

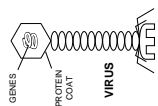


All you need to know about ...

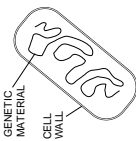
# Module B2

OCR 21st Century Science

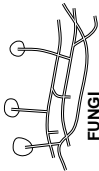
## MICROORGANISMS



**VIRUS**  
Size 20-300 nm  
eg 'flu, polio  
common cold



**BACTERIUM**  
Size 1-5 mm  
eg tonsillitis  
tuberculosis



**FUNGUS**  
Size 50+ mm  
eg athlete's foot  
thrush

## RESISTING INFECTION

The body has barriers to prevent microorganisms entering

- skin
- acid
- white blood cells



A white blood cell ingesting a microbe

## VACCINATIONS

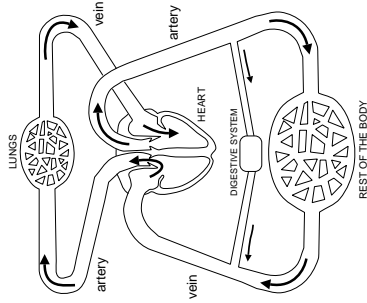
- provide protection from microorganisms
- establish antibodies **before** any infection
- has a safe form of the disease-carrying organism
- are never completely safe
- can have side effects
- you have to weigh up the risks of possible side-effects
- vaccinating a small number of people is useless
- high percentage of the population must be vaccinated
- a 'flu virus changes quickly
- new 'flu vaccines have to be developed regularly
- finding a vaccine against the HIV virus is difficult
- the virus damages the immune system
- there is a high mutation rate

## ANTIBIOTICS

- kill bacteria
  - kill fungi
  - don't kill viruses
  - bacteria and fungi can become resistant to antibiotics
  - only use antibiotics when necessary
  - always finish the course to build up resistance
- ## BACTERIA
- reproduce by cells splitting into two new cells
  - they prefer - **warmth, moisture and nutrients**
  - numbers can double every 20 minutes

## HEART DISEASE

- heart muscle cells need their own blood supply
- **arteries carry blood away** from heart - greater pressure - **thick**
- **veins bring blood** to the heart - less pressure - **thinner**
- when sitting down your heart beats about 70 times a minute



## Heart attacks

- caused by fatty deposits in blood vessels
- caused by lifestyle and/or genetic factors
- not caused by microorganisms
- lifestyle factors
  - poor diet
  - stress
  - smoking
  - excess alcohol intake
- heart disease is very common in the UK
- heart disease is less common in non-industrialised countries
- regular exercise reduces the risk of heart attacks

## Things we can't change:

**Age** – older people are more likely to develop heart disease.

**Gender** – men are more likely to develop heart disease than women

**Genes** – you are at greater risk if your parents have heart disease

## Things we can change:

**Smoking** – more than doubles the risk of heart disease.

**High blood pressure** – increases the risk of heart disease.

**High blood cholesterol** – a high-fat diet, particularly animal fats from meat and dairy products, raises the blood cholesterol level, which increases the risk of heart attacks.

**Being overweight** – can make your blood pressure go up and raise your cholesterol levels. Both increase your risk of a heart attack.

**Diet** – healthy, balanced, low-fat diets reduce risk of a heart attack.

**Exercise** – strengthens the heart and helps to keep weight down. It also decreases blood pressure, and improves the cholesterol balance.

**Stress** – can cause people to eat more, exercise less, and smoke more. So stress increases the risk of a heart attack.

## TESTING DRUGS

Any new drug is checked in many ways before it is tested on people.

### STAGE 1 – Human cells

- The cells are grown in a laboratory.
- Scientists use different types of cells with the disease.
- They try different concentrations of the drug on the cells.

### STAGE 2 – Animal tests

- If early tests have shown that the drug could work .
- If it passes tests on human cells it is tested on animals.
- Scientists apply for a licence to test a drug on animals.
- Other scientists check the results of their work.

### STAGE 3 – Human trials

- Tests on people are called human trials or clinical trials. It takes many years before scientists get to this stage.
- If the drug passes animal tests, the scientists write a plan for human trials.
- Scientists must apply for a licence to do the tests.
- Firstly, the drug is tested on healthy people - his gives data about how safe it is to take.