SCIENCE

Year 9: Cells and systems

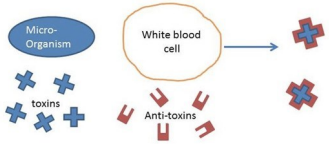
1) Preventing disease transmission

Type of disease transmission	Example of disease	How can transmission be prevented
Direct contact	HIV	Checking donated blood, proper disposal of needles, use of condoms
Indirect contact	Athletes foot	Not sharing towels, cleaning changing rooms regularly, wearing shoes where possible.
Vectors (animals/ insects)	Malaria	Use mosquito nets, insecticides and insect repellents.
Airborne droplets	Measles	Ventilate areas, use face masks, wash hands
Food and water	Salmonella and Cholera	Clean cooking utensils, cook and store food properly. Boil water.

2) White blood cell's response

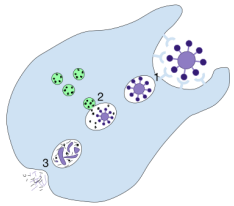
Antitoxins

An antitoxin joins with a toxin and neutralises it's effects.



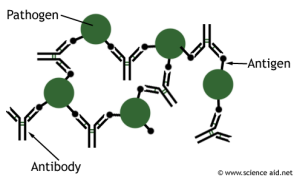
Phagocytosis

The phagocyte engulfs pathogens and breaks it down.



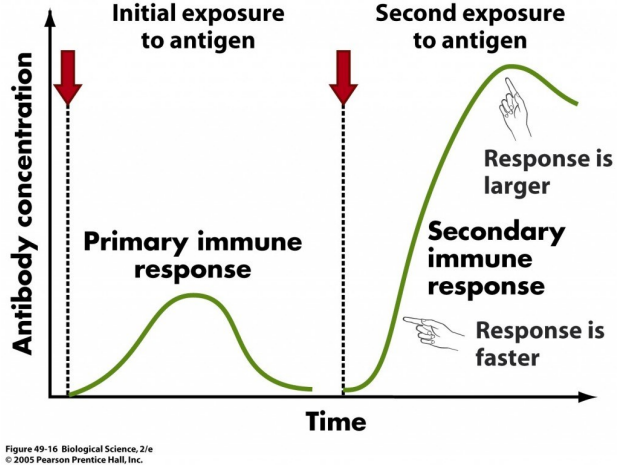
Antibody response

The white blood cell makes antibodies. These will attach to the pathogen's antigens and prevent them from causing harm.



Keyword	Meaning	Keyword	Meaning
Transmission	Passing of a pathogen that causes communicable disease from an infected host to another person.	**Immunity**	the ability of an organism to resist a particular infection or toxin by the action of specific antibodies or sensitized white blood cells.
Pathogen	A microorganism that causes disease	**Vaccination**	treatment with a vaccine to produce immunity against a disease
Phagocyte	A cell that's capable of engulfing and absorbing bacteria and other small cells and particles.	**BMI**	BMI screens for weight categories that may lead to health problems, but it does not diagnose the body fatness or health of an individual.
Antibody	A protein made by the body that fits a specific antigen and neutralises it.	**Balanced diet**	a diet consisting of a variety of different types of food and providing adequate amounts of the nutrients necessary for good health
Antigen	A toxin or other foreign substance that triggers an immune response.	**Alveoli**	any of the many tiny air sacs of the lungs which allow for rapid gaseous exchange.

3) Immunity and Vaccinations



Exposure to pathogens causes your body to make antibodies and memory cells.

The antibodies are used to neutralise the pathogens. The memory cells live in the body after the infection.

If you're infected again with the same pathogen the memory cells produce more antibodies quickly and you don't get ill—this is immunity.

Vaccinations work by making your body create antibodies and memory cells without the actual pathogen being present. This protects you from illness.

RGS BRISTOL **SCIENCE**

Year 9: Cells and systems

4) Diet and health

$$BMI = \frac{mass_{kg}}{height^2_m}$$

Obesity has been linked to many health factors such as heart disease, high blood pressure, diabetes type 2 and certain cancers.

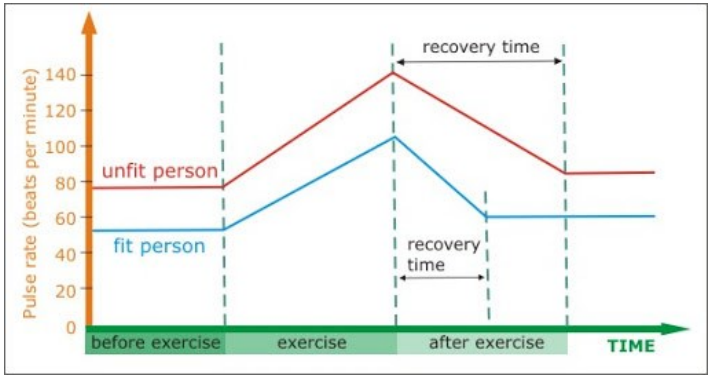
It is categorised as anyone with a BMI over 30.

A balanced diet is eating the nutrients in the correct amounts. These include: protein, carbohydrates, fats, vitamins, minerals, fibre and water.

Some diseases can be triggered by lack of certain nutrients:

Disease	Symptoms	Nutrients missing in diet
Anaemia	Fatigue, breathlessness, dizziness etc.	Iron
Kwashiorkor	Too much fluid in the tissue that causes swelling under the skin	Protein
Rickets	Bowed legs, stunted growth	Vitamin D

5) Effects of exercise



When a person exercises they require more energy, released in respiration.

This needs the heart to pump faster to increase blood flow so oxygen and carbon dioxide get to the cells quicker and carbon dioxide and water are taken to the lungs quicker.

A fitter person's heart pumps more efficiently and recovers quicker than an unfit person's heart.

6) Smoking

Smoking has been linked to: Respiratory disease, cancer, brain damage, heart disease, poor bone and muscle development and death.

The 3 major risk factors in cigarettes are:

1. **Tar** causes cancer of the lungs, mouth and throat. It coats the inside of the lungs, including the **alveoli**, causing coughing. It damages the alveoli, making it more difficult for gas exchange to happen.
2. **Carbon monoxide** is a gas that takes the place of oxygen in **red blood cells**. This reduces the amount of oxygen that the blood can carry. It means that the circulatory system has to work harder, causing **heart disease.**
3. **Nicotine** is addictive. It causes a smoker to want more cigarettes. Nicotine also increases the heart rate and blood pressure, and makes blood vessels narrower than normal. This can lead to heart disease.

7) Drugs

Drugs are chemicals that have effects on the body. They can be put into the following categories:

Stimulants	Sedatives/depressants	Painkillers	Hallucinogens
Fizzy drinks, tea and coffee (caffeine) , cannabis and amphetamines	Alcohol and drugs prescribed by a doctor to help people sleep or to relieve the symptoms of stress.	Paracetamol, aspirin, heroin and morphine.	LSD is an example of a hallucinogen.
Increase the transmission of signals from one nerve cell to the next, which increases alertness, heart rate and breathing rate.	They slow down the nervous system and reactions.	They block nerve impulses from the painful part of the body, or block nerve impulses travelling to the part of the brain responsible for perceiving pain.	Hallucinogens change the way our brains work, distorting our senses. This changes our response to what we see, feel and hear.