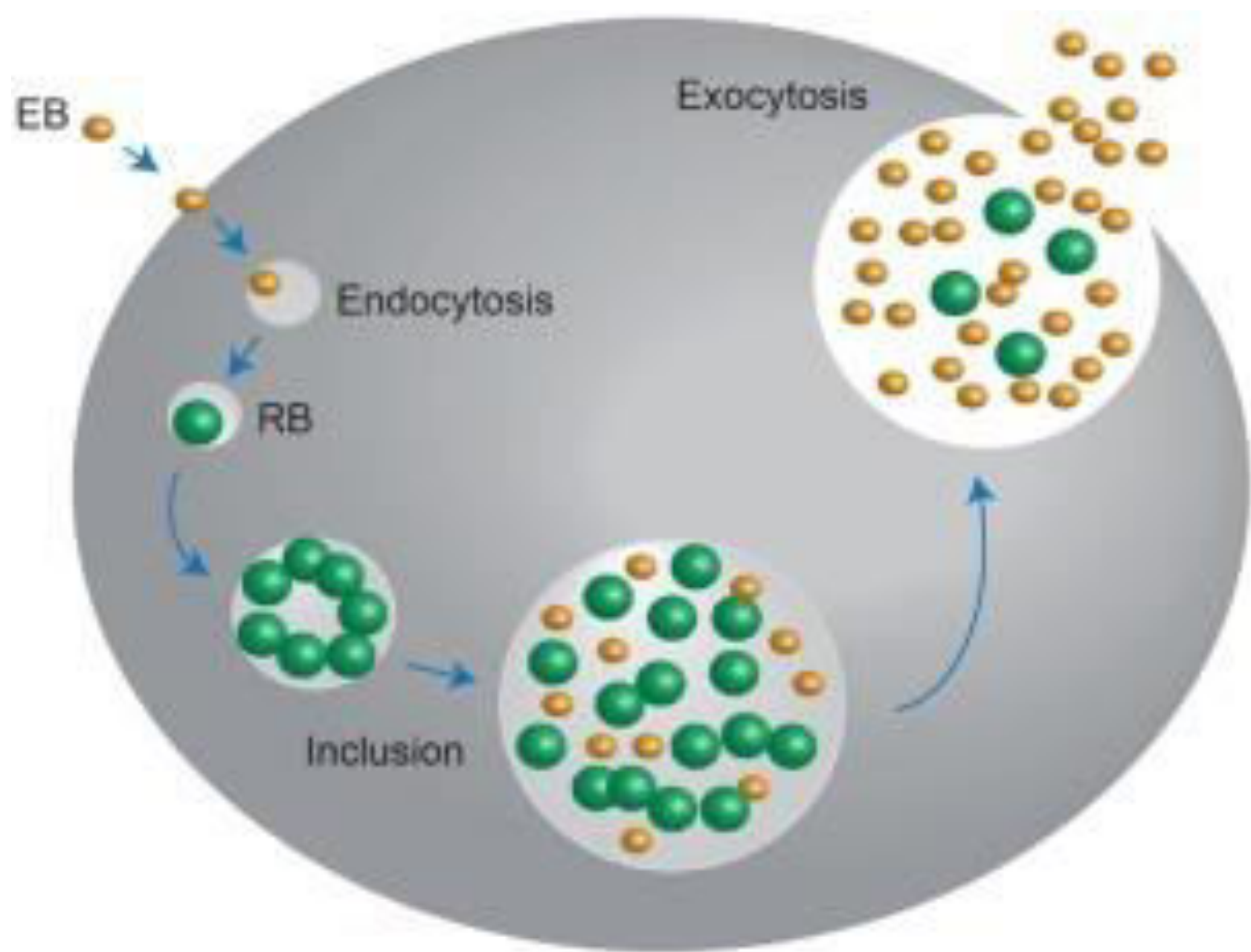
- Obligate intracellular (it depends on host cell for energy).
- Very small round to ovoid organisms.
- Cannot be seen by gram stain, need other stain.
- Direct immunofluorescence is very useful to visualize the chlamydia.
- Chlamydiae bacteria undergo a unique developmental cycle within eukaryotic cells and have 2 distinct morphological forms.
- It is a cause of trachoma in adults.
- Inner and outer membrane similar to those of gram negative rods.

