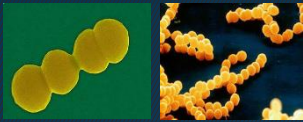


# Streptococcus pyogenes: Biology and Pathogeny



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## Abstract

*Streptococcus* is a genus of spherical Gram-positive bacteria that belong to the phylum Firmicutes. *Streptococcus* species are known for their role as human pathogens, highlighting *S. pyogenes* as one of the most interesting pathogens of humans. However, many species are nonpathogenic and form part of the human microflora. This work is focused on *S. pyogenes* biology and pathogeny.

## Description of *S. pyogenes*

*Streptococcus pyogenes* is a Gram-positive facultative anaerobic bacterium. It occurs as long chains of cocci and produce  $\beta$ -hemolysis. Is classified as Group A *Streptococcus* (GAS). Produce a wide array of **virulence factors**: M protein, lipoteichoic acid (LTA) and F protein for **adherence**; hyaluronic acid capsule for **prevent phagocytosis**; streptokinases, DNases, hyaluronidase and streptolysins for **invasion** and pyrogenic exotoxins acting as **superantigens**. Also present a capsular polysaccharide (C-carbohydrate), an **antigenic component**. To sum up, the surface of *Streptococcus pyogenes* is very complex and chemically-diverse<sup>[1]</sup>. Figure 1.

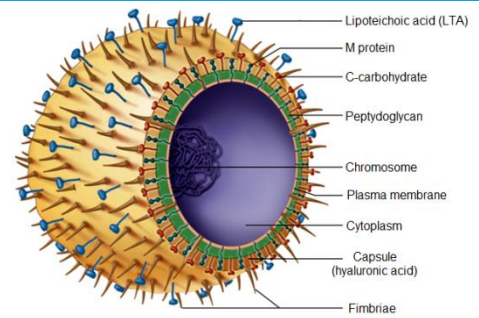


Figure 1. Cell surface structure of *Streptococcus pyogenes*.

## Pathogeny

Suppurative diseases [2,3]		
<u>Throat</u>	<u>Skin</u>	<u>Systemic</u>
Streptococcal pharyngitis (1)	Impetigo	Scarlet fever (3)
	Cellulitis	
	Erysipelas	Toxic shock syndrome
	Necrotizing fasciitis (2)	
Non-suppurative diseases [2,3]		
Rheumatic fever		Acute glomerulonephritis



(1) Streptococcal pharyngitis:  
Sore throat, fever, tonsillar exudates, swollen lymph nodes.



(2) Necrotizing fasciitis: Affected area erythematous and swollen, skin color changes. Also open skin blisters and gangrene.



(3) Scarlet fever: Rash with red spots, sore throat, fever, tonsils with pus, strawberry tongue.

## Treatment

Sensitivity to penicillin and erythromycin of *S. pyogenes* can be used as a possible treatment. However, it is ineffective in mixed infections with *Staphylococcus*, in which cases is used vancomycin. Currently, there aren't effective vaccines and, in severe cases, may be required surgical removal.

## Conclusions

*S. pyogenes* is an important pathogen due to their antigenic structure and the production of exotoxins. It causes suppurative and non-suppurative diseases, and respond well to antibiotic treatment (penicillin). The most dangerous source of dissemination are nasal secretions of a carrier person.

## References

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- <sup>2</sup> Cunningham M. Pathogenesis of group A streptococcal infections. *Clinical microbiology reviews* 470-511 (2000).
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