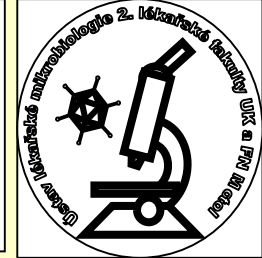


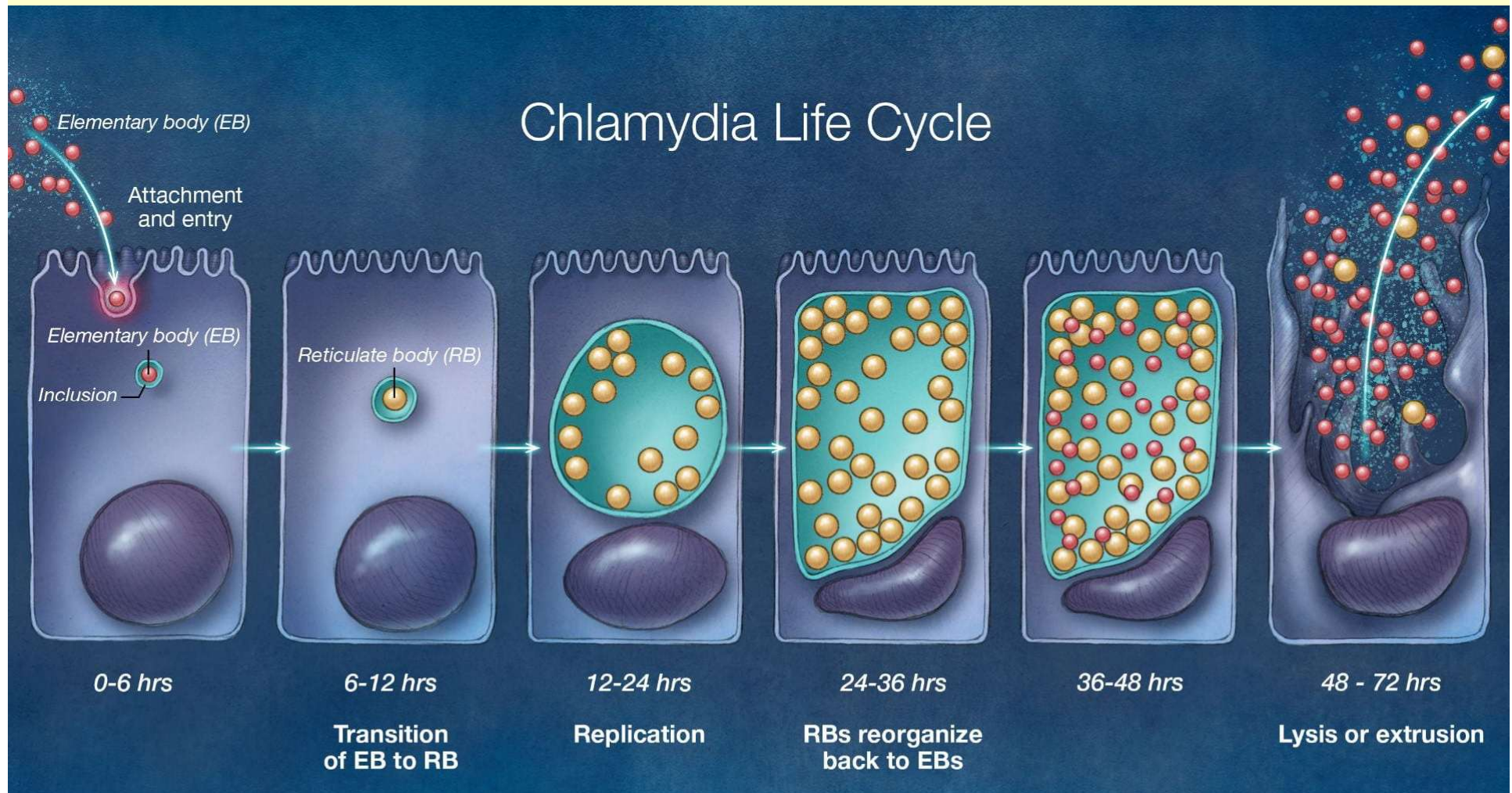


Chlamydia, Chlamydophila and Mycoplasma



Chlamydia – intracellular cycle

They cannot synthesize ATP – „energetic parasites“ – intracellular cycle



Consequence of the infection: lysis of the infected host cells

Eye and urogenital chlamydial infection

***lysis of the infected host cells**

***inflammation of the mucosal epithelium
manifests as:**

- **cervicitis** - inflammation of the cervical epithelium
- **urethritis** - inflammation of the urethral epithelium
- **conjunctivitis** - inflammation of the conjunctiva
- **(proctitis** - inflammation of the rectal mucosa)

