USE OF MENTAL MAPS IN TEACHING THE SUBJECT “CYTOPLASM ORGANOIDS (with a single-layer membrane) - STRUCTURE OF THE ENDOPLASMIC RETITUDE, LYSOSOMA, GOLGI APPARATUS AND PEROXISOMA”

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Annotation: The article is used in the teaching of cytology, histology and embryology to students of biology education at higher educational institutions on the topic "Cytoplasmic organoids (single-layer membrane) - structure of endoplasmic reticulum, lysosome and Golgi apparatus and peroxisome" and students focused on issues of making mental maps in strengthening cognitive activity.

Key words: endoplasmic reticulum, lysosome, Golgi apparatus, membrane, mental map.

Enter

Today, modern education is an integral and integral part of the pedagogical process, which serves to educate a mentally and physically well-rounded person in accordance with the purpose of science.

Pedagogical conditions for the organization of the biological education process through the development of a modern educational system based on the competence approach, the organization of the learning activities of students in accordance with didactic goals through the effective application of educational technologies that develop the educational process we will achieve the formation of students' competences related to science.

With the help of mental maps, the right and left hemispheres of the brain work well. Mind map, mind map, mental map, associative diagram, thinking scheme, associative map are all just a few names of the way we organize our personal thoughts. Usually we think with associations from the center to the side. In this process, there is a single central idea, from which connecting threads lead to other associations, and from them to others. It reminds me of a tree in some way.

Its body is the central idea, and its branches are the ideas that arise from it. A mental map is created in this way. There is no single rule about how it should be. The main task is to define the main idea, with the help of associations, many links can be created. With the help of mental maps, it is possible to learn a new topic and to strengthen the previously learned topic.

Research methodology

Creating a mental map has several stages:

1. Create a main idea and idea
2. The first level is creating topics
3. Development of the second level of subjects
4. Clarify the topic

Analyzes and results

We want to study the subject of single membrane organoids from the science of cytology, histology and embryology. Basically, we get single-layer membrane organoids. Then we divide it into clauses depending on the type. Then we clarify these clauses. You can give a complete description of a new topic through the created mental map.

Single-layer membrane organelles include: endoplasmic reticulum, lysosome, Golgi apparatus, and peroxisomes.

Endoplasmic reticulum. In 1945, using an electron microscope, this cell organoid was discovered by Porter to have a fine mesh in the mesoplasm of cells stained with osmium tetraoxide, and named it endoplasmic mesh. Some time later, Pallade and Porter discovered that the endoplasmic reticulum is a complex network of interconnected microscopic tubules, vesicles, and cisternae. An elementary membrane forms the wall of the endoplasmic reticulum system. The thickness of the membrane is around 70 A^0, and the inner diameter of the round channels is 300-500 A^0. The surface of the endoplasmic reticulum membrane is smooth and rough. Granular, smooth areas are called smooth reticulum due to the adhesion of ribosomal granules with a diameter of 100-150 Angstroms to the surface of the membrane.

Function: The granular (granular) endoplasmic reticulum performs the function of protein and enzyme production. Granular endoplasmic reticulum is well developed in protein-producing cells. According to many scientists, the smooth endoplasmic reticulum is primarily involved in the synthesis, aggregation and transport of lipids and carbohydrates.

Lysosomes. Lysosomes were isolated from acid phosphatase in 1955 by De Duve et al. These enzymes include glucordinase, sour ribonuclease, sour deoxyribonuclease and cathepsins. Lysosomes are characterized by the presence of digestive enzymes in a latent (hidden) state, which is primarily due to the membranes that surround them. . According to the current scientific results and according to the morphological aspect of lysosomes, they are divided into the following groups: primary lysosomes, secondary mesosomes, autophagosomes and telolisosomes (residual bodies).

Function: Lysosomes are vacuole-like organoids that have enzymes necessary for the body to break down proteins and nucleic acids inside the cell and to regenerate them. Enzymes in lysosomes break down various substances entering the cell.

Golgi apparatus. In 1898, the Italian microscopist K. Golgi, using the properties of heavy metal (silver and osmium) mixtures, identified a reticular structure in nerve cells and called it "internal reticular apparatus". There are two structural states of the Golgi apparatus: reticular and consisting of separate structures typical for plant cells - diffuse form. With the help of an electron microscope, it was found that the Golgi apparatus consists of three different sections:

1. Cys section - consists of cisternae surrounded by a smooth membrane and located near the nucleus. In them, transit proteins are phosphorylated and move to the medial compartment. Tanks are constantly updated here. They are formed from smooth endoplasmic reticulum.

2. Medial section - consists of small vesicles located at the ends of cisternae, transit proteins undergo changes and move to the trans section.

3. Trans section - consists of expanded cisternae and vacuoles located in their central part, located close to the plasma membrane.

Function: One of the main functions of the Golgi apparatus is the secretory function. Membrane vesicles of the Golgi apparatus take part in the accumulation, chemical transformation and maturation of the synthesized product in the endoplasmic reticulum. Synthesis of polysaccharides and mucoproteins takes place in the cisterns of the Golgi apparatus, and most importantly, secretion products are released from the cell with the participation of the Golgi apparatus.

Peroxisomes. Peroxisomes are very small structures (0.1–1 μm in diameter) with a fine granular matrix. Peroxisomes are surrounded by a membrane. Peroxisomes contain oxidases and catalases, which ensure the vitality of the organism. The number, size, and protein content of peroxisomes are variable, depending on the cell type and environmental conditions. For example, when baker's yeast is well supplied with glucose, only a few, tiny peroxisomes are observed. 20 to 25 large peroxisomes have been found when yeasts are supplied with very long-chain fatty acids.

Function: The primary function of the peroxisome is to break down very long-chain fatty acids by β-oxidation. In animal cells, long-chain fatty acids are converted to medium-chain fatty acids, which are then transported to the mitochondria and eventually broken down into carbon dioxide and water. In fungi and plant cells, this process takes place only in peroxisomes.

Conclusions

Thus, if we explain and reinforce the topic with the help of mental maps, we will make the students think logically, develop the acquired knowledge, skills and abilities of the students, and increase their interest in the lesson.

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