Immunofluorescence Staining

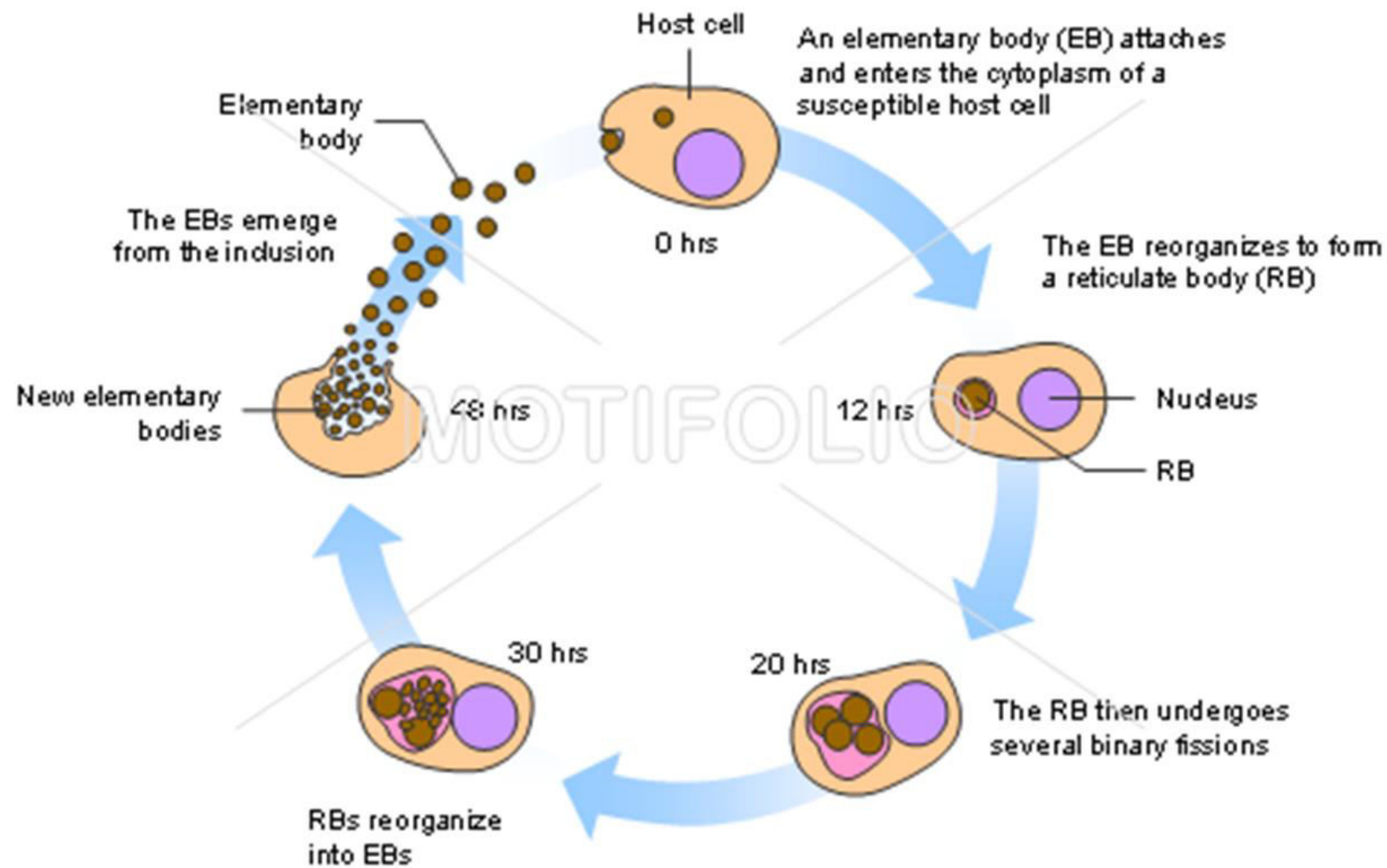


Chlamydia spp. Life Cycle

- Survive by replication inside host cell, which results in death of the cell.
- Chlamydiae occur in 2 forms :
 1. **Elementary body** – extracellular, infective form
 2. **Reticulate body** – intracellular, growing & replicative form
- Chlamydial microcolony within the host cell is called **Inclusion body**.
- Mature inclusion body contains 100 - 500 elementary bodies



The chlamydial life cycle



Transmission

- Highly transmissible.
- Sexual.
- Flies carrying the microorganism.
- Significant asymptomatic carriers exists in the population.
- Re-infection is common.
- Perinatal transmission results in neonatal conjunctivitis in 30%-50% of exposed babies.

The Life Cycle of Trachoma

INFECTING THE EYES

Flies carrying the micro-organism land on children's eyes, to feed on discharge.

FAMILY CONTACT

Women who take care of children also get the infection.

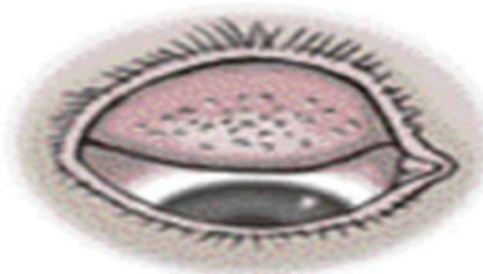
SPREADING OUT

Flies that breed in human feces spread the disease to others.

Dirty hands or face cloths also spread the disease.



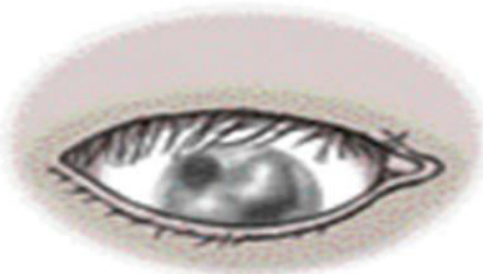
HOW TRACHOMA BLINDS



Infections inflame and thicken the upper eyelid.



Scarred eyelids turn inward.



