

Staphylococcus

Morphology: Gram + cocci, irregular clusters

S aureus

Coagulase neg.
staphylococci
(*S epidermidis* stb.)

Coagulase +

Coagulase -

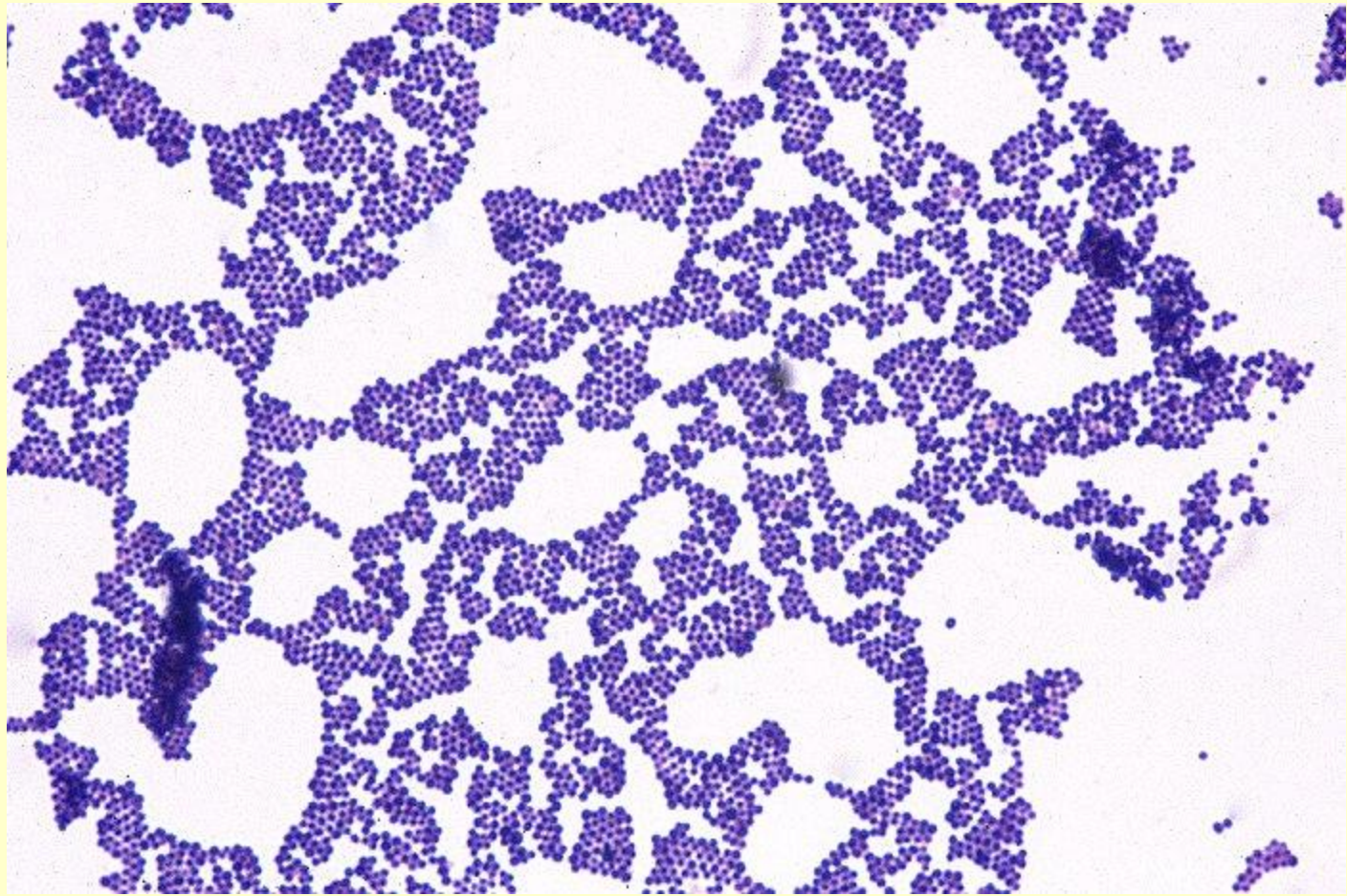
β -hemolysis

- hemolysis

Several diseases

Opportunistic pathogen





Staphylococcus aureus

Culture: BA: golden yellow, β -hemolysis

Virulence factors:

Enzymes:

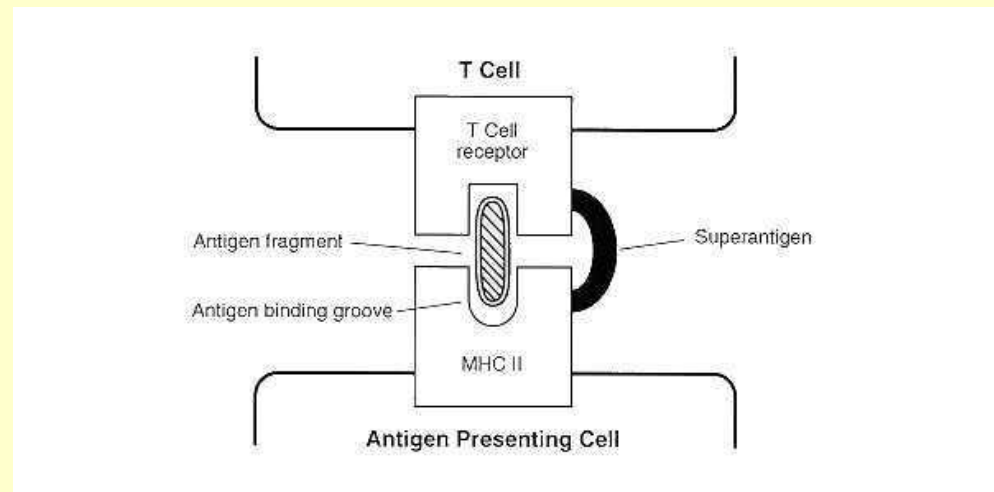
- protein A: binds IgG (Fc portion)
- Coagulase
- Hyaluronidase
- Staphylokinase (fibrinolysin)

Toxins:

- α , β , γ , δ toxin
- Leukocidin
- Exfoliative toxin (scalded skin syndrome)
- Toxic shock syndrome toxin
- Enterotoxins heat resistance!

} Membrane damage

} superantigen



Pathogenicity

Inflammatory/pyogenic:

- Impetigo
- folliculitis
- furunculus
- carbunculus
- Paronychia

- Osteomyelitis
- Arthritis
- Pneumonia
- Sepsis

Toxin mediated:

