

This glossary contains many of the terms in A-level biology, in addition to many terms which are well beyond the A-level syllabus. You really don't need to know *all* of these words, but including some words which aren't in A-level biology in your essays can help you get higher marks.

Disclaimer: Some terms may be defined inaccurately, use at your own risk. Some words which you do need to know for biology A-level are omitted. I did AQA biology A-level (2016 syllabus) but this glossary should probably be applicable to other exam boards.

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A

Acetylation: addition of acetyl group to histone proteins of DNA (more specifically it's the lysine amino acid in histone proteins). Results in DNA being wound less tightly around histone proteins, which makes it easier for RNA polymerase to start transcription.

Acetylcholine: neurotransmitter in cholinergic synapses.

Acetylcholinesterase: breaks acetylcholine down to acetate and choline. Used in cholinergic synapses.

Actin: thin filament in myofibrils.

Actinomyosin bridges: the binding between myosin heads of the thick myosin filament of myofibrils to binding sites on actin filament.

Adaptive / acquired/ specific immune system: long term protection. Specific.

Adenovirus: used to insert genes into cells in gene therapy. Inserts gene into nucleus but not into genome, so gene is not transferred during division.

Adenylyl cyclase: enzyme in cell surface membrane of liver cells that dephosphorylates ATP to cyclic adenosine monophosphate (cAMP) when stimulated by glucagon or adrenaline.

Adipose tissue: fat tissue. Consists of adipocytes.

Adrenaline: "fight or flight" hormone. Secreted by adrenal glands (above kidneys), and has a similar effect to glucagon on the liver.

Afferent arteriole: brings blood in from renal artery to glomerulus. Wider than efferent.

Agranulocyte: aka mononuclear leukocytes (white blood cell). Do not have granules in their cytoplasm. Have one-lobed nucleus. Includes lymphocytes and monocytes (which can differentiate into macrophages).

Algae: different from plants in the following ways: 1. Algae can either be unicellular and multi-cellular while plants are multi-cellular organisms. 2. Algae typically live underwater while plants thrive on land. 3. Algae are nonvascular. They don't have structures such as connective tissues, leaves, stems and roots unlike plants.

Allopatric speciation: speciation due to geographic isolation.

Allosteric site: site on an enzyme where a non-competitive inhibitor binds.

Alpha cells: in islets of Langerhans in pancreas. Secrete glucagon when blood glucose is low.

Ammonification: nitrogen containing organic material to ammonia

Amoeba or amoeboid: eukaryote that can alter its shape, usually by forming pseudopodia. Includes phagocytes. Not a taxonomic group.

Amphipathic: a molecule with hydrophobic and hydrophilic parts. (e.g. phospholipid).

Amyloplasts: heavy starch filled organelle in columellar cells (root tips). They allow plant cells to detect gravity and may be linked to the movement of IAA

Aneurysm: balloon like swelling in artery

Angiosperm: flowering plants

Anneal: to recombine DNA into double stranded form

Antidiuretic hormone (ADH): hormone that stimulates aquaporin containing vesicles to fuse with the distal convoluted tubule and the collecting duct in the kidney. Produced by hypothalamus and secreted by the posterior pituitary gland.

Antigen presenting cell (APC): cell that displays antigens on its surface using MHC molecules. Complementary T cell receptors may bind to the antigens and this activates the T cell. Needed for adaptive immune response.

Apoptosis: cell suicide

Archaea: unicellular prokaryotes. Not bacteria. Do not have murein/peptidoglycan cell wall. Different membrane structure to eukaryotes and bacteria.

Atheroma: fibrous plaque in an artery which restricts blood flow and hereby causes an increase in blood pressure. Increase the risk of aneurisms and thrombosis. Can lead to coronary heart disease (CHD)

Auto-immune condition: immune system attacks own body

Autonomic nervous system: regulates unconscious body functions such as heart rate, urination, and sexual arousal.

