

Mycoplasma

Smallest microbes capable of free living in the environment

Self replicating on artificial culture media

Resemble viruses in having small size and filterable by bacterial filters

Differs by free living in environment and growth on artificial cell free culture media

Lack rigid cell wall

Sterolic triple layered cell membrane

Resistant to antibiotics acting on cell wall β lactams

Pleomorphic-coccoid, bacillary, filamentous and helical

Poor gram negative better stained by giemsa

Reproduce by binary fission and budding

Non motile and non sporing

Contaminants of cell cultures

L forms-Non filterable,sterols absent,revert back to normal state once antibiotic exposure withdrawn,do not cause disease

Out of 16 species 5 are pathogens rest are normal flora of oral and urogenital tract

M.Pneumoniae causes pneumonia

Genital infection-M.hominis and M.genitalum

Mycoplasma pneumoniae

Causative agent of primary atypical pneumonia

Antigens-Glycolipid ag form basis of detection of heterophile ab(cold agglutination test)

Membrane bound proteins helps in attachment

Pathogenesis-

Adhesion to respiratory mucosa forming complex terminal organelle at tip of organism

Injury to respiratory mucosa by cytotoxin, hydrogen peroxide and lipoproteins

Host immunity

Cellular immunity immunopathogenic role
exacerbating pneumonia

Humoral immunity does not protect from early
disease but prevents dissemination

Transmitted by respiratory droplets during
coughing, in summer camps, military
bases, boarding schools

Incubation period 2-4 weeks

Clinical manifestations-

URTI

Pneumoniae(Eaton agent pneumoniae)

Extrapulmonary

manifestations(encephalitis,myocarditis,anemia,arthritis)

Lab diagnosis-

Specimen

Transport media-Standard mycoplasma fluid medium,VTM

Immediately transport

Culture-

Standard solid medium-PPLO agar,serum and pencillin

Standard liquid medium-PPLO broth,glucose,phenol red and pencillin

SP-4 medium contains fetal bovine serum

Hayflick modified medium contains heart infusion broth

Incubate for 5 to 7 days even for 1 to 3 weeks at 37c

Growth in liquid medium

In solid medium as fried egg appearance

Hand lens for examining and dienes staining on plate

Identification-Hemadsorption test-agglutination of guinea pig rbs

Tetrazolium reduction test change to red colour

Growth inhibition test-antisera inhibits growth

Antigenic detection-

DIF test directly in clinical samples

Capture ELISA

Antibody detection(specific)-

IgM in children

IgA for adults

CFT

LAT

ELISA

Antibody detection test(non specific)

Mycoplasma possesses certain heterophile antigens such as surface glycolipid haptens that cross reacts with I ag of RBC or carbohydrate antigens of gr F streptococcus cell wall, This can be used to detect heterophile ab in patient by using non specific ag

Cold agglutination test-O blood group I ag

Streptococcus MG test.

Not done these days as less sensitive and specific

Molecular methods-

PCR

Multiplex PCR

RT-PCR

Treatment-macrolides,Respiratory
flouroquinolones,doxycycline

Pseudomonas

Non fermenting

GNB

Pathogen in hospitalized

Cystic fibrosis

Oxidase positive

Virulence and pathogenesis

Colonization-Adhere and colonize host surface

Pilli,fimbria and polar flagellum

Toxins-GNB producing largest number of
enzymes and toxins

Non diffusible toxins(exotoxin S,U,T) Injectes via
type 111 secretion system evade phagocytic
cells and induce tissue injury

Diffusible toxins(hemolysins,elastases,pyocyanin
Secreted by type 11 secretion system and causes
tissue injury

Exotoxin A-most important factor and inhibits
protein synthesis

Host inflammatory response

Pigment –

Pyocyanin,pyoverdin,pyorubin,pyoverdin

Alginate coat facilitates biofilm formation seen
in cystic fibrosis

Capsule prevents phagocytosis

MDR

Extreme temp survival

Clinical manifestations-VAP,Respiratory
infections,Bacteremia,Infective endocarditis,

Skin,soft tissue infection,ear infections

Lab diagnosis-

Specimen

Direct smear

Culture-peptone water,nutrient agar,kings
media,blood agar,macconkey agar,cetrimide
agar,pseudomonas agar

Motility+

Oxidase +,catalase+,oxidiser,citrate positive

AST-disk diffusion

Typing methods-bacteriocin typing,antibiogram

Typing,serotyping O and H,Molecular methods
by PFGE

Treatment-

Pencillins,cephalosporins,carbapenems,polymyxins,quinolones,monobactam