

Edexcel Diseases Notes

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Animals and plants can suffer from disease during their lives. The disease may be caused by a pathogen and if so the organism must clear the pathogen to be healthy again. **But what is health?**

Health: a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity.

There are many diseases out there in the world but at GCSE there are only a set number that you will need to learn. They will each be covered later in this booklet. All diseases fall into one of two categories, they are either a **communicable disease** or a **non-communicable disease**. What does this mean?

Communicable disease: a disease that **can** be spread directly from one person to another. For example, a common cold or flu.

Non-communicable disease: is a disease that **cannot** be spread directly from one person to another. For example, any cancer or sickle cell anaemia.

Diseases may be correlated – meaning that having one disease may make it more likely that you will develop another. This could be due to:

- **One disease damaging your immune system.**
- **One disease damaging the natural barriers of the body.** So, a disease breaking your skin for example, this could potentially allow more pathogens in through the damaged section.
- **One disease could stop an organ system working properly.**

A pathogen: is an organism (usually a microorganism) that causes disease.

These organisms can be **bacteria, fungi, protists and viruses.**

Exam note: When it comes to the diseases, what do we need to know?

We need to know the **name of the disease, what it does to the body, how it is spread and how it is treated.**

Communicable Diseases

Disease: Cholera.

Details: Cholera is a bacterial infection that causes severe diarrhoea and dehydration. Left untreated, cholera can be fatal within hours, even in previously healthy people.

Spread by: contaminated water.

Treated by: clean fluids and antibiotic drugs.

Disease: Tuberculosis.

Details: Tuberculosis is a bacterial infection that mainly affects your lungs.

Spread by: Droplets – coughing/ sneezing.

Treated by: antibiotic drugs.

Disease: Helicobacter – Stomach ulcers.

Details: Stomach ulcers can be caused by a bacterial infection, they are open sores that develop on the lining of the stomach.

Spread by: Person-to-person transmission by either the oral–oral or faecal – oral route is most likely.

Treated by: antibiotic drugs.

Disease: Malaria.

Details: Malaria is caused by a protist (a single celled living organism like an amoeba) symptoms that typically include fever, tiredness, vomiting, and headaches.

In severe cases, it can cause yellow skin, seizures or death.

Spread by: a vector, an infected female Anopheles mosquito.

Prevention: kill the mosquitoes, prevent them breeding and use mosquito nets at night.

Treated by: antimalarial drugs.

Disease: Human immunodeficiency viruses – HIV.

Details: is a viral disease that destroys human white blood cells. Without these cells the body is unable to fight off other infections even something like a chest infection or cold can be fatal.

When the immune system is this damaged a person is said to have AIDS, acquired immunodeficiency syndrome.

Spread by: HIV is found in the body fluids of an infected person. This includes semen, vaginal and anal fluids, blood and breast milk. **Treated by:** antiviral drugs, these suppress the virus they do not cure it.

Disease: Ebola.

Details: Is a viral disease which can kill 25% to 90% of the individuals it infects. Early symptoms can include fever and muscle weakness.

Spread by: The virus is transmitted in body fluids. This includes semen, vaginal and anal fluids, blood and breast milk.

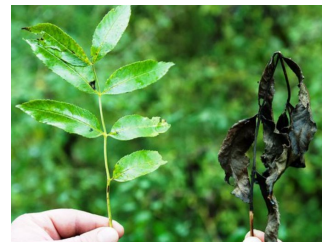
Treated by: antiviral drugs, a vaccine has also been developed.

Disease: Chalara – Ash die back.

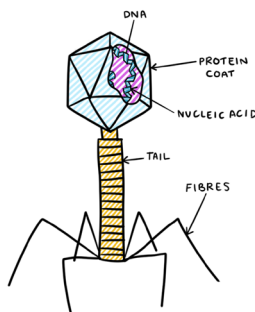
Details: Is caused by a species of fungus called Hymenoscyphus fraxineus which infects ash trees. Infected trees suffer from leaf loss, die back of new shoots and bark lesions.

Spread by: as spores in the wind.

Treated by: kill infected trees.



Structure of a General Virus (not a cell)



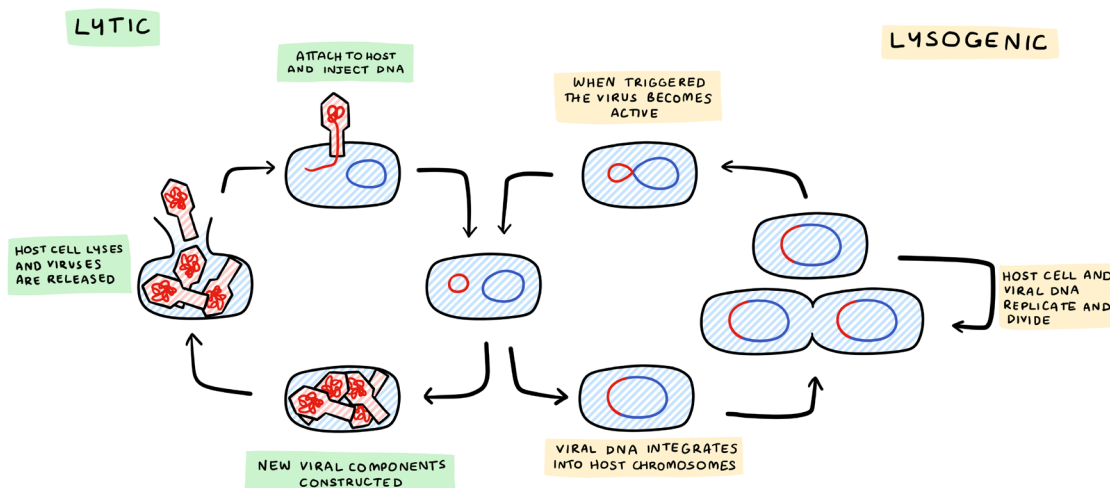
Structure	Function
Protein coat	Encloses the genetic material.
Genetic material	Can be DNA or RNA depending on the type of virus.