Autosome: non sex chromosome

Autotomy: Self-amputation, eg in some lizard tails

Axon: long bit of neurone that conducts impulses away from the cell body

B

B cells: humoral, antibody-driven adaptive immunity. Activated when it binds to complementary antigen. Processes antigen and adds MHC to it to become antigen presenting cell. T helper cell with complementary receptor will bind to the antigen. This stimulates the T helper cell to release cytokines, which stimulates the B cell to divide rapidly to produce plasma cells and B memory cells.

Bacteriophage: virus that infects bacteria

Baroreceptors: mechanoreceptors located in the carotid arteries and in the aortic arch. Detect pressure

Base deletion: DNA base deleted. Results in frame shift. Always results in change.

Base duplication: gene/part of a gene is copied so that there are two copies on one chromosome. Important in evolution.

Base insertion: DNA base is inserted. Results in frame shift. Always has an effect.

Base inversion: two breaks in DNA, $\pi/2$ radians rotation, and ligation.

Base substitution: DNA base substituted. Not always visible (due to codon degeneracy).

Base translocation: part of gene breaks off and joins another gene.

Beta cells: in islets of Langerhans in pancreas. Detects high glucose concentration in blood and secretes insulin

Bowman's Capsule: sac around glomerulus. Collects glomerular filtrate.

Bundle of His: the initial bundle of Purkyne tissue prior to branching

C

Cardiac muscle cells/cardiomyocytes/myocardiocytes/cardiac myocytes: the muscle cells (myocytes) that make up the cardiac muscle (heart muscle).

Cardiomyocytes: unipotent stem cells in the heart. Previously thought that heart muscles are not regenerated.

Carrying capacity: the maximum size that a population can remain sustainable in an ecosystem.

cDNA: complementary DNA. Single stranded. Can be converted into double stranded DNA using DNA polymerase.

Cell mediated immunity/cellular response: immune response without antibodies. Involves phagocytes and antigen-specific cytotoxic T cells.

Cerebellum: coordinates body (including muscle movement and speech)

Chain termination technique: using dideoxynucleotides to end DNA replication because DNA polymerase cannot add to a dideoxynucleotide, and then fragments are analysed.

Chemiosmosis: movement of ions across a semipermeable membrane down their electrochemical gradient. Eg proton movement in respiration or photosynthesis.

Chemoreceptor: detect chemical changes (e.g. pH). Present in carotid arteries and aorta.

Chemotaxis: directional movement of cell/organism in response to a chemical. Eg bacteria to glucose, or phagocytes.

Chiasma(ta): point at which paired chromosomes are in contact during metaphase one of meiosis, and the location where crossing over occurs.

Cholinergic synapse: where acetylcholine is the neurotransmitter.

Chylomicrons: lipoprotein particles. Consist mostly of triglycerides, phospholipids, cholesterol, and protein. Transport lipids from intestines to around the body.

Ciliary muscle: muscle in eye controlling focus

Cisterna(e): flattened membrane disk of the endoplasmic reticulum and Golgi apparatus

Codominant alleles: when both alleles have an effect on the phenotype.

Collagen: fibrous structural protein. Main protein in skin and connective tissue. Structure is 3 alpha helices twisting around each other. Most abundant protein in humans

Columellar: tissue layer at the very tip of the root

Community: all the populations of different species living in the same place at the same time.

Compensation point: the point at which the rate of respiration and photosynthesis are equal

Cones: colour sensitive cells in eye

Cortex: outermost layer of an organ, including the kidney.

Counter-current multiplier system: the system in the kidney with the loop of Henle. Allows concentrated urine to be produced. The longer the loop, the greater the concentration gradient. The longer the loop, the greater the osmotic gradient.

Crassulacean acid metabolism (CAM): plants that absorb CO_2 at night in order to prevent water loss. Usually this applies to plants in extreme dry and hot conditions. Eg cacti or pineapple.

Curare: drug that binds to acetylcholine receptors on post synaptic membranes, hereby preventing action potentials to be passed across a synapse.

Cyclic adenosine monophosphate (cAMP): second messenger in liver during stimulation by glucagon or adrenaline in the process of Glycogenolysis. Activates protein kinase, which results in glycogen being converted into glucose phosphate.

