

Edexcel IAL Biology A-level

Topic 1: Molecules, Transport and Health

Definitions and Concepts

This work by [PMT Education](https://www.pmt.education) is licensed under [CC BY-NC-ND 4.0](https://creativecommons.org/licenses/by-nc-nd/4.0/)



Data Collection and Analysis

Accuracy: How close the data is to the correct or accepted value.

Causation: A relationship between two values or pieces of data where one influences the other.

Correlation: An observed relationship between two completely separate values or pieces of data.

Precision: How close the repeated values of an experiment are to each other.

Qualitative data: Data in the form of non-numerical qualities and characteristics.

Quantitative data: Data in the form of measurable numbers and statistics.

Reliability: The ability to get consistent and repeatable results.

Validity: How well the data measures what it is supposed to.

1.1 – 1.5: Biomolecules (Water, Carbohydrates and Lipids)

Alpha glucose: An isomer of glucose which has the hydroxyl group (OH) on carbon-1 below the plane of the ring.

Amylopectin: A branched polysaccharide made up of alpha glucose monomers joined by α -1,6 glycosidic bonds that makes up starch along with amylose.

Amylose: An unbranched polysaccharide made up of alpha glucose monomers joined by α -1,4 glycosidic bonds that makes up starch along with amylopectin.

Beta glucose: An isomer of glucose which has the hydroxyl group (OH) on carbon-1 above the plane of the ring.

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.

Dipole: A molecule which has an unequal distribution of electrons which causes atoms in the molecule to have partial charges.

Disaccharide: Molecules formed by the condensation of two monosaccharides.

Ester bond: A type of bond formed by a condensation reaction which joins the hydrogen (H) of each fatty acid tail to the hydroxy (OH) of the glycerol molecule in a triglyceride.



Fatty acid: A chain of carbon atoms with the end carbon possessing a carboxyl group (COOH).

Fructose: A monosaccharide which, when combined with glucose, forms the disaccharide sucrose.

Galactose: A monosaccharide which, when combined with glucose, forms the disaccharide lactose.

Glucose: A monosaccharide with the molecular formula $C_6H_{12}O_6$.

Glycerol: A 3-carbon molecule which contains 3 hydroxy (OH) groups and is a component of triglycerides.

Glycogen: A highly branched polysaccharide made of alpha glucose monomers that is used as the main storage of energy in humans and animals.

Glycosidic bond: A bond between two monosaccharides formed in a condensation reaction.

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

Lactose: A disaccharide formed by condensation of a glucose molecule and a galactose molecule.

Maltose: A disaccharide made of two molecules of glucose joined by a glycosidic bond.

Monosaccharide: The individual sugar monomers from which larger carbohydrates are made.

Polysaccharide: Molecules formed by the condensation of many monosaccharides.

Saturated fatty acid: A type of fatty acid molecule containing only single bonds between the carbon atoms.

Saturated lipid: A lipid molecule containing only single bonds between the carbon atoms.

Solvent: A substance which solutes can dissolve into, to form a solution.

Starch: A polysaccharide made of alpha glucose monomers that is used as the main storage of energy in plants.

Sucrose: A disaccharide formed by condensation of a glucose molecule and a fructose molecule.

Triglyceride: A type of lipid formed from a molecule of glycerol joined by 3 ester



bonds to three fatty acid molecules.

Unsaturated fatty acid: A type of fatty acid molecule containing at least one double bond in the carbon chain.

Unsaturated lipid: A lipid which contains at least one C=C double bond.

1.6 – 1.9: The Cardiovascular System

Affinity: The tendency of one substance to bind with another substance.

Aorta: The main artery that carries oxygenated blood away from the heart to the rest of the body at high pressure.

Arteriole: A smaller type of blood vessel that connects arteries with capillaries.

Artery: A type of blood vessel that carries oxygenated blood at high pressure away from the heart.

Atrial systole: The phase in the cardiac cycle following diastole where the atria contract and force the blood into the ventricles.

Capillary: A very small blood vessel with thin walls and a small diameter (one endothelial cell thick) used for substance exchange in tissues.

Cardiac diastole: The phase in the cardiac cycle following ventricular systole where the atria and ventricles are both relaxed and blood flows into the atria.

Circulation: A type of mass transport that overcomes the limitations of diffusion in meeting the requirements of organisms. †

Coronary artery: The main artery that supplies the heart tissue with oxygenated blood.

Diffusion: The passive spreading out of substances from a high concentration to a lower concentration (down their concentration gradient) without the use of energy.

Foetal haemoglobin: The higher affinity form of haemoglobin found in the blood of a developing foetus.

