Chlamydia

1- Obligate intracellular coccoid parasites of mammals and birds

2-contain DNA and RNA, and ribosomes

3-lack ATP, biosynthetic pathways

4-cell wall but peptidoglycan absent

5- use disulfide bonds

6-non motile

7-not transmitted by arthropods.

8-Multiply in the cytoplasm of the host cell. generally epithelial cells causing Basophilic inclusions

Similar to Viral Infections

1-The methods used to study Chlamydia are those of the virologist rather than the bacteriologist.

2-The clinical features, pathogenesis, pathology and epidemiology of chlamydial infections are similar to those of viral infections

Energy Parasites

1-The cells can synthesize DNA, RNA and protein.

2-No flavoproteins or cytochromes.

3-lack of ATP-generating ability

4-need to obtain ATP from the host cell

Why previously Chlamydia considered as viruses? ▪

Because its obligate -intracellular agent as these organisms require the biochemical resources of the eukaryotic host cell environment to fuel their replication because they are unable to produce metabolism for growth and high energy compounds such as ATP

Three species

1-*C. trachomatis*

2-*C. psittaci*

3-*C. pneumoniae*

Ecology

-Chlamydia form two main ecological groups.

1- Infect only humans named as Subgroup A includes

trachoma, inclusion conjunctivitis, and lymphogranuloma venereum

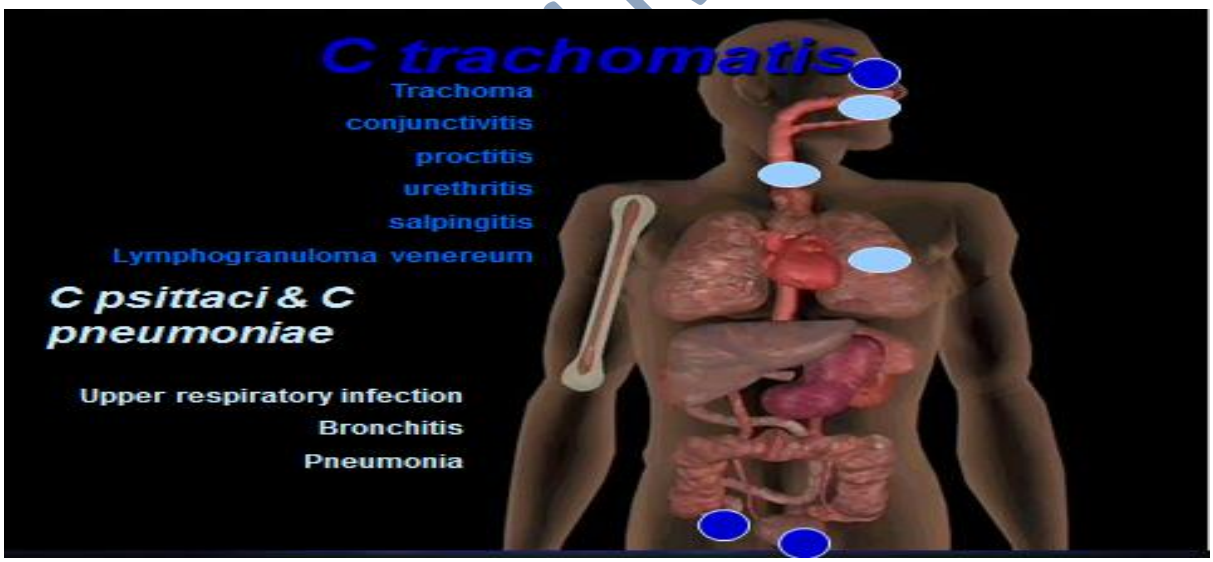
2-Zoonotic Infections named as Subgroup B which caused Respiratory tract infections

-transmitted to man

-About 100 species of birds are naturally infected with chlamydia.

- 71 species of parrots

-finches, pigeons, chickens, ducks, turkeys and seabirds.