Cytochrome c oxidase: large transmembrane protein complex found in bacteria and the mitochondrion of eukaryotes. Last enzyme in the respiratory electron transport chain of mitochondria (or bacteria). (produces H_2O from O_2 , H^+ , and e^-). This is where cyanide binds, hereby preventing reduction of oxygen.

Cytochrome c: protein (haemoprotein) in inner mitochondrial membrane. Is part of electron transport chain. Carries one electron.

Cytokines: chemicals secreted by T helper cell that stimulates clonal selection in B cell.

Cytolysis: cell in hypotonic solution bursts due to osmosis

Cytosol: aqueous component of cytoplasm in cell

Cytotoxic T cells: type of T cell. Aka CD8^+ T-cell. Kills cancer cells, cells with viruses, and other damaged cells. Will kill any cell with antigen that binds to its T cell receptor. Kill using cytotoxins such as perforin.

D

Dendrite: branch of a motor neurone

Dendritic cell: antigen presenting cell in immune system. Act as messengers between innate and adaptive immune systems. Present antigens to T cells (and B cells?)

Denitrification: nitrate to nitrogen gas

Diastole: when atria and ventricles are both relaxing

Dideoxyribose: like deoxyribose but with another oxygen missing. Used in chain termination techniques for DNA sequencing.

Directional selection: natural selection pressure favouring one end of the extreme phenotypes. Occurs in a changing environment.

Disruptive selection: natural selection pressure favouring both types of extreme phenotype. Occurs when the middle phenotype is disadvantageous.

Distal convoluted tubule: carries urine from loop of Henle to collecting duct.

DNA hybridisation: combining two complementary single-stranded DNA molecules and allowing them to form a single double stranded molecule through base pairing. Used to identify if allele is present. Used in Southern blotting.

DNA sequencing: manual: incubate DNA with labelled dideoxynucleotides (each base incubated separately). Run gel electrophoresis with four separate wells (one for each incubated dideoxynucleotide). Autoradiograph is made.

dNTP (deoxyribonucleoside triphosphate): basically DNA nucleotide with 3 phosphates instead of 1. These are the molecules used in DNA replication (and PCR) as the hydrolysis of the phosphates provides the energy needed for polymerisation. Two phosphates joined together (pyrophosphate) are released every time the dNTP is hydrolysed.

Dominant allele: one copy of this allele is required for the phenotype to be expressed.

Double digest: when a DNA fragment is cut out using two different restriction enzymes, one either side of the gene. Using different restriction enzymes means that the two ends are not complementary so no self-ligation will occur, and a gene can be inserted with the correct orientation.

dsRNA: double stranded RNA. Produced by RDRs in response to high levels of mRNA. Can be broken down into siRNA, which stimulates the breakdown of complementary mRNA.

E

Ecosystem: formed from the community and the non-living components.

Efferent arteriole: takes blood away from glomerulus, and is thinner than afferent.

Endocrine: to do with hormones

Endosome: membrane bound compartment in eukaryotic cell

Endosymbiosis/Symbiogenesis: the theory that chloroplasts and mitochondria were independent bacteria and then were taken up by eukaryotes. They have their own DNA and ribosomes so it makes sense.

Epigenome: the sum of the chemical changes to DNA and histone proteins in an organism, but not changes in base sequence. Includes acetylation and methylation.

Epistasis: the expression of one gene affects the expression of another. Occurs in metabolic pathways controlled by multiple enzymes and hereby reduces the number of phenotypes. Also occurs with dependent genes and when two genes code for proteins with the same function.

ER alpha oestrogen receptor: transcription factors. Bind to hundreds of hormone related genes. Stimulated by oestrogen.

Erythrocytes: aka red blood cell

Eutrophication: excess nutrients leaching into an aquatic environment

Extrinsic/peripheral proteins: proteins in a plasma membrane that do not span both sides of the membrane

F

Founder effect: type of genetic bottleneck due to a small population being genetically isolated.