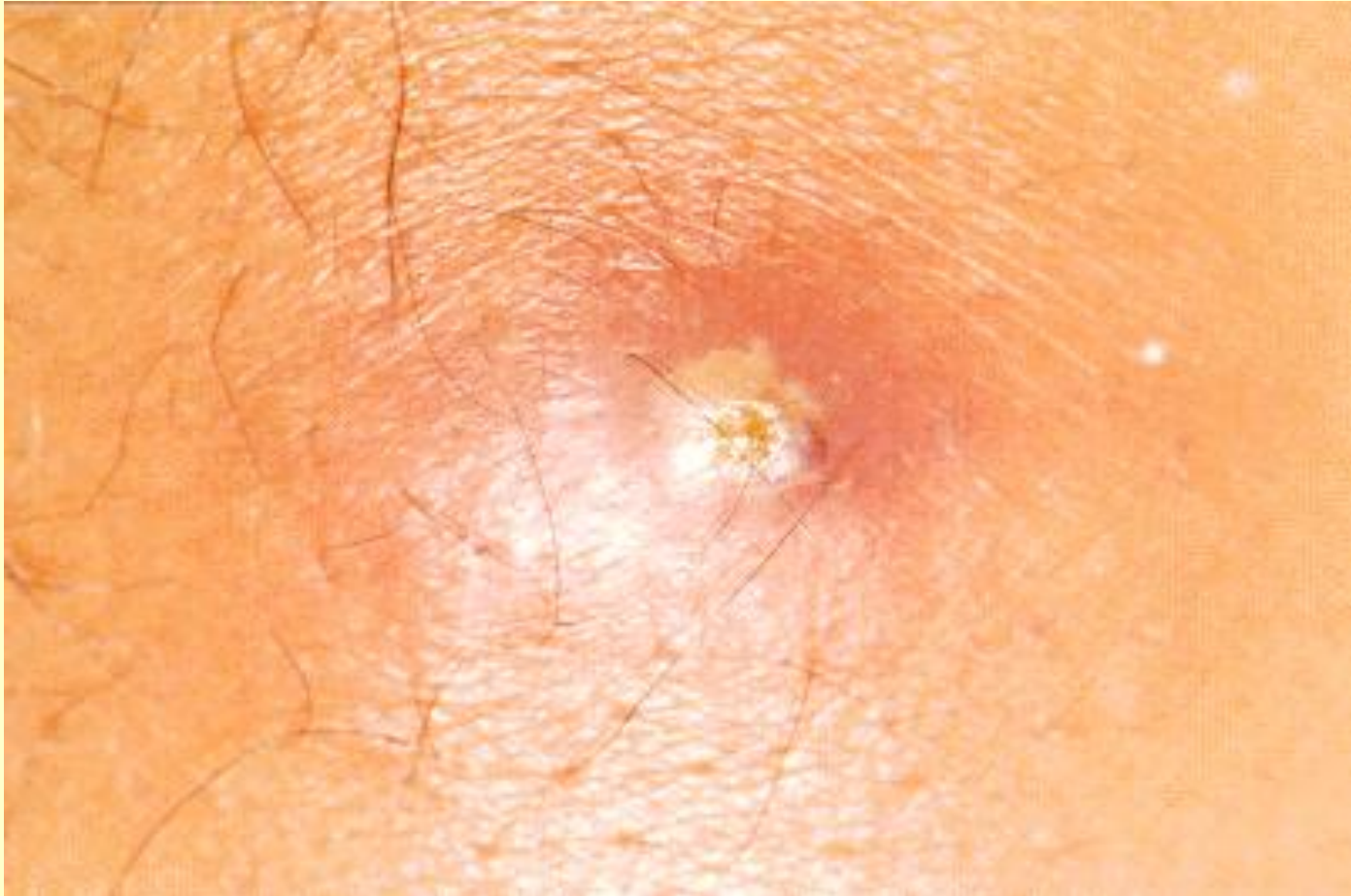
- Food poisoning
- Toxic shock syndrome
- Scalded skin syndrome



Impetigo (*S aureus*)



Paronychia (*S aureus*)



Furunculus



Carbunculus



Scalded skin Syndrome



Toxic shock syndrome

Treatment

- (Penicillin)
- **Oxacillin**
- Erythromycin
- Cephalosporins
- **Vancomycin** (for MRSA: methicillin (oxacillin)-resistant *S. aureus*)

Epidemiology and prevention

- Source: skin, nose
- Transmission: hands, objects
- Prevention: cleanliness, hand disinfection
reduce colonisation in nose (antibiotics)
- Important iatrogenic (nosocomial) pathogens:
newborn nursery, intensive care units, operating rooms

