STAPH AND STREP ARE GRAM-POSITIVE COCCI:

**STAPHYLOCOCCUS:** spread by direct contact, fomites, etc

*Staphylococcus aureus* (yellow colonies) is the most problematic of Staph

- **Common** 20% people’s skin, 30% nares, in rectum, opportunistic
- **Very strong cell walls** resistant to high salt, can survive in cured meats, drying

Invasive because of toxins and enzymes:

- **necrotizing toxin** dissolves tissue
- **enterotoxin** grows in cream products, heat resistant, triggers nausea, violent vomiting, diarrhea 1-6 hrs. lasts 24 hrs (intoxication, not infection).

**Diseases:**

- **pimple to boil to carbuncle** cavity from necrosis, suppuration
- **Abscesses** should be drained to break up niche, remove dormant bacteria
- **Impetigo** mixed infection of Strep and Staph
- **Toxic shock syndrome:** fever, vomiting, sunburn-like rash, shock
- **burn infections** 1° care of burn patients: prevent infection, dehydration
- **scalded skin syndrome** in newborns

Develops resistance to drugs faster than any other bacterium (misuse of antibiotics.)

10 % sens to penicillin now (penicillinase) (*MRSA*: methicillin-resistant Staph aureus)

Serious problem in hospitals (nosocomial). Determine antibiotic sensitivity first.

**STREPTOCOCCUS:** cause more disease than any other single group of bacteria.

Not all strep are pathogens (for instance, lactic acid fermenters in milk)

Pathogenic Strep are carried in the population: 5% in summer, 10% in winter

**Airborne:** Spread by aerosol (a problem esp in elem. schools)

Distinguish among Strep by two techniques:

1) Lancefield Serology of M protein in cell wall, mediates attachment, retards phagocytosis

- **Groups A through O**, most pathogens are in group A.

2) Hemolysis:

- **alpha:** partial clearing, green cast
- **beta:** complete clearing, yellow cast
- **gamma:** no clearing

**Streptococcus pyogenes:** most common Group A beta hemolytic strep.

**Extracellular agents of pathogenicity** produced, esp. enzymes:

- **leukocidin** alters permeability of neutrophils and macrophages, causing lysis
- **erythrogenic toxin** fever and rash (vasodilation)
- **hyaluronidase** spreading factor (digests connective tissue)
- **streptokinase** a fibrinolytic, digest fibrin in inflammatory barrier (used after heart attack)

**Diseases:**

- **Strep throat** Pharyngitis and tonsillitis: beefy red pharynx, fever, SORE throat (but 80% Strep infections are asymptomatic) children under 15 avg 1 infect’n/yr.
- **Scarlet fever** erythrogenic factor diffuses into blood
- **Puerperal fever** infection of uterus following childbirth
- **Rheumatic fever** in 3% of untreated children, appears 1-5 wks later, arthritis, heart murmur
- **glomerulonephritis** filtering basement membrane scarred
- **“Flesh eating bacteria”** invasive Strep, exotoxin A, hyperantigen, causes autoimmune damage

**tooth decay** *S. mutans* (cariogenic) make dextran fr sugar, lactic H+ decays teeth