Chlamydia – taxonomy and infections

genera – Chlamydia (*C. trachomatis*), Chlamydophila (*C. pneumoniae*, *C. psittaci*)

***C. trachomatis* – different serotypes – different diseases**

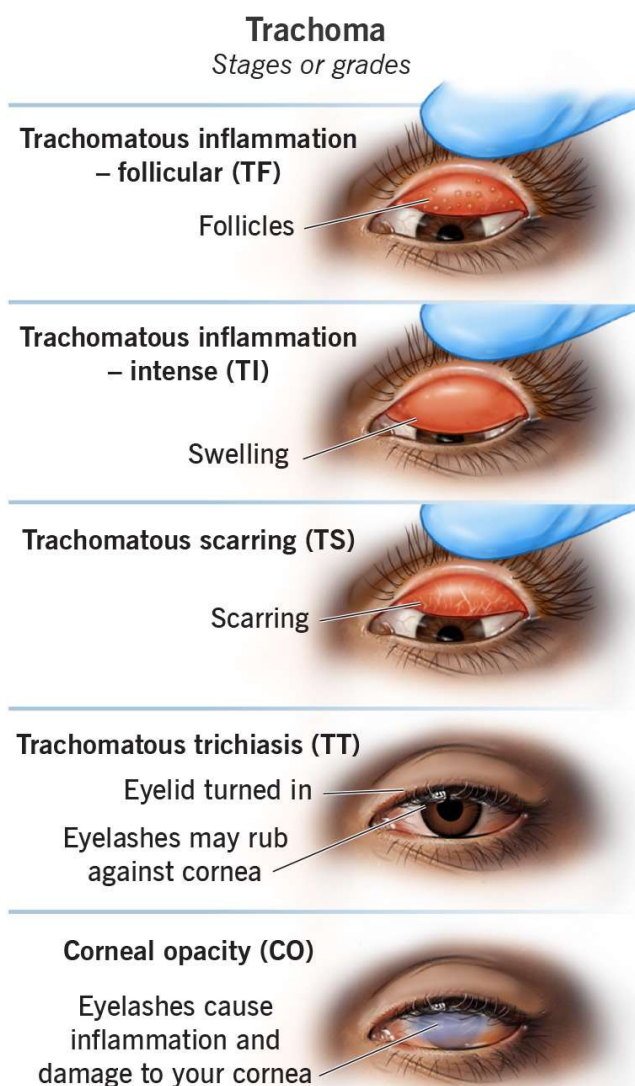
Trachoma (serotypes A-C): developing countries, transmission – directly and indirectly, chron. inflammation of cornea, blindness, transmission – contaminated water

Oculogenital chlamydiosis (serotypes D-K): most frequently STD (asymptomatic, urethritis, cervicitis, newborns – conjunctivitis, if spread – salpingitis=pelvic inflammatory diseases/PID, sterilitis, can lead to peritonitis)

Lymphogranuloma venereum (serotypes L1-L3): – STD, inguinal lymphadenitis, hemorrhagic ulcerative proctitis

Chlamydia – taxonomy and infections

Trachoma
(serotypes A-C):
developing
countries,
transmission –
directly and
indirectly, chron.
inflammation of
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Trachoma

Esmael Habtamu, PhD ^{a,b,c} · Emma M Harding-Esch, PhD ^a · Katie Greenland, PhD ^d · Teyil Wamyil-Mshelia, MSc ^e · Sandra L Talero, MPH ^f · Sailesh Kumar Mishra, PhD ^g · et al. [Show more](#)

Oculogenital chlamydiosis (serotypes D-K)

***most frequently STD** (asymptomatic, urethritis, cervicitis, newborns – conjunctivitis, women - if spread: salpingitis, sterilitis)



Conjunctivitis

Adult inclusion conjunctivitis (paratrachoma)

Neonatal chlamydia conjunctivitis
(10% also pneumonia)



Cervicitis

women

Salpingitis, PID (serotypes D-K)

BACKGROUND

- * INFLAMMATION of **FALLOPIAN TUBES**
 - ~ PELVIC INFLAMMATORY DISEASE (PID)

