MEDICAL BIOLOGY

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Week 1

A- Definition of Biology and Some Biological Concepts
B- Branches of Biology
C- Common and Typical Characteristics of Living Beings

Definition of Biology and Some Biological Concepts

Biology (bios [life] + logy) is:

- the science of life or living matter in all its forms, especially with reference to origin, growth, reproduction, structure, and behavior.
- a science that deals with things that are alive (such as plants and animals)
- Biology is the study of life and living organisms, from one-celled creatures to the most complex living organism of all — the human being. *Biology* includes the study of genes and cells that give living things their special characteristics

In more detail:

"Biology is a science that examines the evolutional history of living beings, their structures - from one-celled creatures to the most complex living organism – their life-sustaining activities, their behaviours, relationships and interactions both with each other and also with the environment and also their capabilities".

BRANCHES OF BIOLOGY

Living beings are divided into two big groups as Plant Kingdom (Regnum Vegetabile) and Animal Kingdom (Regnum Animale). The branch of science examining the Animal Kingdom is called **Zoology** and the branch of science examining the Plant Kingdom is called **Phytology** (Botany).

These two important and big branches of biology are divided into sub-branches to examine the plants and animals in respect to morphology, anatomy, cytology, histology, embryology, ecology, genetics, physiology and systematics. **Common** sub-branches of Botany and Zoology are as follows:

1. **Morphology (morph [form] + logy):** Examines the living beings in respect to their structures. It also has some sub-branches:

a) **Cytology (cyto [cell] + logy)**: The science dealing with cells. Examines the microscopic structures of cells.

b) **Histology (histo [tissue] + ology)**: The science dealing with tissues. Examines the microscopic structures of tissues.

c) **Anatomy (ana [up] + tome [to cut])**: Macroscopically examines the visible internal and external properties of an organism.

d) **Organography**: The science dealing with organs. Examines the structure of the organs of living beings.

e) **Embryology (embryo + logy)**: Examines the embryological developments starting from the formation of a zygote to the formation of an independent living being.

2. **Physiology (physio [nature] 4 logy):** It is the science of the normal function of living things. Examines the activities of vitality and functions of the organs and organ systems.

For example:

- *Metabolism (nutritional) physiology*
- *Growth physiology*
- *Physiology of motion etc*

3. **Molecular Biology:** Examines the structure of genes (structures containing the genetic materials) and the biological events occuring under the control of the genes (e.g. metabolic events such as protein synthesis, hormone synthesis etc.) at the molecular level.

4. **Genetics:** Examines inheritance of genetic characters from generation to generation, the fundamentals of genetics and genetic disorders.

5. **Evolution**: Examines the changes and the origins of these changes that living being has gone through from their simplest form to their current status as individuals and as population.

6. **Systematics (Taxonomy (taxis [arrangement] + nomia [method])**: Deals with the classification of living beings.

7. **Pathology (patho [suffering - disease] + logy)**: Examines the diseases and abnormal structures of the organism.

8. **Microbiology (micro [small] + logy)**: Examines microscopic living beings like viruses, rickettsia, bacteria and protozoa.

9. **Ecology (oikos [house] + logy)**: Examines the relationships of living beings with the environment that they live in.

10. **Sociology (social + logy)**: Examines the social lives of living beings.

11. **Paleontology (Archeobiology)**: The science of fossils. Examines the living beings that had lived in the geological periods and became extinct with the help of their remnants (fossils).

12. **Teratobiology (Teratology)**: Morphologically examines a living being that has formed with a genetic defect; it also examines the reasons of the formation of this defect and the methods of prevention.

13. **Immunobiology (Immunological Biology):** Examines the ability of an organism to recognize the causes of diseases and to resist them, it also deals with the prevention of the disease.