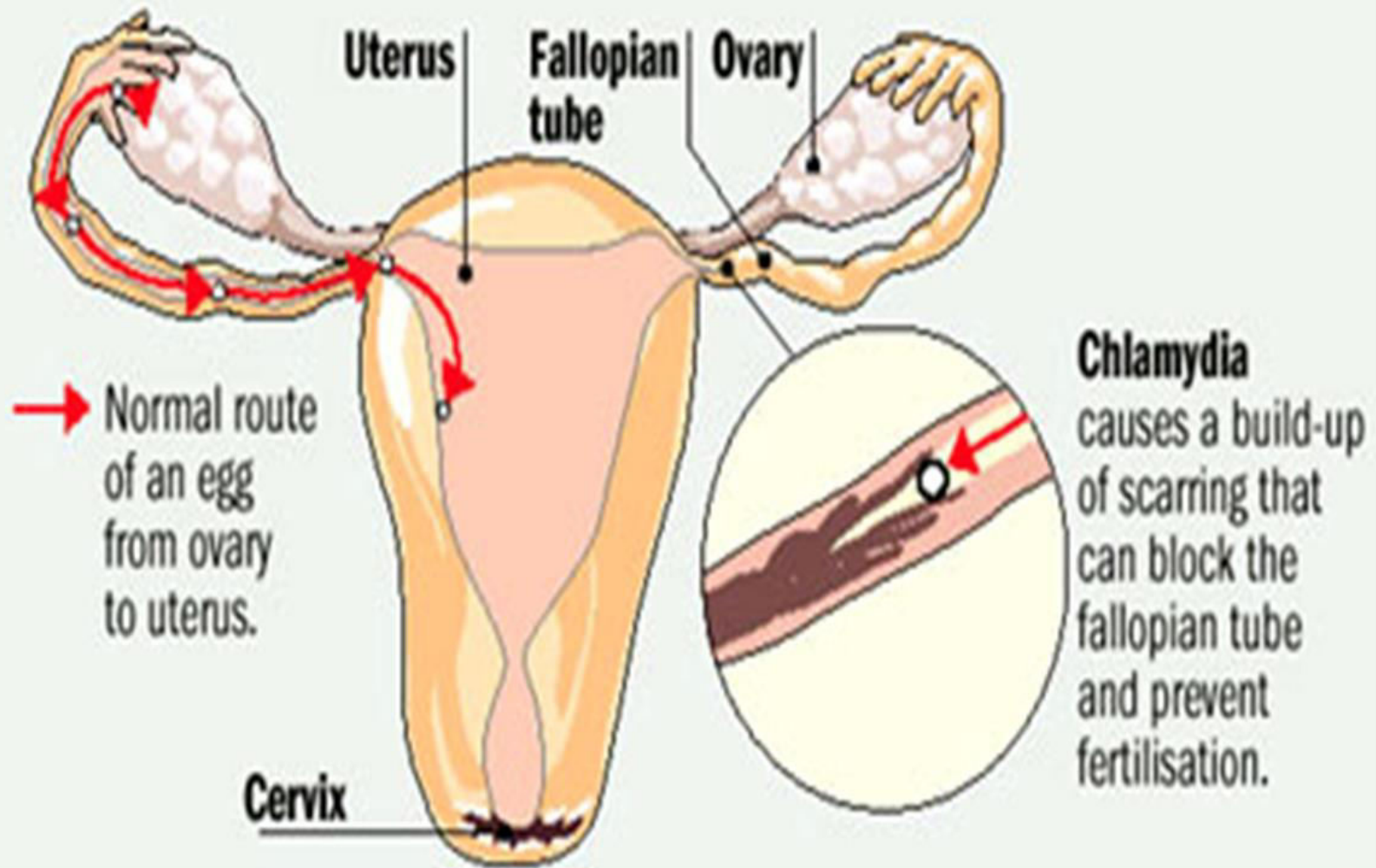
The lashes scratch the cornea, leading to blindness.

Clinical Significance

1. Trachoma.
2. Neonatal conjunctivitis.
3. Inclusion conjunctivitis in adults.
4. Nongonococcal urethritis:
 - ✓ Men → urethritis.
 - ✓ Women → cervicitis and /or urethritis.

Infection may ascend into upper reproductive tract.

CHLAMYDIA THE EFFECTS



Trachoma

- Trachoma is the leading cause of infectious blindness worldwide.
- While the disease usually clears up on its own, infections can scar the inside of an infected person's upper eyelid so that with repeated infections the lid turns inward causing the eye lashes to scratch the cornea, which can lead to blinding trachoma.

Distribution of trachoma, worldwide, 2009



The boundaries and names shown and the designations used on this map do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted lines on maps represent approximate border lines for which there may not yet be full agreement. © WHO 2010. All rights reserved

Data Source: World Health Organization
Map Production: Control of Neglected
Tropical Diseases (NTD)
World Health Organization



Neonatal Conjunctivitis

- 30%-50% of exposed babies.
- The most common presentation is inclusion conjunctivitis of the newborn.
- Usually heals after appropriate antimicrobial therapy.