Chlamydial Morphologies

1-Elementary body

-0.25 - 0.3 um diameter

-electron-dense nucleoid

-Released from ruptured infected cells. Human to human

& bird to human.

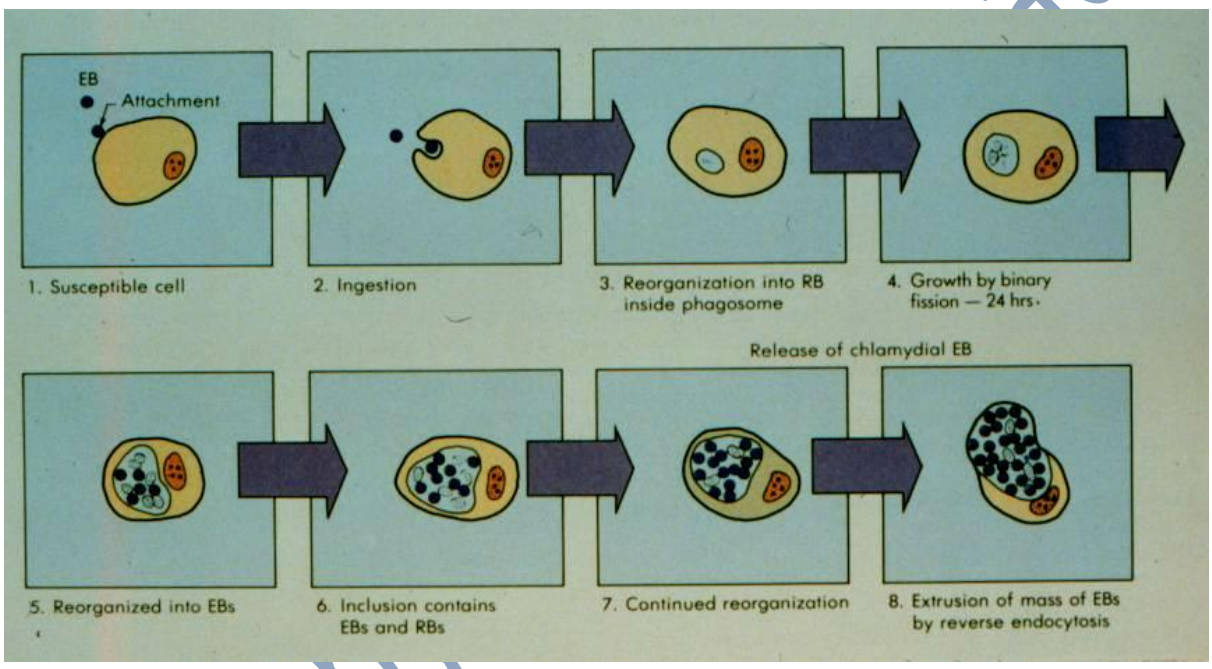
2-Reticulate Body

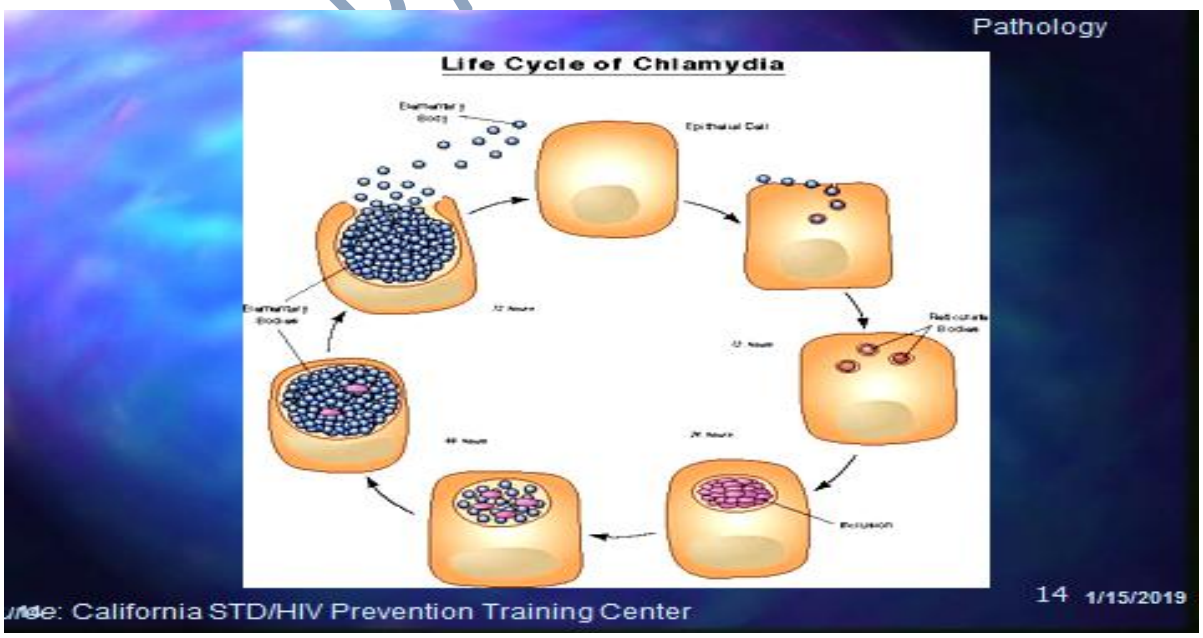
-Intracytoplasmic form 0.5 - 1.0 um

-Replication and growth. (Inclusion body)

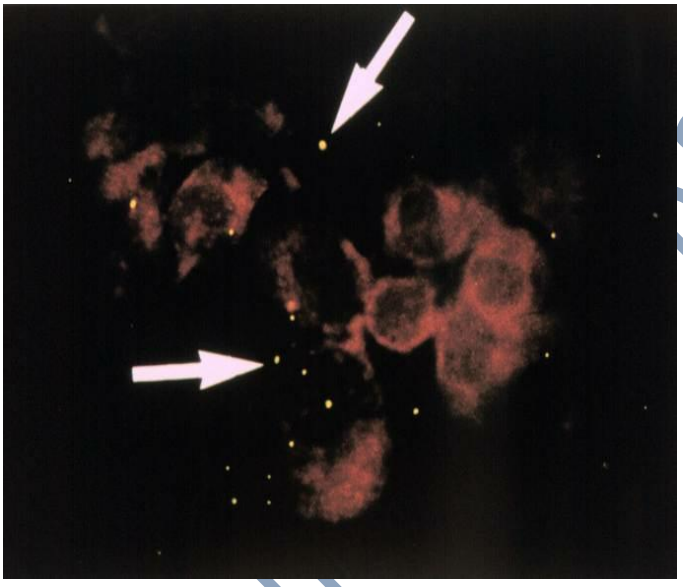
-without a dense center.

