

Definitions and Concepts for Edexcel Biology GCSE

Topic 5: Health, Disease and the Development of Medicines

Definitions in **bold** are for higher tier only

Definitions marked by '*' are for separate sciences only

***Agar plate** - A Petri dish containing agar and nutrients used to culture microorganisms.

Antibiotic - A chemical or compound produced by a living organism that kills or prevents the growth of bacteria. Antibiotics have no effect on the cells of the host organism.

Antibodies - Proteins produced by B-lymphocytes in response to a specific antigen, triggering an immune response.

Anticoagulants - Drugs that reduce clotting of the blood, lowering the risk of a heart attack or stroke.

Antigen - A unique chemical present on the surface of a cell that induces an immune response.

Antihypertensives - Drugs that lower blood pressure, reducing damage to artery walls and the build-up of atheromas.

***Antiseptics** - Chemicals secreted by plants which kill bacterial and fungal pathogens.

***Aseptic techniques** - A range of techniques used to culture microorganisms under sterile conditions in order to minimise contamination.

***Aspirin** - A chemical found in the bark and leaves of willow trees that is used as a painkiller.

***Autoclave** - A device used to sterilise equipment under high temperatures.

Single-blind trial - A study performed in which the participants do not know whether they are receiving the new drug or the placebo. This prevents a patient's bias affecting the results.

B-lymphocyte - A type of white blood cell that produces antibodies specific to a particular antigen.

Body mass index (BMI) - A value based on height and mass used to categorise an individual as underweight, normal weight, overweight or obese. It is calculated using:

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$$\text{BMI} = \frac{\text{mass (kg)}}{(\text{m})^2}$$

Carbon monoxide - A chemical found in cigarette smoke that lowers the ability of red blood cells to carry oxygen. This results in an increased heart rate, raising the risk of cardiovascular disease.

Cardiovascular disease - A group of diseases affecting the heart or blood vessels.

Cell wall - An outer layer made of cellulose that strengthens plant cells and serves as a physical barrier against pathogens.

Chalara ash dieback - An airborne fungal disease that infects ash trees resulting in dark lesions on bark and blackened leaves which wilt and eventually die.

Chlamydia - An infection caused by the bacteria *Chlamydia*, which is spread through sexual contact and may result in infertility.

Cholera - A water-borne disease caused by the bacterium *Vibrio cholerae*, the toxins of which cause severe diarrhoea leading to dehydration.

Cilia - Hair-like structures found on ciliated epithelial cells that waft substances across the surface of the tissue in one direction.

Cirrhosis - Scarring of the liver tissue resulting from the breakdown of alcohol into toxic products in the liver.

Clinical testing - Drug testing carried out on healthy human volunteers to check for any side effects and then on patients to determine the drug's efficacy and to establish an optimum dose.

Communicable disease - A disease that is caused by a pathogen which can be spread between individuals (either directly or indirectly).

Coronary bypass - A surgical procedure involving the use of a blood vessel from another region of the body (e.g. leg, arm) to divert blood around a blockage in the coronary artery.

***Culture** - The growth of living matter *in vitro* under suitable conditions.

***Diagnostic testing** - The detection of foreign antigens in a sample of tissue, or the analysis of pathogenic DNA, to allow accurate identification of specific pathogens.

Disease - A disorder of the body or mind that negatively affects an individual's health.

***Distribution** - The spread of living organisms in an ecosystem. The distribution of infected organisms can be analysed to indicate the type of pathogen involved and its mode of transmission.

Double-blind trial - A study performed where neither the researcher nor the patient know whether the patient is taking the drug or a placebo. This prevents bias from both patients and researchers.



***Ebola** - A disease caused by the Ebola virus which is transmitted via infected bodily fluids. Symptoms include a fever, diarrhoea, vomiting and internal bleeding.

***Growth medium** - A solid or liquid nutrient-rich medium used in the cultivation of microorganisms. It contains carbohydrates, proteins, vitamins and minerals.

Health - A state of complete physical, mental and social well-being (as defined by the World Health Organization, WHO).

***Herd immunity** - When the vaccination of a large proportion of the population provides some protection to unvaccinated individuals who are less likely to catch the disease.

Human Immunodeficiency Virus (HIV) - An infectious virus that is spread by direct contact with infected body fluids. It destroys white blood cells, weakening the immune system and may lead to AIDS (acquired immunodeficiency syndrome).

***Hybridoma cell** - A hybrid cell that results from the fusion of a B-lymphocyte with a myeloma cell. It is used to rapidly produce large quantities of monoclonal antibodies.

Hydrochloric acid - The primary constituent of stomach acid. Its acidic pH kills any pathogens that are swallowed.