COMPLICATIONS

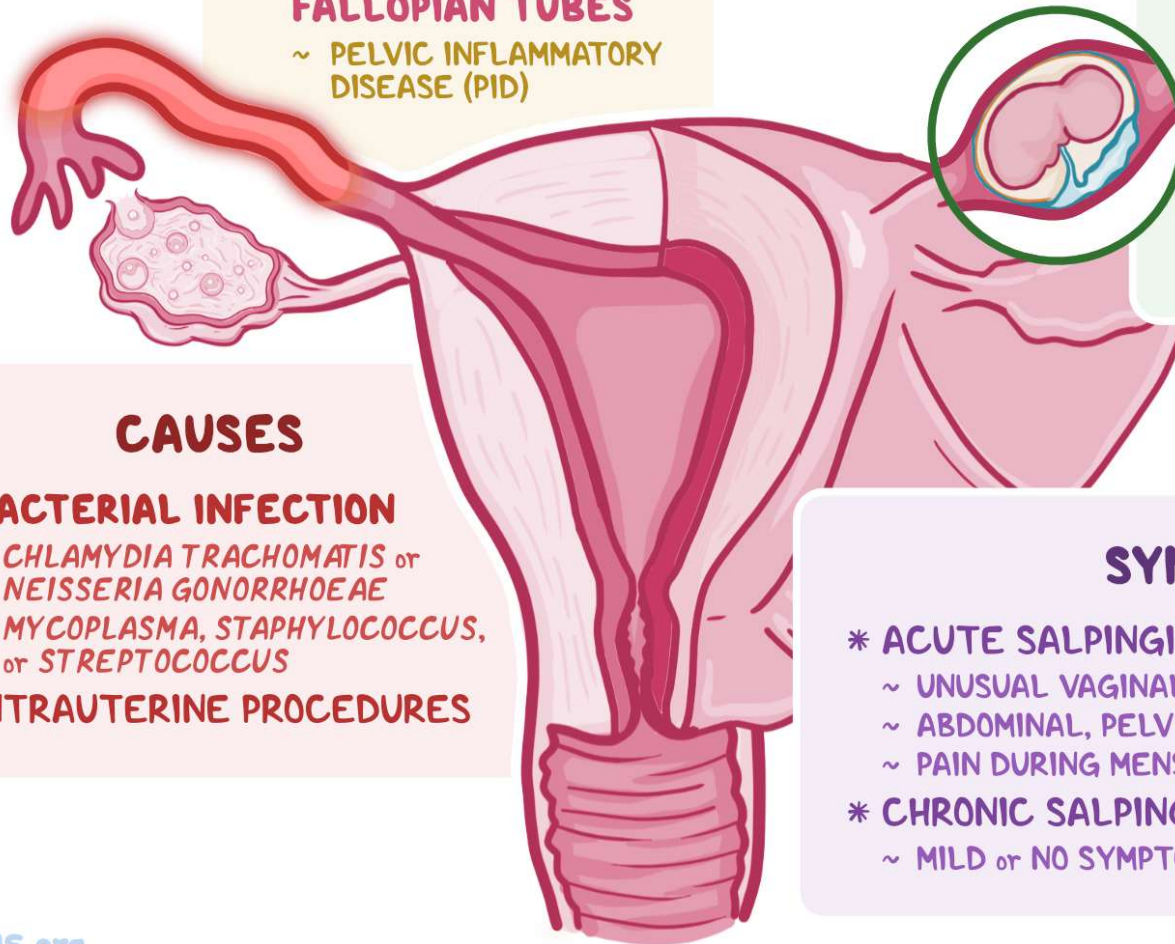
- * TUBAL SCARRING
- * ADHESIONS
- * BLOCKAGES
 - ↓
- * **ECTOPIC PREGNANCY**
- * INFERTILITY

CAUSES

- * **BACTERIAL INFECTION**
 - ~ *CHLAMYDIA TRACHOMATIS* or *NEISSERIA GONORRHOEAE*
 - ~ *MYCOPLASMA*, *STAPHYLOCOCCUS*, or *STREPTOCOCCUS*
- * **INTRAUTERINE PROCEDURES**

SYMPTOMS

- * **ACUTE SALPINGITIS**
 - ~ UNUSUAL VAGINAL DISCHARGE
 - ~ ABDOMINAL, PELVIC, or LOWER BACK PAIN
 - ~ PAIN DURING MENSTRUATION, OVULATION, or SEX
- * **CHRONIC SALPINGITIS**
 - ~ MILD or NO SYMPTOMS



LGV

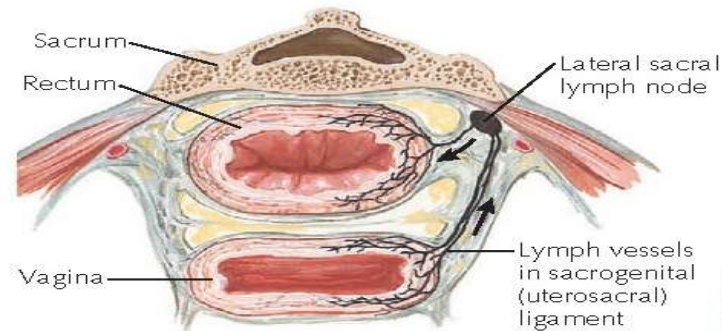
(serotypes
L1-L3)