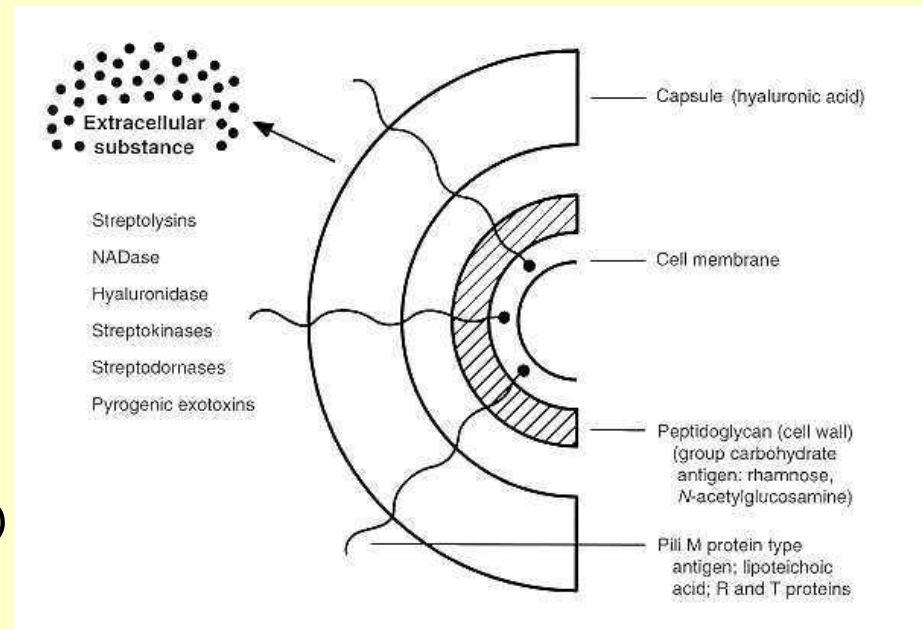
Coagulase negative staphylococci

- *S. epidermidis*, *S. hemolyticus*, *S. hominis* etc.
- normal flora of skin
- opportunistic pathogen - patients with prosthetic appliances, prosthetic heart valve, permanent catheter

