

Communicable diseases

What is a pathogen?

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Name the four types of pathogen.

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Name three ways pathogens can be spread.

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How do bacteria make us feel ill?

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How do viruses cause damage?

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Give two ways the spread of disease can be reduced.

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What are the symptoms of measles?

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How is the measles virus spread?

Viruses, bacteria, protists and fungi.

A microorganism that causes infectious disease.

They reproduce rapidly in the body and may produce toxins that damage tissues.

By direct contact, by water and by air.

Any two of: hygiene, vaccination, treating infected people, controlling vectors, barrier contraception, destroying infected plant material.

They live and reproduce inside cells, causing cell damage.

By inhalation of droplets from sneezes and coughs.

Fever and a red skin rash.

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Why are most young children vaccinated against measles?

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What does HIV initially cause?

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What does HIV attack?

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What is AIDS?

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How is HIV spread?

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What does tobacco mosaic virus (TMV) do to a plant?

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How is *Salmonella* food poisoning spread?

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What are the symptoms of *Salmonella* food poisoning?

A flu-like illness.

It is a serious illness that can be fatal if complications arise.

Late stage HIV infection, when the immune system is so badly damaged that it cannot deal with other infections or cancers.

The body's immune cells (unless controlled with antiretroviral drugs).

Causes a 'mosaic' pattern of discolouration on leaves, reducing photosynthesis and so growth.

By sexual contact or exchange of body fluids such as blood, for example drug users sharing needles.

Fever, abdominal cramps, vomiting and diarrhoea, caused by the bacteria and the toxins they secrete.

By bacteria ingested in food, or on food prepared in unhygienic conditions.

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How is the spread of *Salmonella* controlled in the UK?

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What are the symptoms of gonorrhoea?

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How is the spread of gonorrhoea controlled?

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Why is gonorrhoea harder to treat than it used to be?

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What are the symptoms of rose black spot?

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How does rose black spot affect a plant's growth?

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How is rose black spot spread, and how is it treated?

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What type of pathogen causes malaria?

A thick yellow or green discharge from the vagina or penis, and pain on urinating.

Poultry are vaccinated against *Salmonella*.

Many resistant strains have appeared; it was once easily treated with penicillin.

Treatment with antibiotics, or a barrier method of contraception such as a condom.

Photosynthesis is reduced, so the plant grows less.

Purple or black spots on leaves, which often turn yellow and drop early.

A protist.

Spread by water or wind. Treated with fungicides and/or removing and destroying affected leaves.

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What is the vector for malaria?

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What are the symptoms of malaria?

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How is the spread of malaria controlled?

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Name the non-specific defence systems of the human body.

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How does the stomach defend against pathogens?

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How do the nose and the trachea and bronchi defend against pathogens?

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Name three ways white blood cells defend against pathogens.

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What is phagocytosis?

Recurrent episodes of fever. It can be fatal.

The mosquito; the protist's life cycle includes the mosquito.

Skin, nose, trachea and bronchi, and stomach.

Prevent mosquitos breeding, and use mosquito nets to avoid being bitten.

Hairs and mucus trap pathogens; in the trachea and bronchi, cilia move the mucus away.

It produces hydrochloric acid, which kills pathogens.

A white blood cell engulfs a pathogen and digests it.

Phagocytosis, antibody production and antitoxin production.

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What do antitoxins do?

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What does a vaccine contain?

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How does vaccination prevent illness?

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How does vaccinating most of a population reduce the spread of a pathogen?

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What do antibiotics such as penicillin do?

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Why must specific antibiotics be used?

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Can antibiotics kill viruses?

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Why is the emergence of antibiotic-resistant strains of concern?

Small quantities of dead or inactive forms of a pathogen.

They neutralise the toxins produced by pathogens.

Most people are immune, so the pathogen cannot spread easily, which protects those not vaccinated.

It stimulates white blood cells to make antibodies. On re-infection they quickly make the correct antibodies.

Specific bacteria need to be treated by specific antibiotics.

Cure bacterial disease by killing infective bacteria inside the body.

The antibiotics no longer kill them, so deaths from bacterial disease could rise again.

No. It is also difficult to make drugs that kill viruses without damaging body tissues.

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What do painkillers do?

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Which plant is the source of digitalis?

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Which plant is the source of aspirin?

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Who discovered penicillin, and from what?

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How are most new drugs made?

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What three things are new drugs tested for?

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What is preclinical testing?

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Who is used in clinical trials?

Foxgloves. It is a heart drug.

Treat the symptoms of disease. They do not kill pathogens.

Alexander Fleming, from the Penicillium mould.

Willow. It is a painkiller.

Toxicity, efficacy and dose.

Synthesised by chemists in the pharmaceutical industry, though the starting point may be a plant chemical.

Healthy volunteers and patients.

Testing in a laboratory using cells, tissues and live animals.

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How are doses used in clinical trials?

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What is a placebo, and what is a double blind trial?

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What happens to the results of drug trials before they are published?

Monoclonal antibodies **Triple only** **Higher tier**

What are monoclonal antibodies?

Monoclonal antibodies **Triple only** **Higher tier**

Which cells are stimulated to make the antibody?

Monoclonal antibodies **Triple only** **Higher tier**

What is a hybridoma cell?

Monoclonal antibodies **Triple only** **Higher tier**

How is a large amount of one monoclonal antibody obtained?

Monoclonal antibodies **Triple only** **Higher tier**

Give three uses of monoclonal antibodies.

A placebo contains no active drug. In a double blind trial neither patients nor doctors know who gets it.

Very low doses first. If safe, further trials find the optimum dose.

Antibodies produced from a single clone of cells, specific to one binding site on one protein antigen.

They are scrutinised by peer review: other scientists check the methods and conclusions.

A lymphocyte combined with a tumour cell. It can both divide and make the antibody.

Mouse lymphocytes.

Diagnosis (pregnancy tests), lab measurement or detection, research with fluorescent dye, treating disease.

Single hybridoma cells are cloned, then the antibody is collected and purified.

Monoclonal antibodies **Triple only** **Higher tier**

How can monoclonal antibodies treat cancer?

Monoclonal antibodies **Triple only** **Higher tier**

What are the disadvantages of monoclonal antibodies?

Plant disease **Triple only** **Higher tier**

How can plant disease be detected?

Plant disease **Triple only** **Higher tier**

How can a plant disease be identified?

Plant disease **Triple only**

Which plant diseases and pests do you need to know?

Plant disease **Triple only**

What causes stunted growth in plants?

Plant disease **Triple only**

What causes chlorosis in plants?

Plant disease **Triple only**

Name three physical plant defences.

More side effects than expected, and not yet as widely used as hoped.

They carry a radioactive substance, toxic drug or growth-stopping chemical to cancer cells without harming other cells.

Gardening manual or website, laboratory testing, or testing kits containing monoclonal antibodies.

Stunted growth, spots, decay, growths, malformed parts, discolouration or pests.

Nitrate deficiency. Nitrate ions are needed for protein synthesis and therefore growth.

Tobacco mosaic virus (viral), black spot (fungal) and aphids (insects).

Cellulose cell walls, tough waxy cuticle on leaves, layers of dead cells around stems that fall off.

Magnesium deficiency. Magnesium ions are needed to make chlorophyll.

Plant disease **Triple only**

Name two chemical plant defences.

Plant disease **Triple only**

**Name three mechanical adaptations
of plants.**

Thorns and hairs, leaves that droop or curl when touched, and mimicry to trick animals.

Antibacterial chemicals and poisons to deter herbivores.