Plate 6-18

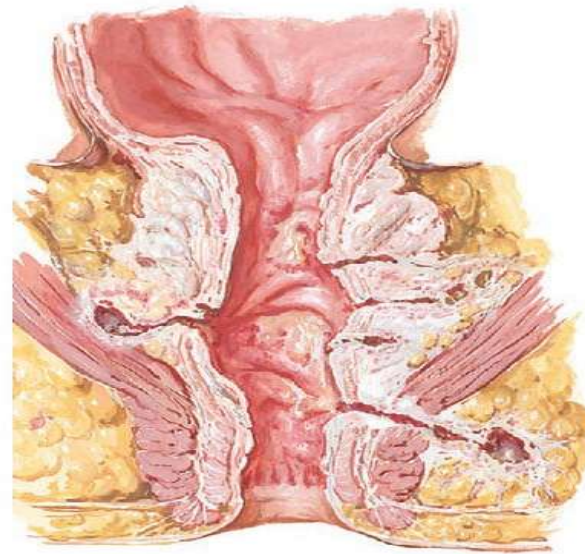


Lymphogranuloma venereum causing chronic lymphedema (*left*) and inguinal adenopathy (*right*)

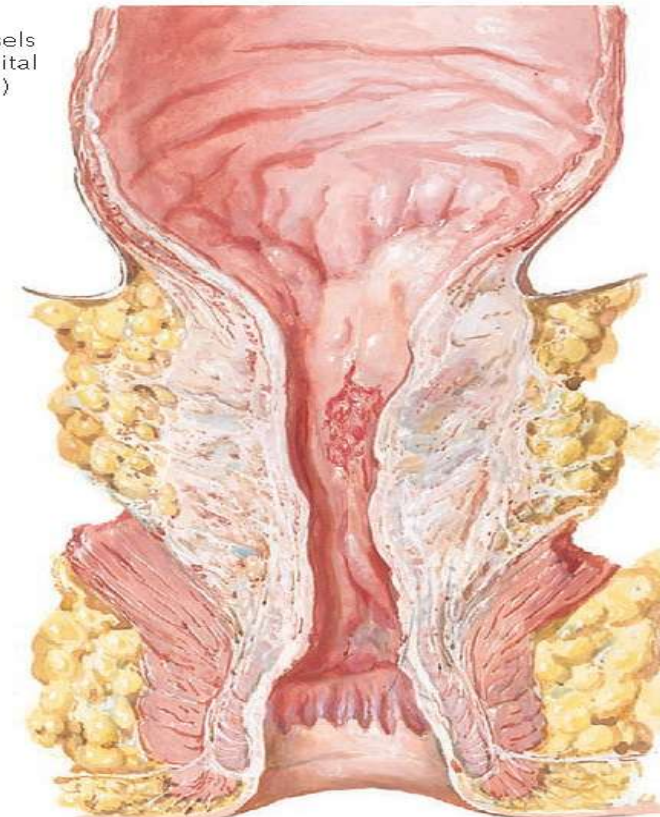
Groove sign seen in a male patient with lymphogranuloma venereum caused by massive adenopathy on either side of Poupart ligament



Pathway of spread of lymphogranuloma (lymphopathia) venereum from upper vagina and/or cervix uteri to rectum via lymph vessels



Stricture of rectum with multiple blind sinuses; strictures cause chronic pain and are a significant source of morbidity



Long tubular stricture of rectum

LGV (serotypes L1-L3)

