

Streptococci Toxin

Streptococci is a genus of gram-positive coccus or spherical bacteria, non-motile, non-spore forming. They often occur as chains or pairs and are facultative or strict anaerobes. **Group A streptococci** have a hyaluronic acid capsule.

Classification of streptococci system includes:

1- Based on hemolysis reactions.

- β - Hemolytic (clear, complete lysis of red cells) \rightarrow *S. pyogenes*
- α – Hemolytic (incomplete, green hemolysis) \rightarrow *S. pneumoniae* and *viridans*
- γ – Hemolytic (no hemolysis) \rightarrow *S. faecalis*

2-Lancefield classification streptococci based on presence of **carbohydrate** antigen in cell wall – 17 groups (A, B, C,...)

3- Human Streptococcal Pathogens

- *S. Pyogenes* • *S. Viridans* • *S. Pneumoniae* • *S. Faecalis*

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Amongst the more common **toxins** secreted by ***Streptococci*** are:-

1. **Streptolysin O & Streptolysin S** \rightarrow Lyse erythrocyte, Leucocyte, platelets.
2. **Streptococcal pyrogenic exotoxin A (SpeA)** \rightarrow causes invasive infections.
3. **Streptococcal pyrogenic exotoxin B (SpeB)** \rightarrow degrades host serum proteins.
4. **Streptococcal pyrogenic exotoxin C (SpeC)** \rightarrow toxic shock like syndrome.
5. **Strepto-dornase** \rightarrow causes surface lesions by remove clotted blood
6. **Hyaluronidases** \rightarrow causes breaks down hyaluronic acid
7. **Streptokinase** \rightarrow causes dissolve blood clots that formed in the blood vessels.
8. **Streptococcal chemokine protease.**

Different methods for laboratory diagnosis of

A- *S. pyogenes* is isolated from **samples** such as **skin, throat, sputum, urine, and blood.**

Culture: The organism is cultured on blood agar with an **added bacitracin antibiotic** disk to show beta-hemolytic colonies and sensitivity (zone of inhibition around the disk) for the antibiotic. Best growth achieved at **pH 7.4-7.6** and temperature **37⁰C.**

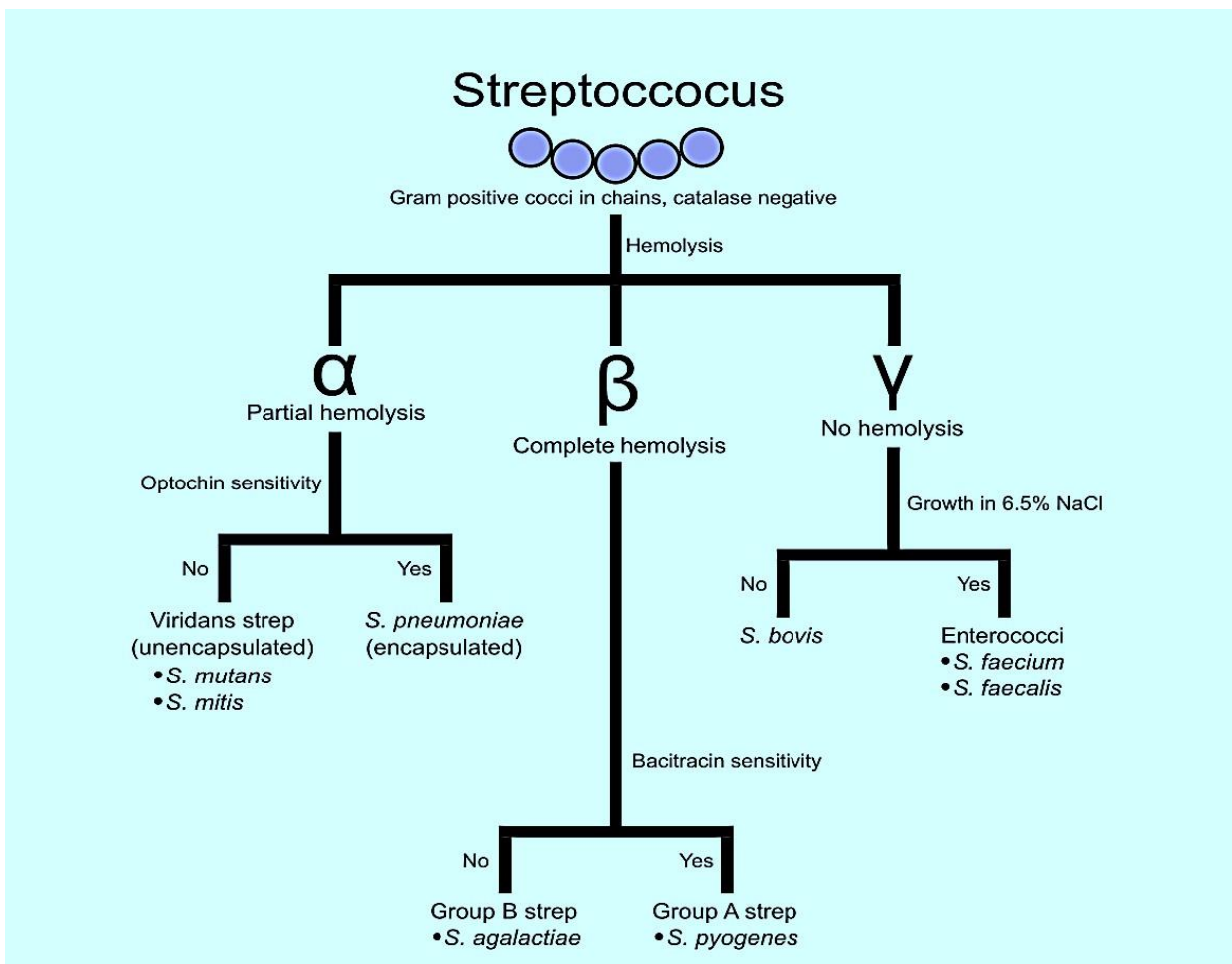
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B- *S. pneumoniae*: Its infection of lung, Otitis media. Isolated from samples such as sputum, blood, wound.

Culture: requires blood or chocolate agar. • Growth improved by 5-10% CO₂. Best growth achieved temperature 25 - 40°C. • Colonies are surrounded by greenish hemolysis, cultured on blood agar with an added optochin disk to show alpha-hemolytic colonies.

C- *S. Faecalis*: It is associated with urinary tract infections.

Culture: in MacConkey agar. Colonies are magenta in color and pin point. It can grow in the range of 10 to 45°C and survive at temperatures of 60°C for 30 min. It ferments glucose and does not produce a catalase.



Diagnosis plan for *Streptococci spp*