**Cells**

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| 1 | Magnification | the number of times bigger the image/drawing is compared to the object/real size |
| 2 | Resolution | the minimum distance needed to differentiate between 2 adjacent objects |
| 3 | Micrometer | 1x10-6 m |
| 4 | Nanometer | 1x10-9 m |
| 5 | 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. |
| 6 | 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. |
| 7 | 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). |
| 8 | 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). |
| 9 | Cell fractionation | The process where cells are broken up and the different organelles they contain are separated out. |
| 10 | Homogenation | The first stage of cell fractionation when cells are broken up by a homogeniser (blender) and organelles are released from the cell. |
| 11 | Ultracentrifugation | The second stage of cell fractionation when the fragments in filtered homogenate are separated in a machine called a centrifuge. |
| 12 | Graticule | A series of lines on a microscope which can be used to calculate the size of objects. |
| 13 | 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. |
| 14 | Organelle | A part of a cell. |
| 15 | Nucleus | Organelle which contains the hereditary material (DNA) which codes for she synthesis of proteins in cytoplasm. |
| 16 | Mitochondria | Organelle where energy is released in aerobic respiration |
| 17 | Chloroplast | Organelle that is the site of photosynthesis |
| 18 | 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. |
| 19 | Smooth endoplasmic reticulum (SER) | Organelle where lipids and carbohydrates are synthesized, stored and transported. |
| 20 | 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. |
| 21 | Lysosome | Organelle formed when the vesicles produced by the Golgi apparatus contain enzymes. They are where unwanted materials & worn-out organelles are digested. |
| 22 | Ribosome | Organelle made of rRNA and protein where protein synthesis occurs. |
| 23 | 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. |
| 24 | 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. |
| 25 | Tissue | A collection of similar cells that perform a specific function. |
| 26 | Organ | A combination of different tissues that are coordinated to perform a variety of functions. |
| 27 | Organ system | Many organs work together in an organ system to perform a particular function. |
| 28 | 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 |
| 29 | Bacteria | A prokaryote. |
| 30 | Plasmid | Small circular loops of DNA which contain genes that bacteria can have. |
| 31 | Flagellum | Part of a bacterial cell which helps the bacteria to move. |
| 32 | Virus | Acellular, non-living particles that are smaller than bacteria. They contain DNA or RNA but can only multiply inside living host cells. |
| 33 | Capsid | A protein coat which encloses the nucleic acid in a virus. |
| 34 | Attachment Protein | The capsid can have these which are essential to allow the virus to identify and attach to a host cell. |

**Mitosis**

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| 35 | Mitosis | The type of nuclear division in which the daughter cells have the same number of chromosomes as the parent cell. |
| 36 | Daughter cell | The cells that are produced by cell division. |
| 37 | Chromatid | One of the two strands of a chromosome that are joined together by a single centromere prior to cell division. |
| 38 | Centromere | The place where the two copies of DNA after replication are joined together. |
| 39 | Interphase | The period of the cell cycle when the cell is not dividing. |
| 40 | Prophase | The first stage of mitosis when the chromosomes become visible and when spindle fibres develop. The nucleolus disappears and the nuclear envelope breaks down. |
| 41 | Metaphase | The second stage of mitosis when the chromosomes arrange themselves across the equator of the cell. |
| 42 | Anaphase | The third stage of mitosis when the centromeres divide into two and the spindle fibres pull the individual chromatids making up the chromosome apart to their respective, opposite poles of the cell. |
| 43 | Telophase | The fourth stage of mitosis when chromosomes reach their respective poles and become longer and thinner, finally disappearing altogether, leaving only widely spread chromatin. The spindle fibres disintegrate and the nuclear envelope and nucleolus re-form. |
| 44 | Cytokinesis | When the cytoplasm divides. |
| 45 | Spindle fibres | These form the spindle apparatus which are responsible for pulling the chromatids to separate ends of the cell. |
| 46 | Centrioles | Where the spindle fibres develop from in animal cells. |
| 47 | Equator | Where the chromosomes arrange themselves during metaphase. |
| 48 | Binary Fission | The process by which cell division occurs in prokaryotic cells. |
| 49 | Cancer | A group of diseases caused by a growth disorder of cells as a result of damage to the genes that regulate mitosis and the cell cycle which results in uncontrolled growth and division of cells. |
| 50 | Tumour | A group of abnormal cells which develops and constantly expands in size. |

**Cell Membrane**

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| 51 | 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. |
| 52 | 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. |
| 53 | Bilayer | A membrane consisting of two layers of phospholipids. |
| 54 | Protein Channel | A protein completely spanning the phospholipid bilayer which form water-filled tubes to allow water-soluble ions to diffuse across the membrane. |
| 55 | 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. |
| 56 | 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. |
| 57 | 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. |
| 58 | Cholesterol | Lipid that is an important component of cell-surface membranes because it adds strength. Excess in the blood can lead to atheroma. |
| 59 | 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. |
| 60 | 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. |
| 61 | Diffusion | The net movement of molecules (or ions) from a region of high concentration to a region of low concentration. It is passive. |
| 62 | 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. |
| 63 | 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. |
| 64 | 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. |
| 65 | Isotonic | A solution which has the same water potential as the cell within it. |
| 66 | 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. |
| 67 | 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. |

