



Phagocytes	<i>Phagocytosis</i>	Phagocytes engulf the pathogens and digest them.
Lymphocytes	<i>Antibody production</i>	Specific antibodies destroy the pathogen. This takes time so an infection can occur. If a person is infected again by the same pathogen, the lymphocytes make antibodies much faster.
	<i>Antitoxin production</i>	Antitoxin is a type of antibody produced to counteract the toxins produced by bacteria.

Antigens (surface protein)

Pathogens are identified by white blood cells by the different proteins on their surfaces **ANTIGENS**.

White blood cells are part of the immune system

Immune system

Non-specific defence systems

The human body has several non specific ways of defending itself from pathogens getting in

	<i>Nose</i>	Nasal hairs, sticky mucus and cilia prevent pathogens entering through the nostrils.
	<i>Trachea and bronchus (respiratory system)</i>	Lined with mucus to trap dust and pathogens. Cilia move the mucus upwards to be swallowed.
	<i>Stomach acid</i>	Stomach acid (pH1) kills most ingested pathogens.
	<i>Skin</i>	Hard to penetrate waterproof barrier. Glands secrete oil which kill microbes

AQA GCSE INFECTION AND RESPONSE part 1

Plants have several ways of defending themselves from pathogens and animals

Human defence systems

Pathogens may infect plants or animals and can be spread by direct contact, water or air

Detection and identification of plant diseases (bio only)

Detection	Identification
<i>Stunted growth</i>	Reference using gardening manual or website, laboratory test for pathogens, testing kit using monoclonal antibodies.
<i>Spots on leaves</i>	
<i>Area of decay</i>	
<i>growths</i>	
<i>Malformed stem/leaves</i>	
<i>Discolouration</i>	
<i>Presence of pests</i>	

Nitrate ions needed for protein synthesis – lack of nitrate = stunted growth.

Magnesium ions needed to make chlorophyll – not enough leads to chlorosis – leaves turn yellow.

Physical	Mechanical
Thick waxy layers, cell walls stop pathogen entry	Thorns, curling up leaves to prevent being eaten
Chemical	
Antibacterial and toxins made by plant	

Bacteria may produce toxins that damage tissues and make us feel ill

Viruses	Bacteria (prokaryotes)	Protists (eukaryotes)	Fungi (eukaryotes)
e.g. cold, influenza, measles, HIV, tobacco mosaic virus	e.g. tuberculosis (TB), Salmonella, Gonorrhoea	e.g. dysentery, sleeping sickness, malaria	e.g. athlete's foot, thrush, rose black spot
DNA or RNA surrounded by a protein coat	No membrane bound organelles (no chloroplasts, mitochondria or nucleus). Cell wall. Single celled organisms	Membrane bound organelles. Usually single celled.	Membrane bound organelles, cell wall made of chitin. Single celled or multi-cellular

Pathogens are microorganisms that cause infectious disease

Pathogens

Communicable diseases

Viruses live and reproduce inside cells causing damage

Pathogen	Disease	Symptoms	Method of transmission	Control of spread
Virus	<i>Measles</i>	Fever, red skin rash.	Droplet infection from sneezes and coughs.	Vaccination as a child.
Virus	<i>HIV</i>	Initially flu like systems, serious damage to immune system.	Sexual contact and exchange of body fluids.	Anti-retroviral drugs and use of condoms.
Virus	<i>Tobacco mosaic virus</i>	Mosaic pattern on leaves.	Enters via wounds in epidermis caused by pests.	Remove infected leaves and control pests that damage the leaves.
Bacteria	<i>Salmonella</i>	Fever, cramp, vomiting, diarrhoea.	Food prepared in unhygienic conditions or not cooked properly.	Improve food hygiene, wash hands, vaccinate poultry, cook food thoroughly.
Bacteria	<i>Gonorrhoea</i>	Green discharge from penis or vagina.	Direct sexual contact or exchange of body fluids.	Use condoms. Treatment using antibiotics.
Protists	<i>Malaria</i>	Recurrent fever.	By an animal vector (mosquitoes).	Prevent breeding of mosquitoes. Use of nets to prevent bites.
Fungus	<i>Rose black spot</i>	Purple black spots on leaves.	Spores carried via wind or water.	Remove infected leaves. Spray with fungicide.

