



# **INFECTIONS OF THE EYE**

- The outer surface of the eye is exposed to the external world and is therefore open to contact with infective organisms.

- The conjunctiva is particularly susceptible. Not only is it a vulnerable epithelial surface, but it is covered by the eyelids, which create a warm, moist, enclosed environment in which contaminating organisms may quickly establish and set up a focus of infection.

- The eyelids and tears, also serve to protect the external surfaces of the eye, both mechanically and biologically; any interference with their function increases the chances that pathogens may become established.

- The conjunctiva can be invaded by other routes, such as the blood or nervous systems and the deeper tissues of the eye can also be invaded from within, particularly by protozoa and worm parasites.

- Eyelid infections are generally due to *Staphylococcus aureus*, with involvement of lid margins (blepharitis) or eyelid glands and follicles (stye, hordeoluni).

# Microbial infections of the conjunctiva

Organism	Comments
Adenovirus	Especially types 3,7,8,19
Measles virus	Infection of conjunctiva via blood
Herpes simplex virus	Virus reactivating in ophtalmic division of trigeminal ganglia causes corneal lesion (dendritic ulcer)
Varicella-zoster virus	May involve conjunctiva
Enterovirus 70 Coxsackie virus A 24	Acute haemorrhagic conjunctivitis
<i>Chlamydia trachomatis</i> (types A-C) (Types D-K)	Cause of trachoma and commonly blindness Cause of trachoma, inclusionn conjunctivitis, infections via fingers, etc. in new-bornes, via birth canal
<i>Neisseria gonorrhoeae</i>	Infection of newborn via birth canal
<i>S.aureus</i>	Cause of eyelid infection (styes) and sticky eye in neonates



# **CONJUNCTIVITIS**

# **Aetiology and pathogenesis**

- To establish infection on the conjunctiva, microorganisms must avoid being rinsed and wiped away in tears.
- The best way of achieving this is to have a specific mechanism of attachment to conjunctival cells.

# ***Chlamydia***

- have surface molecules that bind specifically to receptors on host cells. This is one of the reasons that, of all the organisms which infect the conjunctiva, they are among the most successful.
- There are at least **fifteen different serotypes of *Chlamydia* responsible for inclusion conjunctivitis, and also for trachoma the most important eye infection in the world.**
- **Transmission of *Chlamydia trachomatis* is by contact with contaminated flies, fingers, towels, etc.** Trachoma itself is the result of chronic repeated infections, especially prevalent when there is poor access to water, preventing regular washing of hands and face.

- Under these circumstances spread of chlamydia from one conjunctiva to another is frequent, and can be referred to as 'ocular promiscuity', comparable with the spread of genital secretions in non-specific urethritis.

- Some chlamydia serotypes can infect the urogenital tract as well as the conjunctiva and the conjunctiva or lungs of a newborn infant may become infected after passage do" an infected birth.

- Systemic treatment with erythromycin** is generally needed.

# Diagnosis, treatment and prevention.

- Laboratory diagnosis of chlamydial infections can be carried out using conjunctival fluid or scrapings.
- Because infection and reinfection is facilitated by overcrowding, shortage of water and abundant fly population, the disease can be presented by **improvements in standards of hygiene.**
- In spite of many decades of research there are still no vaccine for chlamydial infections. This is partly because immunopathology itself makes a major contribution to the disease.

