Streptococci

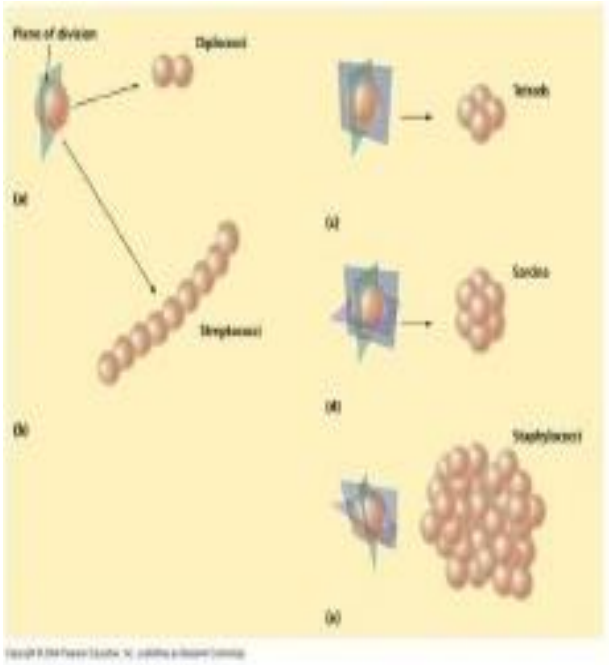
Introduction

Streptococcus genus

Enterococcus genus

The structure

- Gram positive cocci (GPC) arranged in chains
- Cell division: single plane…..Chains



The physiology

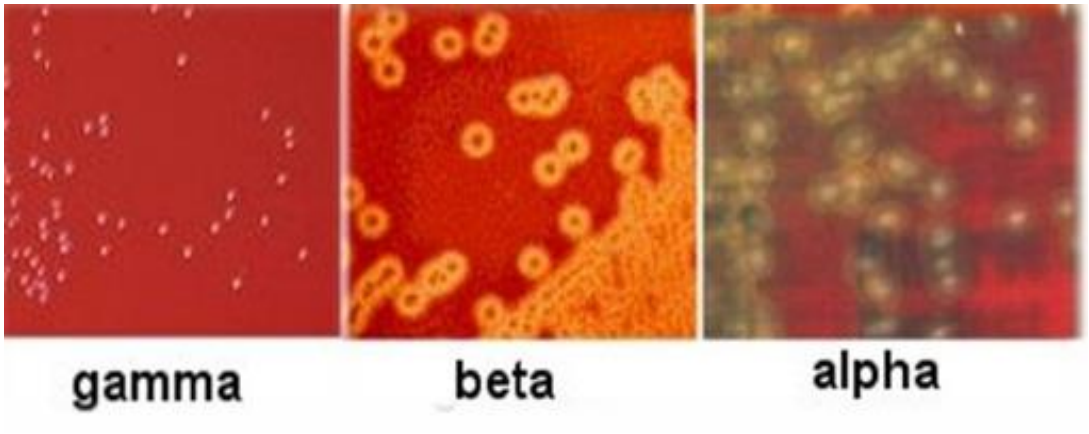
- **Classification of streptococci**
  - A. Lancefield classification
  - B. Haemolytic activity
  - C. M protein
  - D. Molecular biology

Streptococcus species of clinical importance

Group	Species	Lancefield Group	Type of Haemolysis
Pyogenic	***S. pyogenes***	A	β
	S. agalactiae	B	β
	S. eqisimilus	C	β
Mitis	***S. pneumoniae***	O	α
	S. mitis	O	α
	S. sanguis	H	α
Anginosus	*S. anginosus*	G, F	α
Salivarius	*S. salivarius*	K	γ
Bovis	*S. bovis*	D	α
Mutans	***S. mutans***	No	γ

Haemolytic activity

- β haemolysis
- α haemolysis
- γ haemolysis



The Beta haemolytic streptococci (GAS)

S. pyogenes (Group A Streptococci, GAS)

- **Pathogenesis**
- **Virulence factors**
  - F protein
  - M protein
  - Capsule
  - DNAse
  - Streptolysins
  - C5a peptidase
  - Pyrogenic exotoxins
  - Streptokinase
  - Lipoproteinase

