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The discovery of the microscope in the development of the theory of the cell

Jumayeva Dilnoza Abdusattor qizi
Denov Institute of Entrepreneurship and Pedagogy, student of Biology
jumayevad34@gmail.com

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Abstract: Plant cytology (Greek. —cytos-cell) studies plant cells, their structure, organs and their functions. All living organisms are divided into two major kingdoms based on their cell structure: prokaryotes and eukaryotes. Cells of prokaryotic organisms reproduce by simple division, while cells of eukaryotic organisms divide by mitosis and meiosis. One of the most important characteristics of a cell is its diversity and similarity. Cytoplasm and nucleus are the main elements of the cell, in addition, plastids, mitochondria, ribosomes and other organoids are embodied.

The development of the doctrine of the cell is connected with the discovery of the microscope. The first microscope device created by Galileo in 1609 consisted of a lens and a lead tube. The first information about the cellular structure of plants was invented by the Dutch brothers (Hans and Zacharius) Jansen in 1610. A true optical mirror microscope (Greek: —micros-small, small, —skopea-see) came later. The optical microscope was improved by the English scientist Robert Hooke (1635-1703). In 1665, he examined the structure of the stem bark of plants such as shivit, sugarcane, and coral (buzina) with the microscope he invented, and determined that they have a cellular structure, and published his "Micrographical" work. In this work, he calls the cell ``cellula" , that is , ``cell".

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Prokaryotic cells from eukaryotic cells is that their genetic material is located in the cytoplasm, and the genoform (Greek gene - birth, origin, form) carries the genetic characteristics of the cell.

Eukaryotic (Greek. eu-true, karion-nucleus) cells have a complex structure and a true nucleus. Their genetic material is surrounded by a double-layered membrane, the nuclear envelope. Eukaryotic cells are larger than prokaryotic cells.

One of the most important characteristics of a cell is its diversity and similarity. Cytoplasm and nucleus are the main elements of the cell, in addition, plastids, mitochondria, ribosomes and other organoids are embodied.

Cell skin (shell). The cell of higher plants is surrounded on the outside by a very hard shell. It is a product of the cytoplasm. This skin gives a certain shape to the cell and protects it from unfavorable factors of the external environment. Only gametes, spores, and some bottom plants, archimycetes, and slimes do not have skin. The cell membrane consists of three parts: the middle plate (substance between the cells) or the middle layer, and the primary cortex, which belongs to both cells located on either side of it, so that the middle layer is located in between. sticks them together. If the primary cortex has a crystalline structure, the middle plate located between them has an amorphous colloidal structure, and they act as a buffer between the cells, that is, they soften the impact of two cells on each other, promote

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their growth. does not prevent. The middle plate is made of protopectin substance. When the middle plate is broken, tissue cells separate from each other, this phenomenon is called **maceration**. Also thickening of the cell membrane depending on the nature of the cell is to accumulate carbohydrates, such as starch and protein.

Core. The nucleus is a large organelle that is an important component of the cells of eukaryotic organisms. It mainly performs two important tasks: 1) checks the vital processes of the cell by determining which protein should be synthesized and when; 2) preserves genetic traits in the cell and transfers them to young cells when the cell divides, and controls the exchange of substances, growth, development and all other processes.

Cytoplasm is a part of the protoplast and is delimited from the cell envelope by a membrane - the plasmalemma - from the vacuole by a second membrane - the tonoplast. It is a clear, colorless colloidal substance. Cytoplasm hyaloplasm contains plastids performing special tasks, Golgi apparatus, endoplasmic reticulum, mitochondria and other organoids (Greek: organon - member, eidos - net). The biological membrane, which forms the basis of the cytoplasm, is in the form of a dense thin membrane, composed of phospholipids and proteins - lipoproteins.

The specific gravity of the cytoplasm is between 1.025-1.055, and sometimes it can be very low (1.010) or very high (1.060). It refracts sunlight more than water, so it looks better under a microscope.

Golgi complex. Another important organelle in the cell cytoplasm is the Golgi apparatus. It was first recorded in 1898 by the Italian cytologist Golgi and called it dictyosomes. The Golgi apparatus found in plant cells is often in the form of flat granules, which in turn combine into a column. The diameter of the column is 1 nm, and the thickness is 20-25 nm. They are located parallel to each other in the dictyosomes. Dictyosomes are more abundant in dividing and growing cells than in cells that are relatively quiescent. Golgi apparatus has a great service in regulating the water balance in the cell, collecting waste and toxic substances in the cell, and forming the cell vacuole. The Golgi apparatus also participates in the synthesis of carbohydrates in the formation of lysosomes and cell membranes.

Ribosomes. Ribosomes are small particles with a diameter of 17-23 nm, consisting of a double amount of protein and RNA, which are always found in hyaloplasm. If the ribosomes are located individually in the cell - monosome, if they are located in a group - it is called a polysome. In the cells of eukaryotic organisms, ribosomes are the center of protein synthesis. The endoplasmic reticulum is located in the inner part of the cytoplasm, with a single membrane It is an organoid consisting of a system of delimited vacuoles and tubules. Endoplasmic reticulum is divided into granular and smooth forms according to its morphological structure and function.

Mitochondria. Mitochondria (Greek, —mitos- thread, —chondrion- granule) are filamentous or granular organoids, present in the cytoplasm of various cells of animals and plants. Mitochondria were first discovered in plants (under the name of chondriosome) in 1904 by Meves in the tapetum cell of anthers. Mitochondria are found in all systematic groups of plants. Only prokaryotic organisms do not have mitochondria. The morphological characteristics of mitochondria are similar in different plant organisms, and they act as granules, rods, granules, and long or short filaments. Mitochondria vary in shape and size. In most cells, the thickness of the system is relatively constant (about 0.5 μm), and the length reaches a maximum of 7 μm. But depending on the functional state of the cell, it is possible to find very thin (0.2 μm) or very thick (2 μm) rod-shaped mitochondria.

Vacuoles. Common to all plant cells. They are filled with cell sap. In young plant cells, vacuoles are small and numerous, and in mature cells they occupy about 90 percent of the cell. The increase in the

size of the cell depends on the growth of the vacuole. The chemical composition of the cell sap differs from that of the protoplast. The concentration of ions in the cell sap is higher than the concentration in the cytoplasm.

Plastids. Plastids are a permanent cell organelle of a green plant cell. Fungi, bacteria, slimes, and blue-green algae do not have plastids. Plastids were discovered by A. Levenguk. In 1676, he discovered the presence of plastids in the cells of spirogyra algae. Plastids are divided into three groups.

Leukoplasts. Leucoplasts are found in most cells of most plants, embryonic tissue cells, cytoplasm of spores and female gametes, seeds, buds and roots, bulbs and epidermis of monocotyledonous plants.

Chloroplasts. Chloroplasts are found on the surface of plant organs: mainly leaves, partially stems, flowers, fruits and seeds. Chloroplasts contain enzymes that synthesize proteins, fatty acids, and phospholipids, the substances that control the process of photosynthesis.

Chromoplasts. Chromoplasts were first identified in 1837 by I. Berselius, and later in 1885 by A. Schimper. Chromoplasts are mainly red and brown. These types of plastids do not undergo photosynthesis.

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