Miscellaneous microorganism

a-Rickettsia and Chlamydia.

b-Mycoplasma

c-Veillonella

Chlamydiae, Rickettsiae and mycoplasmas are a miscellaneous group of organisms with properties common to both bacteria and viruses.

Chlamydiae

The chlamydiae are a group of microorganisms related to Gram-negative bacteria. However, unlike bacteria, they are unable to grow on inanimate culture media. Their main characteristics include the following

• Larger than most viruses and hence visible by light microscopy.

• Both DNA and RNA are present.

• Obligate intracellular parasites with a complex growth cycle.

• Sensitive to tetracycline, erythromycin, sulphonamides.

There are three species in the genus *Chlamydia*:

1. *Chlamydia trachomatis* is an agent of many diseases

2. *Chlamydia pneumoniae* causes acute respiratory tract infection, including sore throat, mild pneumonia and fever in humans.

3. *Chlamydia psittaci* primarily causes disease **(psittacosis)** in birds such as pet parrots and budgerigars, from which humans contract the infection. The human infection, also known as psittacosis, takes the form of a primary a typical pneumonia.

Chlamedia trachomatis : Causes a spectrum of diseases.

_ **Ocular infections** - neonatal conjunctivitis (blenorrhoea), keratoconjunctivitis, blindness (trachoma). Trachoma is a major cause of blindness in the developing world.

_ Genital infections – non-specific urethritis, the most common sexually transmitted disease in the UK. In the tropics, it causes lymphogranuloma venereum

Pneumonia – in neonates.

Culture and diagnosis

Identified by tissue culture(e.g.Hela cells) ,serology (complement fixation tests)and fluorescent antibody staining of smears from the lesion.

Antibiotic sensitivity

Tetracycline is effective for all chlamydial infections.

Rickettsiae

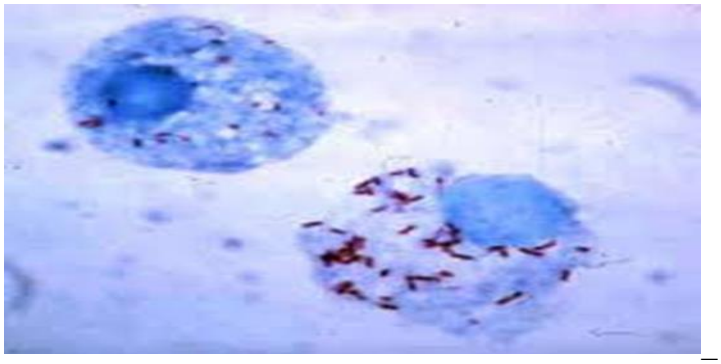
Rickettsiae are pleomorphic organisms, smaller than bacteria but resembling them structurally and metabolically, including cell wall formation. They, like Chlamydia and viruses, are. The best-known human rickettsial disease is typhus, which spreads wildly in conditions of _Coccobacilli, with a multilayered outer cell wall malnutrition and poverty. Rickettsiae are resembling that of Gram-negative bacteria.

_Obligate intracellular parasites that replicate by binary fission .

_visible by light microscope when special stains are used(e.g.Giemsa).

_Able to infect many species, including arthropods, birds and mammals; members of the genus are transmitted to humans via bites of infected arthropods

Sensitive to tetracycline and chloramphenicol.



There are two genera within the Rickettsieae:

Rickettsia and Coxiella.

Rickettsia

Rickettsial diseases include: typhus, an acute febrile illness, now rare, with a maculopapular rash transmitted by the rat flea; the fatality rate is frequently high as a result of haemorrhagic complications spotted fevers – Rocky Mountain spotted fever and other tick-borne fevers.

Coxiella

Coxiella burnetii, an organism closely resembling rickettsiae,. Rickettsial diseases include: Typhus, (typhus fever)

Typhus group of infectious diseases that include epidemic typhus, scrub typhus, and murine typhus.Common symptoms include fever, headache, and a rash.
Typically these begin one to two weeks after exposure Usually Q fever presents as a 'non-bacterial' pneumonia, but lesions may be seen in the brain and other organs, including the heart, with resultant infective endocarditis.

Culture and diagnosis

• Guinea pig inoculation

• Serology: rising titer of antibody in paired sera.

