**Advanced Higher Biology Glossary.**

**Actin** – Globular protein which forms microfilaments. Associated with Myosin for cell movement

**Affinity** - the degree to which a substance tends to combine with another

**Allosteric enzymes -** enzymes whichchangeconformationin response to a modulator.

**Alpha** **Helix** – polypeptide chain coiled into a helix with hydrogen bonding occurring to maintain the arrangement

**Alternative RNA splicing** – Removal of non-coding introns from a primary mRNA transcript to leave only the coding exons. Several mature transcripts can be produced from a single primary transcript

**Antibody** – Y-shaped globular protein with specificity to an antigen

**Apoptosis** – Programmed cell death in response to damage to DNA etc

**Aquaporin** – Integral channel forming proteins within the membrane which selectively allow movement of water molecules across a membrane

**AQP2** (aquaporin 2) – Channel protein found in the collecting duct of the kidneys. They are triggered to move to the cell surface by ADH and allow increased reabsorption of water into the bloodstream.

**Aseptic** **techniques** – Procedures in place to prevent contamination including sterilisation of equipment and work surfaces.

**Bacteriorhodopsin** – Light absorbing molecule found in Archae (One of the three domains of life, the other two being Bacteria and Eukaryota) It pumps protona across the membrane creating a proton gradient which can then be used to generate ATP.

**Beta** **sheets** – Polypeptide chain arranged in rows with the chain coiling in parallel or anti-parallel arrangements

**Buffer** – used to set and maintain a particular pH

**Caspase** **cascade** – Caspase proteins are involved in a series of reactions ( a cascade) which destroy a cell

**Cell Cycle checkpoints** – Checkpoints which assess the readiness of a cell to enter the next stage of the cell cyle. They occur during G1, G2 and Metaphase

**Centrifuge** – Apparatus which spins very quickly to separate materials due to their density – heavier components move to the bottom of the tube

**Centrosome (MTOC)** – Microtubules radiate from the Centrosome and are active during cell division as microtubules form the spindle fibres

**Chromatography** – Has a stationary phase (eg. paper or gel) which the mobile phase (eg. A solvent) moves through carrying the substance being examined – different distances moved by substances of different solubility

**Cooperativity** – Proteins composed of several polypeptides (subunits) can show cooperativity. Changes in binding of one subunit give the other subunits a greater affinity for the molecule eg. Binding of oxygen to one haemoglobin subunit gives the other subunits a greater affinity for oxygen

**Complex** **Media** – A nutrient rich growth medium providing all the basic requirements for cell growth eg. Amino Acids, glucose, salts, watar etc – also have specific growth factors required for animal cell lines

**Cyclin** - proteins that control the progression of cells through the cell cycle by activating cyclin-dependent kinase (Cdk) enzymes

**Cyclin dependant kinases (Cdks)** – When activated by cyclin, Cdks cause the phosphorylation of proteins which stimulate the cell cycle.

**Cytoskeleton** - a microscopic network of protein filaments and tubules in the cytoplasm of many living cells, which supports their shape and function.

**Diabetes** – Inability to regulate blood glucose levels

**Type1** – Failure to produce insulin

**Type2** – Loss of function of insulin receptors on cell surface

**G-Protein** - also known as guanine nucleotide-binding proteins, are a family of proteins that act as molecular switches inside cells, and are involved in transmitting signals from a variety of stimuli outside a cell to its interior.

**Gated** **Channels** – Channel forming proteins controlled by signalling molecules or ion concentration.

**Gel** **electrophoresis** – Used to separate samples of Nucleic acid and Protein by size– Introduced to a gel, they move through it due to an electric current – smaller fragments move further than larger fragments

**Genome** - The complete set of genes or genetic material present in a cell or organism

**GLUT4** - the insulin-regulated glucose transporter. Insulin triggers the movement of GLUT4 transporters to the membrane surface, increasing uptake of glucose to be converted to Glycogen

**Haemocytometer** – Used to estimate total number of cells within a sample, originally used to count number of blood cells

**Hazard** – Anything that poses a potential risk or threat to an individual or the environment

**Hydrophilic** – From the Greek meaning water loving. Having a strong affinity for water

**Hydrophilic** **signals** – Signalling molecules which are not able to pass through the membrane and must have receptor molecules on the cell surface. The signal is transduced across the membrane

**Hydrophobic** - literally means "water-fearing". The tendency of nonpolar substances to aggregate in aqueous solution and exclude water molecules ie. Seemingly repelled from an aqueous environment

**Hydrophobic** **signals** - signalling molecules which can diffuse through membranes so their receptor molecules can be within the nucleus.

