ROBO DYNAMICS

Session 1
Fundamental Unit of Life

Session Objectives

- Cell
- Cell Theory
- Types of Cell & Organism
- Cell Shape
- Cell Size
- Components Of Cell
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Cell

- All living forms are composed of microscopic units called as “Cells”.
- A cell is the basic structural and functional unit of all life forms.
- Study of structure and composition of cell is called as “Cytology”.
- Cell was first observed by “Robert Hooke” in a dead cork slice in the
- year 1665. He described about
- this in his book “Micrographic”.
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Cell

- The word cell was derived from a Greek word “Cellulae” which means
- small room.
- First living cell was discovered by A.V. Leeuwenhoek.
- The term protoplasm was coined by purkinje in 1839.
- Protoplasm was discovered by “Felix Dujardin” and named as sarcode.
- It’s consistency differs under different condition. It exists in sol-gel states.
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Cell

- Protoplasm is an aggregate of various chemicals such as water, ions,
- salts and other organic molecules like proteins, carbohydrates, fats,
- nucleic acids, vitamins etc.
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Cell Theory

- Two biologists, “Schleiden and Schwann” gave the “Cell theory” which was later on expanded by “Rudolf Virchow ”.
- Cell theory states that
  - All plants and animals are composed of cells.
  - Cell is the basic unit of life.
  - All cells arise from pre-existing cells.
- Viruses are the exceptions of cell theory

TYPES OF CELL & ORGANISM

- On the Basis of Number of Cells Organisms can be categorized as:
  - Unicellular organisms: These are organisms which made up of single cell only. This single cell performs all the vital body functions of an organism. e.g. Amoeba
  - Multicellular organisms: These are the organisms which made up of numerous cells. These cells then combine to form an organ and group of organs performing different functions forms an organ system which further forms an organism. e.g. plants and animals

TYPES OF CELL & ORGANISM

- On the basis of type of organization, cells are two types :
  - Prokaryotic cells: these are primitive and incomplete cells. They have less developed nucleus without nuclear membrane & nucleolus. e.g. Bacteria.
  - Eukaryotic cells: these are well developed cells. They have advanced nucleus with unclear membrane and nucleolus. e.g. Plants & animals.

Cell Shape

- Cells are of variable shapes and sizes. Their shape is according to the function. Generally cells are spherical but they may be elongated (nerve cell), branched (pigmented), discoidal (RBC), spindle shaped (muscle cell) etc.

Cell Size

- Size of cell is variable depending upon the type of organism. Some are microscopic while some are visible with naked eyes.
- Their size may vary from 0.2 µm to18 cm.
  - Size of a typical cell in a Multicellular organism ranges from 20-30 mn.
  - The largest cell is ostrich egg(15 cm. in dia with shell & 8 cm. in dia without shell)
  - The longest cell is nerve cell.(upto 1m. or more)
  - Smallest cells so far known are PPLOs e.g. mycoplasma (0.1 µm in dia.)
  - Human egg is 0.1 mm. in dia.

Components of a Cell

- There is an occurrence of division of labour within a cell as they all got certain specific components called “Cell organelles” each of them perform a specific function.
- The three basic components of all the cells are
  - 1M (Plasma Membrane)
  - Nucleus
  - Cytoplasm