Life Science
The Structure of Viruses and Cells

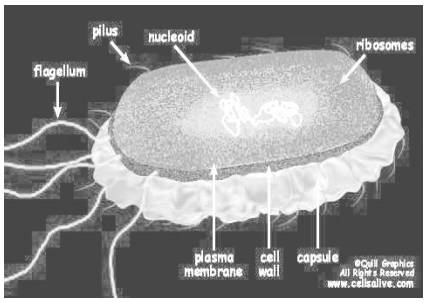
A. Two types of cells

1. **Prokaryotic – no membrane around organelles or nuclear materials (no nucleus)**
   Example: bacteria & blue-green algae
2. **Eukaryotic –have membrane around organelles and nucleus (have a nucleus)**
   Example: Plants and Animals

B. Structure of the Eukaryotic Cell

C. Cell Structure

1. **Cell membrane surrounds and protects the cell**
   a) **Made of fats with proteins embedded in it**
   b) **Semi permeable – allows certain materials and out**
2. **Cytoplasm –living gel like material in the cell**
3. **Nucleus – material that controls the functions and reproduction of the cell (where DNA is found)**
   Nucleus – Chromosomes surrounded by a nuclear membrane.
   a) **Directs the activities of the cell**
   b) **Chromatin – contains chromosomes and chromosomes contain DNA**
   c) **Nucleolus – in the nucleus and involved in making proteins**
4. **Endoplasmic reticulum – extend from the nucleus and carries nuclear messages out from nucleus and carries nuclear messages out from the nucleus**
   1) **Ribosomes are on the ER and is where proteins are made**
5. **Vacuole – where food and liquids are stored in the cell**
6. **Lysosome – where enzymes are stored to break down foods or other worn out cell parts**
7. **Golgi apparatus – Stores proteins and secretions.**
8. **Mitochondria – power house of the cell (place of cellular respiration)**



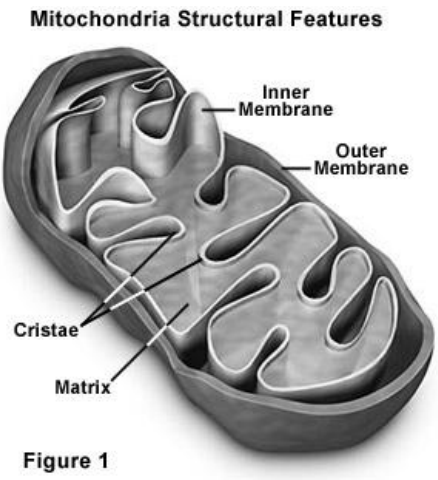


Figure 1

D. Plant Cells have in addition to the above a cell wall and chloroplasts.

a) **Cell wall gives extra support and structure to the cell**
   1) **Made of cellulose**

b) are where photosynthesis takes place
c) Chloroplasts Green organelles in plant cells contain chloroplasts to make food.

E. Energy-processing organelles-help cells do their work
F. Organelles which release energy from food are called *mitochondria*.

II. Microscopes - allow us to view cells
A. Types of microscopes
1. Compound light Microscope – Allows small object to be seen up to about 1000 times magnification.
2. Electron Microscopes – magnify up to 1,000,000 times magnification
a) TEM
b) SEM Figure2- 9 p. 42

III. Cell Theory
A. 1665 Robert Hooke – little empty spaces called cells in cork
B. 1838 Mathias Schleiden - Plants are made of cells
C. Theodore Schwan – Animals are made of cells
D. 1850 Rudolf Virchow – Cells divide to form new cells
E. 1860 Louis Pasteur – proved the theory of biogenesis that life comes from life
F. Cell Theory
1. All living things are made of cells
2. All cells come from other cells
3. Cells are the basic unit of structure and function of all organisms

IV. Viruses –
A. Most are many times smaller than a cell
B. Are considered non living
C. Inside is hereditary material (DNA or RNA) outside is a protein coat
D. Virus Classification (the groups they are put into to help identify them)
E. Virus Classification
1. Shape
2. Type of hereditary material (DNA or RNA)
3. Kind of organisms that they infect
4. Method of reproduction
5. By the disease caused
F. Virus Reproduction
1. Require a cell in order to reproduce
2. Two types of reproduction

a) Active – immediately take over the cell and use the cells energy to reproduce

b) Latent – Inactive, it is a while before it becomes active and takes over the cell and begins to reproduce

3. Viruses take over the activities of the cell and requires the cell to produce viruses which in turn destroys the host cell

a) When viruses fill the cell it explodes and spreads more viruses around

4. Only the organisms can code against a virus to destroy it

a) There is very little in the way of medicine to bring a virus under control

G. Vaccines A vaccine prepares our bodies to fight off viral diseases by introducing a dead or weakened virus into the body

H. Gene therapy - uses viruses to introduce correct genetic material

I. AIDS – Acquired Immune Deficiency Syndrome