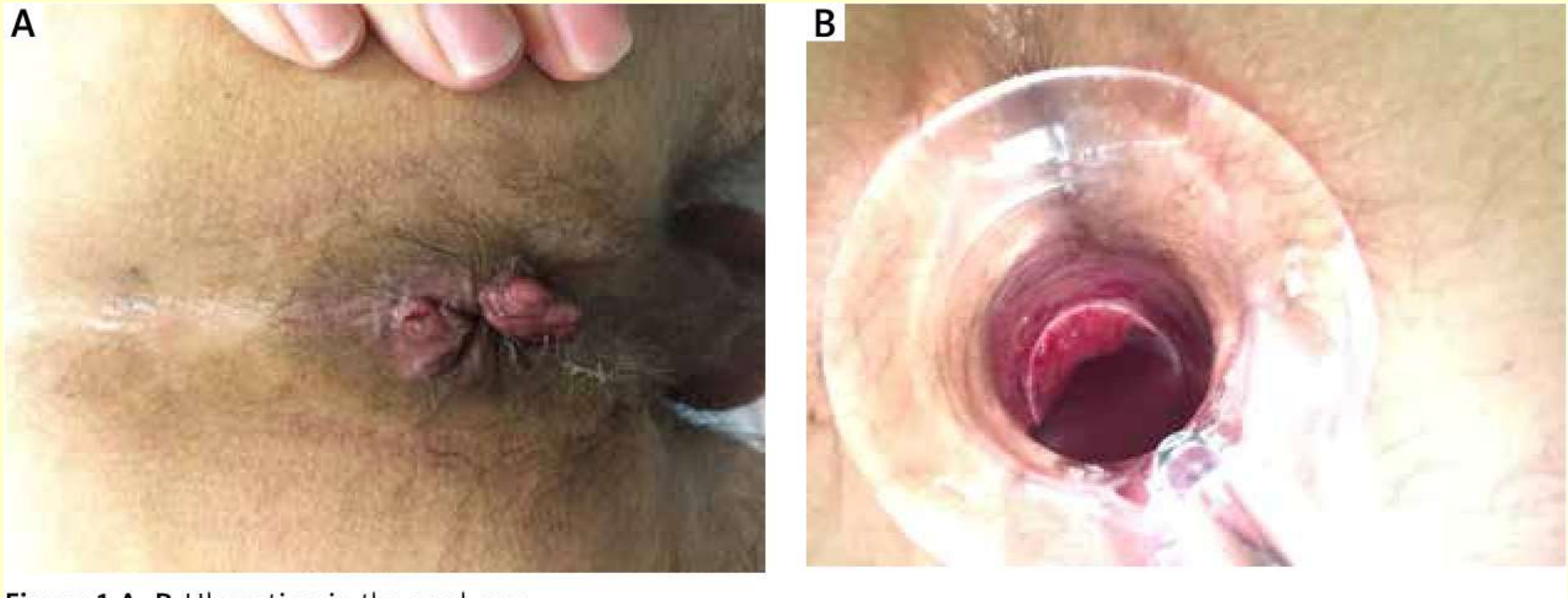


Figure 1 A B Ulceration in the anal area

Ulceration in the anal area (file:///C:/Users/user/Downloads/PDIA_Art_42602-10.pdf)



Lymphadenitis of femoral lymph nodes

(<https://www.google.com/search?q=ulcerated+lymph+nodes+Lymphogranuloma+venereum&tbnid>)

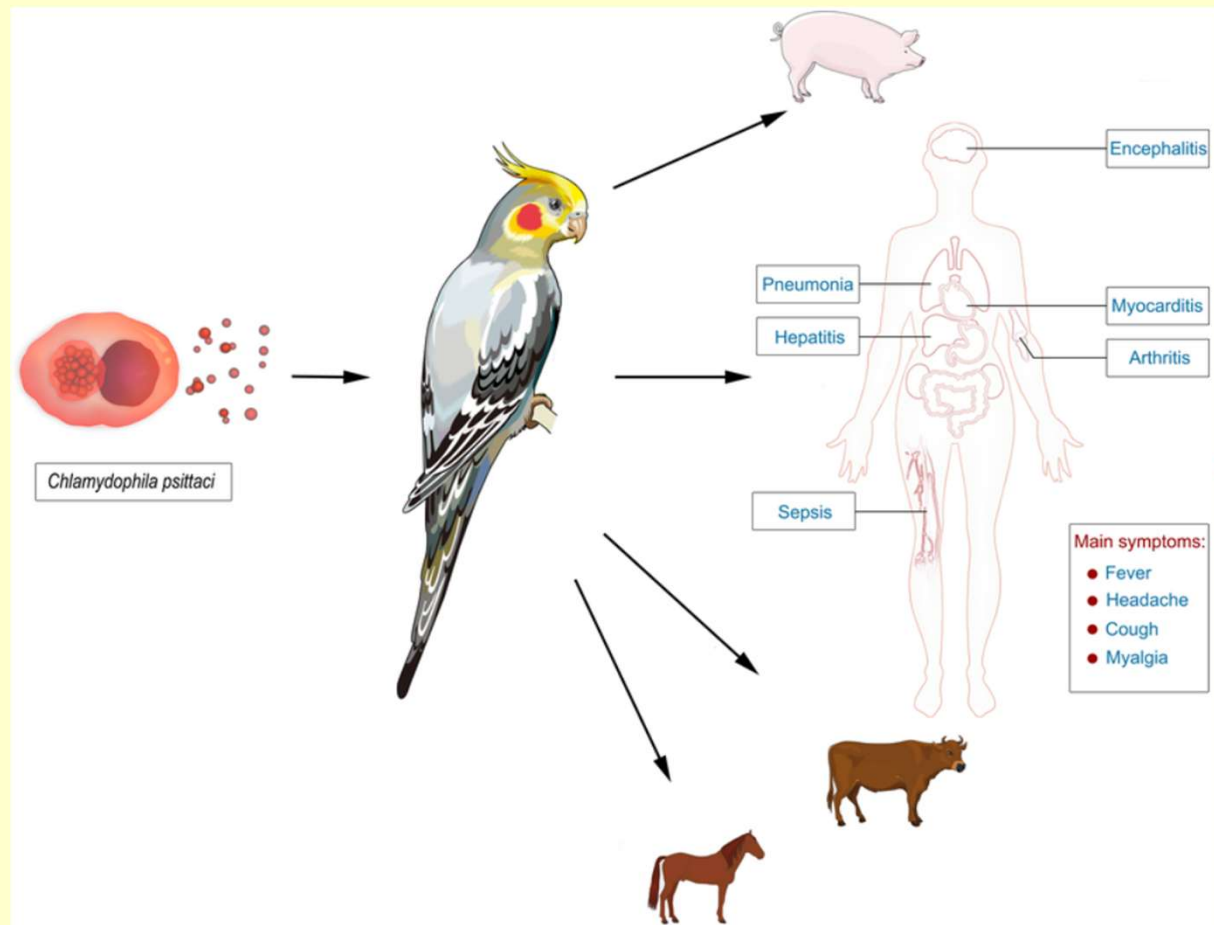
Chlamydial infections: diagnosis and treatment