The Lifecycle of Viruses

Viruses typically undergo one of two life cycles either a lytic or a lysogenic pathway. Both are fascinating and quite different from one another. Questions on viral life cycles tend to range from four to six marks.

The Lytic Pathway	The Lysogenic Pathway
- Viruses cannot replicate outside a host. - The virus binds to host cells. - It inserts genetic material into the host cell. - The virus uses the cell's machinery to produce viral proteins and nucleic acids. - Viral components assemble into new viral particles. - Viruses exit the cell through the host cell membrane this can cause lysis of the host cell. Note: Lysis means to burst or split.	- Viruses cannot replicate outside a host. - The virus binds to host cells. - It inserts genetic material into the host cell. - The cell itself reproduces, replicating the viral genetic material as well. This can happen many times over. - Occasionally, the viral genetic material can separate from the host cell resulting in a lytic pathway.

The figure below shows the lytic and lysogenic pathway of the virus lifecycle



Sexually Transmitted Infections

Questions on sexually transmitted infections (STI's) can be asked separately to the other diseases. There are three of these that we must know about for the Edexcel GCSE specification.

Disease: Chlamydia

Details: is a sexually transmitted infection caused by a bacterium. It is often symptomless in women.

Reduced or prevented by: the use of barrier contraceptives for example the male and female condoms.

Spread by: unprotected sexual/ oral intercourse.

Treated by: antibiotic drugs.

Disease: Gonorrhoea

Details: is a sexually transmitted infection caused by a bacterium.

Reduced or prevented by: the use of barrier contraceptives for example the male and female condoms

Spread by: unprotected sexual/ oral intercourse.

Treated by: antibiotic drugs, though it is becoming increasingly resistant to these treatments

Disease: Human immunodeficiency viruses – **HIV**.

Details: is a viral disease that destroys human white blood cells.

Spread by: Body fluids and unprotected sexual intercourse.

Treated by: antiviral drugs, these suppress the virus they do not cure it. There is no vaccine.

Non Communicable Diseases – Diet

Diet can play a significant part in the development of many non-communicable diseases, including coronary heart disease (CHD), some cancers (lung, liver, bowel), and liver conditions. It's important to understand that while genetics and environmental factors also contribute, dietary choices can have a profound impact.

Coronary Heart Disease: a diet high in saturated fat and cholesterol, can cause a build-up of plaque in the arteries. This narrows the arteries, reducing blood flow to the heart and increasing the risk of heart attack or stroke.

Certain Cancers: a diet which is low in fibre and high in red meat has been linked with an increased risk of bowel cancer. High alcohol consumption can increase the risk of liver damage and liver cancer.

The likelihood of developing these conditions can be reduced by having a healthy diet and taking regular exercise.

Coronary Heart Disease

What is coronary heart disease? It's a condition where the coronary arteries can be narrowed or blocked, this can lead to a heart attack.

What causes coronary heart disease? It is caused by the build up of plaque in the arteries. This "plaque" is a mixture of fat, cholesterol, calcium, and other substances found in the blood.

How can coronary heart disease be prevented? Eat a healthy diet and regular exercise. Avoid smoking and serious stress and keep an eye on your cholesterol levels.

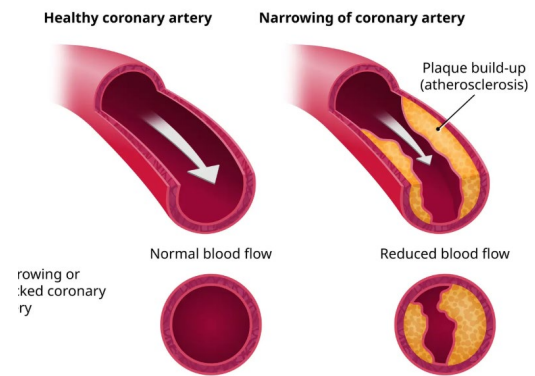
How does smoking contribute to coronary heart disease?

Smoking damages arteries and promotes plaque buildup. It can also increase blood pressure, reduce the blood supply to the heart and increase the risk of a blood clot forming.

How can coronary heart disease be treated?

There are a number of different ways we can treat coronary heart disease once it has become an issue. These are:

1. Lifelong medication such as Statins. These are drugs which reduce the cholesterol levels in the blood.
2. Surgery – a small object called a stent is inserted into a coronary artery to keep it open.
3. Change in lifestyle – this could mean a better diet and more regular exercise.



Body Mass Index - BMI

What is BMI? Body Mass Index (BMI) is a measure used to assess whether a person has a healthy body weight for their height. It is mostly used by doctors to know if someone is a healthy body weight.

$$BMI = \frac{Mass (kg)}{Height^2 (m)}$$

Let's look a few example calculations 😊

Example 1: A person has a mass of 70 kg and a height of 1.75 m. Calculate their body mass index.

$$BMI = \frac{70}{1.75^2}$$

$$BMI = 22.86$$

Example 2: A different person has a mass of 95 kg and a height of 1.65 m. Calculate their body mass index.

$$BMI = \frac{95}{1.65^2}$$

$$BMI = 34.91$$

Limitations of BMI

BMI is not a perfect measure of someone's health. Using BMI has the following limitations:

1. BMI does not differentiate between muscle and fat.
2. It doesn't consider how body fat is distributed around the body, which is really important for health risks.
3. Other methods like waist-to-hip ratio or body fat percentage can provide more accurate measures of health.