gram positive cocci

* Staphylococcus • catalase (+)

S. Epidermis
- part of normal body flora
- low pathogencity
- opportunistic pathogen
- low secretion of virulent factors / enzymes
- Could Cause:
  - Bacteremia
  - Skin abscess
- Catalase positive
- Coagulase negative

* Tests:
collect → culture → identify (gram) → catalase? → coagulase? → susceptibility

S. Aureus
- more invasive, pathogenic
- obligate pathogen
- virulent factors / enzymes:

– Have capsules, in their cell wall there is a protein A → produces AB responsible for dissemination (spread to sys. circ.)

– Produces

a. * Exotoxins: enzyme excreted out of bac. cell (result in food poisoning: vomiting, diahrrea)

b. * Coagulase: converts fibrinogen → fibrin by use of prothrombin → clusters form (Clumping factor, same function) coagulase forms a cover around staph → prevents antibiotic access

c. * Hyaluronidase: spreading factor → aids in dissemination

d. * Leukocidin: destroys WBCs → forms puss, acne → drainage before treatment

e. Enterotoxin: formed inside our body → associated with intestinal staph., heat stable

- Coagulase and Catalase positive
- Causes:
  - Abscesses, wounds – sepsis
  - easily spreads to bone: osteomyelitis
  - Conjuctivitis, pneumonia
  - sepsis – meningitis
- Resistance:

* R- to all B-lactams but could be susceptible to Methicillin / Oxa
* if R to Oxa / Methicillin → MRSA
* then only choice is Vancomycin (toxic) or fucidic acid.

* Streptococcus • catalase (–)

α - Hemolytic (partial) → green pigment

Viridans
- Less virulent
- Normal resp. flora
- Common infections:
  - URTI esp. oral cavity
  - Oral abscesses
  - Dental caries
  - Can disseminate → endocarditis (inflam. of heart) due to sepsis if patient has cong. heart defects or muscle injuries

Pneumoniae
- very virulent, invasive
- have capsules with 85 serotypes but are polysaccharides
  ⇒ vaccines available (Protect. 1–2 yr)
- recommended for
  - very young / old / immune-deficient
  → more susceptible
- more probable following viral infection
- Resistance:
  - Penicillin (50%)
  - Cephalosporins
  - susceptible to 1st generation ceph.
- Leads to:
  - Meningitis
  - Sinusitis
  - Otitis Media
  - Bacteremia
- Healthy carriers: uncapsulated, in URT of healthy individuals (could become capsulated by transduction)

Distinguished by:
* Optician Disc Test

* distinguished by: Bacitracin

β - hemolytic (complete) → clear

C-F Groups
- RTI, no comp.

Group A (S. Pyogens)
- most invasive, patho.
- more than 80 subtypes ∴ vaccine is impossible
- produce severe infl. rxns
- tonsilitis in children (sore throat): Scarlet Fever
- Superficial skin infection – sepsis

* Produces many torins / enzymes:

a. Pyrogenic (Erythrogenic)
- throat, skin infection, esp. in children

b. Superficial Skin toxin
- more dangerous
- wound infection / toxic shock

c. Herolysin toxin:
- used in lab for diagnosis

* Peak incidence in children: 5–15 years old
– Sore throat, tonsilitis, otitis media, Pharyngitis, meningitis

* Complications

Rheumatic fever
- inflammatory disease of heart and joints

Glomerulo-nephritis
- immune disease of kidney

* has M antigen on its cell wall → body immune response targets it

* can be treated by:
- penicillin (also group B)
- erythromycin
- Possess cell wall specific carbs
- 2–30% Healthy carriers

Group B
- less pathogenic
- found normally in intestine, vagina
- rarely associated with RTIs
- opportinistic Pathogens ⇒ cause infections in the following cases:

* Pregnancy:
- UTI
- in case of an injured uterus → dissemination → into blood → Puerperal fever (Sepsis) → could be fatal

* Delivery:
- contamination of amniotic fluid → swallowed by newborn → Lung infection Sepsis: Neonatal Sepsis → could be fatal
- could lead to meningitis

δ - hemolytic (no)

* Enterococci
- Began to appear due to close human-animal contact
- found in intestines
- Cephalosporins use increases their number
- Cause intestinal tract infection
- UTI (hosp. patients due to catheters)
- Opportinistic Pathogen
- Leads to:
  - UTI
  - (rarely) Sepsis
  - endocarditis
  - Wound infections

* Examples
- E. faecium
- E. fecalis