

# *Enterococcus (Enterococcus faecalis, Enterococcus faecium etc.)*

**Microscopy:** G+ cocci in pairs or short chains, catalase negative

**Cultivation:** small greyish white colonies on blood agar with viridation

Some of them have yellow pigment, some are mobil

selective diagnostic Slanetz-Bartley (sodium azide) agar - pink to red colonies

Bile-aesculin agar: black colonies

**Biochemistry:** pyrrolidonylarylamidase (PYR-positive) and leucinaminopeptidase (LAP-positive)  
high resistance, growing in 6,5% NaCl agar, large temperature interval

**Pathogenicity:** part of normal digestive tract flora, more frequent in long term hospitalised patients with medical devices or patients treated with broad spectrum antibiotics

Urogenital infections, wound infections, intraabdominal infections, endocarditis – more often in drug users or seniors, catheter sepsis, biliary tract infection



## **Factors of virulence:**

*gelatinase*, *feromon* substance, *colonization factors*, *bacteriocins* - inhibition of other bacteria

*VanA*, *B*, *C* gens causes rezistence to vancomycin (*C* is gen of primary resistance, *VanA/B* of secondary resistance, transferable through plasmides)

**Treatment:** primary resistant to cefalosporines

Liht urinary tract infection: ampicillin, ampicillin with  $\beta$ -lactamase inhibitors, nitrofurantoin, possible glycopeptides.

Wound infections, sepsis and endocarditis: combination of aminoglykoside + penicillin/ampicillin or glycopeptides (vancomycin, teicoplanin)

**VRE** (vancomycin resistant enterococci) – linezolid, quinupristin/dalfopristin

## **Laboratory dg.:**

microscopy, cultivation on BA, on Slanetz-Bartley medium

Latex agglutination – differentiation from streptococci, from other bacteria through PYR test and LAP

Phenotypic test (production of yellow pigment, moovement)

Biochemistry: fermentation of arabinosis and pyruvate:

### ***E. faecium***

arabinosis fermentation – change of the indicators colour

pyruvate negative

resistent to ampicilin

EN-coccus test



### ***E. faecalis***

without fermentation

pyruvate fermentation

susceptible to ampicillin



## G+ rods

### *Listeria monocytogenes*



**Morphology:** microscopy: G+ rods, catalase positive



**Cultivation:** chromogennous media, growth in cold, on BA form grey colonies with haemolysis – looks like enterococci, streptococci or difteroids

**Pathogenicity:** wound infection, new-born babies infection (meningitis or sepsis)

**Virulence factors:** lysteriolysin, internalins (intracellular alive)

**Treatment:** fluoroquinolons

### **Laboratory dg.:**

microscopy, cultivation on chr. medium/ BA and bile-aesculin medium, catalase detection, BBL test

# *Corynebacterium diphtheriae*



**Microscopy:** G+ rods with metachromatic granules, club-shaped looking like chinese signs, catalase positive

**Cultivation:** does not grow on MH, but on BA, on telur media (Clauberg)

**Pathogenicity:** strains producing toxin (microb attacked by fag) causes diphtheria with pharyngitis (couldn't take off without bleeding), can suffocate, arise of myocarditis etc. Non-toxic strains causes skin inflammations.

**Factors of virulence:** diphtheric toxin

**Therapy:** vaccination, antidiphtheric globulin (deserters!), PNC, tracheostomy, corticoids

**Laboratory dg.:** microscopy, staining of specific parts - granules (Lebranc), Clauberg medium - metal shiny colonies with blue zone around colonies, Lofler medium, detection of toxins through Elek test, PCR, demonstration on guinea-pig.

## ***Other Corynebacteria (C. jeikeium etc.)***

**Microscopy:** G+ rods with metachromat. granules, club-shaped form looks like chinese signs, arranged in palisades, catalase positive

**Cultivation:** any growth on MH, but BA

**Pathogenicity:** wound infection, sepsis, urinary tract infections

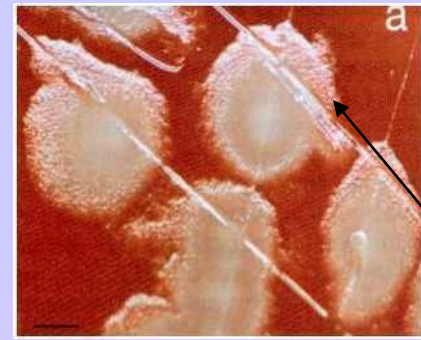
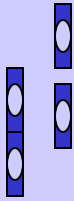
**Factors of virulence:** haemolysins

**Treatment:** vancomycin, teicoplanin, rifampicin, if possible - PNC

**Laboratory dg.:** microscopy, cultivation on BA, biochemistry...

# Rod *Bacillus*

## *B. anthracis*



**Microscopy:** G+rods looks like bamboo stick, spors (central terminated) – only in air

**Cultivation:** on BA – large, flat, spreading through the agar surface - caput medusae, ahaemolytical

**Pathogenicity and pathogenesis:** contact with ill person, dead animals or their productes (skin), spors invade into organism, germinate and produce toxin. Via entrance is disease devided into 3 forms.

1. skin - pustula maligna

2. pulminal – after inhalation arises hemoragic necrosis of nodes with mediastinitis ends as septic shock

3. intestinal – via contaminated food – causes bloody diarrhea, high temperature etc.

!! spors are easy to diffuse, that's why it is discussed as a biological warfare!!

**Virulence:** toxin (3components)

**Therapy:** PNC, ciprofloxacin, doxycylin, chloramphenicol

**Prevention:** veterinary control of animal, vaccination of animal or people

**Laboratory diagnosis:** microscopy, cultivation on BA

Antigen detection - Ascoli termoprecipitation reaction, animal demonstration

!! Can do only laboratory with biosafety level III.



## *B. cereus*



**Microscopy:** G+rods, central terminated spores

**Cultivation:** on BA flat colonies with  $\beta$  haemolysis, PEMBA-**blue** colonies

**Pathogenicity:** component of gastrointestinal flora, contamination of food, causing diarrhea, vomiting. Diarrhea is caused by thermolabile enterotoxin (source: sauce), vomiting is caused by thermostable toxin (source: rice). Also causes eye + wound infection

**Factors of virulence:** enterotoxins

**Treatment:** rehydration + linkosamids. Prevention: good food preparation  
Eye infection: lincosamids + aminoglycosides

**Laboratory dg.:** microscopy, cultivation on BA/PEMBA, detection of granules  
toxin detection via ELISA method or latex agglutination