



Communicable diseases 1

Pathogens are microorganisms that cause infectious disease.

Pathogens may be viruses, bacteria, protists or fungi.

They may infect plants or animals and can be spread by direct contact, by water or by air.

How to prevent the spread

Being hygienic- *washing hands thoroughly*

Killing vectors – *killing vectors by using insecticides or destroying the habitat*

Isolation- *isolating an infected person will prevent the spread*

Vaccination- *people cannot develop the it on*



Viral diseases 2

Measles symptoms include fever & a red skin rash and can be fatal if complications arise. For this reason most young children are vaccinated against measles. The measles virus is spread by inhalation of droplets from sneezes and coughs.

HIV initially causes a flu-like illness. Unless successfully controlled with antiretroviral drugs the virus attacks the body's immune cells. Late stage HIV infection, or AIDS, occurs when the body's immune system becomes so badly damaged it can no longer deal with other infections or cancers. HIV is spread by sexual contact or exchange of body fluids such as blood which occurs when drug users share needles.

Tobacco mosaic virus (TMV) is a widespread plant pathogen. It gives a distinctive 'mosaic' pattern of discolouration on the leaves which affects the growth of the plant due to lack of photosynthesis.



Bacterial diseases 3

Salmonella (food poisoning)

Symptoms include fever, abdominal cramps, vomiting and diarrhoea. The salmonella bacteria is spread in food, or on food prepared in unhygienic conditions. In the UK, poultry are vaccinated against Salmonella to control the spread.



Gonorrhoea is a sexually transmitted disease (STD) with symptoms of a thick yellow or green discharge from the vagina or penis and pain on urinating. It easily treated with the antibiotic penicillin until many resistant strains appeared. Gonorrhoea is spread by sexual contact. The spread can be controlled by treatment with antibiotics or the use of a barrier method of contraception such as a condom.



Fungal & protists diseases

4

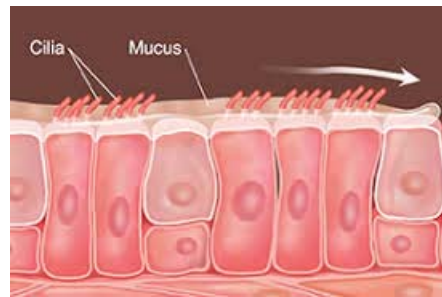
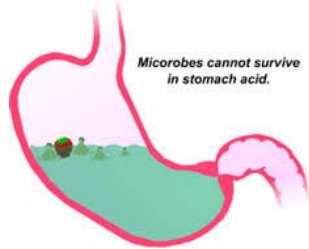
Rose black spot is a fungal disease where purple or black spots develop on leaves, which often turn yellow and drop early. It affects the growth of the plant as photosynthesis is reduced. It is spread in the environment by water or wind. Rose black spot can be treated by using fungicides and/or removing and destroying the affected leaves

The pathogens that cause malaria are protists. The malarial protist has a life cycle that includes the mosquito. Malaria causes recurrent episodes of fever and can be fatal. The spread of malaria is controlled by preventing the vectors, mosquitos, from breeding and by using mosquito nets to avoid being bitten.



Human Defence System

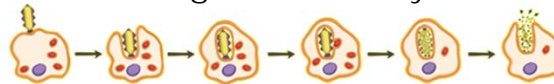
The non-specific defence systems of the human body against pathogens, including the: **Skin, Nose, trachea, bronchi & stomach.**



Role of the immune system

If pathogens pass the non-specific first line of defence they will cause an infection. However, the body has a second line of defence to stop or minimise this infection. This is called the immune system.

Phagocytes surround any pathogens in the blood and engulf them. They are attracted to pathogens and bind to them.



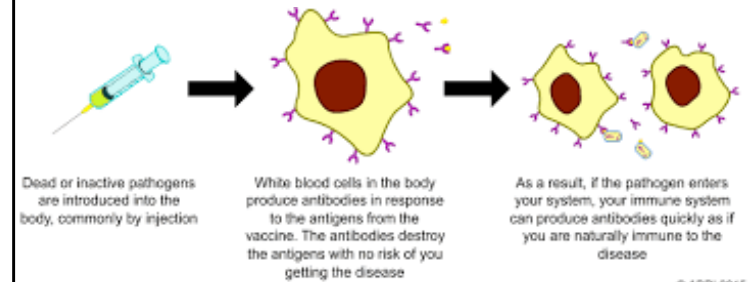
Lymphocytes recognise proteins on the surface of pathogens called **antigens**. Lymphocytes detect that these are foreign not naturally occurring within your body and produce **antibodies**. The antibodies cause pathogens to stick together and make it easier for phagocytes to engulf them.

Lymphocytes can also produce antitoxins to neutralise toxins.

1

Vaccinations

2



Fighting disease – drugs

3

Antibiotics cannot kill viral pathogens. It is difficult to develop drugs that kill viruses without also damaging the body's tissues

Painkillers and other medicines are used to treat the symptoms of disease but do not kill pathogens..

Discovery of drugs

4

Traditionally drugs were extracted from plants & microorganisms.

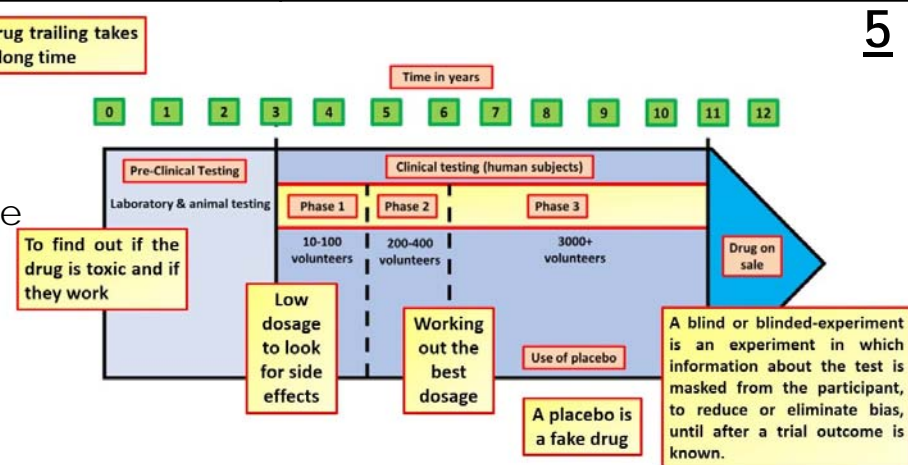
- The heart drug **digitalis** originates from foxgloves.
- The painkiller **aspirin** originates from willow.
- **Penicillin** was discovered by Alexander Fleming from the Penicillium mould.

Development of drugs

Placebo =

An inactive substance made to resemble a drug for researchers to use as a control.

Drug trailing takes a long time



5