# Chlamydia trachomatis- conjunctivitis

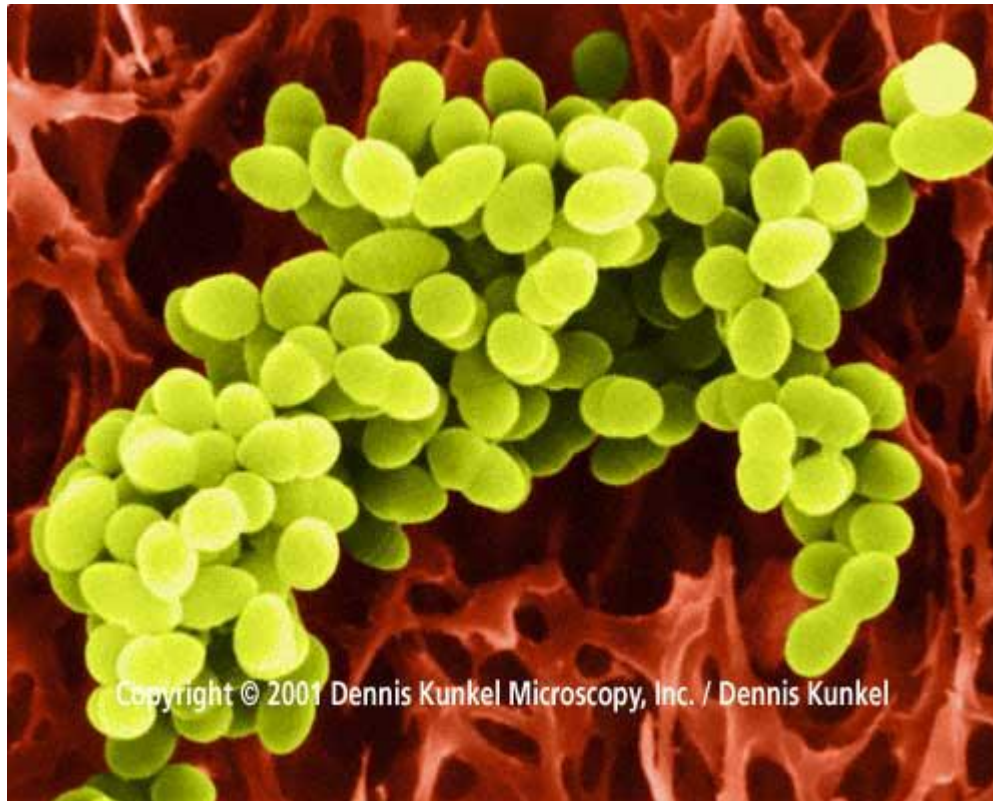


# Other conjunctival and surface infections

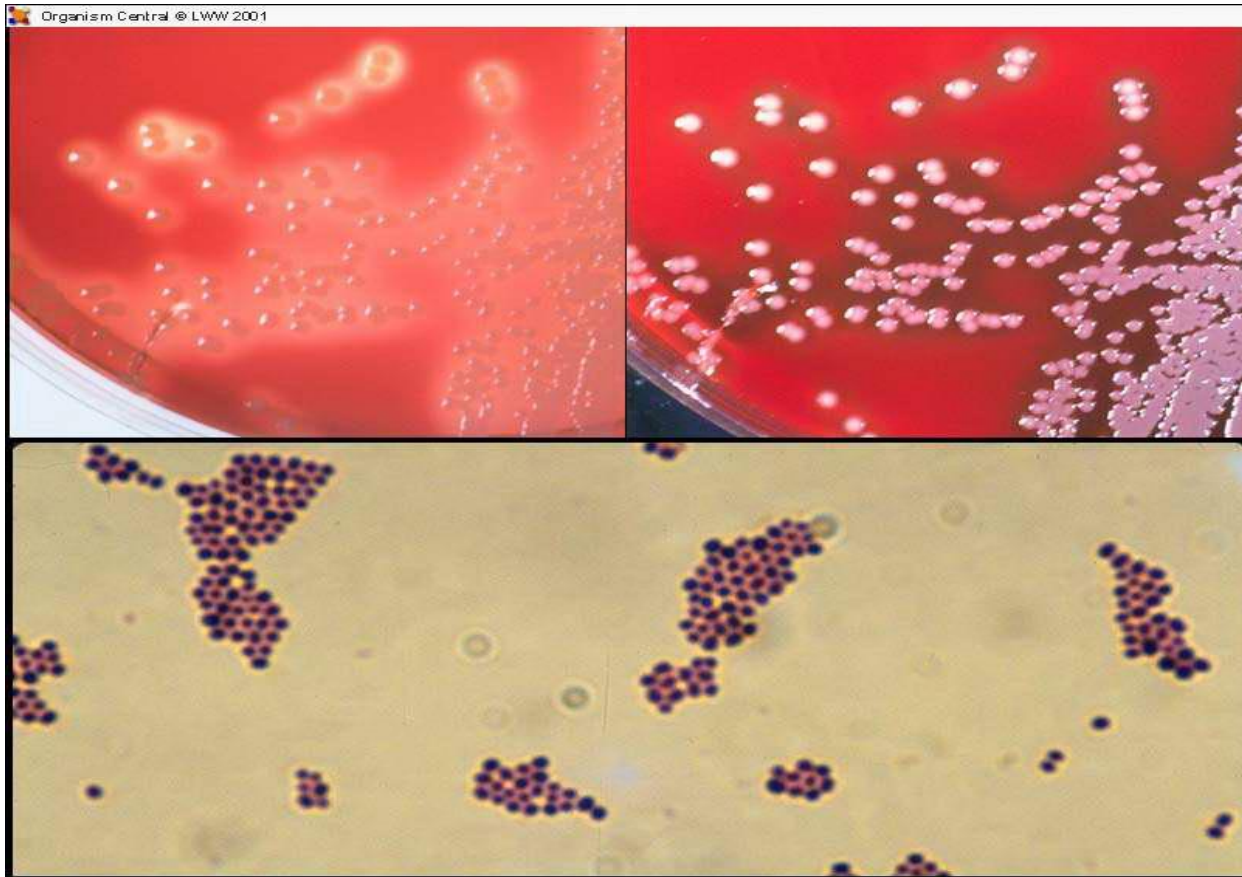
- Several bacteria (e.g. *S.pneumoniae*, *H.influenzae* and *Leptospira*) may cause conjunctivitis.
- Infection by *N.gonorrhoeae* is a hazard of birth through an infected birth canal; It is seen on the first or second day of life (ophthalmia neonatorum) and requires urgent treatment with penicillin, but can be prevented by applying erythromycin ointment shortly after birth.
- *S. aureus* also produces infections in newborns as well as in adults. The eyes of infants may be invaded by this organism if there is transfer from the child's own body or from infected adults.
- Direct infection of the eye may also be associated with the use of contact lenses. Excessive wearing can lead to a reduction in effectiveness of the eye's defence mechanisms, allowing pathogens to become established, but more likely hazards are the use of contaminated eye drops or cleaning solutions and the insertion of contaminated lenses.

