Al-Mustaqbal University

Department of Optics Techniques

Biology

First stage

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Definition of Biology

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Biology

Definition of Biology:- is a natural science concerned with the study of life and living organisms, including their structure, function, growth,evolution, distribution, and taxonomy. The word biology is derived from Greek origin: Bio means life and logy means science or the study of living things.

The importance of Biology

.Improved understanding on functions of organisms.

.Improved understanding on causes of disease.

.Finding treatment for diseases.

.Improved understanding on ecology.

.Better management on environment problems.

.Improved quality and production of food.

Branches of Biology:

1-Morphology: study the external structure of the body.

2-Embryology: The study of formation and development of embryo

3-Anatomy : study the internal structure of the organisms.

4-Cell biology :study the compositions of the cell, and functions of its organelles

5-Immunobiology :a study of the structure and function of the immune system, innate and acquired immunity, the bodily distinction of self from non self, and laboratory techniques involving the interaction of antigenswith specific antibodies.

6-Microbiology: the branch of biology that deals with microorganisms and their effects on other living organisms.

7-Molecular Biology :the branch of biology that deals with the formation, structure, and function of macromolecules essential to life ,such as nucleic acids and proteins, and especially with their role in cell replication and the transmission of genetic information.

8-Mycology - the study of fungi.

9-Parasitology - the study of parasites and parasitism

10-Pathology - the study of the nature of disease and its causes, processes ,development, and consequences

11-Physiology - the biological study the functions of living organisms and their parts

12-Virology - study of viruses

13-Histology: microscopic study of the types of tissues that form the body organs.

14-Genetics:A branch of biology that deals with the heredity and variation of organisms.

Classification of living organisms:

Taxonomy: it deals with classification of different organism to groups. The term taxonomy is derived from two Greek words (taxis) means arrangement, (nomos) means low.Robert Whittaker In 1968, Whittaker's classification scheme recognizes five kingdoms: Monera ,Protista, Fungi, Plantae, and Animalia.

1-The kingdom Monera : The kingdom Monera includes the bacteria and the cyanobacteria. These one celled organisms are prokaryotic. Prokaryotic organisms have neither nucleus nor organelles in their cytoplasm, possess only a single chromosome, have small ribosomes, and reproduce by simple fission. Many of the organisms (called autotrophic) can synthesize their own foods, and some (called heterotrophic) digest preformed organic matter.

2-The kingdom Protista: The second kingdom, Protista, includes the protozoa, the one-celled algae. The cells of these organisms are eukaryotic. They are unicellular, and they may be autotrophic or heterotrophic. Eukaryotic organisms have a nucleus and organelles in their cytoplasm, possess multiple chromosomes, have large ribosomes, and reproduce by mitosis.

3-The kingdom Fungi : The third kingdom, Fungi, includes the yeasts, molds, mushrooms, and other similar organisms. The cells of this kingdom are eukaryotic and heterotrophic. Some fungal species are unicellular, whereas other species form long chains of cells and are called filamentous fungi. A cell wall containing chitin or cellulose is found in most members. Food is

taken in by the absorption of small molecules from the external environment.

The kingdom Plantae

The fourth kingdom is Plantae. Classified here are the ferns, and seed producing plants. All plant cells are/eukaryotic and autotrophic. The organisms synthesize their own foods by photosynthesis, and their cell walls contain cellulose. All are multicellular.

The kingdom Animalia The final kingdom, Animalia, includes animals. Animals without backbones (invertebrates) and with backbones (vertebrates) are included here. The cells are eukaryotic; the organisms are heterotrophic. All animals are multicellular, and none have cell walls. such as sponges, hydras, worms, insects, starfish, reptiles, amphibians, birds, and mammals. The feeding form is one in which large molecules from the external environment is consumed, then broken down to usable parts in the animal body.

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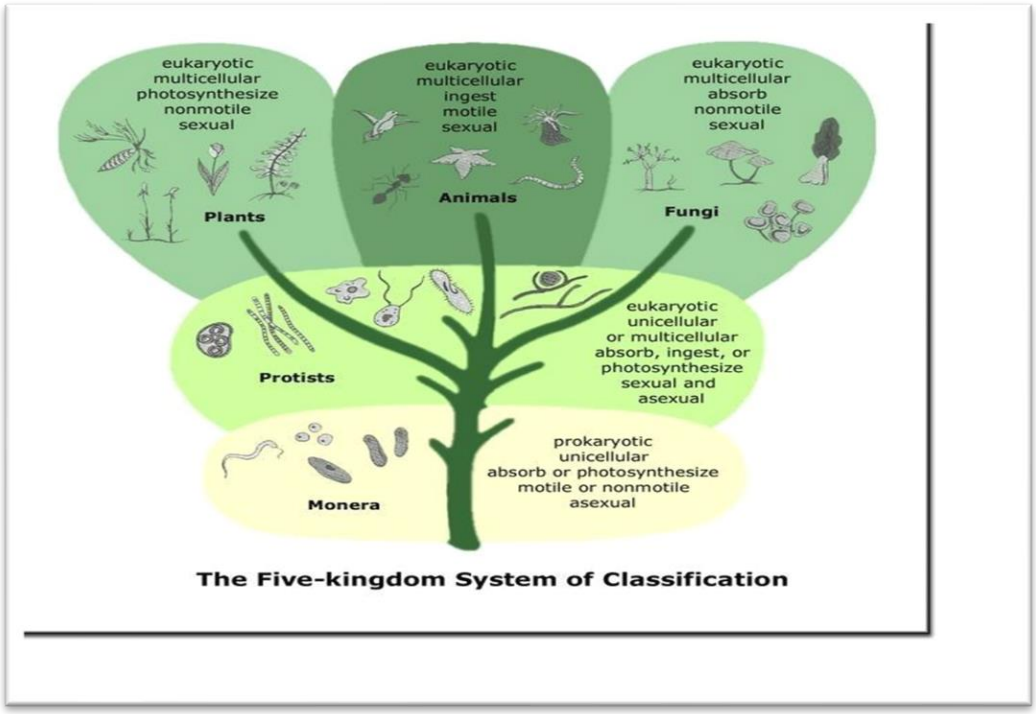

Fig: Classification of organism by Robert Whittaker

How are organisms placed in their kingdoms? depending on:

1.Cell type , complex or simple .

2.Their ability to make food.

3.The number of cells in their body.

4.Type of nuclear material .