

## B5 Communicable Diseases

**Communicable (infectious) diseases** (e.g., tuberculosis and flu) are caused by **pathogens** such as bacteria and viruses that can be passed from one person to another. **Non-communicable diseases** cannot be transmitted from one person to another (e.g., heart disease and arthritis). Both communicable and non-communicable diseases are major causes of ill health, but other factors can also affect health.

### How pathogens cause disease

Once bacteria and viruses are inside your body, they may reproduce rapidly.

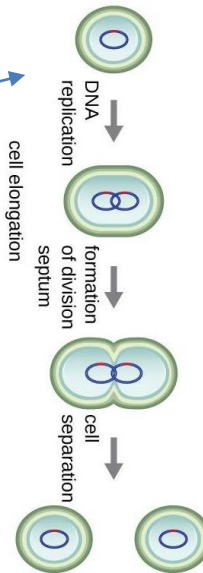
- Bacteria divide rapidly by splitting in two (called binary fission). They may produce toxins (poisons) that affect your body and make you feel ill. Sometimes they directly damage your cells.
- Viruses take over the cells of your body. They live and reproduce inside the cells, damaging and destroying them.

Common disease symptoms are a high temperature, headaches, and rashes. These are caused by the way your body responds to the cell damage and toxins produced by the pathogens.

### Hygiene

Simple hygiene measures are one of the most effective ways of preventing the spread of pathogens. These include:

- Hand washing, especially after using the toilet, before cooking, or after contact with an animal or someone who has an infectious illness.
- Using disinfectants on kitchen work surfaces, toilets, etc. to reduce the number of pathogens.
- Keeping raw meat away from food that is eaten uncooked to prevent the spread of pathogens.
- Coughing or sneezing into a handkerchief, tissue, or your hands (and then washing your hands).
- Maintaining the hygiene of people and agricultural machinery to help prevent the spread of plant diseases.



**Viruses reproduce rapidly in body cells, causing damage to the cells.**

**Measles** is a disease caused by a virus – the symptoms are a fever and a red skin rash, the virus is spread by breathing in droplets from sneezes and coughs. Although most people recover well from measles, it can be fatal if there are complications so most young children are vaccinated against measles.

**HIV (human immunodeficiency virus)** causes AIDS – it can be spread by sexual contact or exchange of bodily fluids, e.g. it can be transmitted in blood when drug users share needles. At first, HIV causes a flu like illness. If untreated the virus enters the lymph nodes and attacks the body's immune cells. Taking antiviral drugs can delay this happening. Late stage HIV or AIDS is when the body's immune system is damaged and cannot fight off other infections or cancers.

**Tobacco mosaic virus (TMV)** occurs in tobacco plants and many other species, including tomatoes – the distinctive 'mosaic' pattern of discolouration reduces the chlorophyll content of leaves, it therefore affects photosynthesis and plant growth.

**Bacteria may damage cells directly or produce toxins (poisons) that damage tissues.**

**Salmonella** is a type of food poisoning caused by bacteria – the bacteria are ingested in food, which may not have been cooked properly or may not have been prepared in hygienic conditions. The bacteria secrete toxins, which cause fever, abdominal cramps, vomiting and diarrhoea. Chicken and eggs can contain the bacteria, so chickens in the UK are vaccinated against salmonella to control the spread.

**Gonorrhoea** is a sexually transmitted disease (STD) caused by bacteria – it is spread by sexual contact. The symptoms are a thick yellow or green discharge from the vagina or penis and pain when urinating. It can be easily treated with penicillin, but many resistant strains have now appeared. The use of a barrier method of contraception, e.g. a condom, can stop the bacteria being passed on.

**Protists are single-celled organisms. However, unlike bacteria, they are eukaryotic.**

**Malaria** is caused by a protist – the protist uses a particular type of mosquito as a vector. It is passed on to a person when they are bitten by a mosquito. Malaria causes a severe fever, which reoccurs and can be fatal. One of the main ways to stop the spread is to stop people being bitten, e.g. killing the mosquitos or using mosquito nets.

**Rose black spot** is a fungal disease – it is spread when spores are carried from a plant to a plant by water or wind. Purple or black spots develop on leaves, which often turn yellow and drop early. The loss of leaves will stunt the growth of the plant because photosynthesis is reduced. It can be treated by using fungicides, removing, and destroying the affected leaves.



Your body has several lines of defence against the entry of pathogens. These include the skin (barrier and antimicrobial), the nose, the trachea, the bronchi, and the stomach. Your white blood cells help to defend you against pathogens by ingesting them and by making antibodies and antitoxins.

**Vocabulary:**

**agar gel** widely used solid (gel) culture medium used for growing microorganisms

**aphids** insects that penetrate the plant phloem and feed on the dissolved food. They act as plant pathogens and are also vectors that carry pathogenic viruses, bacteria, and fungi into healthy plant tissue

**binary fission**  
reproduction by simple cell division, for example in bacteria

**chlorosis**  
the yellowing seen on the leaves of plants when they cannot make chlorophyll due to a lack of magnesium ions

**communicable (infectious) disease**  
disease caused by pathogens that can be passed from one organism to another

**culture medium**  
a liquid or gel used to support the growth of microorganisms or other cultures, often containing specific nutrients

**inoculate**  
introducing microorganisms to a culture medium, or introducing modified microorganisms into an individual to protect them against disease

**microorganisms**  
organisms that are usually single-celled and can only be seen using a microscope . They include bacteria, fungi, viruses and protists

**mutation**  
a change in the genetic material of an organism

**non-communicable diseases**  
are not infectious and cannot be passed from one organism to another

**pathogens**  
microorganisms that cause disease

**sexually transmitted disease (STD)**  
transmitted from an infected person to an uninfected person by unprotected sexual contact

**vaccine**  
dead or inactive pathogenic material used in vaccination to develop immunity to a disease in a healthy person

**virus**  
pathogens that are much smaller than bacteria and can only reproduce inside living cells of other organisms

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