Fovea: area of internal eye with high concentration of cones

Frame-shift mutation: shift in frame of DNA when a base is deleted or inserted

G

Gametocyte: diploid germ cell that divides by meiosis to form a gamete.

Gel electrophoresis: slab of gel made of agarose sugar and polyacrylamide. Electrodes are placed at either side of gel. Current is flown between them. DNA fragments are drawn towards positive electrode (as DNA is negative due to phosphate groups on nucleotides) and are separated based on size.

Gene machine: takes in amino acid sequence and produces corresponding DNA with no introns.

Genetic drift: change in allele frequency in a population just by chance. More likely in small populations, and after a genetic bottleneck such as the founder effect.

Genotype: alleles of a gene/all the alleles of all genes that an individual inherits.

Glomerulus: capillary network in Bowman's capsule in cortex. Involved in blood filtration. Blood comes in through afferent arteriole and leaves through efferent arteriole. High pressure ultrafiltration.

Glucagon: secreted by alpha cells. Stimulates Glycogenolysis and gluconeogenesis. Adrenaline has a similar effect. Decreases rate of respiration.

Gluconeogenesis: formation of glucose from non-carbohydrates such as fatty acids and amino acids

GLUT4: glucose transporter protein stored in vesicles in the cytoplasm when not in use. Insulin stimulates fusion of these vesicles with the cell membrane of eg muscle and adipocytes

Glycogenesis: formation of glycogen from glucose. In liver

Glycogenolysis: breakdown of glycogen to glucose. Happens in liver due to adrenaline or glucagon using second messenger model, with cAMP being the messenger stimulating protein kinase.

Granulocyte: aka polymorphonuclear leukocytes/ PML because nucleus is lobed into segments. white blood cell with granules in the cytoplasm. Neutrophil is a granulocyte.

Gymnosperms: seed producing plants but with no flowers. Includes conifers and cone producing plants

H

Habitat: where the organism lives

Haematopoiesis: the formation of blood cellular components from haematopoietic stem cells (HSC), which can self-renew because at least some daughter cells remain HSC. HSC can mature into any type of mature blood cell.

Haemophilia: sex linked disorder, so males are more likely to have it. Bloods clots slowly.

Hepatic: to do with the liver

Heteropolymer (and heteropolysaccharide): polymer made from different kinds of monomer (e.g. DNA and protein).

Heterozygous: having two different alleles of a gene at the same locus on homologous chromosomes.

Hexokinase: enzyme that catalyses hexose sugars eg: $\text{glucose} + \text{ATP} \rightarrow \text{Glucose 6-phosphate} + \text{ADP}$ (this happens in glycolysis)

Hippocampus: part of brain associated with (long term) memory

Histone deacetylase / HDAC: enzyme that removes acetyl groups on histones, hereby inhibiting transcription of genes.

Holozoic nutrition: the type of nutrition where food is ingested, digested, absorbed, and rest is egested (e.g. humans have it).

Homopolymer (and homopolysaccharide): polymer made from one type of monomer (e.g. cellulose, chitin)

Homozygous: having the same two alleles of a gene at the same locus on homologous chromosomes

Horizontal gene transfer: transfer of DNA that is not from parent to offspring (aka linear). This might happen with transgenic plants with herbicide resistance; their resistance is passed on to other plants. Genes might be transferred to chloroplasts to reduce the chance of horizontal gene transfer. Occurs in bacteria when plasmids are exchanged.

Hormone: either protein or steroid (lipid soluble). Protein cannot diffuse through cell membrane, so second messenger is used (eg glucagon and adrenaline) whilst steroid hormones can diffuse (eg oestrogen).

Humoral response: immune response with antibodies, as opposed to cell mediated immunity. Involves clonal selection and B cells.

Hyperglycaemia: high blood sugar. May be due to diabetes

Hypha(e): "thread" of a fungus

Hypoglycaemia: low blood sugar. May be due to diabetes when too much insulin is injected.