# S.aureus

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# S.aureus



- Several organisms invade the superficial tissues of the eye after transport through the bloodstream or, in the case of **herpes simplex virus**, by movement along the trigeminal nerve. Reactivation of the virus in previously infected patients can result in the development of a keratitis with formation of dendritic ulcers.


- Inadvertent use of topical steroids** may aggravate this condition, and the resultant severe ulceration may lead to corneal destruction.

# **Virusul Herpes simplex I**



## Zona zoster





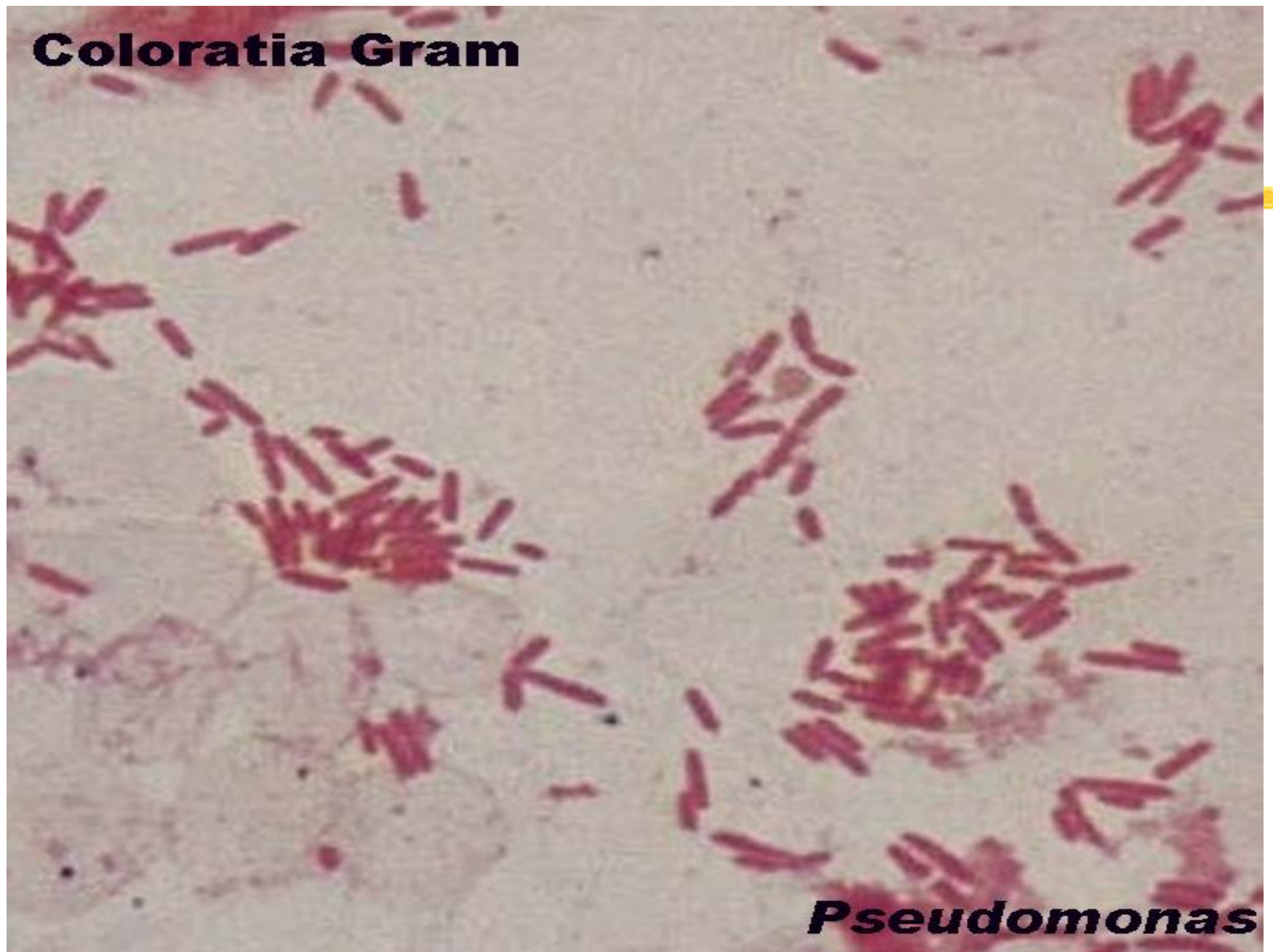
# **INFECTION OF THE DEEPER LAYERS OF THE EYE**

