

# Streptococcus

thumb Streptococci - Gram staining The genus Streptococcus includes primary and secondary pathogenic bacteria. They occur as commensals on the mucous membrane of humans.

- **MORPHOLOGY:** G + cocci in pairs and chains, non-sporulating, immobile.
- **METABOLISM:** negative catalase test, are facultatively anaerobic and microaerophilic, may be capnophilic (CO<sub>2</sub> promotes growth).
- **OCCURRENCE:** on the skin and mucous membranes of the respiratory, digestive and genital tracts as part of the normal microflora.
- **CULTIVATION:** grow on blood agar in small colonies, often with a hemolysis zone; they also grow in liver broth.
- **MATERIAL COLLECTION:** clinical material from purulent infections, cerebrospinal fluid, blood and sputum is collected for diagnosis.

## Distribution

Alpha-hemolytic (right) and beta-hemolytic (left) streptococci growing on blood agar The genus includes a large number of species whose properties are quite different, so they are further divided into:

### 1. According to changes in blood agar

- **beta-hemolytic** (hemolysis)
  - complete disruption of erythrocyte membranes, clearing of the soil around colonies of *Streptococcus pyogenes*, *Streptococcus agalactiae* *Streptococcus dysgalactiae*;
- **alpha-hemolytic** (viridizing) - *Streptococcus pneumoniae*, *Streptococcus mutans*, *Streptococcus salivarius*;
- **gamma-hemolytic** - no changes *Streptococcus bovis*, *Streptococcus urinalis*;

### 2. According to Lancefield

- serologically according to specific antigens
- antigen = specific polysaccharide **substance C**
- demonstrated only in **β-hemolytic** and some viridizing strains
- Antigen A-Z<sup>[1]</sup>

### 3. According to biochemical and physiological characteristics

### 4. According to pathogenicity and place of occurrence

- pyogenic (*Streptococcus pyogenes*, *S. agalactiae*, *S. equi*)
- oral = group of viridators
- enterococci
- lactococci
- **opportunistic** - often members of the normal microflora of humans and animals
- **obligate** - *S. pyogenes*, *S. agalactiae*, *S. pneumoniae*

## Representatives

### Streptococcus pyogenes

Primarily pathogenic, beta-hemolytic coccus in the chains. He belongs to group A (according to Lancefield). He has a rich antigenic structure and forms many extracellular products significant for pathogenicity. Causes respiratory, skin and systemic infections. May cause sterile post-streptococcal consequences -rheumatic fever or glomerulonephritis, which may occur with untreated infections or premature discontinuation of antibiotic.

### Streptococcus agalactiae

Beta-hemolytic coccus belonging to group B (according to Lancefield). It produces the CAMP factor, which is used in the CAMP test. Asymptomatic occurrence in women in the vagina can cause (pneumonia, sepsis, meningitis...), which are often fatal. In older children or adults (especially immunocompromised) it may cause urinary tract infections, pharyngitis and purulent infections of surgical wounds.

### Streptococcus pneumoniae

Occurs in pairs (diplococci). He is the originator of pneumonia, sinusitis, otitis media, meningitis and other diseases.

### Viridizing streptococci

They are a regular part of the physiological microflora of the oral cavity. These include *Streptococcus mutans*, *S. salivarius*, *S. milleri*, *S. sanguinis* and others. *Streptococcus pneumoniae* can also be included here.

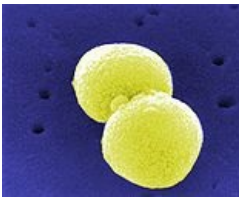
**Streptococcus mutans**

It is the cause of tooth decay.

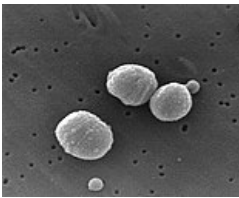
**Picture gallery**

**Alpha-hemolytic streptococci**

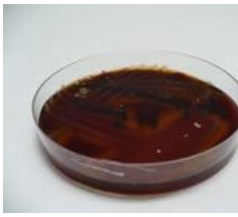
Soubor:Pneumokokl	Soubor:Streptococc	Soubor:Streptococc	Soubor:Streptococc	Soubor:Streptococcus
	pneumoniae.jpg	pneumoniae M-faze-krevni agar.jpg	pneumoniae M-faze-krevni agar-detail hemolyzy.jpg	pneumoniae R-faze-krevni agar.jpg