Hypothalamus: part of brain associated with hormones. Contains pituitary gland. Involved in osmoregulation (produces ADH). Contains osmoreceptors

I

Immunoglobulin: Fancy term for antibody

Indoleacetic acid (IAA): specific growth factor in plants (ie auxin)

Innate response: aka innate immune system. Does not provide long lasting protection.

Insulin: hormone secreted by beta cells. Decreases blood glucose by stimulating uptake of glucose in muscle cells, adipose cells, and liver cells. Insulin stimulates glucose transporters (GLUT4) in vesicles to fuse with the surface of muscle cells and adipocytes. Stimulates glycogenesis in liver. Stimulates fat synthesis in adipose tissue. Increases rate of respiration.

Integrase: enzyme that inserts a piece of DNA into the main DNA. Used by HIV to insert its DNA into host cell.

Intrinsic/integral proteins: proteins in a plasma cell that span both sides of the membrane.

iPS cells: induced pluripotent stem cells. Somatic cells have had certain genes activated in order to render the cell pluripotent. Can be done by adding transcription factors that stimulate the transcription of the genes associated with pluripotency. Or a virus that contains genes that code for transcription factors can be used.

J

K

Kinase: enzyme that catalyses the transfer of a phosphate group.

Kinesis: non-directional response to a stimulus

L

Leukocytes: aka white blood cells. Part of immune system. Derived from multipotent stem cells in the bone marrow (hematopoietic stem cells). Found in blood and lymphatic system.

Ligament: connects two bones

Ligase: enzyme that catalyses the joining of two DNA fragments.

Ligation: joining of two DNA fragments. Catalysed by ligase.

Lignin: class of complex organic polymers with important structural role in plants. Provides reinforcement to xylem in plants.

Linkage: genes are on the same chromosome. Autosomal linkage means they are on the same autosome. Sex linkage is when the genes are on sex chromosomes.

Liposome: small lipid vesicle enclosing something (could be drugs). Double layer. Used for gene therapy to transfer DNA.

Locus: fixed position of a gene on a chromosome

Loop of Henle: part of nephron that enters the medulla of the kidney. Has descending and ascending limb (latter has thin then thick section).

Lymph: fluid that circulates in lymphatic system.

Lymphocytes: subtype of white blood cell. Main kind of cell found in lymph (hence the name). 3 types: B cells, T cells, and NK cells (natural killer cells).

M

Macrophage: type of phagocyte. Amoeboid movement. Part of innate/non specific immune system. Can become antigen presenting cell (APC)

Major histocompatibility complex (MHC): protein molecules that bind to antigens on antigen presenting cells. Needed for acquired immune system.

Mechanoreceptors: sensory receptor that responds to mechanical pressure or distortion

Medulla oblongata: part of brain. Cardioregulatory centre is here.

Medulla: (renal) innermost section of kidney. Has low water potential.

Metastasis: cancer that spreads to different parts of the body whence it started

Methylation: addition of methyl group to DNA. Inhibits transcription.

Mica: very thin layer of glassy material. Used in experiments with phototropism in plants. Impermeable to water.

Micelle: single layer lipid droplet. Also formed during the digestion of lipids into monoglycerides and fatty acids in the presence of bile salts.

miRNA: microRNA. Smaller than siRNA and less specific. Type of RNAi (RNA interference). Binds to mRNA and physically prevents it from being translated. Associated with protein complex. Results in mRNA being degraded or stored (and used later)

Monoblasts: normally found in bone marrow. Mature into monocytes which in turn develop into macrophages.

Monoculture: when only one type of crop is grown. This reduces biodiversity, but also increases the risk of the extinction due to disease because of little variation in the species.

Monocyte: type of leukocyte (white blood cell). Can differentiate into macrophages or dendritic cells. Part of adaptive immunity and innate immune system. Produced in bone marrow by monoblasts.

Multipotent stem cell: cell that can divide into many types of cell

Mutagenic agents: increase rate of DNA mutations. Include harmful radiation and some chemicals.