Infections and clinical features of GAS

A. Non-invasive diseases

B. Invasive soft tissue infections

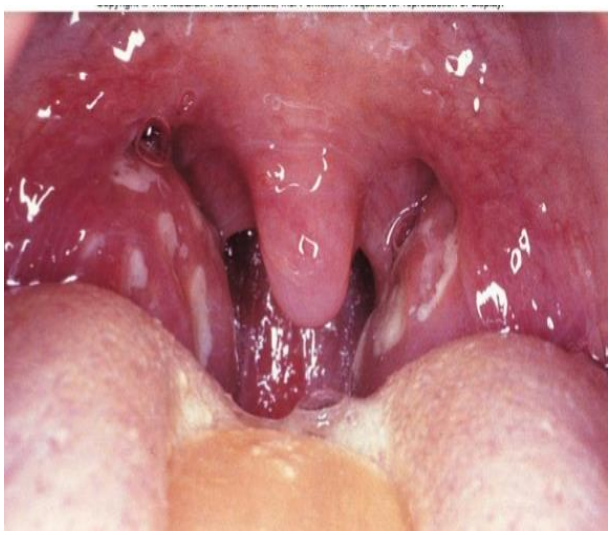
C. Non-suppurative sequelae (immunologically mediated)

A. Non-invasive diseases

I. Pharyngitis

II. Scarlet fever

III. Skin infections



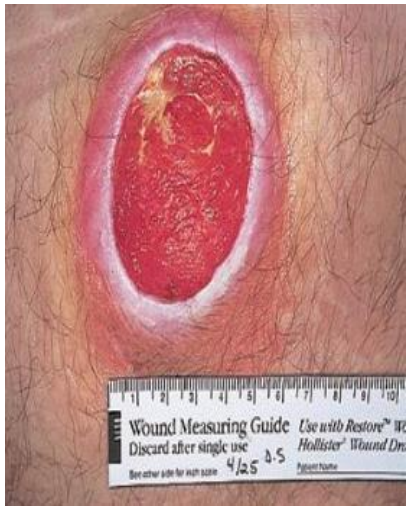
B. Invasive soft tissue infections

I. Necrotizing fasciitis

II. Streptococcal toxic shock syndrome

III. Other suppurative infections

IV. Bacteraemia



C. Non-suppurative sequelae

I. Rheumatic fever

II. Acute glomerulonephritis

Laboratory diagnosis

1. **Specimen**
2. **Processing of specimens:**
3. **Identification of *Str. pyogenes:***
   - Gram stain
   - Catalase test
   - PYR test
   - Bacitracin test
4. **Rapid identification**

Str. pyogenes

Characteristics

The Beta haemolytic streptococci (*Streptococcus agalactiae*)

Streptococcus agalactiae

- **Pathogenesis**
- **Clinical features**
  - **Infection in the neonate**
  - **Infection in the adult**

Modes of transmission

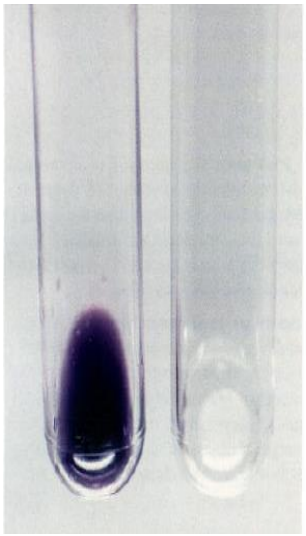
- Endogenous
- Exogenous

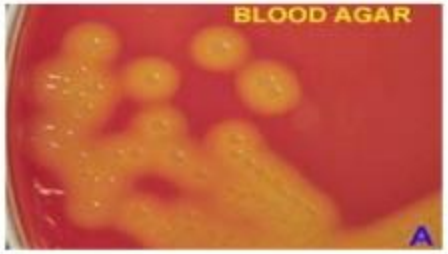
Laboratory diagnosis

1. **Specimen:**
2. **Processing of specimens:**
3. **Identification of *Str. pyogenes:***
   - Gram stain
   - Catalase test
   - CAMP test
   - Bile-esculin hydrolysis
   - Sodium hippurate hydrolysis
   - Bacitracin test

Streptococcus agalactiae

Characteristics





The α haemolytic streptococci (*Streptococcus pneumoniae*)

