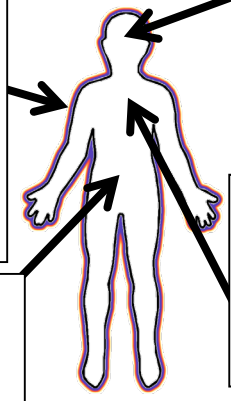
AQA B3a Infection and response: Communicable diseases Triple Biology (Page 1 of 2)

Key word	Definition
health	This is the state of physical and mental wellbeing.
ill health	Disease is a major cause of ill health but this can also be caused by poor diet, stress and life situations.
disease	A major cause of ill health. Diseases can be both communicable and non-communicable.
communicable disease	A disease that can be passed from one organism to another by direct contact, water or air e.g. measles
non-communicable disease	A disease that cannot be spread between organisms e.g. asthma, cancer, coronary heart disease.
antigen	Surface proteins found on pathogens that are recognised by white blood cells
pathogen	microorganisms such as viruses and bacteria that cause infectious diseases in animals and plants.
phagocytes	A type of white blood cell that engulfs pathogens and digests them by phagocytosis
lymphocytes	A type of white blood cell recognise antigens on the surface of pathogens, and produce antibodies or antitoxins

Human defence systems- The human body has several non specific ways of defending itself from pathogens and preventing them from causing diseases

SKIN
Physical, waterproof barrier. Scabs made from platelets if you cut yourself. Glands produce antimicrobial secretions to kill pathogens.

STOMACH ACID
Stomach acid (pH2) kills most pathogens taken in through food and drink.



NOSE
Nasal hairs and sticky mucus prevent pathogens entering through the nostrils.

TRACHEA AND BRONCHI
Lined with mucus to trap dust and pathogens. Cilia (hair like structures) waft to move the mucus up the throat to be swallowed.

Pathogen	Disease	Symptoms	Transmission (how they are spread)	Reducing or preventing spread
virus Reproduce rapidly in the body. Viruses live and reproduce inside cells, causing cell damage.	Measles	Fever, red skin rash, can be fatal	Droplet inhalation from coughs and sneezes	Vaccination as a child
	HIV	Initially flu like symptoms, serious damage to immune system caused when HIV develops into AIDS	Sexual contact and exchange of bodily fluids e.g. blood	Anti-retroviral drugs/ use of condoms
	Tobacco Mosaic Virus	Mosaic pattern of discolouration on leaves in plants. Affects growth of plant due to lack of photosynthesis	Spread via gardening tools or workers hands	Remove infected leaves and destroy, clean gardening equipment, don't use infected soil, wash hands
bacterium (pl. bacteria) Reproduce rapidly in the body. Bacteria may produce toxins (poisons) that damage tissues and make us feel Il.	Salmonella (food poisoning)	Fever, cramp, vomiting and diarrhoea	Food prepared in unhygienic conditions or being undercooked	Improve food hygiene, wash hands, vaccinate poultry and cook food thoroughly
	Gonorrhoea	Green discharge from penis or vagina, pain when urinating	Direct sexual contact or exchange of bodily fluids	Use condoms, treat using antibiotics
protist	Malaria	Recurrent fever, can be fatal	By animal vector-mosquitoes	Prevent breeding of mosquitoes, use of nets to prevent bites, use of insecticides
fungus (pl. fungi)	Rose Black Spot	Purple/ black spots on leaves that turn yellow and drop early. Affects growth of plant due to lack of photosynthesis	Spores carried by wind or water	Remove infected leaves, spray with fungicides.

Different types of disease may interact

Defects in the immune system (the system your body uses to fight off infection) mean that an individual is more likely to suffer from infectious diseases.

Viruses living in cells can be the trigger for cancers e.g. HPV (human papilloma virus) which can cause cervical cancer in women.

Immune reactions initially caused by a pathogen can trigger allergies such as skin rashes and asthma.

Severe physical ill health can lead to depression and other mental illness, particularly when they impact on a person's ability to carry out everyday activities.

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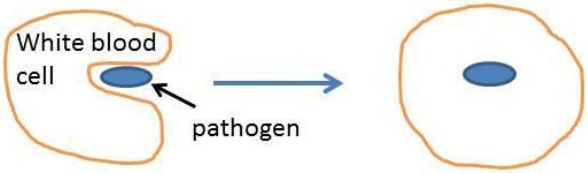
If a pathogen enters the body, the immune system tries to destroy the pathogens. White blood cells form part of the immune system and can help to defend against pathogens in 3 ways:

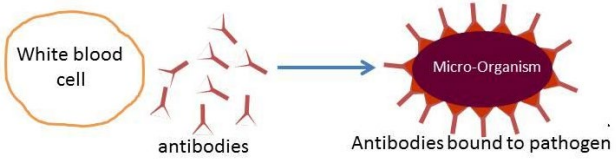
Phagocytosis

White blood cells can ingest pathogens and kill them.



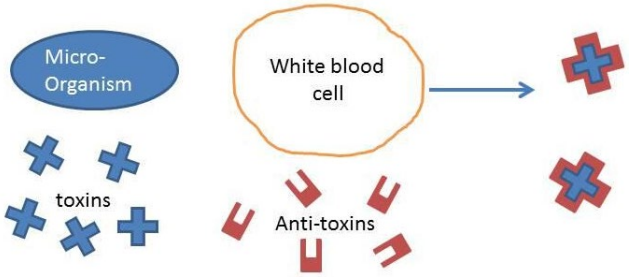
Antibody production

White blood cells can produce antibodies which bind to pathogens. This clumps pathogens together to make it easier for phagocytosis to happen. Your body makes unique antibodies for each pathogen that attaches to the shape of antigens on the pathogens (these are also unique).



Antitoxin production.

White blood cells can produce antitoxins which bind to toxins produced by the pathogen, which neutralises them.



Detection and identification of plant diseases	
Plant diseases can be detected by:	**Identification can be made by:**
stunted growth	Reference using gardening manual or website laboratory test for pathogens testing kit using monoclonal antibodies.
spots on leaves	
area of decay (rot)	
growths	
malformed stem/leaves	
discolouration	
presence of pests	

Plants can be damaged by a range of ion deficiency conditions	
Nitrate deficiency can cause stunted growth. Remember, nitrogen is needed for the production of protein in plants	Magnesium deficiency can cause chlorosis. This is a lack of chlorophyll and causes yellow leaves. This deficiency will affect photosynthesis, and so growth, as less glucose will be produced.

Plants can be infected by a range of viral, bacterial and fungal pathogens as well as by insects e.g. aphids (greenfly).

Plants have several ways of defending themselves from pathogens and animals

Physical	**Mechanical**	**Chemical**
All of these prevent pathogens invading: • Tough waxy cuticle • cell walls • Layers of dead cells around stems (bark on trees) which fall off	Thorns and hairs to deter animals Drooping or curling leaves when touched Mimicry to trick animals	Antibacterial chemicals Poisons to deter herbovires