Haemoglobin: The oxygen carrying conjugated protein found in erythrocytes which has a quaternary structure made of two alpha and two beta chains which each contain a haem prosthetic group.

Left atrium: The chamber in the heart that receives oxygenated blood from the pulmonary vein and passes it on to the left ventricle.



Left ventricle: The chamber in the heart that receives oxygenated blood from the left atrium and pumps it out of the heart to the rest of the body.

Mass transport: The bulk transport of substances to all parts of an organism using mass flow.

Oxygen affinity: the continuous relationship between haemoglobin oxygen saturation and oxygen tension.

Oxygen dissociation curve: A graph that describes the relationship between the partial pressure of oxygen and the percentage saturation of haemoglobin in the blood.

Pulmonary artery: The main artery that carries deoxygenated blood from the heart to the lungs for reoxygenation.

Pulmonary vein: The main vein that carries oxygenated blood away from the lungs and back to the heart.

Right atrium: The chamber in the heart that receives deoxygenated blood directly from the vena cava and passes it on to the right ventricle.

Right ventricle: The chamber in the heart that receives deoxygenated blood from the right atrium and pumps it out of the heart to the lungs for reoxygenation.

The Bohr effect: A decrease in the affinity of haemoglobin for oxygen in areas with a high carbon dioxide concentration.

Vein: A type of blood vessel that carries blood at lower pressure into the heart from other parts of the body.

Vena cava: The main vein that carries deoxygenated blood into the right atrium of the heart.

Ventricle: A type of chamber in the heart which receives blood from the atrium above it and pumps it out of the heart.

Ventricular systole: The phase in the cardiac cycle following atrial systole where the ventricles contract and force the blood out of the heart and around the body.

Venule: A smaller type of blood vessel that connects veins with capillaries.

1.10 – 1.20: Cardiovascular Disease

Anticoagulants: A class of antithrombotic drug that slows the normal process of blood clot formation and is used as a treatment for CVD.



Antihypertensives: A class of drug that is used as a treatment for high blood pressure (hypertension).

Antioxidants: Molecules that inhibit the oxidation of other molecules. Oxidation can lead to chain reactions that may damage cells. †

Atherosclerosis - A disease characterised by a buildup of plaque within arteries which narrows them and can lead to heart attacks and strokes.

Blood clot: A gelatinous mass of fibrin and blood cells formed by the coagulation of blood.

Body mass index (BMI): A method of measuring a person's weight with respect to their height to calculate whether they are of a healthy weight or not.

Cardiovascular disease (CVD): A term used to describe a group of diseases related to the heart and blood vessels.

Cholesterol: An essential component of plasma membranes and myelin, the substance surrounding many nerve fibres. It necessary for the formation of certain hormones and vitamin D. (bio factsheet)

Coagulation: The process of blood turning into a gel and forming a clot, often in response to a broken blood vessel to prevent blood loss.

Coronary heart disease: A condition in which the blood supply to the heart is blocked or interrupted by a build-up of fatty substances in the coronary arteries.

Endothelial dysfunction: The failure of the endothelial layer (the inner lining) of the small arteries to perform its functions normally.

Fibrin: An insoluble protein formed from fibrinogen under the action of thrombin which is used to seal the wound during blood clotting.

Fibrinogen: A soluble protein which is the precursor of insoluble fibrin which is used to seal the wound during blood clotting.

High-density lipoproteins (HDL): A dense molecule made of proteins and lipids that is used to remove cholesterol from tissues and transport it to the liver for excretion.

Inflammatory response: A response triggered by the buildup of cholesterol and fatty acids, which involves white blood cells arriving at the site of endothelial damage.

Low-density lipoproteins (LDL): A lower density molecule made of proteins and lipids that is used to transport cholesterol around the body to different tissues which can cause cholesterol buildup in blood vessels.



Plaque: A substance containing fatty molecules, cholesterol, blood platelets, fibrin, calcium ions and cellular debris. These attach to a roughened part of the lining of an artery.

Platelet inhibitor: A class of antithrombotic drug which makes platelets less likely to coagulate and is used as a treatment for CVD.

Prothrombin: The inactive form of thrombin.

Statins: A class of drug that is used to lower cholesterol levels in the blood.

Thrombin: The active form of prothrombin which converts soluble fibrinogen to insoluble fibrin during the process of blood clotting.

Thromboplastin: A clotting factor which converts prothrombin to thrombin during the blood clotting process.

Waist-to-hip ratio: A comparison of the size of a person's waist to their circumference of their hips which can be used to determine a person's health risk.

Definitions denoted with a '+' taken from: [Pearson Edexcel International Advanced Subsidiary/Advanced Level in Biology – Specification – Issue 1 \(September 2017\)](#).