***Inhibition zone** - The circular area around an antibiotic-soaked paper disk on an agar plate in which the bacteria do not grow. The area of the zone can be calculated using πr^2 .

***Inoculating loop** - A tool used to safely transfer, smear or streak a small sample from a microorganism culture.

Immune system - The body's defence against pathogens once they have entered the body. It aims to prevent or minimise disease caused by pathogens.

Immunisation - The deliberate exposure of an individual to a dead or inactive pathogen. This triggers the production of antibodies and memory lymphocytes, providing immunity against a disease.

***Lysogenic pathway** - One of two pathways by which viruses replicate within host cells, characterised by the integration of viral DNA into the host cell genome.

Lysozyme - An enzyme found in tears that digests bacterial cell walls, killing bacteria and protecting the eye.

***Lytic pathway** - One of two pathways by which viruses replicate within host cells. Viral DNA is injected into the host cell and replicated using host cell machinery. New viral structures are produced and assembled before the host cell ruptures, releasing new viruses.

Malaria - A disease caused by a protist that lives within two hosts: mosquitoes and humans. It results in damage to red blood cells and causes recurrent episodes of fever.

Malnutrition - A condition resulting from a diet lacking in, or too rich in nutrients.



Memory lymphocyte - A type of white blood cell that remains in the blood and provides immunological memory to a specific antigen on a pathogen.

***Monoclonal antibodies** - **Antibodies that are clones from a single parent B-lymphocyte and that are specific to one protein antigen.**

Mucus - A viscous, slimy fluid that lines the surface of many tissues in the body and traps pathogens.

***Myeloma cell** - **A type of tumour cell that fuses with a B-lymphocyte to form a hybridoma cell.**

Nicotine - A chemical found in cigarette smoke that raises heart rate and blood pressure, increasing the risk of cardiovascular disease.

Non-communicable disease - A disease that cannot be spread between individuals. It is caused by the interaction of a number of risk factors.

Non-specific defences - General physical and chemical barriers that defend the body against many different types of pathogens.

Pathogen - A disease-causing organism, e.g. viruses, fungi, bacteria, protists.

Placebo - A substance that is indistinguishable from the real drug but has no effect on the recipient.

Pre-clinical drug testing - Drug testing carried out in a laboratory using human cells and tissues to determine its toxicity and efficiency, and then on live animals to establish a safe dose.

***Pregnancy test kit** - **A test that uses monoclonal antibodies to detect HCG in a woman's urine. A positive result (the formation of a blue line) indicates pregnancy.**

Primary immune response - The response of the immune system to a pathogen when it is first encountered. A small number of antibodies are produced slowly.

***Quinine** - A chemical secreted from the bark of the cinchona tree that is used as an antimalarial drug.

Risk factor - A variable associated with a greater chance of developing a disease or infection.

Secondary immune response - The response of the immune system to a pathogen when it is encountered for a second (third, fourth...etc.) time. Memory lymphocytes rapidly produce a large number of antibodies.

Sexually transmitted infection (STI) - An infection that is spread through sexual contact or direct contact with infected genital fluids.

Side effects - Additional effects that a drug has, different from those intended.



Specific immune response - The second line of defense against pathogens triggered by foreign antigens.

Statins - A class of drugs used to decrease blood cholesterol levels, reducing the rate of fatty deposit build-up in the arteries.

Stent - A small, hollow tube that can be surgically implanted into the lumen of arteries to keep them open.

***Stomach ulcers** - A disease caused by the *Helicobacter pylori* bacterium which is transmitted orally by eating infected foods or drinking infected water. It results in stomach pain, nausea and vomiting.

Susceptible - Describes an individual that is at an increased risk of contracting a disease.

***Symptom** - A change experienced by an organism that indicates disease.

Transplant - A medical procedure in which an organ or tissue in an individual is replaced.

Tuberculosis - An airborne bacterial disease caused by *Mycobacterium tuberculosis* that damages lung tissue and weakens the immune system.

***Tumour markers** - Proteins present on the cell surface membranes of cancer cells that are not found on normal body cells.

Viruses - Non-living infectious agents that invade host cells and take over cell metabolism, replicating within them.

Waist-to-hip ratio - The ratio of the circumference of the waist to the circumference of the hips. It can be used to indicate abdominal obesity and is calculated using:

$$\text{waist-to-hip ratio} = \frac{\text{waist circumference (cm)}}{\text{hip circumference (cm)}}$$

***Waxy cuticle** - A waxy layer that reduces water loss from the leaf surface and provides a surface barrier to prevent the entry of pathogens.

White blood cells - Cells of the immune system that protect the body from invading pathogens.