Laboratory Diagnosis of *Chlamydia trachomatis*

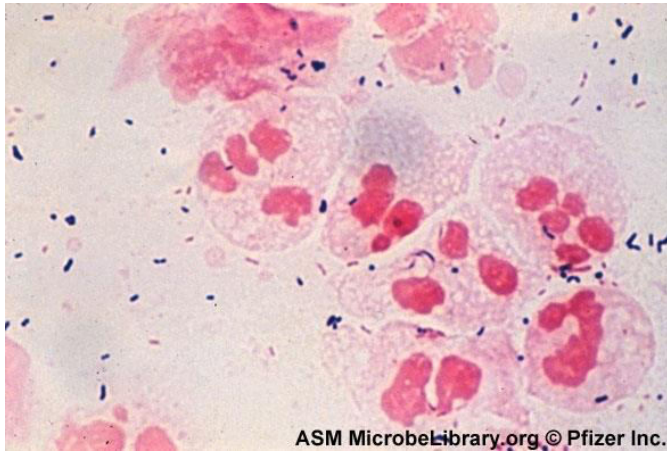
Four approaches available:

1. Direct microscopic demonstration of inclusion or elementary bodies.
2. Isolation of chlamydia → rare & time consuming (Yolk sac of 6 - 8 days or tissue culture).
3. **ELISA** – best for screening large number of specimens, detects chlamydial Ag
4. Molecular methods – **PCR**

Microscopy of *Chlamydia trachomatis*

- **Gram negative:** difficult to see, better use Giemsa
- **Giemsa Stain:** Elementary body & the Reticulate body stains blue in cytoplasm of infected cells
- **Immunofluorescence staining:** more sensitive & specific, by using monoclonal Abs. Identifies inclusion bodies as well as extracellular elementary bodies.

