**Lecture2**

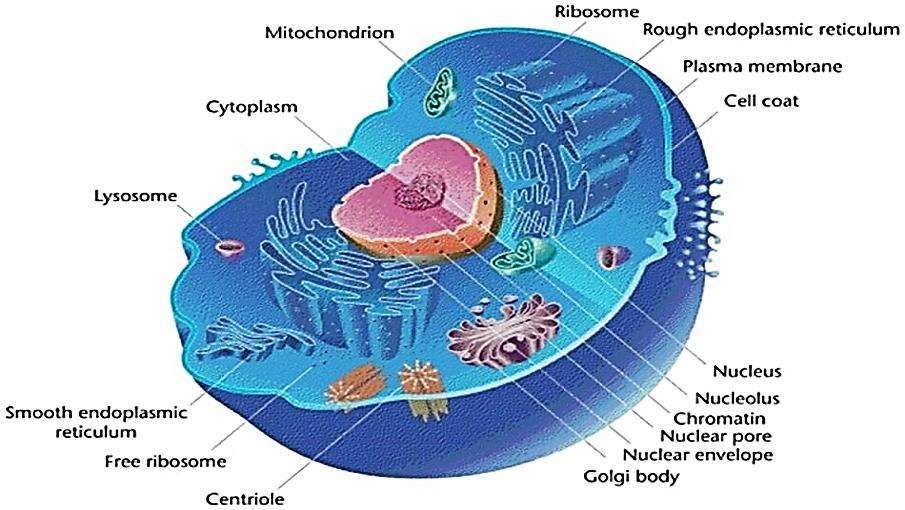
**Animal Cell and Plant Cell**

* All living things are made up of cells. Animal cells and plant cells share the common components of a nucleus, cytoplasm, mitochondria and a cell membrane.
* Plant cells have three extra components,a **vacuole,chloroplast** and a **cell wall**.

**Animal cells**

Animals are made up of millions of cells. Animal cells have an irregular shapes and are made up of four key parts (Figure 2):

* **Nucleus** – This contains genetic material (DNA), and controls the cell's activity.
* **Cell membrane** – A flexible layer that surrounds the cell and controls the substances that enter and exit.
* **Cytoplasm** – A jelly-like substance where the chemical reactions happen.
* **Mitochondria** – This is where energy is released from the food molecules.



**Figure 2: The animal cell**

**Plant cells**

Plants are also made up of millions of cells. Plant cells have a nucleus, cell membrane, cytoplasm and mitochondria too, but they also contain the following structures (Figure 3):

* **Cell wall** – A hard layer outside the cell membrane, containing cellulose to provide strength to the plant.
* **Vacuole** – A space inside the cell that is used to store substances and help the cell keep its shape.
* **Chloroplasts** – Structures that contain the green pigment **chlorophyll**, which are a key part of photosynthesis.

