

## 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:

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

**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 ( $\text{NH}_2$ ), a carboxyl group ( $\text{COOH}$ ) 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.

*Definitions denoted with a '†' taken from: [Edexcel Biology A Salters-Nuffield Specification, 9BN0, Issue 4 \(Pearson\)](#)*