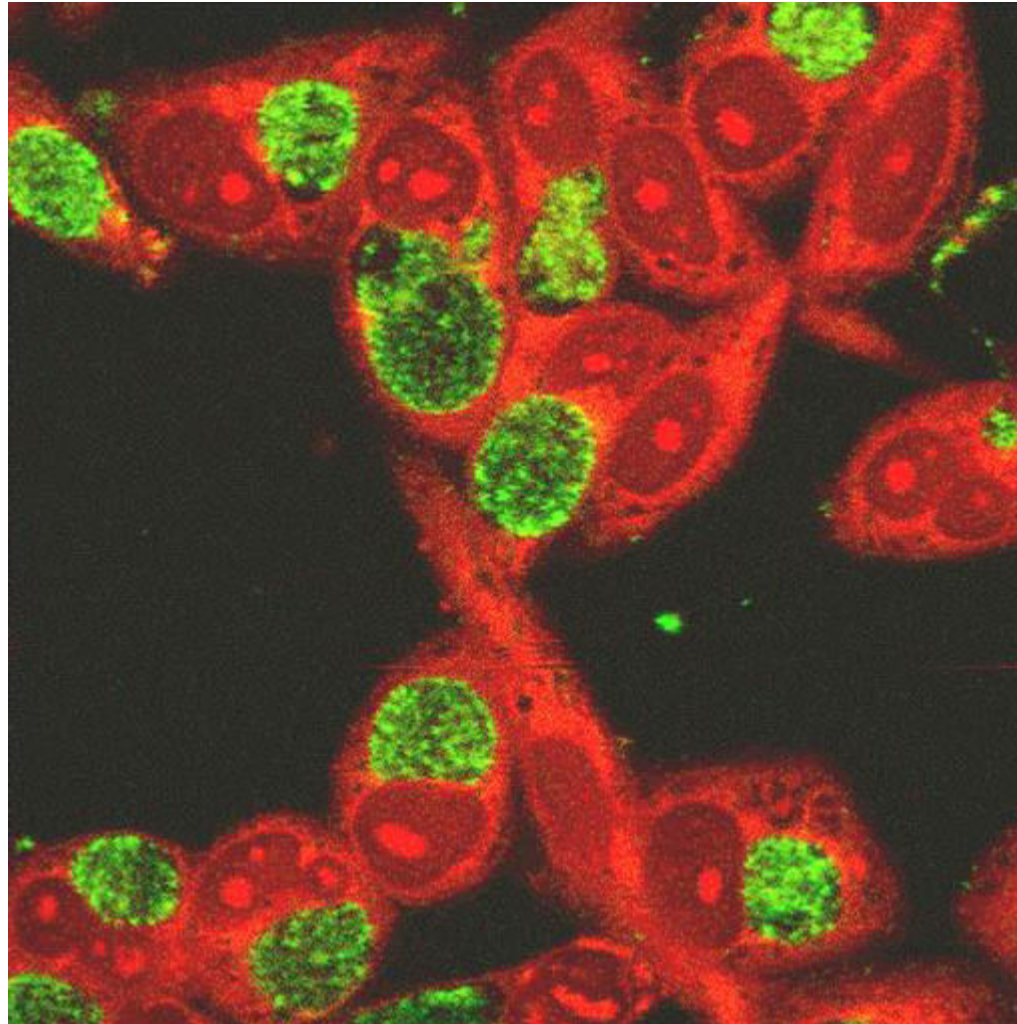
Gram stain



Giemsa stain



IF staining

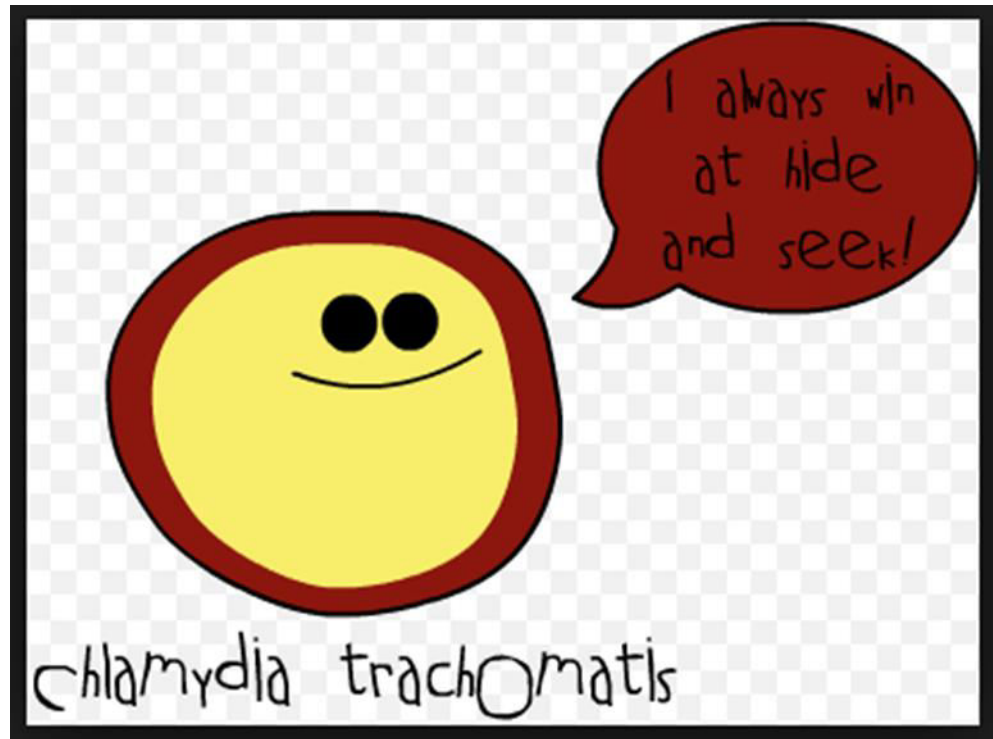


Treatment & Prevention

- Zithromycin and tetracycline usually used for treatment.