- *S. saprophyticus*
- pathogen in urinary tract

Streptococci

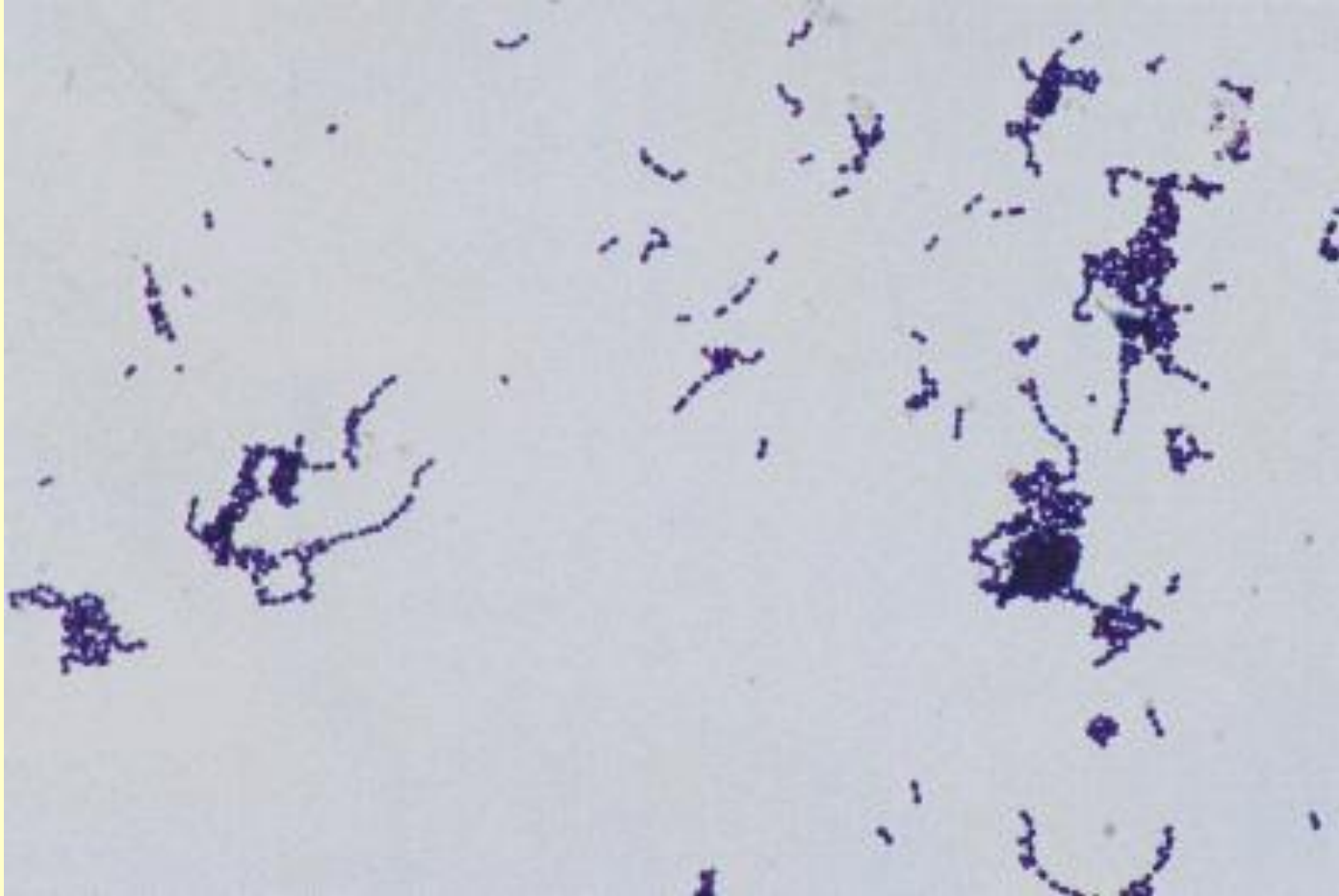
- Morphology: Gram + cocci, in pairs or chains
- Culture: BA (α , β , non hemolytic)
- Biochemistry: catalase neg.
- Classification:
 - C polysaccharide:
Lancefield groups (species)
 - M protein: adherence



species	group	hemolysis	habitat
S pyogenes	A	β	upper resp. tract
S agalactiae	B	β	Female genitalia
Enterococcus faecalis	D	-, (α)	Digestive tract
S pneumoniae	-	α	resp. tract
Oral (viridans) group	-	α	mouth

Beta-hemolytic streptococci





Streptococcus pyogenes

Streptococcus pyogenes

- Culture: BA, β hemolysis, non pigmented colonies
- Virulence factors:

Cell surface factors:

- M protein
- Hyaluronic acid capsule

Enzymes:

- Streptokynase (fibrinolysin)
- streptodornase (Dnase)
- Hyaluronidase

Toxins:

- **Streptolyzin O**
- Streptolyzin S
- Erytrogen toxin
- Pyrogenic exotoxin A
- Exotoxin B

S pyogenes – pathogenicity

Pyogenic (invasive)

- Pharyngitis
- Tonsillitis
- Erysipelas
- Cellulitis
- Impetigo
- Fasciitis
- Myositis
- Sepsis

