Lecture 6

Genus Staphylococcus

General characters of Staphylococcus

Staphylococcus are gram positive cocci, non-motile arranged in groups. On nutrient agar, they form colonies white, yellow or golden yellow in color. Their hemolytic capacity is variable. Pathogenic strains produced coagulase, ferment sugar (glucose, lactose, mannitol) with acid production, liquefy gelatin

On the basis of pigment production 3types of staphylococci are identified.

1- *Staphylococcus aureus* produce golden yellow colonies and are pathogenic.
2- *Staphylococcus epidermidis* produce white colonies and are non pathogenic.
3- *Staphylococcus saprophyticus* produce grey colonies and are non pathogenic.

***Staph aureus* (STAPH PYOGENES)**

Morphology they are spherical, (0.8 to 0.9) non motile, non capsulated, non sporing , stain with ordinary aniline dye and are Gram positive. They are arranged in cluster. (grapelike).

Biochemical reactions

They ferment number of sugar producing acid and no gas glucose. Lactose, sucrose, maltose, mannitol. Fermentation of mannitol is important in *staph aureus*. They are catalase positive and coagulase positive. They liquefy gelatin.

Characteristics of pathogenic strain

1) Coagulase positive.
2) Mannitol fermentation
3) *B. hemolysis*
4) Golden yellow pigment
5) Liquefy gelatin.
6) Phosphatase is produced.

Enzyme produced : most strains of *staph aureus* produced these following enzymes .

1) **Coagulase**
2) **Clumping factor**

3) **Phosphatase**
4) **Hyaluronidase**
5) **Deoxyribonuclease**.

Toxins

1) **Haemolysin**. Staph aureus produces at least 3 types of haemolysin known as alpha, beta, and gamma. All haemolysis are sheep red cell rapidly. Alpha haemolysin rabbit and sheep red cell rapidly. Alpha haemolysis is produced by coagulase positive streain and is important in the pathogenesis of infection in man it is leucocidal, cytotoxic, dermonecrotoxic and lethal. It is antigenic and is neutralized by antitoxin.

   Beta haemolysis is produced by staph. Isolated from animal.

2) **Enterotoxin**
3) **Fibrinolysin**:
4) **Lipases**
5) **Proteases**

Pathogenicity: *Staphylococci aureus* the majority of acute pyogenic lesions in man. The staphylococcal lesion is characteristically localized. A staphylococcal disease may be classified as

A) **Cutaneous lesions**

B) **Deep infection**

C) **Food poisoning**

Staph saprophyticus: They are nonpathogenic they may act as opportunist pathogens causing acne pustules, stitch abscess. If resistance is poor they may cause serious illness like septicemia.

It is found as saprophyte and is never pathogenic. On blood agar, they are never hemolytic. They don't ferment sugar and they don't produce toxin or coagulase.