Biology

Non specific defense

Your body is the first defence system
Your body has ways to stop germs from entering in the first place

Skin

- Skin acts like a barrier to stop pathogens from entering
- It also make anti microbial substances that kills the germs

Nose

- Nose has hair and mucus that traps the dust and the germs

Trachea and bronchi windpipe

- It makes the mucus to trap the germs
- they also have tiny hair called Celia which push mucus up to the throat

Stomach

- It make hydrochloric acid which kill germs that enter with food and mucus

Immune system or second defence system

If germs get inside your body

- Your immune system fights them
- the main fighter are white blood cells
- they move in your blood and look for germs
- they fight germs in three ways

Eating the germs- phagocytosis

- Some white blood cells eat the germs
- they swallow the microbes
- then they digest inside the cell

Making antibodies

- Every germ has a special shape on its surface
- This shape is called an antigen
- B Lymphocytes a type of white blood cells see this antigen
- They make antibodies that fit exactly on that antigen
- The antibodies locked into germs
- Then other white blood cells destroy the germs
- Antibodies are specific, one antibody works for only one type of germ

If the same germ enter again

- white blood cells remember it
- they make antibodies very fast
- you do not get sick from that germ again

Vaccination

- Vaccines stop illness before it happen
- When a new germ enters your body needs time to make antibodies you make get sick
- Vaccination helps your body prepare early

What is inside a vaccine

- A vaccine contains dead or inactive pathogens
- They have antigens but they cannot cause disease

How vaccination works

- White blood cells make antibodies for these harmless germs
- Later, if real germ enter
- your body make antibodies quickly
- you don't get sick

MMR vaccine protects against measles mumps and rubella

Pros and cons of vaccination

Pros

- Vaccines have controlled or removed many diseases
- polio measles
- smallpox is completely gone
- polio cases are reduced by 99%
- If many people are vaccinated
- even unvaccinated people stay safe

Cons

- Sometimes vaccines don't work
- rarely people get small reaction such as swelling fever

Fighting diseases with drugs

Symptom revealing drugs

- painkillers reduce the pain
- they do not kill the germs
- cold medicines only reduce the symptoms not cure infection

Antibiotics

- antibiotics kill bacteria
- they do not harm the body cell
- antibiotics do not work on viruses like cold or flu because viruses live inside cell

Antibiotic resistance

- In an infection some bacteria already resistant

When treated with antibiotics

- normal bacteria die
- resistant bacteria survive
- Resistant bacteria reproduce
- soon the whole population becomes resistant
- this is basically called natural selection

Mrsa is a dangerous bacteria resistant to many antibiotics

Discovery of drugs

- Many medicines first came from plants and microorganisms
- plants make Chemicals to protect themselves; human use them as medicines

Example

- Aspirin comes from willow tree
- digitalis comes from Fox gloves plant
- penicillin discovered by Alexander Fleming in 1928 he saw mold killing bacteria on a Petri dish
- Today drugs are made in labs but many start from Natural sources

Testing and developing new drugs

New drugs must be tested to check

- if they work
- if They are safe
- the best dose

Pre clinical testing

- tested on cells and tissues in the lapse
- if drugs affect hole systems like blood pressure so it is test on live animals
- it checks that how well it works how harmful it is what those to you
- in UK all new drugs must be tested on two different mammals

Clinical trials

- tested on human volunteers
- first on healthy people small dose to check the side effects
- then on ill patient to find the optimum dose

Two group of patients

- one group gets the real drug
- one group gets the fake drug plasseypur
- helps show if drug really works or if changes are due to placebo effect

Double blind trials

- neither the doctor nor the patient knows who got the real drug or placebo
- prevents bias

peer review

other scientist Check the result before their published