- **Nucleic Acid Amplification Tests (NAATs, Nucleic Acid Amplification Tests – PCR, LAMP - Loop-Mediated Isothermal Amplification, Cartige based system – e.g. point of care tests e.g. GeneXpert).**: The gold standard for detecting *C. trachomatis* DNA from **conjunctival swabs** due to its exceptionally high sensitivity and specificity.
- **Direct Immunofluorescence (DFA) / Giemsa Staining:** Older cytology methods used to identify chlamydial inclusion bodies or antigens under a microscope, though less sensitive than NAATs
- **Treatment (surgery and antibiotics): tetracycline, azitromycin**

Chlamydophila - pneumoniae (*C.psittaci*, *C.pneumoniae*)

***C. psittaci* pneumonia (zoonosis) – source – birds**

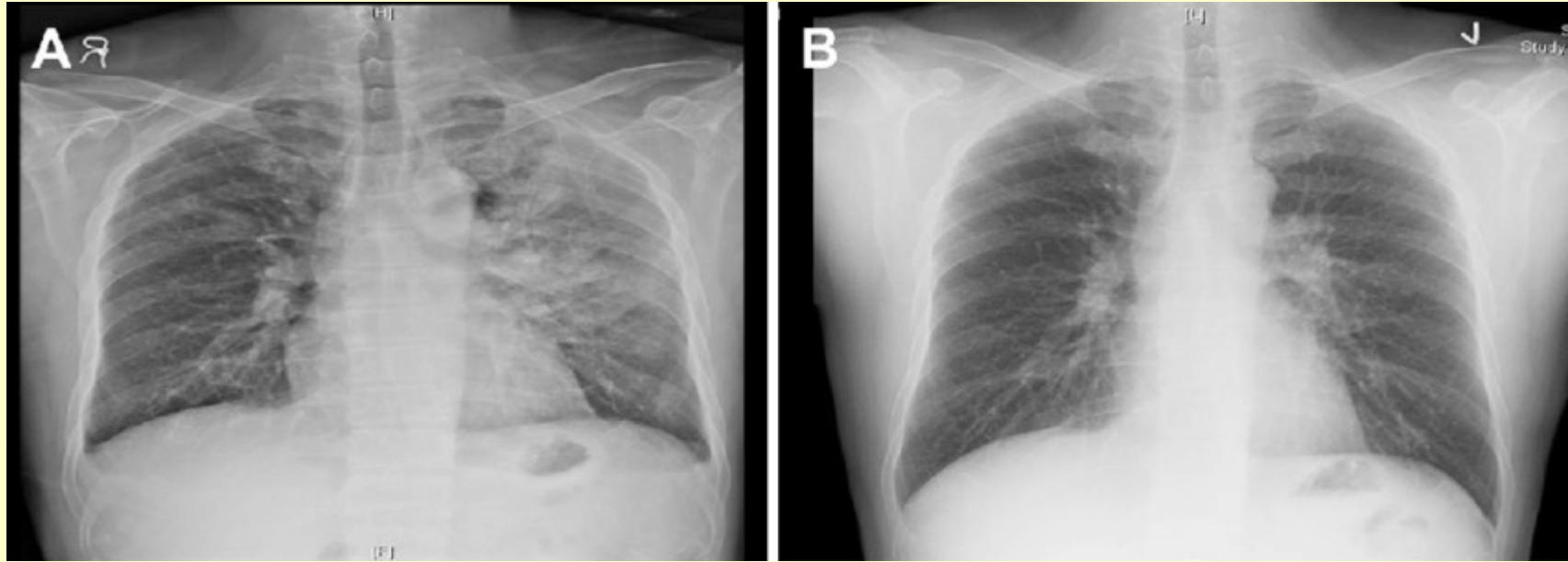
Atypical pneumonia – can be serious, fever, dry cough, head and joint pain, complication – peri-, endo-, myocarditis



