

Mycoplasma

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Mycoplasmas are essentially bacteria lacking a rigid cell wall during their entire life cycle and they are also much smaller than bacteria.

The first organism of this type was associated with pleuropneumonia of cattle, and was originally called the pleuropneumonia like organism (PPLO).

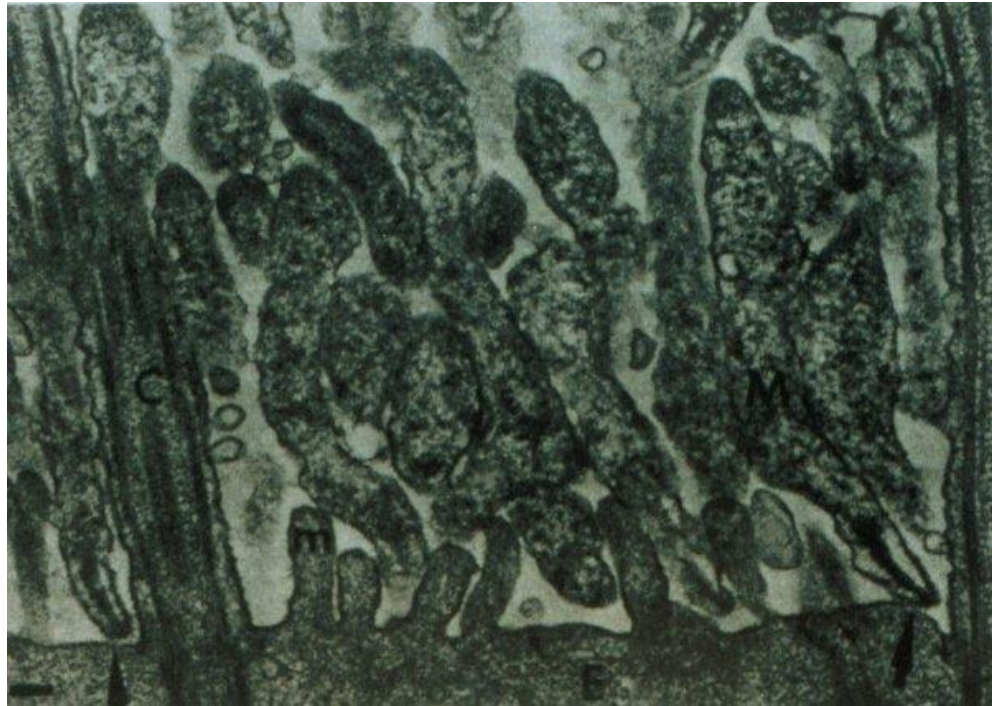
Mycoplasmas are prokaryotes lacking cell wall however , they have unique cell membrane that contains sterols , which is not present in either bacteria or viruses . Mycoplasma organisms are small 150-250nm .

General Characteristics:

Smallest known free-living organisms.

because of the absence of cell walls, they do not stain with the Gram stain, and they are more pleomorphic than bacteria.

They appear as tiny pleomorphic cocci, short rods, short spirals, and sometimes as hollow ring forms.



Culturing Mycoplasma :

Mycoplasma can be cultured on liquid or solid medium.

Optimal growth temperature range 35-37C.

**Culture Medium Should Be Enriched With 20% Horse Serum
Or Human Serum. Colonies Appears As Fried Egg Appearance.**

Requires **Sterols** for growth, can be grown on laboratory media.

Most are facultatively anaerobic Exception
M. pneumoniae

Replication controversial Replication time 1-6 hours

PATHOLOGY :

Mycoplasmas are Human And Animal pathogens,

Scientists have isolated at least 17 species of mycoplasma from human , four (4) types are responsible for clinically significant infections that come to the attention of practicing clinicians. These are :

Mycoplasma spp. Which utilize glucose or arginine but do not split urea.

Mycoplasma Pneumoniae

M. genitalium

M hominis

Ureaplasma urealyticum, which hydrolyze urea.

Mycoplasma are found mostly on the surface of mucous membranes .

They can cause chronic inflammatory disease of the respiratory system, urogenital tract and joints. The most common human infection caused by mycoplasma pneumonia which is responsible for 10-20% of all pneumonias.

Pneumonia

Pneumonia is frequently confused with virus infection.

Primary atypical clinical Tracheobronchitis

Pharyngitis

Differential diagnosis from Streptococcus pyogenes sore throat

Mycoplasma pneumoniae is extracellular pathogen attaches to respiratory epithelium by an attachment factor called P1

Interacts with a glycoprotein receptor on the epithelial cell surface ciliostasis is followed by epithelial cell destruction.

