Streptococci

Streptococci is a genus of gram-positive coccus (plural cocci) or spherical bacteria that belongs to the family *Streptococcaceae*, within the order Lactobacillales (lactic acid bacteria).

Important types of *Streptococci* bacteria:

- *Streptococcus pyogenes*
- *S. agalactiae*
- *S. pneumonia*
- *S. mutans*
- *S. bovis*

General characteristics:

• Streptococci are spherical cocci that are gram-positive, formed in chains or pairs, and all Streptococci are negative for catalase (unlike other cocci)

• Oxidase (-), Catalase (+).

• Non-motile, aerobic (optionally anaerobic) and forced non-aerobic, not forming spore.

• Its growth is weak on the usual culture media, but it is better growth when cultured on blood agar, serum or glucose is added.

Streptococci are classified based on:

1. Type of hemolysis on blood culture media (Hemolytic Properties)

2. Serotype of reaction (Lancefield Grouping)

Samples: according to infection, throat swab, C.S.F, sputum, blood, pus.

Laboratory diagnosis:

1) gram stain 2) Blood agar for hemolysis

3) CHO fermentation 4) Bile sensitivity

Bacitracin disk: is a polypeptide antibiotic produced by organisms of the licheniformis group of Bacillus subtilis var Tracy.

It is used to determine its effect of a small amount (0.04 IU or 0.05 IU not higher) on different microorganisms. The presumptive identification of beta hemolytic Group A streptococci from beta hemolytic non-Group A Streptococci is usually done by testing for sensitivity to bacitracin.

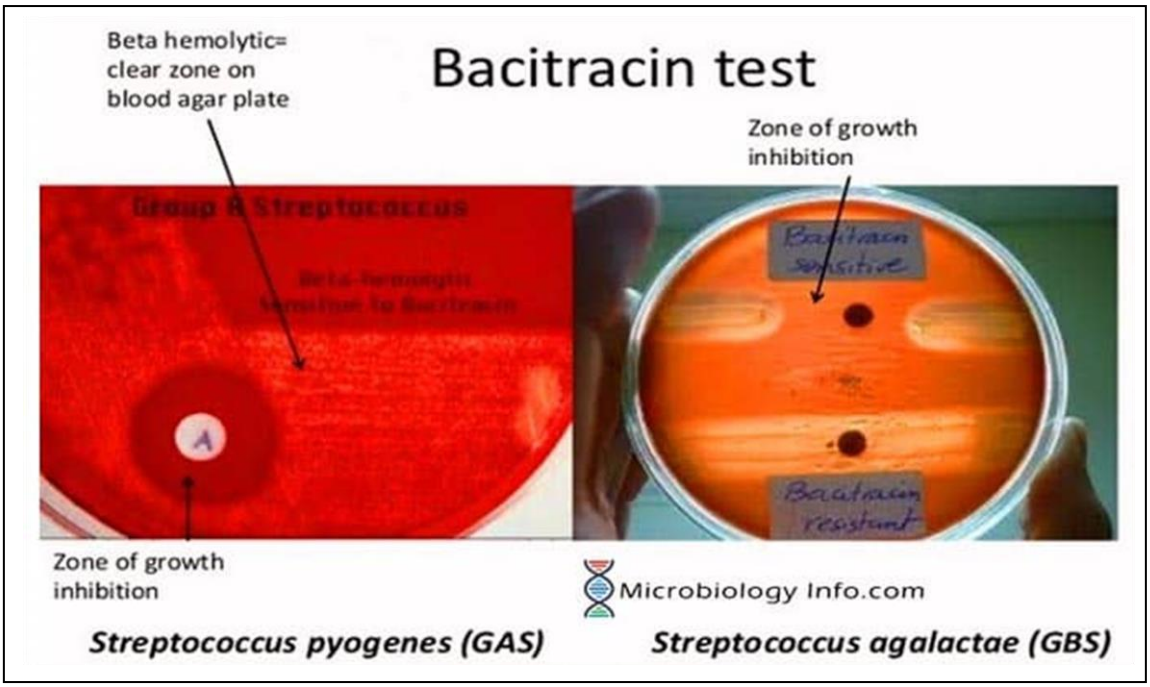
Many laboratories use this test as the sole test for diagnosing GAS infections due to the difficulty in performing sera-grouping and high cost of antisera.

Uses

1) The test is used for presumptive identification and differentiation of beta-hemolytic group A streptococci (Streptococcus pyogenes– susceptible) from other beta-hemolytic streptococci.
2) It is also used to distinguish staphylococci species (resistant) from micrococci (susceptible).

Principle

- The antibiotic bacitracin inhibits the synthesis of bacterial cell walls by interfering the peptidoglycan synthesis of bacteria.
- A disk impregnated with a small amount of bacitracin (0.04 units) is placed on an agar plate, allowing the antibiotic to diffuse into the medium and inhibit the growth of susceptible organisms. After incubation, the inoculated plates are examined for zones of inhibition surrounding the disks.
- If the organism grows up to the edge of the disk, it is resistant to the antimicrobial compound infusing the disk. If there is a zone around the edge of the disk where the organism has not grown, the organism is susceptible to the antimicrobial in the disk.

Method:

1) Using an inoculating loop, streak two or three suspected colonies of a pure culture onto a blood agar plate.
2) Using heated forceps, place a bacitracin disk in the first quadrant (area of heaviest growth). Gently tap the disk to ensure adequate contact with the agar surface.
3) Incubate the plate for 18 to 24 hours at 35°-37°C in ambient air for staphylococci and in 5% to 10% carbon dioxide (CO2) for streptococci differentiation.
4) Look for a zone of inhibition around the disk.