Developmental Cycle of Chlamydia

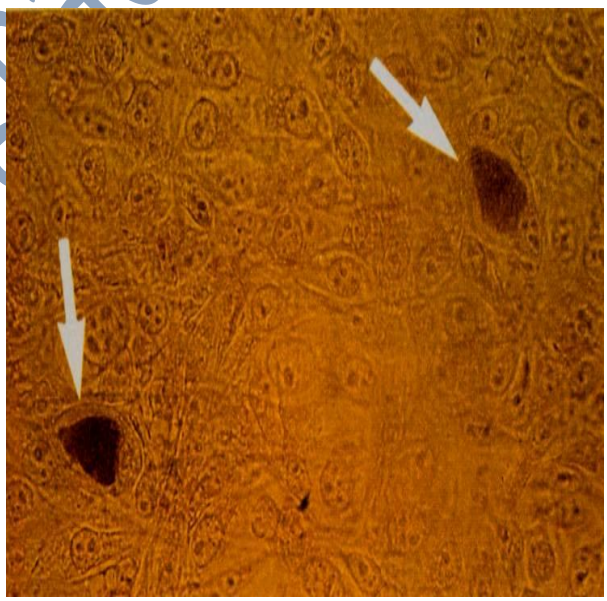




property	C.trochomatis	C.psittaci	C.pneumonia
Host range	human	Birds, lawer, mammal, human rare	human
Elementary body morphology	Round	Round	Pear-shaped
Inclusion morphology	Round ,vacuolar	Variable, dense	Round, dense
Glycogen containing inclusion	Yes	No	No
Plasmid DNA	Yes	Yes	No
Susceptibility to sulfonamide	Yes	No	No



