

Microbes

Microbes or micro-organisms are tiny living things, which can only be seen using a microscope.



The most common types of microbes are bacteria, viruses and fungi.

All microbes can reproduce very quickly.

Microbes are very useful to humans, as they are used to make food like cheese, yoghurt, bread and beer. They are also used in genetic engineering, where they can make useful products for humans.

Bacteria

Bacteria are very small living cells which have no nucleus.

There are thousands of different types of bacteria, which come in many different shapes.

Bacteria reproduce by dividing into two identical daughter cells. Bacteria can be used to make yoghurt and cheese.

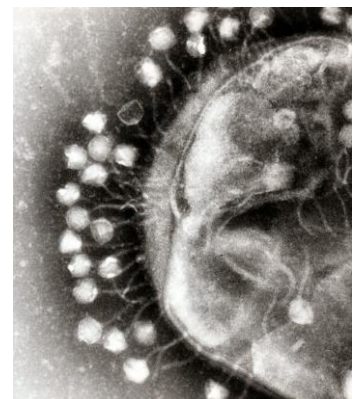


Viruses

Viruses are much smaller than bacteria and fungi.

They have a variety of shapes.

Viruses are not living cells. They cannot reproduce on their own, and depend on a host cell for reproduction.

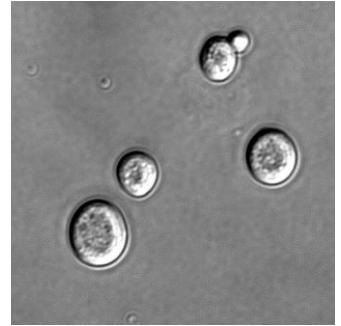


Fungi

There are two main types of fungi- yeast and mould.

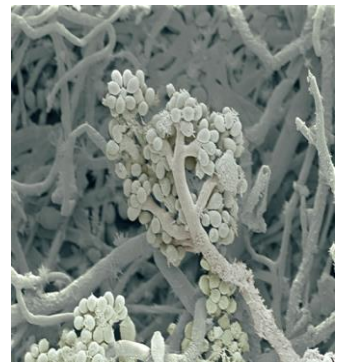
Yeast

Yeast is a single celled organism. Yeast cells have a small circular shape and reproduce by budding. Yeast is used to make bread and beer.



Mould

Moulds are made up of tiny thread-like structures. They reproduce by releasing spores. Mould grows best in warm, damp conditions. This means mould often grows well in bathrooms. Mould is also commonly found on food that is past its use-by date.



Microbiological Safety

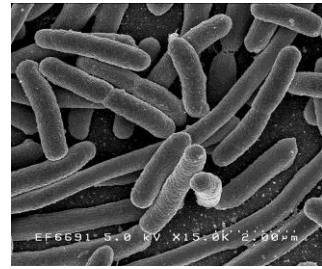
Microbes grow best in warm and moist conditions when the pH is not too acidic. When working with microbes, scientists have to make sure that their work is not contaminated with the wrong kind of microbe. They make sure everything around them is clean or sterile by using disinfectant to kill any stray microbes. They will then wash their hands and wear protective clothing such as gloves, masks and overalls. They may also work inside special hoods which clean the air around where they are working.

This is the warning sign for a biological hazard:



Good Microbes

Our bodies normally contain billions of bacteria. They live all over our body, but especially in our intestines, where they help digestion.



Bad Microbes

Some microbes are harmful and cause disease. Microbes can get inside our bodies in many ways: through cuts in our skin, breathing in, in food or drink, through sharing needles or having sex with an infected person.

These are all caused by microbes:

Bacteria	Viruses	Fungi
Food poisoning	Influenza (flu)	Athlete's foot
Gastritis	The common cold	Ringworm
Gonorrhoea	Chicken pox	Thrush
Abscesses and boils	AIDS	Fungal nail infections

Preventing infection

Many infections can be avoided by:

- keeping our homes and our bodies clean.
- covering our mouths when coughing or sneezing.
- not taking drugs.
- being careful when preparing food.
- drinking clean and safe water.
- taking preventative medicines on holiday.
- practising safe sex.

Immune System

Your body has lots of ways to prevent microbes causing infection:

- acid in your stomach
- chemicals in your blood
- wax in your ears
- tears in your eyes
- mucus and hairs in your nose and windpipe
- your skin acts as a barrier

Your immune system also has special cells which control infection. For example there are two types of white blood cells:

- Phagocytes which recognise foreign material and then destroy it.
- Lymphocytes which make antibodies to fight specific microbes.

Vaccination

Some infections can be prevented through vaccination. A vaccine is made from a weak or dead form of the disease-causing microbe. It is injected into a person, which means their immune system can make antibodies against it. This means the person then has immunity against the microbe.

Genes

Genes are pieces of **DNA** found in **chromosomes** inside cells. Everything a cell does is controlled by its **genes**. DNA can be extracted from cells. This is useful in identification, for example people killed in disasters, or to find out who is the father of a baby. The police use DNA testing to catch criminals. Scientists can change the genes in a cell, for example to make plants that grow better. This is called Genetic Engineering.