Streptococcus pneumoniae

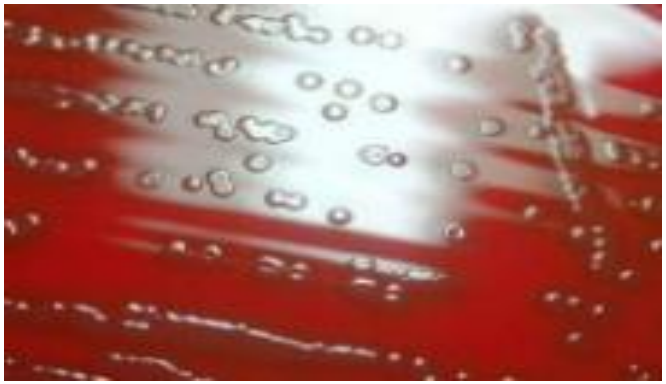
- **Pathogenesis**
- **Clinical features**

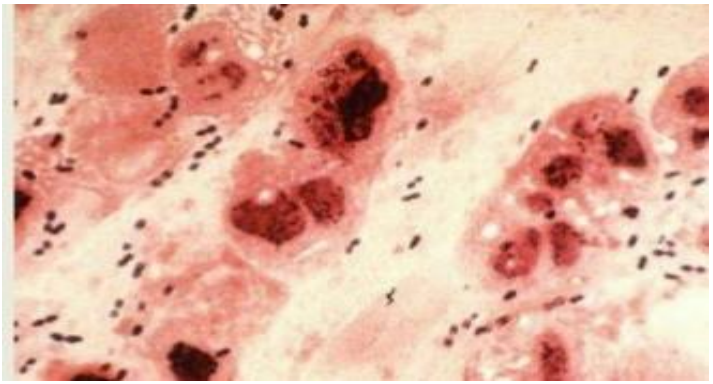
Laboratory diagnosis

1. **Specimen:**
2. **Processing of specimens:**
3. **Identification of *Pneumococcus:***
   - Gram stain
   - Catalase test
   - Quellung test
   - Bile solubility
   - Optochin test

Streptococcus pneumoniae

- **Characteristics**





Commensal streptococci (The viridans Streptococci)

The viridans Streptococci

- Inhibiting the colonization of many pathogen including pyogenic streptococci by:
- Present as normal flora
- **Clinical features**

Enterococci
(Faecal-type Streptococci)

Enterococcus species

- **Characteristics**
  - 16 species: *E. faecalis* and *E. faecium* are most impo.
- Habitat
- **Clinical features**

Laboratory diagnosis

1. **Specimen:**
2. **Processing of specimens:**
3. **Identification of *Enterococcus*:**
   - Gram stain
   - Catalase test
   - Bile-esculin test
   - PYR test
   - Optochin test
   - Grow in salt?

Enterococcus species

- **Laboratory identification**

Prevention and control

- Proper hygiene, Fairly readily killed by heat or by common disinfectants
- Chemoprophylaxis
- Vaccination

Treatment

- **Antibiotic treatment**

Overview of the Medically Important Gram Positive Cocci

Family, Genus, species	Characteristics	Clinical manifestations
Staphylococcaceae	Cocci in cluster; catalase-positive	
Staphylococcus aureus	Coagulase +ve, yellow-pigmented colonies	Pyogenic infections, toxicoses
S. epidermidis	Coagulase -ve, whitish colonies, normal flora	Foreign body infections
Streptococcaceae	**Cocci in chains and in pairs, catalase-negative**	
Streptococcus pyogenes	Cocci in chains, Lancefield group A, β -hemolysis	Tonsillitis, scarlet fever, skin infections
S. pneumoniae	Diplococci, α-hemolysis	Pneumonia, otitis media, sinusitis
S. agalactiae	Chain-forming cocci, group antigen B, β-hemolysis	Meningitis/sepsis in neonates
S. viridans	Cocci in chains, α-hemolysis	Endocarditis, dental caries
Enterococcaceae	In chains & pairs, α, β, or γ-hemolysis, group antigen D, catalase -ve	Flora of intestines of humans and animals
Enterococcus faecalis Enterococcus faecium	Aesculin-positive, growth in 6.5% NaCl, pH 9.6	Opportunistic infections