Clinical course and symptoms

- **Onset:** Sudden onset of high fever (often $\geq 39^{\circ}\text{C}$), chills, severe fatigue, and myalgia (muscle soreness).
- **Respiratory signs:** Dry or productive cough with sputum, shortness of breath, and chest pain.
- **Extra-pulmonary signs:** Frequently includes digestive symptoms (diarrhea, abdominal pain, poor appetite) and neurological signs (headache, dizziness).
- **Severe progression:** Can rapidly deteriorate into severe community-acquired pneumonia (SCAP) requiring oxygen therapy or mechanical ventilation.

Chlamydophila psittaci pneumonia



Chest X-ray taken (A) on Day 12 shows abnormalities with infiltration and patchy lesion on the left upper lung and (B) on Day 24 reveals improvement after minocycline treatment (<http://dx.doi.org/10.1016/j.jfma.2012.08.017>)

Severe pneumonia – could be deadly (mortality rate is approximately **5%** among **hospitalized** patients, but it drops to **less than 1%** with timely and appropriate antibiotic treatment.

Pneumonia caused by *Chlamydophila pneumoniae*

Is a common type of **atypical community-acquired** lung infection spread through respiratory droplets

Symptoms

Gradual onset of a prolonged, worsening cough lasting weeks or months, low-grade fever, headache, and fatigue, sore throat, hoarseness, and nasal congestion (upper respiratory signs before lower tract involvement). Mostly **mild or self-limiting illness** (could be also severe systemic symptoms), though persistent malaise can linger

Diagnosis

Chest X-ray, Molecular testing owing small infiltrates or signs of mild **atypical pneumonia** – PCR from nasopharyngeal or throat swabs

Serology to look for IgM and IgG antibody titers, though single tests have limited value due to high baseline adult exposure.

***C. psittaci* and *C. pneumoniae* Diagnosis**

- **Exposure history:** A crucial clue is a history of contact with poultry, parrots, or other birds.
- **Molecular testing:** Definitive identification relies on DNA based method: 16S rRNA PCR of **sputum** or **bronchoalveolar lavage** (BAL).
- **Serology** – detection of IgM and IgG specific antibodies
- **Standard treatment response:** Prompt administration of doxycycline or respiratory quinolones (like moxifloxacin) typically results in fever resolution within 3 to 5 days and a favorable prognosis.

Mycoplasma infections

genera – Mycoplasma and Ureoplasma

Small organisms (up to 250 nm), smallest genome – fastidious, cultivation is not relevant for diagnosis

Cell wall free organisms – inactive cell wall active antibiotics

Epidemiology – *M. pneumoniae* – most frequent – children and young adults, spread- secretion of upper resp.tract, *M. hominis*, *Ureoplasma genitalium*, *U. urealyticum* – urogenital infections in sexually active individuals

Pathogenesis – host cell is essential, epicellular adherence and using nutrients, peroxides and superoxides – harm affected tissue