Mycorrhizae: symbiotic association between a fungus and the roots of a vascular host plant.

Myocardial infarction: heart attack.

Myocyte: muscle cell

Myofibrils: fibres inside muscle fibre. Consist of actin and myosin filament

Myogenic: muscle cells that contract without nervous stimulation

Myosin: thick filaments in myofibrils

N

Nephron: functional unit of a kidney

Neuromuscular junction: synapse between neurone and muscle cell.

Neutrophil: aka neutrocyte. Type of granulocyte. Type of white blood cell. Part of innate immune system. Type of phagocyte. Do amoeboid movement by chemotaxis. Can become antigen presenting cell (debatable?).

Niche: the combination of biotic and abiotic factors that a species occupies in a habitat.

Nitrification: ammonium compounds turned into nitrite then nitrate. By nitrifying bacteria.

Nitrogen fixation: nitrogen gas to nitrogen containing organic molecules. By nitrogen fixing bacteria in the root nodules in leguminous plants. Also by lightning.

Nodes of Ranvier: nodes on axon between Schwann cells. Where depolarisation occurs.

Non-disjunction: when chromosomes (or sister chromatids) fail to separate during meiosis, resulting in zygotes with the incorrect number of chromosomes. Eg 21 trisomy with Down's syndrome

Nuclease: enzyme that break bonds between nucleotides (phosphodiester bonds). Exonuclease breaks bond between nucleotides at the end of a polynucleotide chain. Endonuclease hydrolyses bonds between nucleotides within DNA molecule.

O

Oesophagus: tube that connects your mouth and your stomach

Oncogenes: a mutated proto-oncogene gene with the potential to cause cancer

Oocytes: immature egg cell. Female gametocyte.

Osmoregulation: homeostatic control of blood water potential. Involves hypothalamus.

Oviparous: egg laying e.g. birds.

Ovoviviparous: eggs laid inside body e.g. some sharks.

Oxidoreductase: an enzyme that catalyses the transfer of an electron from one molecule to another.

P

P53 gene: a tumour-suppressor gene, and about 50% of cancers are thought to be due to mutations in this gene.

Pacinian corpuscle: onion like mechanoreceptor in skin

Palmitoylation: the covalent attachment of fatty acids to amino acids (generally membrane proteins). Increases membrane association of proteins by increasing their hydrophobicity.

Parasympathetic nerve: connects medulla and SAN. Slows down heart rate using acetylcholine as neurotransmitter

Parotid gland: largest of the salivary glands. Secretes saliva

Parthenogenesis: Asexual reproduction

PCR: polymerase chain reaction. Used to clone genes. Occurs in thermal cycler with reagents including DNA polymerase, oligonucleotides, and free DNA nucleotides. Three main steps: 1: template DNA strand is denatured (H bonds are broken) by heating to 94°C. 2: cooling to ~50°C. Primers are annealed (H bonds form between exposed template DNA and primers). 3: Temperature raised to optimum of DNA polymerase. Binds to primer and produced copy of DNA strand.

Peptidoglycan: murein (bacterial cell wall)

Phagocyte: cell that digests harmful cells by phagocytosis. Move by amoeboid movement and chemotaxis. Include neutrophils, monocytes, macrophages, mast cells, and dendritic cells.

Phenotype: features of an individual as a result of their genes (genotype) and their environment.

Phosphatase: removes phosphate group

Phosphoanhydride: the bond in ATP.

Phosphocreatine: quick store of ATP in muscle cells. Phosphorylates ADP to produce ATP and creatine

Photoautotrophic: produce organic material using light

Photorespiration: Rubisco from the Calvin cycle acts on oxygen instead of CO₂ (this is wasteful). Reduced in C₄ plants.

Pinocytosis: cell "drinking" by creating a vesicle of fluid from outside the cell

Plagioclimax community: when humans prevent an ecosystem from developing further, and potentially preventing the formation of the climax community.

Plasmolysis: when a cell with a cell wall is placed in a hypotonic solution, becomes dehydrated, and the cell membrane breaks away from the cell wall.

