THE CELL

The smallest unit of life is the cell. All living beings except the viruses are composed of one or many cells. On the cytological basis, the cellular organisms fundamentally may have either prokaryotic cells or eukaryotic cells. But because viruses contain definite organisation, genetic material, characteristic mode of inheritance and other biological properties, therefore, they have genetic significance and demand priority in discussion.

Viruses

Viruses have sub-microscopic entities with a core of only one type of nucleic acid (DNA or RNA). Viruses lack in structures of typical cell such as plasma membrane, cytoplasm and nucleus and also having no necessary energy yielding and synthetic enzyme system, therefore they cannot lead a free living mode of life. For the performance of fundamental life activities such as reproduction

and maintenance of genetically determined structures and functions, they have to lead a parasitic mode of existence. All viruses are intracellular parasites of specific hosts which may be bacteria, plants, or animals and cause great damage even death to their cellular structures. The capsid of virus is the specialized entity used by the virus to enter any particular plant, animal or bacterial cell.

Prokaryotic Cells

Prokaryotes are the simplest and smallest (1-2um in length) cells and are surrounded by a plasma membrane. Prokaryotes have no distinct nuclear compartment to house their DNA. Blue-green algae and bacteria are prokaryotes.

Eukaryotic Cells

The eukaryotic cells have a true nucleus, that is the nuclear substances such as DNA containing stainable and thread-like chromosomes, RNA rich

nucleolus, and nucleoplasm, all remain well separated from the cytoplasm by two perforated lipoproteinous nuclear membranes. Such eukaryotic cells occur in most plants (from algae to angiosperms) and animals (from protozoa to mammals).

The eukaryotic cells have a plasma membrane that demarcates it from the external environment. It is also organised into membrane-limited internal compartments (nucleus, organelles and vesicles). Compartmentalization is an important concept in biology; it serves to establish an environment in which biochemical reactions are facilitated by the high concentration of both substances and the enzymes that act on them. The major compartments that we have in eukaryotic cells are nucleus, organelles and vesicles.

The components of a eukaryotic cell are:

- Plasma membrane. Plasma membrane is a living membrane of molecules of phospholipids, cholesterol and proteins. It is selectively permeable.

- Cell wall. The plasma membrane of plant cells are surrounded by non-living and rigid coat called cell wall. It supports the cell mechanically.
- Cytoplasm. This includes the cytosol and the organelles in it.
- Nucleus. This is a centrally located component which controls all vital activities of the cytoplasm and carries DNA in it.

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