- **Trauma to the eye** may result in the establishment of ***Pseudonas aeruginosa***, giving rise to serious inner eye infection. This organism may also be introduced via **contaminated eye drops**.

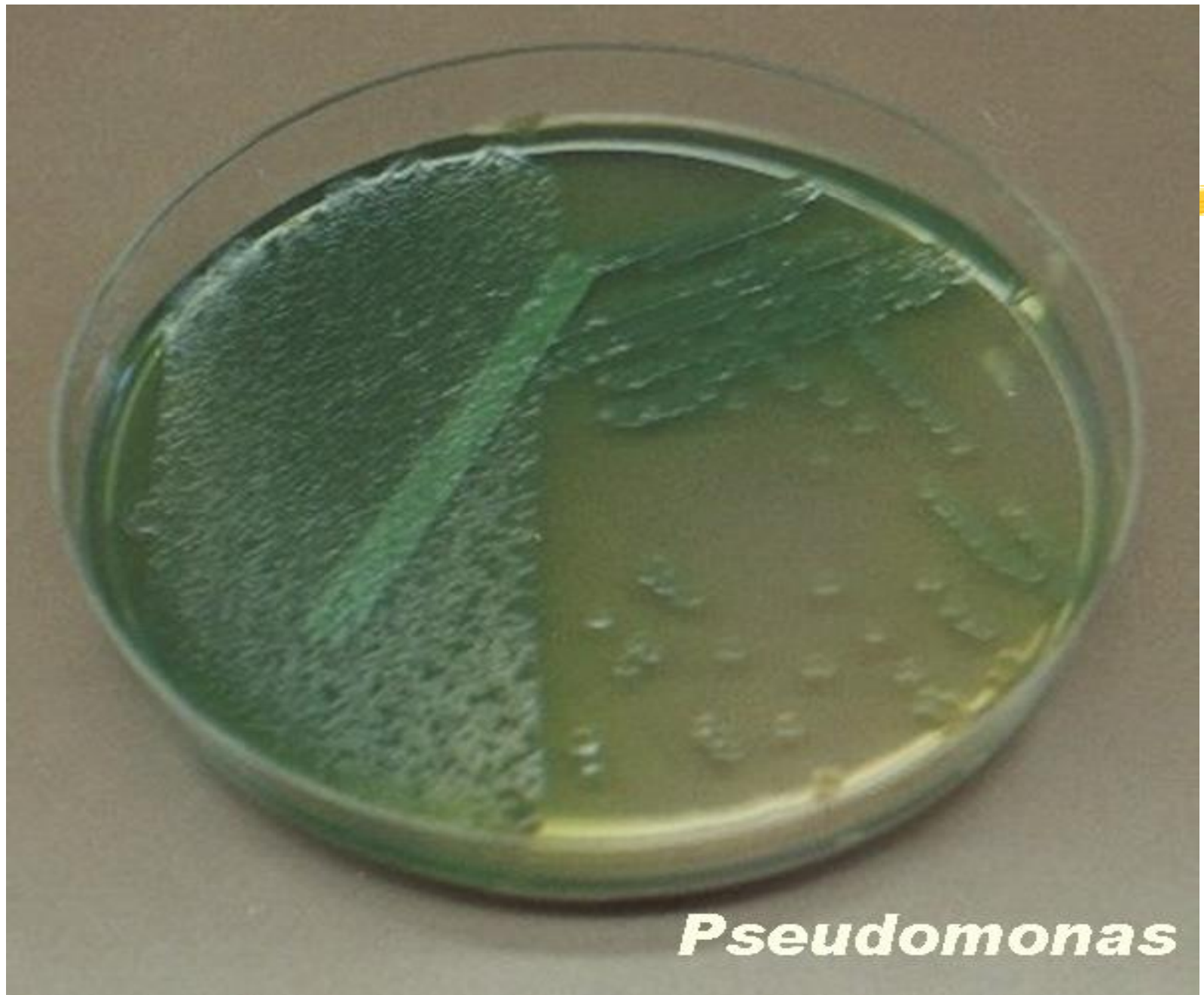
- **Rubella and cytomegalovirus** may invade the fetal eye in utero, the former causing cataracts and microphthalmia, the latter a severe chorioretinitis.