Platelets: aka thrombocytes. Stop bleeding by clotting up blood vessel injuries. Have no nuclei. Clot up with positive feedback mechanism.

Pluripotent: cell that can divide into any body cell (but not placental cells)

Podocytes: form lining of Bowman's capsules. Have large gaps between them to allow glomerular filtrate into the renal space.

Polynuclear/ multinucleate cells: eukaryotes with multiple nuclei (eg striated muscle fibre)

Population: a group of organisms of the same species living in a particular area at a particular time that can potentially interbreed

Primer: short strand of DNA (ie oligonucleotide) that acts as starting point of DNA synthesis.

Progenitor cell: similar to a stem cell but more differentiated. (progenitor cells are already pushed towards a target cell). Can replicate a finite number of times, unlike stem cells which can replicate indefinitely.

Promoter region: region of DNA that initiates transcription.

Protista: any eukaryotic organism that is not an animal, plant or fungus. Not official group

Proto-oncogenes: control cell division and could become oncogenes

Protoplasm: components of cell excluding cell membrane (and wall). ie its cytoplasm plus nucleus

Proximal convoluted tubule: in cortex of kidney. Transports glomerular filtrate. Useful substances are removed from the filtrate into blood capillaries by active transport, diffusion, osmosis.

Pseudoautosomal region: region on X and Y chromosome where crossing over occurs during meiosis because they are homologous. There are only two regions, both at the termini.

Pseudopodia: temporary protrusion on the surface of an amoeboid cell in order to move/feed/whatever such as phagocytosis. Formed by microtubules.

Purkyne tissue: heart muscle cells that conduct impulses

Pyrosequencing: recently developed high speed DNA sequencing technique

Q

R

RDR: RNA-dependent RNA polymerases: catalyse production of double stranded RNA (dsRNA). Occurs when there are high levels of mRNA in a cell. dsRNA can be hydrolysed into small sections of siRNA, which stimulate the breakdown of complementary mRNA.

Recessive allele: two copies of this allele are required for the phenotype to be expressed.

Recognition sequence: specific sequence of DNA bases at which restriction enzymes can act.

Recombinant DNA: DNA molecule with more than one source for the DNA.

Recombinant offspring: offspring with a different combination of alleles from either of its parents.

Renal pyramids: structures in the medulla of the kidney

Renal: to do with the kidneys

Restriction endonucleases/restriction enzymes: break bonds between nucleotides on both strands. Therefore can form fragments of DNA. Cuts DNA only at specific recognition sequence. Can form blunt ends or sticky ends (one strand protrudes a bit). Produces restriction fragments which can be separated using gel electrophoresis. Sticky ends are useful for ligation.

Retrovirus: virus with single stranded mRNA that converts its genetic content into DNA using reverse transcriptase. HIV is a retrovirus. Used in gene therapy.

Reverse transcriptase: enzyme that converts mRNA into cDNA (single stranded complementary DNA). Found in HIV. cDNA can then be converted into double stranded DNA using DNA polymerase. Used to produce DNA from mRNA.

Ribonuclease: nuclease (which breaks bonds between nucleotides) that hydrolyses RNA

Ribosomes: consists of rRNA and protein. Carries out translation and produces polypeptides. 80s in eukaryotes and 70s in prokaryotes (and chloroplasts and mitochondria)

Rods: light sensitive cells in eye. Lower visual acuity than cones.

S

Saltatory conduction: "jumping" of action potential from node to node on a myelinated neurone.

Saprobiotic: digest biological molecules

Sarcolemma: cell surface membrane of muscle fibre (cell)

Sarcomere: the basic unit of muscle contraction in a myofibril (which is in a muscle cell)

Sarcoplasm: cytoplasm of striated muscle cell

Sarcoplasmic reticulum: specialised tubules in muscle fibres that store calcium ions

Schwann cells: cells insulating neurone axons. Form myelin sheath. Allow saltatory conduction.