Mycoplasma

Symptoms

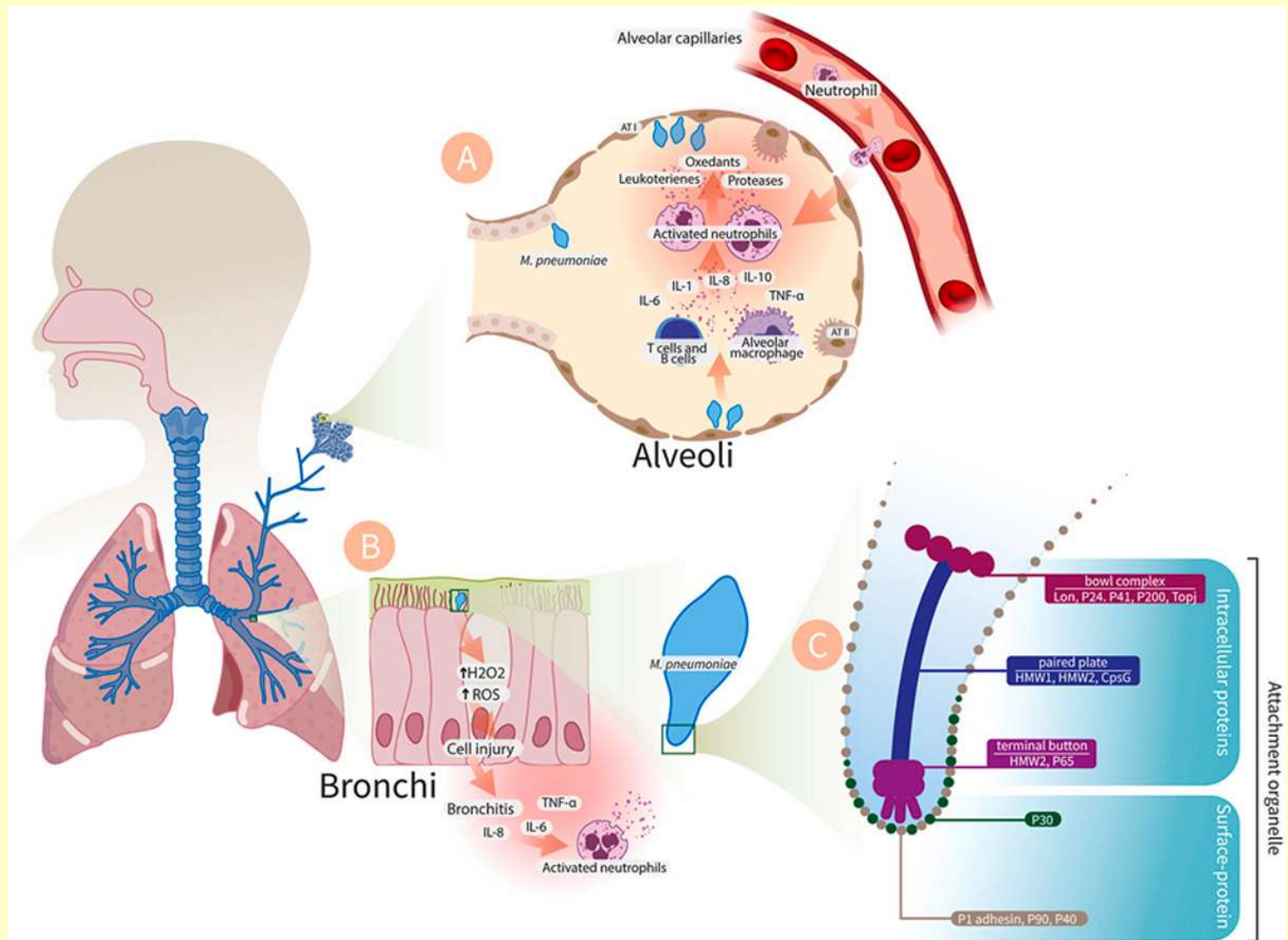
***M. pneumoniae* infections** – incubation period around 21d, usually mild, infection of upper resp.tract, cca 10% **atypical pneumonia** – without alteration of total status (polymorbid patients – serious course), complication – peri- a myocarditis, meningoencephalitis

M. hominis*, *M. genitalium* and *Ureoplasma ureolyticum infections – urethritis, cervicitis, PID. Rarely can cause conjunctivitis.

Diagnosis – *M. pneumoniae* – undirect detection/serology – most frequently – **IgA, IgM, IgG** (also CFR), **direct detection** – **deep nasopharyngeal swab**, sputum, BAL – PCR, **dif.dg** – chlamydiosis, Q fever, legionellosis, ***M. hominis*, *M. genitalium* a *Ureoplasma*** – **direct detection** – **uretral swab, cervix**, dif. dg – *Neisseria gonorrhoeae*, *Trichomonas vaginalis*

Therapy – betalactam antibiotics not effective, **macrolides, tetracyclines** (fluoroquinolones)

Pathogenesis pneumonia



A: The entry of *Mycoplasma pneumoniae* into the alveolar space as a pathogen causes the **activation of inflammatory reactions** by immune cells, at the head of which are the alveolar macrophages. Macrophages cause the **call of neutrophils** and their migration from the alveolar capillaries by **producing and releasing cytokines**. Activated neutrophils in the alveolar space release **leukotrienes, proteases and oxidants** which increase **tissue damage** and **alveolar edema**.

B: The **adhesion** of *Mycoplasma pneumoniae* to **bronchial cells** can cause **oxidative stress** and increase **cell damage** and cell death through the production of oxidants like H₂O₂, which can lead to **bronchitis**. **C:** The structure of attachment organelle of *Mycoplasma pneumoniae* which help this pathogen to **attach and invade the respiratory epithelial** cell is consisted of two group of surface-proteins and intracellular-protein (<https://www.sciencedirect.com/science/article/abs/pii/S088240102400411X>).