THE GENERA *MYCOPLASMA* AND *UREAPLASMA*

Mollicutes

- *mollis* = soft; *cutis* = skin “soft skin”
- Bacteria lack a rigid cell wall, they only have a trilaminar outer membrane
- Small size 0.2-0.3 µm
- Small genome
- Members of the order *Mycoplasmatales*, class *Mollicutes*
- Some are free living but most are parasitic

Mollicutes

- Only two genera, *Mycoplasma* and *Ureaplasma* are important in medicine.

- These groups of microorganisms, previously described under the general title of pleuropneumonia-like organisms (PPLO), are small procaryotic cells (200-250 nm in diameter).

- They resemble larger procaryotic cells (e.g. bacteria) in their ability to grow in cell-free media although some are exacting in their growth requirements and grow slowly.

- They have no rigid cell wall. There is a trilaminar cytoplasmic membrane, but unlike that of bacteria, it contains cholesterol or carotenol in addition to the usual phospholipids.
- The mycoplasma cannot synthesize their own cholesterol and require it as a growth factor in the culture medium.

- The absence of a rigid cell wall is reflected in branched and other unusual morphological forms of the mycoplasma cell.

- Cells of some species have a coccobacillary morphology, other are filamentous, some have specialized processses for attachment to host cells that are probably also related to the capacity for gliding motion.

- In line with absence of a cell wall these microorganisms are not inhibited by members of the beta-lactam antibiotics.
- In general they are sensitive to tetracyclines, macrolides, fluoroquinolones and chloramphenicol.

- Mycoplasma are grown in soft agar medium with a high (10-20%) concentration of serum or other protein such as ascitic fluid.

- The function of the serum or other protein is to provide a source of cholesterol, fatty acids, or urea in the case of the ureaplasmas, and to regulate their availability to the organisms.

- Some mycoplasma species are aerobes or facultative anaerobes, other grow better in hydrogen or nitrogen with 10% CO_2.
- The colonies looks like "fried egg" on the solid agar.
- Colony size varies from 200-500 µm for the large colony mycoplasmas to 15-30 µm for the ureaplasmas.

- **The established human mycoplasma flora comprises:**
  - ***M. pneumoniae***
  - *M. hominis*
  - *M. salivarium*
  - *M. orale*
  - *M. buccale*
  - *M. faucium*
  - *M. fermentans*
  - *M. genitalium*
- Of these mycoplasmas *M. pneumoniae* is the predominant pathogen.
- *M. hominis*, *M. fermentans*, *M. genitalium* have a variable importance.

Mycoplasma

- History: PPLO and pneumonia.
  - PleuroPneumonia-Like Organisms (PPLO): term first used to describe microorganism now known as *Mycoplasma pneumoniae*, responsible for 10-30% of lower respiratory infections (acute bronchitis and pneumonia in adult humans).
  - Initiated by conditions of crowding.

Clinical associations are:

- *M. pneumoniae* with pharyngitis, sinusitis, febrile bronchitis or pneumonia.
- In recent years extrapulmonary manifestations such as arthritis, hepatitis have been reported.
- *M. hominis*, *M. fermentans* or *U. urealyticum* with some cases of salpingitis, tuboovarian abscess, pelvic abscess, septic abortion and fever.
- An association of *U. urealyticum* (and perhaps now *M. genitalium*) with non-gonococcal (NGU) or postgonococcal urethritis or cervicitis.

- Despite some colonial similarities, mycoplasmas are quite distinct from L-phase variants of bacteria and do not revert to bacteria when cultured in media free of inhibitors of bacterial cell wall synthesis or other L-phase inducers.

- The ureaplasma (*Ureaplasma urealyticum*) were previously known as T mycoplasma, T for tiny colony - a reference to the size difference of their colonies compared with those of the mycoplasmas.

- As the name implies, they have the ability to split urea to amoniac, unlike the mycoplasma.

- *Mycoplasma hominis* and *Ureaplasma urealyticum* are frequently found colonizing the genital tracts of normal, sexually active man and women. They are less common in sexually inactive populations, which supports the view that they may be sexually transmitted.

- *M. hominis* may cause pelvic inflammatory disease, post-abortal and post-partum fevers.

- *Ureaplasma urealyticum* has been associated with urethritis and prostatitis in man.

- Fortunatelly, both *M. hominis* and *U. urealyticum* are susceptible to tetracycline which is also the treatment of choice for chlamydial infections.

Infections, vhich can be caused by *Chlamydophila pneumoniae*:

pharyngitis	2 - 5 %
sinusitis	5 - 10 %
bronchitis	5 - 10 %
acute exacerbation of chronic bronchitis	4 - 5 %
community-acquired pneumonia	**6 - 25 %**

Infections, vhich can be caused by *Mycoplasma pneumoniae*:

- **pneumonia**
- pharyngitis
- tracheobronchitis
- bronchitis
- bronchiolitis
- otitis media

Laboratory diagnosis of mycoplasma infections

- *M. pneumoniae* infection of the respiratory tract:
  - diagnosis may most easily be made by detection of specific IgM antibody.

- Serodiagnosis may be supported by demonstration of antigen or specific nucleotide sequences, or by culture of the microorganism.