Y7 & 8 Infection and response (Higher)

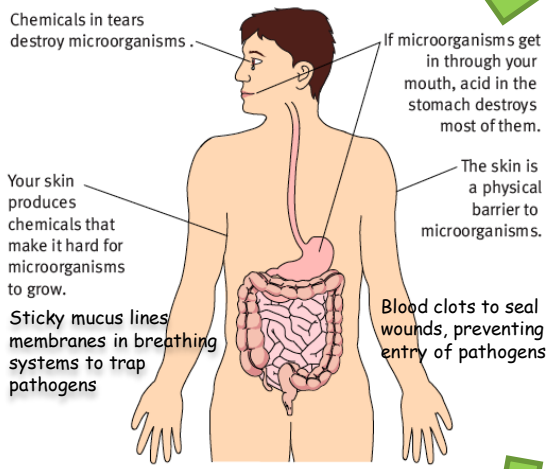
START

How is disease caused?
- Small living things called microorganisms cause disease.
- These are **bacteria**, **fungi**, **protists** and **viruses**.
- Microorganisms that cause disease are called **pathogens**.
- They can be spread and infect others.
- The infection can cause symptoms like sneezing.

How are diseases spread?
- Microbes can be passed from person to person through physical contact.
- Some can move through the air or water.
- Some, like Malaria, can be transferred by insects.

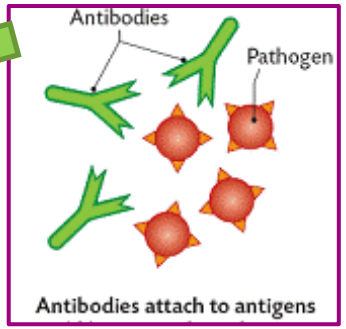
How do viruses and bacteria damage us?
- Viruses enter our cells and reproduce quickly, damaging our cells.
- Bacteria also reproduce quickly and make toxins that damage tissues and make us feel ill.

How does the body prevent disease?
- Your skin, nose, trachea, bronchi and stomach can all help prevent disease.
- Mucus and ciliated cells can trap pathogens.



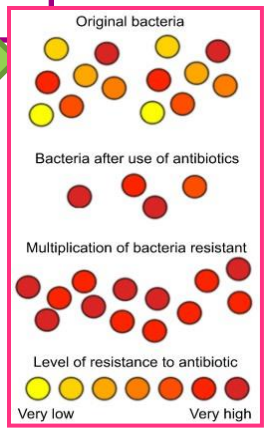
The human body has barriers to stop harmful MOs getting inside.

How do white blood cells stop pathogens?
1. Phagocytes a type of white blood cell can engulf and destroy/digest pathogens in **phagocytosis**.
2. They can produce **antibodies**.
3. They can produce antitoxins which neutralise (make harmless) toxins produced by bacteria



- Only one type of antibody will bind to one pathogen as they are a specific shape.
- The antibodies then take the pathogen to the phagocyte (WBC) to be destroyed

How do antibiotics work?
1. They can kill bacteria in our bodies.
2. They can't kill viruses because viruses live inside our cells where antibiotics can't reach.
3. Some bacteria are becoming resistant to some antibiotics- they don't kill them any more!



How do other drugs work?
1. Painkillers and other medicines treat the symptoms of the disease but do not kill the pathogen.
2. Difficult to develop drugs to treat viruses without also damaging body tissues.

Where do we get drugs from?
- Most drugs today are made in the lab.
- Some are found naturally is plants and fungi.
- The heart drug "digitalis" is made from the plant foxglove.
- Aspirin comes from the willow tree.
- The antibiotic Penicillin comes from a fungus.

How do we test new drugs.
- New drugs are tested for a safe dose (how much should be given), whether they work (efficacy) and if they are toxic.
- They are first tested on cells, tissues and animals.
- Clinical trials use healthy volunteers and patients.
- Low doses are given at the start. If the drug is safe, further trials are done to find the best dose of the drug.
- In double blind trials, patients are given a placebo (the scientist is the only one who knows whether the patients have the drug or the placebo).

