Staphylococcus aureus Characteristics

Staphylococcus aureus is a gram-positive cocci that literally means “golden grape cluster berry,” due to its clustered appearance on Gram stain. It is frequently found as normal flora on the skin and nasal passages, and its presence is usually pathogenic. It can cause a wide range of illnesses, from minor skin infections to life-threatening diseases, such as pneumonia, osteomyelitis and endocarditis. Characteristically, Staph aureus is catalase-positive, meaning it produces the enzyme catalase. This enzyme allows the bacterium to convert hydrogen peroxide to water and oxygen. This characteristic is helpful in distinguishing Staphylococci from catalase-negative streptococci and enterococci. Staph-aureus can also be differentiated from other staphylococcal organisms, like Staph epidermidis and Staph saprophyticus, because it is coagulase-positive. The enzyme coagulase is thought to play a role in clotting plasma and coating the bacterial cell, which may prevent phagocytosis. This organism is beta-hemolytic, which results in a complete lysis of red blood cells in blood culture media. This bacterium contains protein A, which is a structure anchored to the peptidoglycan cell wall. Protein A is an IgG binding protein that binds to the Fc region of the antibody and plays a role in inhibiting phagocytosis. Methicillin-resistant Staphylococcus aureus (MRSA) is strain of Staph aureus that has become resistant to most antibiotics. These strains are often found in hospitals but are becomingly more and more prevalent in community-acquired infections. The mechanism of resistance in MRSA is altered penicillin binding proteins (PBPs). Because of the altered structure, many classes of antibiotics are unable to bind to the bacterium to kill the pathogen.



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Characteristics

Gram-Positive
Graham-cracker Positive-angel
This organism stains positively on Gram stain due to the thick peptidoglycan layer, which absorbs crystal violet.

Cocci
Cockeyed
Coccus refers to the spherical, oval or round shaped type of bacteria. they can be arranged in pairs, clusters or chains. streptococci, staphylococci, diplococci are one of cocci family.

Catalase-Positive
Positive-Cat
Characteristically, Staph aureus is catalase-positive, meaning it produces the enzyme catalase. This enzyme allows the bacterium to convert hydrogen peroxide to water and oxygen. This characteristic is helpful in distinguishing staphylococci from catalase-negative streptococci and enterococci.

Coagulase-Positive
Positive Clogs
Staph aureus can also be differentiated from other Staphylococcal organisms like Staph epidermidis and Staph saprophyticus because it is coagulase-positive. The enzyme coagulase is thought to play a role in clotting plasma and coating the bacterial cell, which may prevent phagocytosis.

Beta-Hemolytic
Beta-fish in Petri-dish
This organism is beta-hemolytic, which results in a complete lysis of red blood cells in the blood culture media.

Protein A Virulence Factor
Protein-strand (A) Apple
This bacteria contains protein A, which is a structure anchored to the peptidoglycan cell wall. Protein A is an IgG-binding protein that binds to the Fc region of the antibody and plays a role in inhibiting phagocytosis.

Inhibits Phagocytosis
Inhibiting-chains on Mac-man
Protein A is an IgG-binding protein that binds to the Fc region of the antibody and plays a role in inhibiting phagocytosis.

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MRSA

MR. Saw

Methicillin-resistant Staph aureus (MRSA) is strain of Staph aureus that has become resistant to most antibiotics. These strains are often found in hospitals, but are becoming more and more prevalent in community-acquired infections.

Resistant to Beta Lactams Due to Altered Penicillin Binding Proteins (PBPs)

(B lac) Black Beta-fish wearing Resistance-bandana altering PBJ-sandwich

The mechanism of resistance in MRSA is altered penicillin-binding proteins (PBPs). Because of the altered structure, many classes of antibiotics are unable to bind to the bacterium to kill the pathogen.

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