Self-ligated: when DNA fragments have just joined back on themselves

Sex chromosome: allosome, heterotypical chromosome, heterosome, heterochromosome, or idiochromosome

Sinoatrial node (SAN): modified heart muscle cells that control the contraction of the heart by regularly sending out waves of electrical impulses. Located in right atrium.

siRNA: small interfering RNA. Fragments of dsRNA. Binds to complementary mRNA and stimulates the breakdown of this mRNA. Double stranded

Somatic: relating to the body

Southern blotting: technique used to determine presence of a base sequence. Steps: digest sample DNA and amplify by PCR. Separate fragments by gel electrophoresis. Denature (i.e. separate DNA strands in fragment) by adding HCl or NaOH. Blotting, meaning transferring the strands to nitrocellulose (it's positively charged so DNA binds)(nylon membrane). Hybridise with labelled DNA probe (which is complementary to the gene you are looking at). Autoradiography (if label is radioactive). Probe will have bound to DNA if sequence is present.

Species: a group of similar organisms that can reproduce to give fertile offspring.

Spermatocyte: male gametocyte.

Spermatophyte: seed producing plants

Sphincter: circular muscle that normally maintains constriction of a natural body passage or orifice

Stabilising selection: natural selection pressure favouring middling phenotypes. Occurs in a non-changing environment.

Stem cell: an undifferentiated cell of a multicellular organism which is capable of giving rise to indefinitely more cells of the same type, and from which certain other kinds of cell arise by differentiation.

Striated muscle: muscle tissue that features repeating functional units called sarcomeres

Summation: effect of several impulses acting at the same time (spatial) or in quick succession (temporal)

Sympathetic nerve: connects medulla and SAN. Speeds up heart rate using noradrenaline as neurotransmitter

Sympatric speciation: speciation when the populations live in the same geographical area. Opposite of allopatric speciation.

Synaptic cleft: the gap between two neurones (a synapse)

Systole: when atria or ventricles are contracting

T

T cells/lymphocytes: cell mediated, cytotoxic adaptive immunity. Stimulate B cells in clonal selection by secreting cytokines. Have T cell receptors that bind to antigens on antigen presenting cells.

Taxis: directional response to a stimulus.

T-cell receptor: molecule found on the surface of T cells that bind to antigens bound to MHC molecules. T cell is activated when an antigen from an antigen presenting cell binds to the T cell receptor.

Tendon: attaches muscle to bone

Terminator region: region of DNA that ends transcription.

Thigmotropism: turning or bending of a plant or other organism in response to a touch stimulus.

Thrombosis: formation of blood clot inside blood vessel

Totipotent: cell that can divide into any type of cell, including placental cell

Transcription factors: protein that binds to the promoter region of a gene in order to allow RNA polymerase to start transcription. May join with cofactors.

Transfection: when a correct gene is inserted into a cell in gene therapy.

Transformation/ transformed bacteria: when DNA is somehow inserted into a bacteria (could be a plasmid).

Transgenic: organism that contains a gene from another organism.

Tropomyosin: type of actin molecule that prevents myosin heads from binding to binding sites on actin filament.

Troponin: actin molecule to which calcium binds, resulting in a change in shape in tropomyosin and hereby revealing the myosin binding site.

Tubulin: protein that is main constituent of microtubules in cells (therefore cytoskeleton)

Type 1 diabetes: auto-immune condition. Body destroys beta cells.

Type 2 diabetes: liver and adipose tissue becomes unresponsive/ less sensitive to insulin

U

Unipotent: a cell that can divide only into one kind of cell

Urea: product of breakdown of amino acids. Secreted in urine in mammals.

Ureter: goes from kidney to bladder

Urethra: from bladder to penis/elsewhere

V

Vector: artificial form of DNA that can be transferred between organisms. Can be a plasmid or bacteriophage.

Vitreous humour: fluid filling your eye

Viviparous: live birth, e.g. us

VNTR: variable number tandem repeat. A short nucleotide sequence repeated in tandem. The number of repeats varies in people (because it is inherited) so it can be used for genetic fingerprinting.

W

X

Y

Z