Key words:
1. **Pathogen: A microorganism that can cause disease.**
2. **Microorganism: A living thing too small to see with only your eyes.**
3. **Symptom: Effects on your body from a pathogen.**
4. **Communicable: Diseases can be passed on to other people**
5. **Antibiotic: A type of drug that can kill bacteria.**
6. **White Blood Cell: A type of cell in the immune system.**
7. **Vaccine: An inactive or dead version of a pathogen used to prevent disease.**
8. **Painkiller: A type of drug used to reduce symptoms of disease.**

Y7 & 8 Infection and response (Foundation + Higher)

1. What is a pathogen?
2. How can you catch a pathogen?
3. How do viruses make us ill?
4. How do bacteria make us ill?
5. What does our body do to stop pathogens from getting inside?
6. What do phagocytes do?
7. What do antibodies do?
8. What do antitoxins do?
9. What is a vaccine?
10. What do antibiotics do?
11. Where do we get drugs from?
12. What is a painkiller?
13. How do we test new drugs?

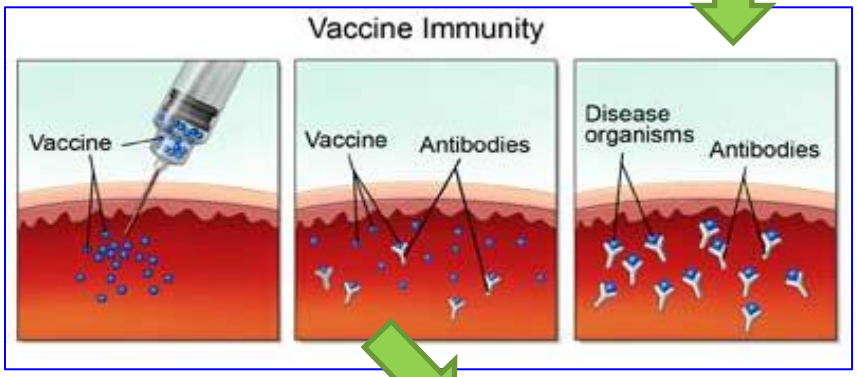
START

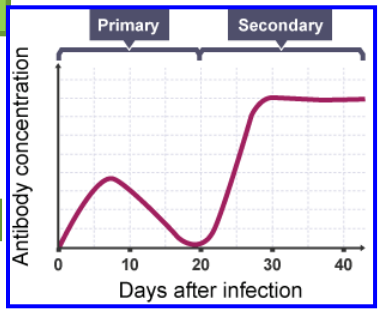
Examples of diseases

Type of pathogen	Human diseases/Plant diseases
Virus	Measles, Flu, HIV/ Tobacco mosaic virus
Protist	Malaria
Fungi	Athletes foot/ Rose black spot
Bacteria	Salmonella, gonorrhoea

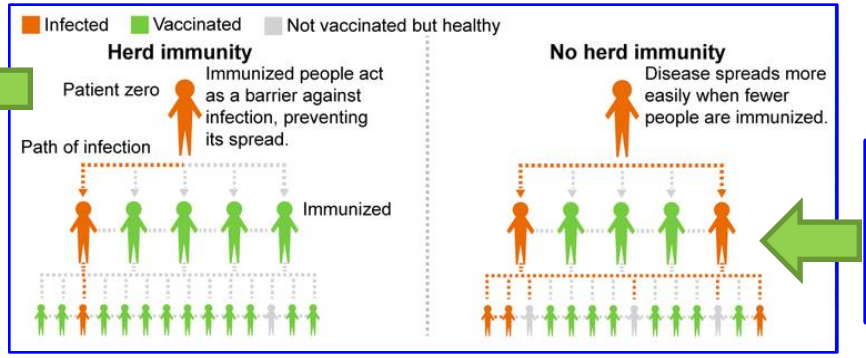
VACCINATION

How do vaccines work?
- Vaccines prevent illness, but can't cure it.
- A dead or inactive version of a pathogen is injected into a person.
- This makes white blood cells make antibodies to fight the infection.
- If the real pathogen enters the body, white blood cells remember how to fight it and do so quickly.





If more people are vaccinated against a disease it will be harder for the disease to spread. This is called herd immunity



Vaccines have side effects like:
- Feeling tired
- Feeling sick
- Fever
- Rash
- Swelling + pain at the injection site

BUT
It is still better to be vaccinated