

MORPHOLOGY OF MICROORGANISMS.*Nurova Hikoyat Kenjayevna**Bukhara State Pedagogical Institute**nurovahikoyat94@mail.ru*

Abstract: This article provides general information on the morphology (external structure) of microorganisms and the systematics of prokaryotes. The article presents the main morphological features of microorganisms, such as the structure of the cell wall, organelles and cell membrane. The systematics of prokaryotes, namely bacteria and archaea, is also analyzed. The differences between bacteria and archaea, their ecological conditions and how genetic features are distinguished in systematics are considered. The article reveals the importance of modern classification methods in microbiology and genetics.

Keywords: Microorganisms, morphology, prokaryotes, bacteria, archaea, cell devoir, flagellum, fimbriae, systematic classification, gram-positive bacteria, gram-negative bacteria, ribosomal RNA.

Аннотация: В статье представлены общие сведения о морфологии (внешнем строении) микроорганизмов и систематике прокариот. В статье представлены основные формы микроорганизмов, морфологические особенности, такие как строение клеточной стенки, органы движения и клеточная мембрана. Также анализируется систематика прокариотов, то есть бактерий и архей. Рассмотрены различия бактерий и архей, условия их среды обитания, а также особенности выделения их генетических характеристик в систематике. В статье раскрывается значение современных методов классификации в микробиологии и генетике.

Ключевые слова: Микроорганизмы, морфология, прокариоты, бактерии, археи, деувар клеток, жгутики, фимбрии, систематическая классификация, грамположительные бактерии, грамотрицательные бактерии, рибосомальная РНК.

Anotatsiya: Ushbu maqola mikroorganizmlarning morfologiyasi (tashqi tuzilishi) va prokariotlarning sistematikasi haqida umumiy ma'lumotlar taqdim etadi. Maqolada mikroorganizmlarning asosiy shakllari, hujayra devori tuzilishi, harakatlanish organlari va hujayra membranasi kabi morfologik xususiyatlari keltirilgan. Shuningdek, prokariotlar, ya'ni bakteriyalar va arxeylar sistematikasi ham tahlil qilinadi. Bakteriyalar va arxeylar o'rtasidagi farqlar, ularning ekologik sharoitlari va genetik xususiyatlari tizimatikada qanday ajratilishi ko'rib chiqiladi. Maqola mikrobiologiya va genetikada zamonaviy tasniflash usullarining ahamiyatini ochib beradi.

Kalit so'zlar: Mikroorganizmlar, morfologiya, prokariotlar, bakteriyalar, arxeylar, hujayra devoir, vayllus (flagellum), fimbrialar, sistematik tasniflash, gram-musbat bakteriyalar, gram-manfiy bakteriyalar, ribosomal RNA.

Introduction

Microorganisms are invisible organisms that come in many different shapes and sizes, and their morphology (external structure) and systematics are one of the main areas of biology and microbiology. The morphology and systematics of microorganisms are important for understanding their evolution, ecology, and interactions. This article provides detailed information on the external structure of microorganisms and the systematics of prokaryotes (bacteria and archaea).

Morphology of Microorganisms

Microorganisms have various morphological features, and they can come in many shapes and structures. The external structure of microorganisms mainly differs depending on their cell shape, size, cell wall structure, locomotor organs, and other structures.

1. Cell Shape

Microorganisms have various shapes and structures, and their main shapes are as follows:

Cocci: Cocci are round or spherical microorganisms. They often form groups with each other. Cocci are divided into two types:

Tetrad: Groups of 4 cocci (e.g. *Micrococcus*).

Diplococci: Groups of 2 cocci (e.g. *Streptococcus pneumoniae*).

Staphylococci: Random groups of cocci (e.g. *Staphylococcus aureus*).

Bacillus (Bacilli): Bacilli are bacteria that are straight or curved cylindrical in shape. Their length is often greater than their width (e.g. *Escherichia coli*, *Bacillus subtilis*).

Spirilla (Spirochetes or Spirochetes): Spirals are microorganisms that are spiral or coiled in shape. They are often motile and can be either liver-shaped or spiral-shaped (e.g. *Treponema pallidum*, *Helicobacter pylori*).

2. Cell Wall Structure.

Microorganisms are divided into two main groups based on the structure of their cell walls: gram-positive and gram-negative bacteria. The cell wall serves as a defense mechanism for microorganisms and allows them to adapt to their environmental environment.

Gram-positive bacteria: Their cell wall consists of a thick peptidoglycan layer and is often stained blue. Examples of this type of bacteria are *Staphylococcus aureus*, *Bacillus subtilis*.

Gram-negative bacteria: Their cell wall has a thin peptidoglycan layer and has a lipopolysaccharide (LPS) layer on the outside. They are usually stained red. Bacteria such as *Escherichia coli*, *Pseudomonas aeruginosa* are known as gram-negative bacteria.

3. Organelles of movement Some microorganisms are able to move. Organelles of movement can be: Flagellum: A flagellum is a long, thread-like organelle of bacteria. They provide movement, and some bacteria have one or more villi.

Fimbriae: Fimbriae are microscopic long, thin, and sometimes non-motile fibers that help bacteria adhere to surfaces. Fimbriae play an important role in bacterial interactions and specific ecological niches.

4. Cell Membrane

The cell membrane of microorganisms is a structure made of phospholipids and proteins that provides communication between the cell and the external environment. The membrane contains proteins, enzymes, and other structures that play an important role in metabolism,

energy production, and regulation of the internal environment of the organism.

Systematics of Prokaryotes

Prokaryotes are microorganisms that do not have a cell nucleus and are divided into two main groups: Bacteria and Archaea. Prokaryotes are classified based on morphology, ecology, biochemistry, and molecular structure.

1. Bacteria

Bacteria are the most common prokaryotes in the world, and they live in a wide range of environmental conditions. Bacteria can come in a variety of shapes and sizes. They are divided into two main groups as gram-positive and gram-negative bacteria. The main classification criteria for bacteria are:

Shape: Cocci, bacilli, spiral bacteria.

Mode of nutrition: Autotrophs and heterotrophs.

Chemical properties: Metabolism, enzymes, and energy production.

2. Archaea

Archaea are another type of prokaryotes that live in many extreme conditions, such as high temperatures, high salt environments, or acidic environments. Archaea are evolutionarily closer to eukaryotes than to bacteria. Archaea are divided into the following types:

Methanogens: Organisms that produce methane.

Thermophiles: Organisms that live at high temperatures.

Halophiles: Organisms that live in high salt conditions.

3. Prokaryotes in systematics:

The main criteria for classifying prokaryotes are:

Morphology: Cell shape, size, cell wall structure.

Biochemistry: Nutrition, enzymes, and metabolism.

Genetic characteristics: DNA composition, ribosomal RNA (rRNA) analysis, molecular biology.

In systematics, the classification of prokaryotes is currently more precisely determined using molecular biology and genetic analysis. Ribosomal RNA analysis identifies the differences between bacteria and archaea and distinguishes them from each other.

Conclusion

The morphology of microorganisms and the systematics of prokaryotes are one of the important areas of microbiology and biology. The external structure and systematics of microorganisms are necessary for a better understanding of their ecological, evolutionary, and genetic characteristics. Identifying the differences between bacteria and archaea and refining their classification is important for scientific research, and is widely used in the fields of microbiological diagnostics, medicine, and ecology.

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