Streptococcaeae Part II
*S. pneumoniae*, Viridans group, Abiotrophia, Gemella, Leuconostoc, Pediococcus

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### Streptococcus pneumoniae

#### Alpha-hemolytic streptococci

**Streptococcus pneumoniae**

- **Gram stain:** GPC in pairs, lancet-shaped (can have capsules)

- **Colony morphology**
  - Small, gray, glistening, alpha hemolysis
  - Autolysis of cells upon extended incubation so center of colony begins to disappear
  - If encapsulated, colonies are mucoid

- **Optochin/Taxo P sensitive**
- **Bile solubility positive**

- **Clinical significance**
  - Normal respiratory flora in rare to few amounts
  - Predisposing conditions for infection
  - Community acquired bacterial pneumonia
  - Sinusitis, otitis media, mastoiditis, meningitis, peritonitis, arthritis, conjunctivitis

- **Virulence factors**
  - Polysaccharide capsule – able to resist phagocytosis
**Streptococcus pneumoniae**

- Susceptibility testing
  - Seeing resistance to penicillin so must do susceptibility testing on clinically significant isolates
  - Oxacillin KB disk to screen for penicillin susceptibility

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**Streptococcus viridans group**

- Colony morphology
  - Tiny, gray, domed, alpha hemolysis

- Optochin/Taxo P resistant
- Bile solubility negative
- Bile esculin negative
- No growth in 6.5% NaCl

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**Streptococcus viridans group**

- Clinical significance
  - Normal flora
  - Generally non-pathogenic
  - Subacute bacterial endocarditis (#1 cause)
  - Liver abscesses, bacteremia
- **Streptococcus anginosus/milleri group**
  - Deep wound infections

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**Abiotrophia species**

- Nutritionally variant streptococci
- Requires Vitamin B6 / pyridoxal to grow
- Clinical significance
  - Normal flora
  - Endocarditis

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**What disease is *Streptococcus pneumoniae* the most common cause?**

Community acquired bacterial pneumonia. It can also cause meningitis, sinusitis, otitis media, peritonitis, and conjunctivitis.
How can you differentiate *Streptococcus pneumoniae* from *Streptococcus viridans* group?

Susceptibility to Optochin and bile solubility. *Streptococcus pneumoniae* is optochin sensitive and bile solubility positive. *Streptococcus viridans* group is optochin resistant and bile solubility negative.

*Streptococcus viridans* group are clinically significant for what disease?

Subacute bacterial endocarditis (#1 cause)

*Abiotrophia* species are clinically significant for what disease?

Subacute bacterial endocarditis

*Gemella* species

- Colony morphology
  - Resemble *Streptococcus viridans* group
  - Can be alpha or gamma hemolytic
- Gram stain: GPC in pairs and chains
  - Easily decolorized
  - Pairs may have adjacent sides flattened

*Gemella* species

- Identification
  - PYR variable
  - Vancomycin sensitive
  - Glucose non “F”
  - Bile esculin negative
  - No growth in 6.5% NaCl

*Gemella* species

- Clinical significance
  - Normal flora of respiratory and GI tracts
  - Rarely isolated from humans
  - Opportunistic pathogen
    - Septicemia
    - Wounds, abscesses
    - Respiratory
    - UTI
**Streptococcus-like bacteria**

**Leuconostoc species**
- Colony morphology
  - Resemble *Streptococcus viridans* group
  - Can be alpha or gamma hemolytic
- Gram stain: GPC in pairs and chains
  - Can be coccobacilli in appearance

**Leuconostoc species**
- Identification
  - PYR negative
  - Vancomycin resistant
  - Glucose "F"
  - Bile esculin positive
  - Variable growth / no growth in 6.5% NaCl

**Clinical significance**
- Normally found in environment
- Opportunistic pathogen in immunosuppressed patients
  - Septicemia
  - Wounds
  - CSF

**Pediococcus species**
- Colony morphology
  - Resemble *Streptococcus viridans* group
  - Can be alpha or gamma hemolytic
- Gram stain: GPC in pairs, tetrads and clusters

**Pediococcus species**
- Identification
  - PYR negative
  - Vancomycin resistant
  - Glucose "F"
  - Bile esculin positive
  - Variable growth / no growth in 6.5% NaCl
  - Group D antigen positive

**Clinical significance**
- Normally found in environment
- Opportunistic pathogen in immunosuppressed patients
  - Blood
  - Saliva
  - Stool
  - Urine
  - Wounds
How can you differentiate Gemella, Leuconostoc and Pediococcus from each other?

<table>
<thead>
<tr>
<th>Biochem</th>
<th>Gemella</th>
<th>Leuconostoc</th>
<th>Pediococcus</th>
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<tbody>
<tr>
<td>G.S.</td>
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<td>Pair, chain</td>
<td>Tetrad, cluster</td>
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<td>Type Grp D</td>
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Summary…

- Classification – hemolysis, C-substrate
- Gram stain – GPC in pairs & chains
- Identification
  - Beta Strep (PYR, Taxo A, SXT, Na hipp)
  - Alpha Strep (Optochin, bile solubility)
  - Gamma Strep (PYR, BE, 6.5% NaCl)
  - Strep-like organisms
- Clinical significance of each organism

Who am I?

Enterococcus species

Streptococcus pyogenes

Streptococcus pneumoniae

Streptococcus agalactiae