***11Streptococcus Bacteria* Dr.Younis A.**

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***Streptococci* are gram positive , spherical, pair or chain in form, wide distributed in nature, some of them are members of normal human flora, other are associated with important human disease.**

**Other characteristic …….>\* Most group A, B, and C strains produce capsules.**

***\*Streptococci* grow on solid media as discoid colonies, 1-2mm in diameter , but colonies of capsule producing strains are often mucoid**

***\*Peptostreptococci*  is an obligatory anaerobes**

***\*Streptococci* need enriched media which contain blood or tissue fluid .**

**\* *Streptococci* need 10 % CO2 for its growth and hemolysis at 37 •c**, whereas group D *streptococci* ,(***Enterococci***) grow well at between 15 – 45**•c**.

***Enterococci*** also grow in high (6.5%)NaCl concentration , 0.1% methylen blue and in bile esculin agar.

Most *streptococci* are facultative anaerobes.

***Streptococci*** are catalase negative , one of the most important characteristic of ***Streptococci***  used for identification is the type of hemolysis. There are three type of hemolysis:

1. Alpha hemolysis (α) mean incomplete lysis of RBC, characterized by ((green zone)) round colony on blood agar culture.
2. Beta Hemolysis (β) mean complete lysis of RBC, characterized by (( clear zone)) round colony on blood agar culture.
3. Gamma hemolysis ( γ) ornon hemolysisClassification of **\*\*\*Lancefield classification of *Streptococci* according to type of hemolysis\*\*\***

**A - Beta hemolytic streptococci*:*  Which are arranged into groups** (A-U) (A-H and K-U ) on the basis of antigenic difference in C The carbohydrate of the cell wall , for example group A*- streptococci*

**….*Streptococcus pyogenes* …...causing pharyngitis .**

**Group B –** *streptococci* **……..S.agalactia causing newnatal meningitis, normaly present ingenetal tract of monen.**

**Group D –** *streptococci* Which include:

a- Enterococci , for example *Enterococcus fecalis*

b-Non Enterococci for example *Streptococcus bovis*

***\*Enterococci*  grow in 6.5 % NaCl , while non *Enterococci* inhibit.**

**\* *Enterococci* not killed by penicillin G while non *Enterococci* killed.**

**B-Non- Beta –Hemolytic *Streptococci***

**Some produce no hemolysis , other produce alpha hemolysis example *Streptococcus pneumonia* and viridance group of *streptococci ( S.mitis,***

**The following table showing the main differences between *Streptococcus pneumonia* and viridance group of *streptococci***

***S.* *pneumonia* viridance group of *streptococci***

1- Arranged in pairs 1- arranged in long or short chain

2- Bile soluble (in 2%sodium 2- **non bile soluble**

**deoxycholate)**

3- Sensitive to optichin 3- non inhibited by optichin

4- Capsulated 4- non capsulated

5- Cause pneumonia , meningitis; 5- non pathogenic mostly, and

Respiratory tract infection. **some** of them are normal flora

of oral cavity

6- Alpha hemolysis 6- alpha hemolysis

***C-Peptostreptococci***  : They are grow under anaerobic or microaerophilic condition, produce variable hemolysis; they are member of normal flora of gut and female genital tract.

**Transmission : Most** *Streptococci* are part of microflora of human throat , skin , and intestine but produce disease when gain access to tissue or blood .

**Pathogenesis : Group - A** *Streptococci* (*S.pyogenes)* cause disease by three mechanisms:-

1- Inflammation 2- Exotoxin production 3- Immunologic

Streptococci causes different type of disease but the most common disease diseases are :-

**1- Rhomatoid fever**

**2-Scarlet fever**

3-Endocarditis

4-Pharyngitis

5-Various skin disease ( examples Erysiplas, necrotizing fasciitis and impetigo ).

6-Glumerulonephritis and other urogenetal tract infection like endometritis, and urinary tract infection.

**Diagnosis :**

**Laboratory diagnosis of Streptococcal infection include :-**

**1- Specimens collection , which depend upon the nature of streptococcal infection …., throat swab, pus; or blood for culture.**

**2- direct smear for Gram staining , in which the presence of Gram positive cocci is indicative in specimens collection from site of infection other than regions of normal flora.**

**3- serological test are use for estimation of anti- streptolysin – O (ASO- titer ) and titer of anti- DNase B which are indicative of previous infection in patient suspected having acute glomerulonephritis .**

**4- Isolation of the microorganism by using culture media.**

**The most important species of Streptococci**

*Streptococcus pyogenes* They are aerobic bacteria , on blood agar culture we see beta hemolysis , this microorganism produce several enzymes and toxins which include :-

a- Erythrogenic toxin ,which cause scarlet fever.

b-Streptolysin, which are on two types :- 1-Streptolysin –O (oxygen Labile)

2-Streptolysin –S (oxygen stable)

c-Hyalurodinase which act as a spreading factor

d- Pyrogenic exotoxin A causing Streptococcal toxic shock syndrome

e- Exotoxin B , a protease that rapidly destroy tissue causing necrotizing fasciitis .

2***- Streptococcal agalactia***  ……., They are Beta hemolytic bacteria but with narrow zone of hemolysis.

\*Normally inhibit genital tract of women but under certain circumstances they induce disease in human, like neonate meningitis and endocarditis.

\* It produce pigments under certain circumstances on certain media ( Colombia media).

3***- Streptococcus fecalis ( Enterococcus fecalis)*** \*\* This bacteria are member of flora of the gut so it is a friendly bacteria.

\*\* They are non hemolytic

\*\*\* Also produce sex pheromone which stimulate bacterial aggregation which can be used for differentiation between bacteremia and septicemia.