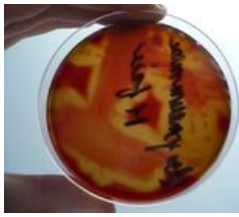
*Streptococcus pneumoniae*



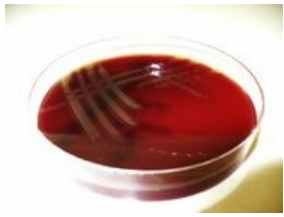
*Streptococcus pneumoniae*



*S. pneumoniae* na krevním agaru, M-fáze



*S. pneumoniae* in blood agar , M-phase, detail hemolysis



*S. pneumoniae* in blood agar , R-phase

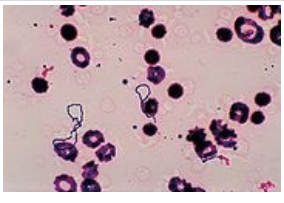
Soubor:Streptococc	Soubor:Streptococc	Soubor:Streptococcus
pneumoniae R-faze-detail hemolyzy.jpg	mutans Gram.jpg	viridans PHIL 2897 lores.jpg



*S. pneumoniae* in blood agar, R-phase, detail hemolysis



*Streptococcus mutans*



*Streptococcus viridans*

**Beta-hemolytic streptococci A and B**

Soubor:Streptococc	Soubor:Streptococc	Soubor:Streptococc	Soubor:Streptococc	Soubor:Streptococcus
pyogenes.jpg	pyogenes-krevni agar.jpg	pyogenes-krevni agar-detail hemolyzy.jpg	agalactiae.jpg	agalatiae-krevni agar.jpg



*Streptococcus pyogenes*



*S. pyogenes* na krevním agaru



*S. pyogenes* in blood agar, detail β-hemolysis



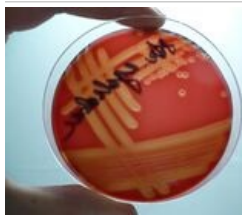
*Streptococcus agalactiae*



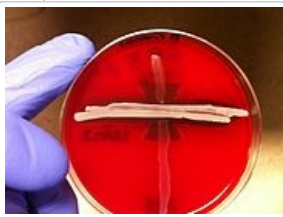
*S. agalactiae* na blood agar

Soubor:Streptococcus agalactiae-krevni agar-hemolyza.jpg

Soubor:CAMP test.JPG



*S. agalactiae* na krevním agaru, detail  $\beta$ -hemolýzy



CAMP test for detection of *S. agalactiae* – in blood agar

## Links

### related articles

- **Streptococcal infections:** Group A streptococcal infection A • Scarlet fever • Sleep angina • Erysipelas • Viral streptococcal infections • Complications and treatment of streptococcal infections • Rheumatic fever

## References

### References \_ \_ \_

1. ↑ JULÁK, Jaroslav. *Introduction to medical bacteriology*. 1st edition. Prague: Karolinum, 2006. 404 pp [https://www.wikiskripta.eu/w/Speci%C3%A1ln%C3%AD:Zdroje\\_knih/8024612704](https://www.wikiskripta.eu/w/Speci%C3%A1ln%C3%AD:Zdroje_knih/8024612704)
2. BEDNÁŘ, Marek, Andrej SOUČEK and Věra FRAŇKOVÁ, et al. *Medical microbiology: Bacteriology, virology, parasitology*. 1st edition. Prague: Marvil, 1996. 558 pp [https://www.wikiskripta.eu/w/Speci%C3%A1ln%C3%AD:Zdroje\\_knih/8023802976](https://www.wikiskripta.eu/w/Speci%C3%A1ln%C3%AD:Zdroje_knih/8023802976)
3. RYŠKOVÁ, Olga, et al. *Microbiology for dentistry students*. 1st edition. In Prague: Karolinum, 2004 [https://www.wikiskripta.eu/w/Speci%C3%A1ln%C3%AD:Zdroje\\_knih/80-246-0834-0](https://www.wikiskripta.eu/w/Speci%C3%A1ln%C3%AD:Zdroje_knih/80-246-0834-0)

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Kategorie:Mikrobiologie Kategorie:Bakterie

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