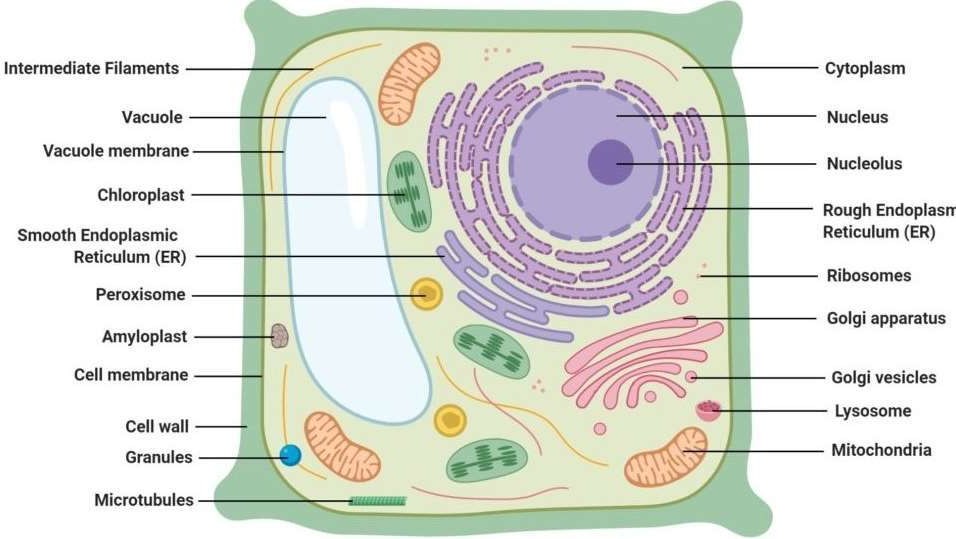


Figure )3(: The plant cell

**Table 2 Comparsion between Animal cell and Plant cell**

|  |  |  |
| --- | --- | --- |
| **Characteristic** | **Animal cells** | **Plant cells** |
| **Size and Shape** | Generally smaller than plant cells with their cells ranging from 10-30um in length.  Shapes vary greatly from irregular shapes to round  shapes. | Larger than animal cells with the cell size ranging from 10um-100um in length.  Plant cells similar in shape with most cells being rectangular or cube-shaped. |
| **Cell Wall** | They lack the cell wall but  possess a plasma (cell) membrane, | They have both a cell wall that is  made up of cell membrane and cellulose. |
| **Plasma membrane** | Present | Present |
| **Ribosomes** | They are present and they are used for protein synthesis and  genetic coding of the protein, amino acid sequences. | They are present and they are used for protein synthesis and cellular repair mechanisms. |
| **Endoplasmic reticulu** | Present | Present |
| **Lysosomes** | lysosomes, contain digestive enzymes to break down cellular macromolecules. | rarely contain lysosomes as the plant vacuole and the Golgi bodies handle  molecule degradation of waste cellular products. |
| **Vacuoles** | Present | Present |
| **Nucleus** | Present and it lies at the  center of the cell | Present and it lies on the side of the  Cell |
| **Centrioles** | They are present with their major function involving the assistance of the cell division  process. | They are absent in plant cells |
| **Microfilaments and Microtubules** | Present | Present. |
| **Cilia and Filaments** | Present; they allow movement of cells or part of the cell, for example,  swimming of the sperm to the ova. | Absent in plants |
| **Plastides** | Absent | Present; they give pigmentation color to the plants and also facilitate trapping of light energy used for  photosynthesis. |
| **Golgi bodies** | They have larger and fewer Golgi bodies with their major function being to process and package protein and lipid macromolecules as they are  being synthesized. | They have smaller but more Golgi bodies with their major role being modification, processing, sorting and packaging proteins for cellular secretion. |

**Table(3) *Comparison between Bacterial, Animal and Plant Cells* as shown figure 4 (For information only).**

|  |  |  |  |
| --- | --- | --- | --- |
|  | Bacterium | Animal | Plant |
| **Type of Cell** | Prokaryotic cells | Eukaryotic cells | Eukaryotic cells |
| **Cell Wall** | Present (protein-  polysaccharide) | Absent | Present (cellulose) |
| **Cell membrane** | Present | Present | Present |
| **Nucleus** | Absent | Present | Present |
| **Plasmids** | Present | Absent | Absent |
| **Plastids** | Absent | Absent | Present |
| **Mitochondria** | Absent | Present | Present |
| **Ribosomes** | Present | Present | Present |
| **Lysosomes** | Absent | Present | Present but are few in  numbers |
| **Chromosomes** | A single circle of  naked DNA | Multiple units DNA  associated with protein | Multiple units DNA  associated with protein |
| **ER** | Absent | Present | Present |
| **Centrioles** | Absent | Present | Absent |
| **Vacuoles** | Absent | Absent or small | Usually a large single  Vacuole in mature cell |
| **Golgi Apparatus** | Absent | Present | Present |
| **Mode of Nutrition** | Both heterotrophs  and autotrophs | Heterotrophs | Autotrophs |
| **Mode of Respiration** | Both aerobic and  Anaerobic | Aerobic respiration | Aerobic respiration |
| **Mode of Reproduction** | Both sexual and asexual mode of reproduction. | Sexual reproduction in higher animals and asexual in lower  animals. | Both sexual and asexual mode of reproduction. |

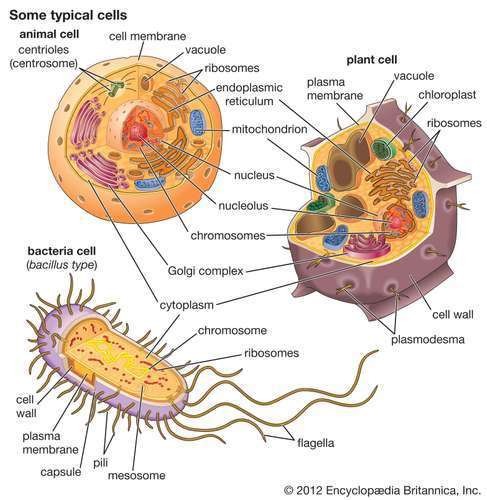


Figure (4): Comparison between Bacterial Animal and Plant Cells

