**Cells**

|  |  |
| --- | --- |
| Magnification | the number of times bigger the image/drawing is compared to the object/real size |
| Resolution | the minimum distance needed to differentiate between 2 adjacent objects |
| Micrometer | 1x10-6 m |
| Nanometer  | 1x10-9 m |
| Light Microscope | A type of microscope which has a condenser, objective lens and eyepiece lens and light is passed through the thin specimen an up through the objective and eyepiece lenses to the eye.  |
| Electron microscope | Beams of electrons are used to visualize structures in a vacuum. Electrons have a smaller wavelength than light so electron microscopes have a higher resolution than light microscopes. |
| Scanning Electron Microscope (SEM) | A type of electron microscope which bounces beams of electrons off the surface of an object to develop a 3D image of the specimen (no need therefore for thin sections). |
| Transmission electron microscope (TEM) | A type of electron microscope which asses a beam of electrons through a very thin section of specimen (which often has been stained with heavy metals to show up the fine internal structures). |
| Cell fractionation | The process where cells are broken up and the different organelles they contain are separated out. |
| Homogenation | The first stage of cell fractionation when cells are broken up by a homogeniser (blender) and organelles are released from the cell. |
| Ultracentrifugation | The second stage of cell fractionation when the fragments in filtered homogenate are separated in a machine called a centrifuge.  |
| Graticule | A series of lines on a microscope which can be used to calculate the size of objects.  |
| Eukaryote | A cell that has a membrane-bound nucleus and chromosomes. The cell also possesses a variety of other membrane-bound organelles, such as mitochondria and endoplasmic reticulum.  |
| Organelle | A part of a cell. |
| Nucleus | Organelle which contains the hereditary material (DNA) which codes for she synthesis of proteins in cytoplasm. |
| Mitochondria | Organelle where energy is released in aerobic respiration |
| Chloroplast | Organelle that is the site of photosynthesis |
| Rough endoplasmic reticulum (RER) | Organelle which provides a large surface area for the synthesis of proteins and glycoproteins and where proteins are transported that are synthesised on ribosomes. |
| Smooth endoplasmic reticulum (SER) | Organelle where lipids and carbohydrates are synthesized, stored and transported. |
| Golgi | Organelle that contains a stack of membranes that make up flattened sacs (cisternae) where glycoproteins are synthesized, lipids are transported, modified and stores, proteins are packaged and lysosomes are formed. |
| Lysosome | Organelle formed when the vesicles produced by the Golgi apparatus contain enzymes. They are where unwanted materials & worn-out organelles are digested. |
| Ribosome | Organelle made of rRNA and protein where protein synthesis occurs. |
| Cell Wall | Organelle which provides mechanical strength to prevent the cell bursting under the pressure created by the osmotic entry of water, to give mechanical strength. Made of cellulose in plants and chitin in fungi.  |
| Vacuole | Organelle which contains a solution of mineral salts, sugars, amino acids, wastes and sometimes pigments such as anthocyanins. They support herbaceous plants by making cells turgid, may provide a temporary food store and if they contain pigments they may colour petals to attract pollinating insects. |
| Tissue | A collection of similar cells that perform a specific function. |
| Organ | A combination of different tissues that are coordinated to perform a variety of functions. |
| Organ system | Many organs work together in an organ system to perform a particular function. |
| Prokaryote | A cell of an organism belonging to the kingdom Prokaryote that is characterized by lacking a nucleus and membrane-bound organelles. E.g. bacteria |
| Bacteria | A prokaryote. |
| Plasmid | Small circular loops of DNA which contain genes that bacteria can have. |
| Flagellum | Part of a bacterial cell which helps the bacteria to move. |
| Virus | Acellular, non-living particles that are smaller than bacteria. They contain DNA or RNA but can only multiply inside living host cells.  |
| Capsid | A protein coat which encloses the nucleic acid in a virus. |
| Attachment Protein | The capsid can have these which are essential to allow the virus to identify and attach to a host cell.  |

**Cell Membrane**

|  |  |
| --- | --- |
| Plasma Membrane | Membranes consisting of a phospholipid bilayer found around and within all cells. The cell-surface membrane is the plasma membrane that surrounds cells.  |
| Phospholipid | Triglyceride in which one of the three fatty acid molecules is replaced by a phosphate molecule. Phospholipids are important in the structure an functioning of plasma membranes. |
| Bilayer | A membrane consisting of two layers of phospholipids.  |
| Protein Channel | A protein completely spanning the phospholipid bilayer which form water-filled tubes to allow water-soluble ions to diffuse across the membrane. |
| Carrier Protein | A protein completely spanning the phospholipid bilayer which bind to ions or molecules then change shape in order to move these molecules across the membrane. |
| Glycoprotein | Carbohydrate chains attached to a protein (often extrinsic) which are part of the cell surface membrane. They act as recognition sites, help cells to attach to one another and allows cells to recognise one another.  |
| Glycolipid | A carbohydrate covalently bonded with a lipid. They act as recognition sites, help maintain stability of the membrane and help cells attach to one another. |
| Cholesterol | Lipid that is an important component of cell-surface membranes because it adds strength. Excess in the blood can lead to atheroma. |
| Permeability | How permeable a substance is depends on the size, polarity and charge of the molecule. If it is small, non-polar and fat soluble it is very permeable and can pass through the cell membrane. |
| Fluid mosaic model | The arrangement of the various molecules of the cell-surface membrane. Fluid because the individual phospholipid molecules can move relative to one another and mosaic because the proteins vary in shape, size and pattern. |
| Diffusion | The net movement of molecules (or ions) from a region of high concentration to a region of low concentration. It is passive.  |
| Facilitated diffusion | Diffusion involving the presence of protein carrier molecules to allow the passive movement of substances (normally large, polar or charged molecules) across plasma membrane. |
| Osmosis | The passage of water from a region where there is a higher water potential to a region where there is a lower water potential through a partially permeable membrane. |
| Water potential | The pressure created by water molecules. It is the measure of the extent to which a solution gives out water. The greater the number of water molecules present, the higher (less negative) the water potential. Pure water has a water potential of zero. |
| Isotonic | A solution which has the same water potential as the cell within it.  |
| Active transport | Movement of a substance from a region where it is in a low concentration to a region where it is in a high concentration. The process requires the expenditure of metabolic energy in the form of ATP.  |
| Co-transport | The transport of one substance coupled with the transport of another substance across a plasma membrane in the same direction through the same protein carrier. |