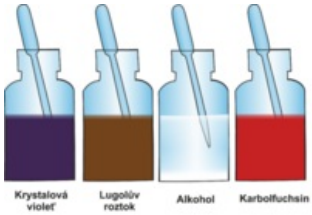
Gram staining

One of the basic stains in microbiology, **gram staining** gave rise to the division of bacteria into **Gram positive (G+)** and **Gram negative (G-)**. This division is based on the different structure of the bacterial wall.

Procedure

The sample or bacterial culture to be examined is applied to the slide and the staining solutions are gradually applied. Allow each solution to work for approximately 1 minute[1]. The procedure is easily remembered by the abbreviation **VLAS (VLAK)**:

- Crystal **V***iolet*
- **L**ugol's solution
- **A**lcohol
- rinse with water
- **S**afranin or **C**arbolfuchsin

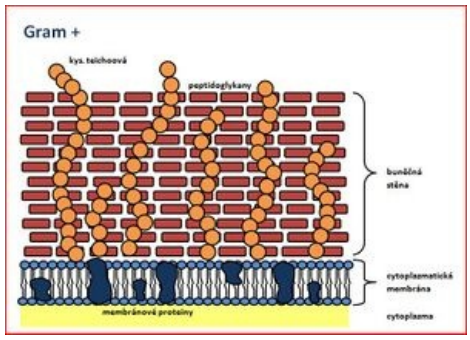


Gram coloring

Positivity and negativity

G+

Gram-positive bacteria have a wall composed of peptidoglycan and polysaccharides through which teichoic acid passes. During staining, the crystalline **violet** enters the cells and forms a **blue** complex color with Lugol's *solution. The alcohol is unable to penetrate the cell wall and dissolve the complex. Safranin staining gives the bacteria a* deep purple *color.*

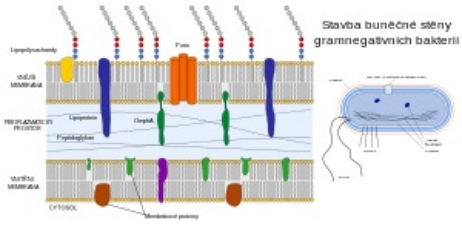


Gram positive

- G+ cocci: *Staphylococcus, Streptococcus, Enterococcus;*
- G+ bacilli: *Corynebacterium, Clostridium, Listeria, Bacillus*.

G–

Gram-negative bacteria have a wall consisting of a thin layer of peptidoglycan and a layer of lipopolysaccharide. In the same process, the third step involves **washing out** of the complex with alcohol and **decolorization**. Safranin stains the bacteria red.



Gram negative

- G- cocci: *Neisseria;*
- G- coccobacilli: *Haemophilus influenzae, Bordetella pertussis, Legionella, Brucella,* etc.
- G- bacilli: *Klebsiella, E. coli, Enterobacter, Citrobacter, Serratia, Vibrio, Pseudomonas, Proteus, Helicobacter pylori, Yersinia, Campylobacter, Salmonella, Bacillus fragilis,* etc.

G labile and non-staining

Some bacteria, especially after long cultivation and multiple passaging, or if they survive the attack of antibiotics against the cell wall (L-forms), can change from G+ to G-.

Bacteria that contain a lot of fatty acids and waxes in their wall (*Mycobacterium tuberculosis*) can not be stained by Gram at all.

Links

Related articles

- Burri staining
- Staining by Giemsa
- Hematoxylin-Eosin staining
- Chromosome staining
- Bacteria

Source

- RYŠKOVÁ, Olga. *Návody k praktickým cvičením z lékařské mikrobiologie.* 1. edition. Praha : Karolinum, 1997. ISBN 80-7184-307-5.

Reference

1. JULÁK, Jaroslav. *Praktická cvičení a semináře z lékařské mikrobiologie.* 2. edition. Praha : Karolinum, 2009. 113 pp. ISBN 978-80-246-1141-9.

Source

- ws:Gramovo barvení