

## Streptococcus Pneumoniae Characteristics

*Streptococcus pneumoniae* is a gram-positive lancet-shaped diplococci that is a major cause of pneumonia, meningitis and otitis media. Characteristically, this bacteria is alpha-hemolytic, which causes dark green colonies on blood agar. It is catalase-negative, which allows it to be distinguished from catalase-positive *Staph aureus*. Strep pneumonia can be differentiated from *Streptococcus viridans* using an optochin test. Strep pneumoniae is optochin-sensitive while Strep viridans is optochin-negative. The bacterium can also be differentiated from Strep viridans because *Streptococcus pneumoniae* is bile-soluble while Strep viridans is not. This organism is encapsulated with a positive Quellung reaction. The capsule acts as a virulence factor for the organism.



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### Characteristics

#### Gram-Positive

[Graham-cracker Positive-angel](#)

This organism stains positive on Gram stain due to thick peptidoglycan layer, which absorbs crystal violet.

#### Diplococci

[Double-cockeyes](#)

This bacterium has a spherical shape and usually occurs as two joined cells.

#### Lancet-Shaped

[Lance](#)

This organism has a distinctive morphology on Gram stain called "lancet-shaped" diplococci.

#### Catalase-Negative

[Negative-cat](#)

Characteristically, *Streptococcus pneumoniae* is catalase-negative, which is helpful in distinguishing *Streptococcus* from *Staphylococcal* species that are catalase- positive.

#### Optochin-Sensitive

[Octopus Sensitive-crying](#)

The optochin test aids in the differentiation between *Streptococcus pneumoniae* and *Streptococcus viridans*. *Streptococcus pneumoniae* is optochin-sensitive, meaning the growth of bacteria is inhibited around an optochin disc, while growth of bacteria that are optochin-resistant will not be affected.

#### Bile Soluble

[Bile Melting](#)

*Streptococcus pneumoniae* can be differentiated from *Streptococcus viridans* based on sensitivity to lysis by bile. *Streptococcus pneumoniae* is bile soluble and will lyse in presence of bile, while *Streptococcus viridans* will not.

### **Alpha-Hemolytic**

#### **Alpha Afro**

This bacteria is alpha-hemolytic, which causes dark green colonies on blood agar. It is caused by hydrogen peroxide produced by bacterium, which oxidizes hemoglobin to green methemoglobin.

### **Polysaccharide Capsule**

#### **Polly-sack Capsule**

This organism has a capsule, which has anti-phagocytic properties.

### **Positive Quellung Reaction**

#### **Positive Quail-lungs**

A Quellung reaction is a biochemical reaction in which antibodies bind to a bacterial capsule, allowing species with a positive Quellung reaction to be visualized under a microscope. *Streptococcus pneumoniae* has a positive Quellung reaction.

### **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. *Streptococcus pneumoniae* releases IgA proteases which destroy IgA, leading to increased pathogenicity. Other IgA protease producers include *Neisseria gonorrhoeae*, *Neisseria meningitidis*, and *Haemophilus influenzae* type B.