} skin

Toxic

- Skarlat fever
- Toxic shock syndrome

Immunologic

- Rheumatic fever
- Glomerulonephritis



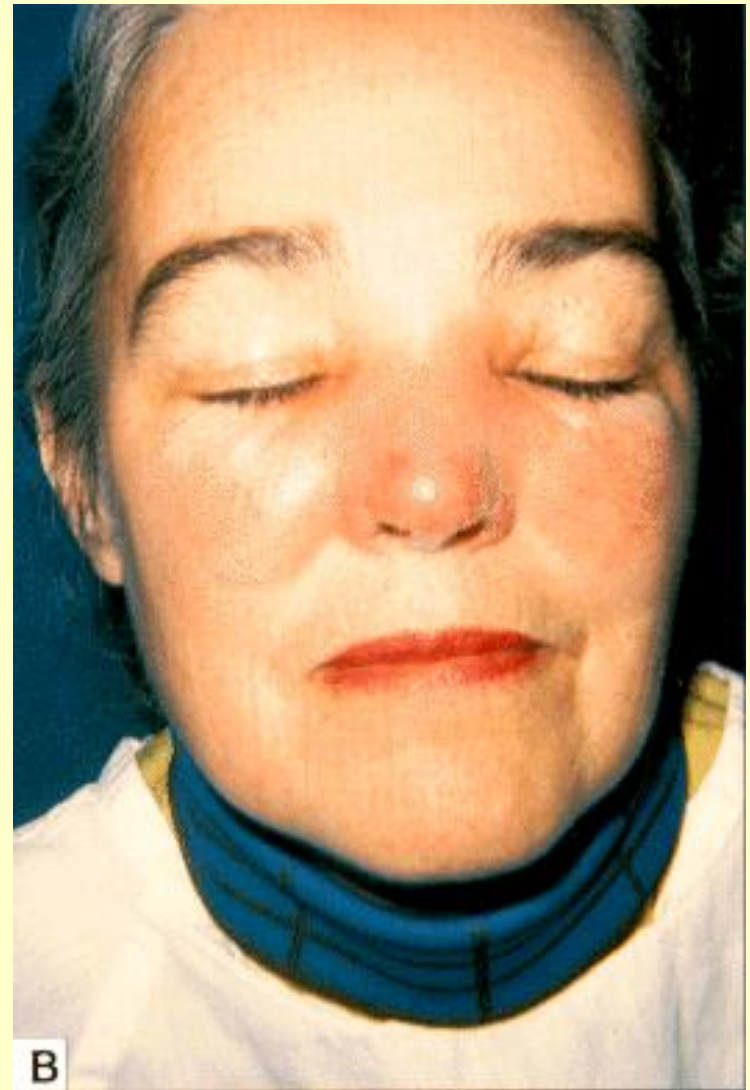
Pharyngitis (*S pyogenes*)



Impetigo (*S pyogenes*)



Scarlatina



Erysipelas



Cellulitis



S pyogenes - cellulitis

Streptococcus pyogenes

Identification:

- colony morphology
- C polysaccharide (latex agglutination)
- Bacitracin sensitivity

Treatment:

- Penicillin, erythromycin

Epidemiology and prevention

S pyogenes: skin, resp. tract

- Treat carrier stage
- Preventing rheumatic fever: penicillin prophylaxis

Oral Streptococci

„Viridans” group: α hemolysis

Normal flora of mouth

Streptococcus anginosus group (F, G)

- *S anginosus*, *S milleri*, *S intermedius*, *S constellatus*
- Hemolysis: α , β , -
- Normal oral flora: gingival crevices, dental plaque

Streptococcus mutans group

- *S mutans*, *S sobrinus*, *S cricetus*, *S rattus*
- Dental caries : sucrose \longrightarrow polysaccharide capsule (glycocalyx)
covers of the outer surface of bacteria (adherence)

Streptococcus salivarius group

- S salivarius, S vestibularis

Streptococcus mitis group

- S mitis, S sanguis, S gordonii, S parasanguis, S oralis

Viridans Streptococci:

- Oral normal flora
- Dental caries
- Bacterial endocarditis

Profilaxis of endocarditis:

Antibiotic should be given (penicillin)

- Before oral surgery, tooth extraction
- In patients at risk
(heart valve damage , prosthetic valve)

Anaerobic Streptococci

- Peptostreptococcus anaerobius, P. magnus, P. micros
- Found in carious dentine, subgingival plaque, dentoalveolar abscesses
- Anaerobic/microaerophilic
- Often in mixed infections: with other anaerobes and aerobes