Prevention:

- Sexual protection, sexual education .
- Facial cleanliness is important in prevention of trachoma (*children with dirty faces are 2 to 3 times more likely to have trachoma*). Also general improvements in water supply for face washing and sanitation .
- Environmental changes is also important in preventing trachoma. Done by limiting number of flies, discouraging people from sleeping close to their livestock, and encouraging villagers to regularly collect and burn trash.
- Detection and treatment is the most effective mean of control



Treponema pallidum

Characteristics:

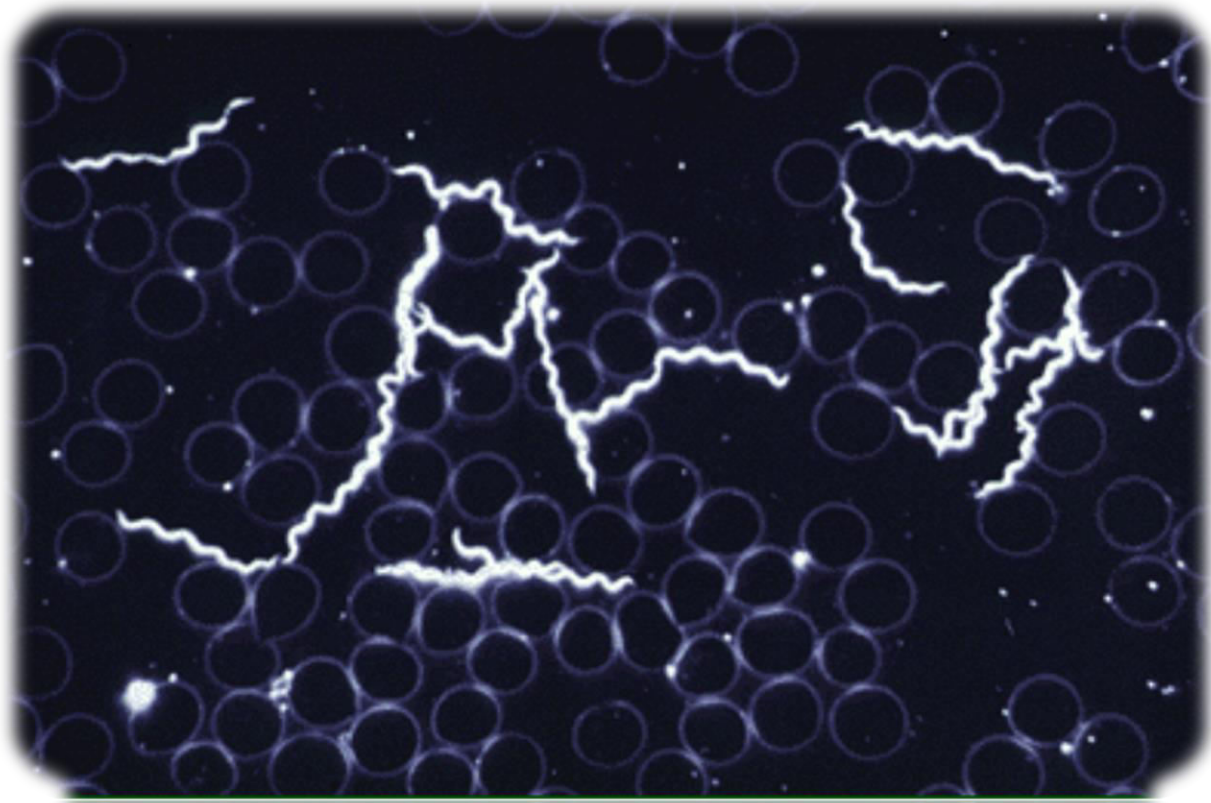
- Gram negative bacteria.
- Spiral in shape (spirochaetes).
- Extremely fastidious need living cell to grow.
- Very fragile and sensitive to disinfectants, heat, and drying.
- Can be seen on fresh primary or secondary lesions by dark field microscopy or fluorescent antibody techniques.
- Differ from other gram negative organism that it does not have LPS.
- It is the etiology of Syphilis.



Gram stain



Dark Field Microscopy



Immunofluorescence stain



Clinical Significance

1. Syphilis

- It is a sexually transmitted disease.
- Can be transmitted from pregnant mother to fetus (congenital syphilis).