Destruction of the host cell is due to release of hydrogen peroxide and superoxide anion.

Mycoplasma contributes to several respiratory infections , the infection progresses to tracheobronchitis or pneumonia and usually self-limited.

Pleural effusion (usually small)occurs in 5-20% of patients. Mycoplasmas have been implicated in the pathogenesis of Asthma , leading to acute and chronic wheezing in some individuals.

Other systemic infections of mycoplasma:

Rarely other organs may be involved (Central nervous system, Pancreas ,joints, skin, heart and pericardium), propably as a result of haematogenous spread. Ureaplasma can be normal flora in sexually active individuals. Ureaplasma is part of normal genital flora of both sexes, it is found in about 70% of sexually active individuals. It had been described associated with non specific urethritis , infertility, chorioamnioatis and premature birth (stillbirth), pneumonia and meningitis.

Lab Diagnosis:

Culture:

**Fried Egg Colonies On Medium Containing Sterols –
Most Mycoplasmas Require A Rich Medium Containing A –
Sterol And Serum Proteins For Growth.**

Serology:

Complement Fixation Test, Hemagglutination –

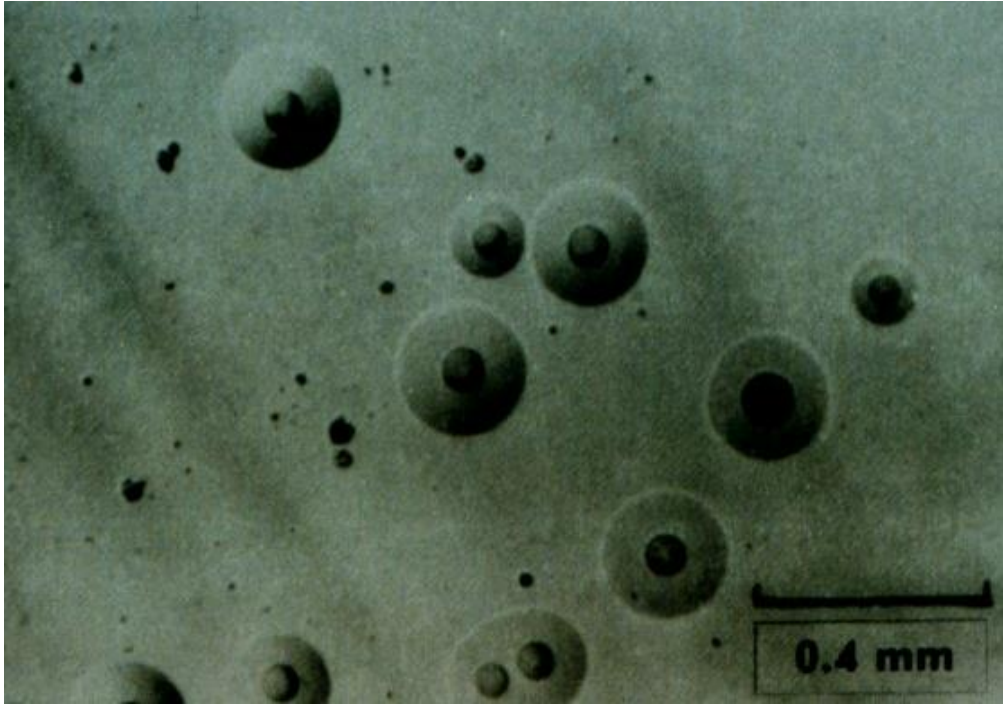
Culture Mycoplasma from sputum, mucous membrane swabs or other specimens

direct inoculation into liquid or solid media containing serum, yeast extract and penicillin to inhibit contaminating bacteria.

**On solid media, they form minute, transparent colonies.
looks like a fried egg.**

**The different strains vary in their growth rate may –
take from two days to several weeks to form a
colony.**

**Fried egg colonies Stain intensely with neutral red or
Tetrazolium or Methylene Blue.**



Hemagglutinin :

Cold agglutinins to human O erythrocytes.

hemabsorption & B-hemolysis of guinea pig red blood cells.

Identification:

conclusively identified by staining its colonies with fluorescein-labelled antibody.

M. pneumoniae Nucleic Acid Probes

specific recombinants to oligonucleotide sequences that are only found in Mycoplasma pneumonia, PCR test for the ribosomal gene .

Treatment:

They Are Normally Destroyed By Heat At 45c In 15 Minutes. They Are Relatively Resistant To Penicillins, And Cephalosporins.

They Are Sensitive To Tetracyclines , Erytromycins , And Doxycyclie.

Thank you