Neisseria gonorrhoeae Characteristics

Neisseria gonorrhoeae, also called gonococcus, is a gram-negative diplococci that causes the sexually transmitted infection gonorrhea. Neisseria are fastidious organisms that require nutrient supplementation to grow in laboratory cultures. Specifically, they grow on chocolate agar and can be isolated on Thayer-Martin agar, sometimes called VPN agar. Thayer-Martin agar is an agar plate containing vancomycin, polymyxin and nystatin, and other nutrients that facilitate the growth of Neisseria species, while inhibiting the growth of other organisms. Characteristically, Neisseria gonorrhoeae are oxidase-positive and ferment only glucose. Virulence mechanisms include pili, Opa proteins, and rapid antigenic variation. Pili are used to adhere to mucosal surfaces by extending the pili and retracting after attaching to a substrate, causing the organism to drag forward. They also have surface proteins, called Opa proteins, that bind to receptors on immune cells and play a role in preventing an immune response. Another important virulence mechanism is rapid antigenic variation. Neisseria gonorrhoeae is capable of altering the outer surface Opa proteins, making it difficult to mount a defense.

PLAY PICMONIC

Characteristics

Gram Negative

Graham-cracker Negative-devil

Neisseria gonorrhoeae is a gram-negative bacterium, which does not retain crystal violet dye when Gram stained due to thin peptidoglycan layer.

Diplococci

Double-cockeyes

Diplococci are round-shaped bacterium that typically occur in pairs.

Chocolate Agar

Chocolate-bar

Neisseria are fastidious organisms that require nutrient supplementation to grow in laboratory cultures. Specifically, they grow on chocolate agar, which is an enriched growth medium containing red blood cells that have been lysed, providing growth factors like NAD and hemin. The agar is named for the chocolate color of the medium and does not actually contain chocolate.

Thayer-Martin Media

Thief driving Aston Martin car

Thayer-Martin agar is an agar plate containing vancomycin, polymyxin, nystatin, and other nutrients that facilitate the growth of Neisseria species, while inhibiting the growth of other organisms.

VPN

VPN on license plate

Thayer-Martin agar is also called VPN agar and contains vancomycin, polymyxin, nystatin, and other nutrients that facilitate the growth of Neisseria species while inhibiting the growth of other organisms. This is also known as VCN inhibitor, for the combination of antibiotics it has (vancomycin, colistin, and nystatin).

Oxidase Positive

Ox-daisy Positive

An oxidase test is used to determine if bacteria produce certain cytochrome c oxidases to help differentiate bacteria. Neisseria gonorrhoeae is oxidase-positive.

Glucose Fermenting

Glue-bottle Fern

Neisseria gonorrhoeae can be distinguished from other gram-negative bacteria because the organism is glucose fermenting. However, unlike Neisseria meningitidis, Neisseria gonorrhoeae cannot ferment maltose.

Pilus

Pillars

Pili are used to adhere to mucosal surfaces by extending the pili and retracting after attaching to a substrate, causing the organism to drag forward.

Opa Surface Protein

Throwing plates and saying Opa

Neisseria gonorrhoeae have surface proteins called Opa proteins that bind to receptors on immune cells, and they play a role in preventing an immune response.

Rapid Antigenic Variation

Varied Ant-gems

Rapid antigenic variation is an important virulence mechanism. Neisseria gonorrhoeae is capable of altering its surface Opa proteins, making it difficult to mount a defense.

IgA Protease

(IgA) Apple-goblin with Propeller-ace

An IgA protease is an enzyme that cleaves certain amino acid sequences of proteins including, immunoglobulin A. Neisseria gonorrhoeae releases IgA protease which destroy IgA, leading to increased pathogenicity. Other IgA protease producers include Streptococcus pneumoniae and Haemophilus influenzae type B.