2. Congenital Syphilis → transmitted through placenta

Stage of the Disease	Symptoms	Notes
Primary syphilis	Chancre: hard genital or oral ulcer at site of inoculation.	Not painful, it heals spontaneously. (asymptomatic period can last up to 24 weeks)
Secondary syphilis	Rash: may be accompanied by hepatitis, meningitis, or glomerulonephritis.	
Latent syphilis	No symptoms	<i>Treponema pallidum</i> is in latent stage It may last for 3 to 30 years
Tertiary syphilis	degeneration of nervous system and cardiovascular problems occur.	Approximately 40% of infected individuals disease will progress into tertiary stage.

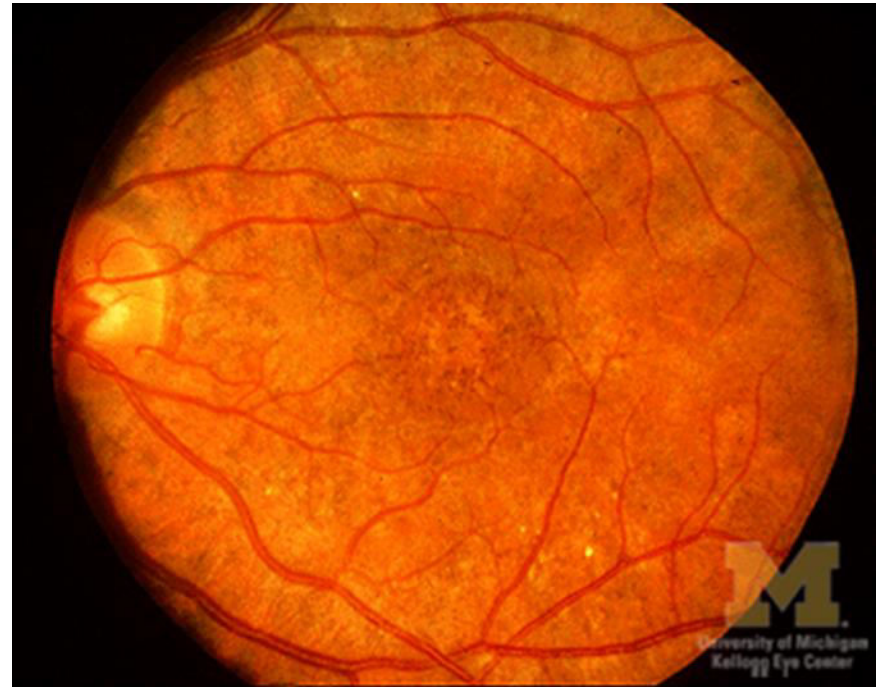
Ocular Syphilis

- ocular syphilis usually occur on 2nd and 3rd stage of the disease.
- Uveitis is the most common ocular symptom.
- The disease can affect both immunocompetent and immunocompromised individuals.

Ocular Syphilis

Congenital syphilis (in fetus):

Can cause retinitis that is marked with the presence of numerous black and white spots in the anterior retina (salt & pepper appearance)



Laboratory Diagnosis

- *T.pallidum* can be detected from lesion by immunofluorescent stain, but this is not routinely done.
- Infection is usually diagnosed by **serology**.

Treatment:

- ✓ Penicillin is curative for primary and secondary syphilis.
- ✓ Prevention is by safe sexual practice.

Serology for Diagnosis of Syphilis

- **Non-specific tests (non-treponemal tests)** for syphilis are the **VDRL** (*Venereal Disease Research Laboratory*) and **RPR** (*Rapid Plasma Reagin*) tests.
- The term non-specific is used because the antigens are not treponemal in origin, but are from extracts of normal mammalian tissues.
- Therefore, these tests are useful for screening.
- All positive results should therefore be confirmed by a **specific test**.

- These tests use treponemal antigens extracted from *T. pallidum*.
- Tests in common use include: enzyme-linked immunosorbent assays which detect IgM and IgG.