Antibiotic sensitivity: Tetracycline or chloramphenicol.

Mycoplasmas

Mycoplasmas are the smallest prokaryotes capable of binary fission, and they grow, albeit slowly, on inanimate media. Mycoplasmas are indeed wall-less bacteria, without the peptidoglycan cell wall but bound by a plasma membrane consisting of lipids and sterols (including cholesterol). Hence, they are highly pleomorphic. Analysis of *Mycoplasma* genome sequences (16SrDNA) suggests that these organisms are most closely related to *Bacillus*–*Lactobacillus* and *Streptococcus* sub groups of Gram positive bacteria. The most important species of the genus *Mycoplasma* is *Mycoplasma pneumoniae*, which causes**:**

_A common pneumonia, atypical pneumonia

_ Mucocutaneous eruptions, including the oral mucosa

_ Haemolytic anaemia.

Mycoplasma pneumoniae

Primary atypical pneumonia

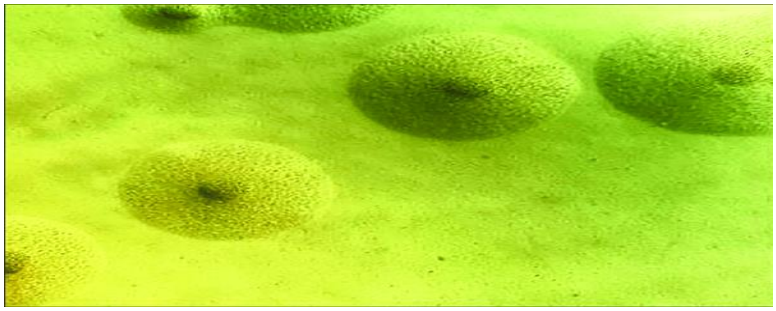
Primary atypical pneumonia takes the form of fever, non productive cough, severe headache, weakness and tiredness. The acute illness lasts for about 2 weeks, but in a majority, the symptoms last longer.

Mucocutaneous eruptions

M. pneumoniae may cause skin rashes and ulcerations of both the oral and vaginal mucosa.. The skin lesions, which often affect the extremities, have a target or iris appearance(**target lesions**). In the oral mucosa, erythematous patches may appear first, quickly becoming bullous and erosive. This leads to extensive blood encrustations, especially the labial lesions. When the oral ulceration is associated with the skin rash and conjunctivitis, it is called **Stevens**–**Johnson syndrome**.

Culture and diagnosis

Mycoplasma can be cultured in special media but is a slow grower (about 10 days); the colonies have a characteristic fried-egg' appearance. Immunofluorescence of colonies transferred to glass slides is useful (as they do not take up the Gram stain well).Serology is useful as the culture results are delayed. Complement fixation testing for *M. pneumoniae* antibodies is diagnostic.



Antibiotic sensitivity: Tetracycline for adults and erythromycin for children.

Oral mycoplasmas

Mycoplasmas have been isolated from saliva, oral mucosa and dental plaque, but their significance is not clear. The oral species are poorly characterized and include *Mycoplasma buccale*, *Mycoplasma orale* and *Mycoplasma salivarium*. The latter two species have been isolated from salivary glands and are thought to play a role in salivary gland hypo function. Estimates of the oral carriage of mycoplasma vary from 6% to 32%.

Veillonella

Veillonella spp. are non-motile, gram-negative diplococci ,anaerobic .

Veillonella is part of the normal flora of the mouth and gastrointestinal tract and may be found in the vagina. *Veillonella* species are common and considered mainly harmless, or even beneficial, colonizers of the mouth from the early years of life onward .V. parvula subsp. parvula is detected in saliva, on the tongue, and in plaques. They are able to utilize lactate produced by *Streptococcus mutans*, and are thus considered as beneficial bacteria in dental .plaques.

Veillonella spp. are often regarded as contaminants; they are often associated with oral infections; bite wounds; head, neck, and various soft tissue infections; and they have also been implicated as pathogens in infections of the sinuses, lungs, heart, bone, and CNS. Recent reports have also indicated their isolation in pure culture in septic arthritis and meningitis**.**

References:

1- Atlas of Oral Microbiology 2015 Chapter 3 - Supragingival Microbes Pages 41-65

2-Essential microbiology for dentistry 4th edition 2012