- **Congenital syphilis** produces a retinopathy and keratitis may appear in later life. Secondary syphilis is also associated with ocular inflammation.

**Coloratia Gram**



***Pseudomonas***

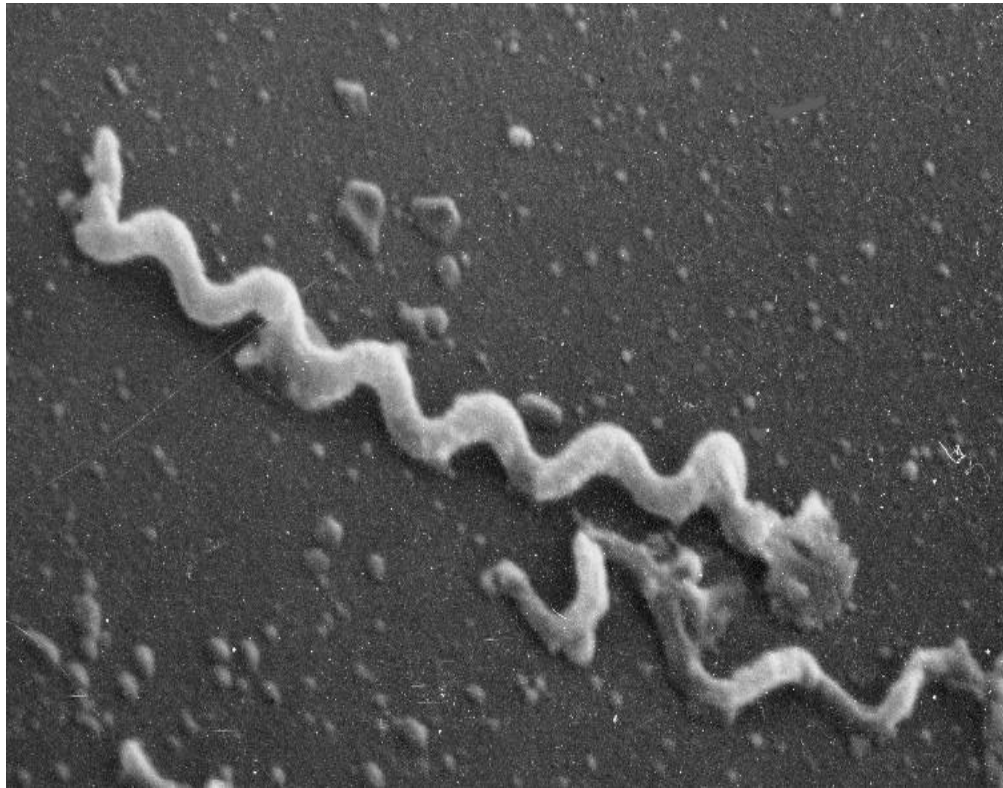


***Pseudomonas***



***Pseudomonas***

# Treponema pallidum



# Toxoplamosis

- **Chorioretinitis** is also associated with toxoplasmosis. Although infection with this protozoa (*Toxoplasma gondii*) is widespread it is not serious unless:
  - 1) **acquired in utero**, when the organism invades all tissues, especially the central nervous system, or
  - 2) **acquired (or reactivated) under immunosuppression**. Infection occurs by swallowing oocysts released by **infected cats** (the primary host) or by **eating meat containing tissue cysts**. Women who become infected in pregnancy may transmit the infection to the foetus, and can cross the placenta. Tissue cysts can form in the retina of the foetus and undergo continuous proliferation, producing progressive lesions, particularly when levels of immunity are low. These lesions may also involve the choroid and lead ultimately to blindness.