Al-Rasheed University College Second year

Medical Lab Technology Medical Analysis

 Aisst.Lec: Hawraa dawood Microbiology (Practical)

 **THE GRAM POSITIVE COCCI \4\2022**

***Streptococci***

* ****PATHOGENIC SPECIES:**

1. *Streptococcus pyogenes*

2. *Streptococcus agalactia*

3. *Streptococcus faecalis*

4. *Streptococcus pneumonia*

5. The viridans group (*Streptococcus viridans*)

**General Characteristics of streptococci**

1. Gram positive cocci arranged in long chains

2. Includes 100 species **(Normal flora & pathogens)**

3. Colonies are gray to white in color

4. Catalase test **Negative**

**4. Streptococci could be classified based on their hemolytic activity into:**

 **A. Alpha hemolytic**: Greenish zone around colonies due to degradation of hemoglobin, e.g., *S. pneumonia* and *Viridians streptococci.*

** **B. Beta hemolytic:** Complete hemolysis around the colonies. e.g., *S. pyogenes* and *S. agalactiae.*

 **C. Gamma hemolytic (Non hemolytic):** e.g., *S. faecalis* (*Enterococcus faecalis*)

**5. Lancefield grouping** (on the basis of C-carbohydrate antigen in cell wall of

Streptococci)

**Group A** = *S. pyogenes*, **Group B** = *S. agalactiae,* **Group D** = *Enterococci*

**The difference between *Streptococcus* and *Staphylococcus:***

|  |  |  |
| --- | --- | --- |
| **Comparison** | **Staphylococcus species** | ***Streptococcus species*** |
| **Gram stain** | Staphylococcus Images, Stock Photos & Vectors | Shutterstockappear spherical (cocci), and form in grape-like clusters  | Group A streptococcal infection - WikipediaThat live in pairs or chains of varying length  |
| **Catalase test** | Positive result | Negative result |
| **Growth** | Can grow in any types of media: in low or much nuterints,simple&Enriched | Fastidious Microorganism: cannot be easily cultivated in media. Enriched media Ex: Blood, serum |

* **Diseases:**

1. Erysipelas (red skin) 7. Streptococcal sore throat

2. Otitis media 8. Osteomyelitis

3. Septicemia 9. Endocarditis

4. Wound infection 10. Meningitis

5. Sepsis (Scarlet fever) 11. Bronchitis

6. Sinusitis 12. Rheumatic fever

***Streptococcus pyogenes* *Group a beta-hemolytic Streptococci***

**Diagnostic Procedures:**

1. **Gram stain:** Gram positive cocci in long chain and single cell
2. **Culture of specimen:** Beta-hemolytic colony onBlood agar plates
3. **Biochemical and Other tests:**
* **Catalase test** (negative)
* **Bacitracin sensitivity test:** Streak colony on blood agar plate over its surface and Place bacitracin disk in the center of the streaked area, Incubate overnight
	+ - **RESULT**: An inhibition zone of 5mm or greater is considered sensitive.
* **ASOT: Anti-Streptolysin O Titer:** The test is done by performing a serum serial dilutions and reacting these dilutions with the specific antigen suspension and determining the lowest concentration or the highest dilution **(Titer)** that produces a positive results.

 ***Streptococcus agalactia***: **Group B, beta-hemolytic streptococci**

**DIAGNOSTIC PROCEDURES:**

1. **Gram stain:** Gram positive cocci in long chain
2. **Culture of specimen:** On blood agarproduces larger colonies and more translucent to opaque colonies surrounded by a zone of Beta-hemolysis.
3. **Biochemical and Other tests:**
* Catalase negative.
* **Bacitracin resistant:**
* 
* **CAMP test:** This test is done by making a single streak of Streptococcus (to be identified) on sheep blood agar perpendicular to a strain of *Staphylococcus aureus*. The two streak lines must not touch one another. The plate is incubated for **24 hours.**

**The positive result** is expressed by a zone of increased lysis assuming the shape of an arrow-head at the junction of the two streak lines.



**GROUP D STREPTOCOCCI**

**Non-haemolytic or alpha-haemolytic colonies**

 **Two types:**

**1. Enterococci (*E. faecalis*)**

. Normal flora of colon

. Can grow in presence of 7.5% NaCl and bile salts

**Diseases**

° Opportunistic UTI

° Wound infections

**2. Non-Enterococci (*S. bovis*)**

. Can grow in presence of bile salts (not NaCl)

. May cause endocarditis