**Immunoassay** – Uses antibodies linked with reporter enzymes to cause a colour change in the presence of a specific antigen

**Induced** **fit** – Model to describe the action of enzymes for example. When the substrate binds to the enzymes active site there is a temporary conformational change to the enzyme which increases binding and interaction with the substrate, lowering the activation energy required for the reaction

**Inoculum** – The starting material used to grow a culture from eg. Bacterial culture

**Interphase** – the phase of the cell cycle in which the cell spends the majority of its time. In preparation for cellular division, it increases in size and DNA replication occurs in preparation for the M Phase

**G1** – Initial growth phase of the cell including production of more cell organelles

**S** – Cell growth continues and replication of chromosomes occurs

**G2** – Assessment of DNA replication and final preparations for Mitosis

**Kinase** – Catalyses the transfer of a phosphate group from a donor molecule (usually ATP) to an acceptor

**Ligand** – A substance which can bind to a protein eg, hormones. The protein has a shape complementary to the ligand to allow binding to occur

**M Phase** - Division of the nucleus and division of the cell itself

**Mitosis** – Division of the nucleus to form 2 new nuclei, each with a full complement of chromosomes

**Cytokinesis** – Division of cytoplasm to form 2 daughter cells

**Microtubule** - composed of hollow straight rods made of globular proteins called tubulins govern the location and movement of membrane-bound organelles and other cell components.

**Modulators** – These bind to a secondary site on an enzyme to alter its conformation. They can be positive modulators to activate the enzyme or negative modulators to deactivate it.

**Monoclonal** **Antibodies** – Antibodies produced from hybridomas which are all identical and specific to a particular antigen

**Myosin** – Motor proteins which move along actin filaments to bring about movement in a call

**Na/KATPase** – The enzyme which acts as the **Sodium/Potassium pump** which per cycle remover 3 Sodium ions from the cell and takes 2 Potassium ions into the cell.

**p53** **protein** – Protein which can activate a Caspase cascade

**Phosphatase** - An enzyme that removes a phosphate group from its substrate

**Phosphorylation** – The addition of a phosphate group to a protein or other organic molecule

**Post translational modification** – Addition of different chemical groups to or modification of a protein to allow a particular function

**Protein Conformation** – Structural arrangement of the polypeptide chains within a protein which can be altered due to several factors

**Protein** **Structure** – The different levels of arrangement of polypeptides within a protein

**Primary** – The sequence in which the amino acids are found within a protein

**Secondary** – Hydrogen bonding occurring within a polypeptide forming alpha helices or beta pleated sheets

**Tertiary** – Bonding of many types occurring between the R-groups of amino acids within a protein

**Quaternary** - The arrangement of multiple folded polypeptides connected together

**Proteome** – The entire set of proteins expressed by a genome (proteome much larger than genome)

**R-groups** – Amino acids have the same basic structure with a variable R-group providing the ability of the amino acids to have different bonding occurring between them.

**Resting Potential** – The neurone maintains a difference in ion concentration between the inside and outside of the cell, high levels in the cytoplasm – this can be measured and is known as the resting potential

**Retinal** –Light sensitive molecule within the eye which bind to membrane proteins called Opsin to form the eyes photoreceptors

**Retinoblastoma** - A tumour suppressor protein that is dysfunctional in several major cancers. One function of pRb is to prevent excessive cell growth by inhibiting cell cycle progression until a cell is ready to divide. When phosphorylated, it allows DNA replication in the S Phase.

**Signal Transduction** – Conversion of extracellular signals to an intracellular response in a cell

**Symport** -an integral membrane protein that simultaneously transports two substances across membrane in the same direction.

**Synapse** –Structure which allows a neurone to pass a signal to another neurone or another cell

**Thylakoid membrane** – Membrane forming the Grana. Light energy absorbed by photosynthetic pigments causes the flow of hydrogen across the Thylakoid membrane. Diffusion of the hydrogen back across the membrane drives ATP synthase and generates ATP.

**Transcription** **factor** - a protein that binds to specific DNA sequences, thereby controlling the rate of transcription of genetic information from DNA to messenger RNA

**Transmembrane** – Proteins which span a membrane and act as channels or transporters of ions