Definitions and Concepts for Edexcel (A) Biology A-level

Topic 2 - Genes and Health

Topic 2 - Exchange of substances

Fick's Law of Diffusion: The law that relates the rate of diffusion to the concentration difference, surface area and membrane thickness using the following equation:

$$Rate\ of\ diffusion \propto \frac{Membrane\ surface\ area \times Concentration\ difference}{Membrane\ thickness}$$

Alveoli: Small air sacs found in the lungs at the end of bronchioles which provide a large surface area for gas exchange.

Fluid mosaic model: A model that describes membrane structure as a sea of mobile phospholipids studded with various proteins.

Hydrophilic: A molecule which is attracted to water.

Hydrophobic: A molecule which repels water.

Integral membrane protein: A type of protein bound to the membrane with strong interactions.

Peripheral membrane protein: A type of protein that is weakly bound to the surface of the membrane.

Amphipathic: A molecule with both hydrophobic and hydrophilic parts.

Phospholipid: A type of lipid formed by the condensation of one molecule of glycerol, two molecules of fatty acid and a phosphate group.

Osmosis: The net movement of water molecules across a partially permeable membrane from a region of high water concentration to a region of lower water concentration without the use of energy.

Active transport: The active movement of substances from a low concentration to a higher concentration (up their concentration gradient) with the use of energy in the form of ATP.

Facilitated diffusion: The net movement of substances from a high concentration to a lower concentration (down their concentration gradient) through transport proteins without the use of energy.

Endocytosis: The bulk uptake of substances into a cell by invagination of the membrane to form a vesicle trapping the substances inside the cell with the use of energy in the form of ATP.

Exocytosis: The bulk transport of substances out of a cell using a vesicle that fuses with the plasma membrane using energy in the form of ATP.

Topic 2 - Inheritance

Amniocentesis: Sampling the amniotic fluid to determine the sex of the foetus or any abnormalities that may be present during development.

Chorionic villus sampling: Sampling the placenta to test for any genetic diseases that may be present in the developing foetus.

Cystic fibrosis (CF); An autosomal recessive genetic disorder which causes the production of excess thick mucus.

Dominant trait: A trait which is present if an individual has at least one copy of the gene.

Gene: A sequence of bases on a DNA molecule that codes for a sequence of amino acids in a polypeptide chain.✢

Genotype: The genetic makeup of an organism.

Heterozygote: An organism which has two different versions of the same gene.

Homozygote: An organism which has two of the same versions of a gene.

Incomplete dominance: A type of inheritance where a dominant allele does not completely mask the recessive allele and so the trait produced is a combination of both alleles.

Monohybrid inheritance: A genetic cross between two homozygous organisms.

Mutation: A change in the sequence of bases in a DNA molecule.

Phenotype: The observable characteristics of an organism.

Pre-implantation genetic diagnosis (PGD): A method used to diagnose diseases before implantation of the embryo into the uterus.

Prenatal testing: Testing performed before childbirth to determine the overall health of the developing foetus.

Recessive trait: A trait which is only present when an individual has two copies of the gene and can be masked by a dominant gene.

Topic 2 - Proteins

Amino acid: The monomers containing an amino group (NH_2), a carboxyl group (COOH) and a variable R group that make up proteins.

Polymers: Molecules made from a large number of monomers joined together.

Monomers: The smaller units from which larger molecules are made

Condensation reaction: A type of reaction that joins two molecules together with the formation of a chemical bond involving the elimination of a molecule of water.

Hydrolysis: Breaking a chemical bond between two molecules involving the use of a water molecule.

Dipeptide: Molecules formed by the condensation of two amino acids.

Polypeptide: Molecules formed by the condensation of many amino acids.

Enzyme: A protein molecule that acts as a biological catalyst and increases the rate of biochemical reactions.

Fibrous protein: A class of long chain proteins that are generally insoluble in water and typically have structural roles.

Globular protein: A class of spherical shaped proteins that are generally water soluble and typically have metabolic roles.

Secondary structure: The local interactions of the amino acids in the polypeptide chain.

Tertiary structure: The way that the whole protein folds to make a three dimensional structure.

Hydrogen bond: A type of weak bond formed between an electropositive hydrogen and an electronegative atom like oxygen or nitrogen.

Haemoglobin: A type of conjugated globular protein used to transport oxygen that is made up of four polypeptide chains each containing a haem prosthetic group.

Collagen: A type of fibrous protein that provides strength to many different cell types and makes up connective tissues.

Enzymes: Biological catalysts that reduce activation energy.✢

Intracellular enzyme: An enzyme that works within cells.

Extracellular enzyme: An enzyme which works outside of cells.

Ribosomal RNA (rRNA): A type of RNA that makes up ribosomes.

Ribosome: An organelle found in the cytoplasm of cells that carries out protein synthesis.