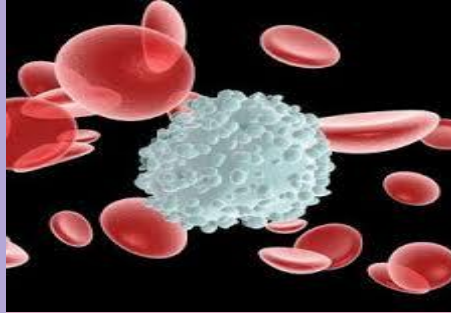


defending against infection



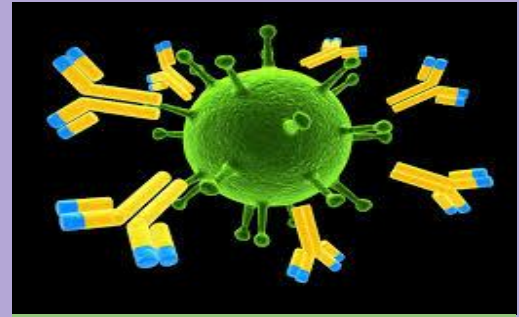
white blood cells:

- ingest pathogens and destroy them
- produce :
- antibodies to destroy a particular pathogen
- or antitoxins to counteract toxins produced by pathogens



lymphocytes:

- a type of white blood cell
- produces specific antibodies to kill a particular pathogen
- these antibodies have a protein that has a chemical fit to a certain antigen
- reproduces quickly & makes copies of the antigen



antibodies:

- lymphocytes produce them
- they are proteins
- can neutralise pathogens by: 1) bind to pathogen and destroy 2) coat pathogens - clumping them together so they are easily ingested by white blood cells

Medicine

Some medicines:

- ★ help to relieve the symptoms of a disease
- ★ kill the infectious pathogens.



painkillers:

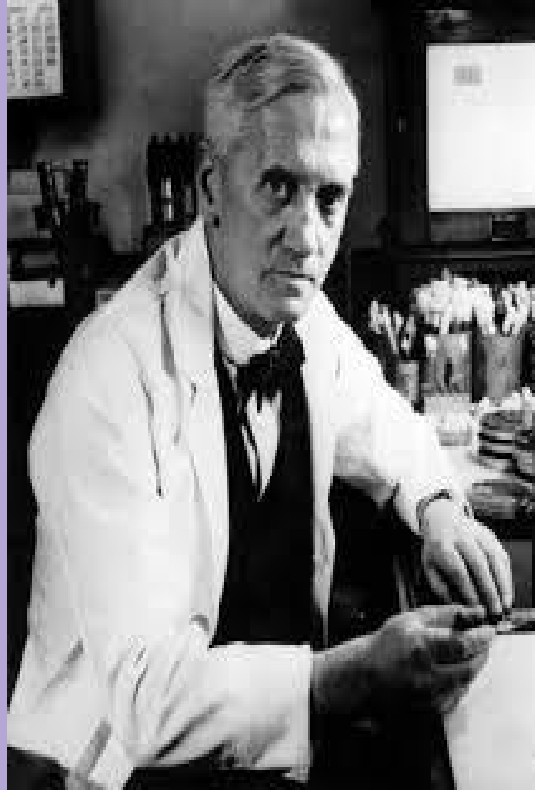
- relieve symptoms of an infectious disease
- do not kill pathogens involved
- paracetamol, aspirin and morphine block nerve impulses from painful parts of the body or nerve impulses travelling to the part of the brain that perceives pain



antibiotics:

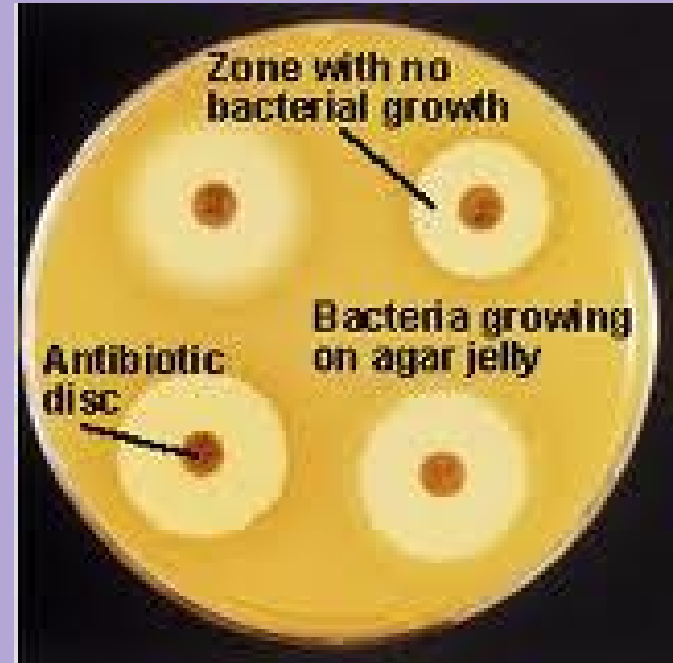
- substances that kill bacteria or stop their growth
- don't work against viruses as they live & reproduce inside healthy cells (so will damage body tissues)
- Penicillin was the first antibiotic
- specific bacteria should be treated using specific antibiotics
- use of antibiotics have prevented many deaths from infectious bacterial diseases

Alexander Fleming 1928



discovered the first
antibiotic - Penicillin

He noticed that some
bacteria he had left in
a **Petri dish** had
been killed by
**naturally occurring
penicillium mould**.
Since the discovery
of penicillin, many
other antibiotics have
been discovered and
developed.



internal conditions part 2

Preview from 14 of 31

ion content of the body:

controlled to protect cells from too much water entering or leaving the cells. it is controlled by:

- the **skin** (sweating)
- passing **urine** (produced by kidneys)

temperature of the body

controlled to maintain the temperature at which enzymes work best. Controlled by:

- sweating
- shivering
- controlling blood flow to skin

blood sugar levels

controlled to supply cells with a constant supply of energy. Controlled by:

- the release and storage of glucose (controlled by insulin)

developing new drugs

New medical drugs have to be tested to ensure that they work, and are safe, before they can be prescribed.

There are three main stages of testing:

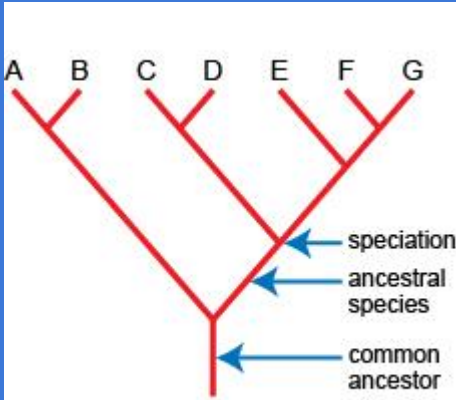
1. The drugs are tested using **human cells grown in the laboratory**.
2. **animals**: In the UK, new medicines have to undergo these tests, but it is **illegal** to test **cosmetics and tobacco products on animals**. A typical test involves giving a known amount of the substance to the animals, then monitoring them carefully for any side-effects.
3. **clinical trials**: They are tested on healthy volunteers to check they are safe. Very low doses of the drug are given to begin with. If there are no problems, further clinical trials are done to find the optimum dose for the drug.

double blind trials

designed to minimise the placebo effect:
some patients are given a drug, others a placebo.

both doctors and patients don't know who was given the placebo until after

Evolution



In this evolutionary tree, species A and B share a common ancestor. Species F and G share a common ancestor, which itself shared a common ancestor with species E. All seven species share a common ancestor, probably from the distant past.

The theory of evolution states that evolution happens by natural selection.

The key points are that:

- individuals in a species show a wide range of variation
- this variation is because of differences in their genes
- individuals with characteristics most suited to the environment are more likely to survive and reproduce
- the genes that allow these individuals to be successful are passed to their offspring.

Individuals that are poorly adapted to their environment are less likely to survive and reproduce. This means that their genes are less likely to be passed on to the next generation. Given enough time, a species will gradually evolve.

If in the past the conditions on Earth had been different, evolution by natural selection could have produced some very different results. For example, if the Earth had been hotter, colder, bigger or smaller, our bodies would have changed to suit those conditions.