# Prokaryotic cells – Bacteria

## I. Introduction

- the most numerous and ancient inhabitants
- billions of years develop along with eukaryotes
- each prokaryotic cell is an independent organism it lives independently
- adapted to the conditions inhabit all living environments
- for humans

harmful

🥒 eubacteria

🗕 classification 🥧 cyanobacteria

archaebacteria

# II. Eubacteria

## 1. Characteristics

simple organisms

-dimensions 0,2 -2,0 μm

number tens of thousands of species

studied about two thousand species - bacteriology

# 2. Indicators for distinguishing species

- cell shape
- arrangement of cells into cell associations
- presence of flagella
- way of obtaining energy
- -- pigmentation
- pathogenicity





# 4. Cell associations

- during reproduction the cell generations remain united
- --- only in cocci depending on the number of divisions and the plane of division
  - diplococci (pairs)
    - tetracocci (fours)
    - --- streptococci (chain)
    - \_\_\_\_ staphylococci (clusters)
    - \_\_\_\_ sarcines (packages)
  - cause severe human disease

# 5. Bacterial cell structure

a) plasma membrane

$$\in$$

structure - lipids, proteins forms a fold to the cytoplasm - mesosome functions - general membrane functions

b) cell wall



on the plasma membrane structure - polysaccharides (murein), lipids, proteins functions  $\rightarrow$  gives shape



#### 6.2. Respiration

- $\rightarrow$  enzymes that break down organic matter
- $\rightarrow$  get material, energy
- $\rightarrow$  species

heterotrophs - aerobes need oxygen

heterotrophs - anaerobes break down organic matter in an oxygen-free environment production

#### 6.3. Reproduction

One generation lives 20-30 minutes - grow and divide by simple division in the middle zone - mesosome

- a) essence
- the cell lengthens
- the chromosome attaches to the plasma membrane in the middle zone the mesosome
- from the point of attachment duplication of DNA
- cell elongation the two new chromosomes separate
- barrier formation (from the plasma membrane and the cell wall)

b) conditions

- availability of nutrients
- oxygen
- heat
- moisture
- (c) reproductive inhibitors
- antibiotics
- UV rays
- low temperatures



#### 7. Archaebacteria - exist in extreme conditions

- → vacuum
- $\rightarrow$  acid solutions
- ightarrow at a temperature of + 90  $^\circ$  C
- → highly concentrated NaCl solution

## 8. Optional structures



movement in a liquid medium

rotating motion

short projections

large number

help binding to animal cells

## 9. Significance of frequent reproduction

 $\rightarrow$  the hereditary programme changes greatly under the influence of the environment - mutations occur and a new type of bacteria is formed

- $\rightarrow$  quick adaptation
- $\rightarrow$  fighting them is difficult

## 10. Endospores

 $\underline{reason}$  unfavourable conditions  $\rightarrow$  lack of nutrients

∖vdrought, cold

formation \_\_\_\_\_ cell processes stop

## viability of spores

• spore formation is not a form of reproduction, as only one spore is formed from one

bacterium

## 11. Methods of destruction



• chemicals  $\rightarrow$  70% alcohol

 $\rightarrow$ 5% iodine tincture