**Immune System**

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| 68 | Pathogen | A microorganism that causes disease |
| 69 | Self | The body’s own cells and molecules. |
| 70 | Foreign (non-self) | **Not** your own body’s cells and molecules. |
| 71 | Antigen | A molecule that triggers an immune response by lymphocytes. |
| 72 | Lymphocyte | Type of white blood cell responsible for the immune response. They become activated in the presence of antigens. There are two types: B lymphocytes and T lymphocytes. |
| 73 | Phagocyte | Type of white blood cell which carries out a non-specific immune response and ingests and breaks down pathogens by phagocytosis. |
| 74 | Phagocytosis | Mechanism by which phagocytes engulf particles to form a vesicle or a vacuole. |
| 75 | Lysosome | Contain enzymes called lysozymes which they release into the phagosome which hydrolyse the bacterium. |
| 76 | Phagosome | A vesicle formed as the bacterium is engulfed by the phagocyte. The lysosome release their lysozymes into the phagosome. |
| 77 | Antigen-presentation | When an antigen-presenting cell e.g. phagocyte displays foreign antigens on their own cell-surface membrane. |
| 78 | Cell-mediated immunity | The type of response when T lymphocytes respond to antigens that are presented on a body cell. |
| 79 | T Cells | Cells which mature in the thymus and are associated with cell-mediated immunity. |
| 80 | Clonal Selection | As the receptor on a helper T cell attaches to the antigen this activates the T cell to divide rapidly by mitosis and form a clone of genetically identical cells. These cloned T cells stimulate B cells to divide and form a clone of identical B cells all of which produce the antibody that is specific to the foreign antigen. |
| 81 | TH cells (helper T cell) | Contain receptors which respond to a single antigen. Many different types of T cell, each one responds to a different antigen. |
| 82 | TC cells (cytotoxic T cells) | Kill abnormal cells and body cells that are infected by pathogens by producing a protein called perforin which makes holes in the cell-surface membrane. |
| 83 | Humoral Immunity | The type of response which involves B lymphocytes and antibodies. |
| 84 | B Cells | Each type of B cell produces a specific antibody that responds to one specific antigen. |
| 85 | Plasma B Cells | When the B cell is activated to divide by mitosis it gives a clone of plasma cells which produce and secrete the specific antibody that exactly fits the antigen on the pathogen’s surface. |
| 86 | Antibody | A protein with specific binding sites produced by B cells in response to the presence of appropriate antigen. |
| 87 | Memory B Cells | Some B cells develop into memory cells which can respond to future infections by the same pathogen by dividing rapidly and developing into plasma cells that produce antibodies as part of the secondary response. |
| 88 | Monoclonal antibodies | Antibodies produced by a single clone of cells. |
| 89 | Primary Response | Caused by initial response to the antigen which involves the production of antibodies and memory cells. |
| 90 | Secondary response | Caused by second exposure to the antigen. Memory cells are responsible for this response – they divide rapidly and develop into plasma cells (which secrete many antibodies quickly) and more memory cells. |
| 91 | Passive immunity | Resistance to disease that is acquired from the introduction of antibodies from another individual, rather than an individual’s own immune system e.g. across the placenta or in the mother’s milk. It is usually short lived. |
| 92 | Active immunity | Resistance to disease resulting from the activities of an individual’s own immune system whereby an antigen induces plasma cells to produce antibodies. |
| 93 | Natural immunity | A type of active immunity resulting from an individual becoming infected with a disease under normal circumstances. |
| 94 | Artificial immunity | A type of active immunity resulting from vaccination. It involves inducing an immune response in an individual without them suffering symptoms of the disease. |
| 95 | Vaccination | The introduction of a vaccine containing appropriate disease antigens into the body, by injection or mouth, in order to induce artificial immunity. |
| 96 | Herd immunity | Arises when a sufficiently large proportion of the population has been vaccinated which makes it difficult for a pathogen to spread within that population. |
| 97 | Antigenic variability | Pathogen may mutate frequently so that its antigens change suddenly rather than gradually which means vaccines become ineffective because the new antigens on the pathogen are no longer recognized by the immune system. |
| 98 | HIV | Human immunodeficiency virus which causes the disease acquired immune deficiency syndrome (AIDS). It has a lipid envelope, attachment proteins, a capsid and two single strands or RNA and enzymes. |
| 99 | Reverse transcriptase | An enzyme in HIV which enables the production of DNA from RNA. |
| 100 | Retrovirus | A group of viruses which have the ability to make DNA from RNA because they have reverse transcriptase. |
| 101 | mRNA | A single stranded polynucleotide found in HIV. |
| 102 | AIDS | The disease caused by HIV. |
| 103 | ELISA test | Enzyme linked immunosorbent assay which uses antibodies to detect the presence and quantity of a protein in a sample. |
| 104 | Antibiotic | A substance produced by living organisms that can destroy or inhibit the growth of microorganisms |