C trachomatis elementary bodies



C trachomatis inclusions

Chlamydia trachomatis

Clinical disease

1-lymphogranuloma venereum

2-nongonococcal urethritis (NGU)

3-epididymitis

4-salpingitis

5-mucopurulent cervicitis

6-pelvic inflammatory disease (PID)

7-Reiter's syndrome

8-neonatal chlamydia

Chlamydia pneumoniae

-This bacterium was first recognized in 1983 as a respiratory pathogen, after isolation from a college student with pharyngitis.

-Pneumonia or bronchitis, gradual onset of cough with little or no fever. Less common presentations are pharyngitis, laryngitis, and sinusitis

Transmission

-Person-to-person transmission by respiratory secretions.

- Risk Groups

-All ages at risk but most common in school-age children. By age 20 years, 50% of population have evidence of past infection. Reinfection throughout life appears to be common

Chlamydia Diagnostics

Preferred •

Nucleic acid amplification tests (NAATs)

Acceptable in limited circumstances

Culture

Not recommended •

Non-amplification tests

Serology

A-Specimen collection and transport. أ-

-The microorganism can be recovered from infected cells of the urethra ,cervix ب- ,conjunctivae,nasopharynx,and from material aspirated from the fallopian tubes and epididymis.

-Urethral specimen should .
not be collected until 2hour
after the patient has voided

-swabs should be placed into the appropriate transport medium or onto a slide prepared for direct fluorescent AB.testing.

-Because Chlamydia are relatively labile ,viability can be maintained by keeping specimen cold and minimizing transport time to the lab.

-specimen should be refrigerated upon recipient if processing is delayed more than 24 hour it is refrigerated or frozen at -70.

Culture

-Isolate the organism from infected tissue.

-Inoculate the yolk sac of seven-day chick embryos

-Inoculate McCoy human cells.

-Characteristic cytoplasmic inclusion bodies in infected cells.

-Historically the "gold standard" •

-Variable sensitivity (50% – 80%) •

-High specificity •

-Use in legal investigations •

-Approved for use in all anatomical sites •

-Not suitable for widespread screening •

Non-Amplification Tests: Not Recommended •

-Less expensive than culture or NAATs, but sensitivity only 50 – 75%

-Direct fluorescent antibody (DFA)

-Detects intact bacteria with a fluorescent antibody

-Variety of specimen sites

-Enzyme immunoassay (EIA)

-Detects bacterial antigens with an enzyme-labeled antibody

-Nucleic acid hybridization (NA probe)

-Detects specific DNA or RNA sequences of *C. trachomatis* and *N. gonorrhoeae*

Serology

-Rarely used for uncomplicated infections

-Comparative data between types of serologic test are lacking

-Criteria used in LGV diagnosis

-Complement fixation titers >1:64 can support diagnosis of LGV in the appropriate clinical context.

Serologic test interpretation for LGV is not standardized

-Types of serological tests

1-Immunofluorecent tests

2-Delayed Type Skin Reaction

3-Antibodies to Family antigen

Immunofluorecent tests

1-Microimmunofluorescent tests

-patients with eye infections

-Check tears for the presence of anti-chlamydia antibody.

2-Direct immunofluorescence

-staining of conjunctival cells with fluorescein - conjugated monoclonal antibody is sensitive and specific.

-In neonatal conjunctivitis and early trachoma

FREI Test

-Delayed-type skin reaction to killed organisms in genitourinary infections

Antibodies to Family antigen

-Rising titer of antibody against the chlamydial family antigen in lung infections.

-Complement fixation test

-Fluorescent antibody test.