

Useful Drugs

■ PSE/Science, years 8 and 9

2

NOTES

Background information

A 'disease' can be defined as any unhealthy condition of the body or mind. 'Infectious diseases' are those caused by the invasion of the body by microbes that are capable of growing there and causing illness. The following are all infectious agents.

BACTERIA: a large group of typically unicellular micro-organisms that can only be seen under the microscope. Characteristics of bacteria include a tough cell wall surrounding the membrane, and a single circular thread of DNA. Many bacteria help maintain the balance of living creatures (e.g. those that inhabit the intestines) and of chemicals in the environment (e.g. those that break down waste in the soil and trap nitrogen). Only a few kinds of bacteria are harmful. If they enter the body, they multiply rapidly and release poisons. Normally the body's defender cells (e.g. lymphocytes) are able to attack the bacteria quickly and successfully, but occasionally there are just too many bacteria to cope with. Subsequently, you become ill.

Examples of illnesses caused by bacteria are: **food poisoning, tetanus, tuberculosis (TB), gonorrhoea, typhoid and syphilis.**

VIRUSES: small infectious particles which are parasites. When outside a cell (whether it is a plant, animal or bacteria), viruses are lifeless, inert particles made of nucleic acid (DNA or RNA), fats and proteins. When they invade the body, they become extremely active, taking over the cell's genetic machinery to make more viruses, usually destroying the cell in the process. Around half of the infections that afflict humans are caused by viruses. In most cases, the body's own defence system will eventually beat the virus. However, some diseases caused by viruses are lethal (e.g. AIDS).

Examples of illnesses caused by viruses are: **smallpox, mumps, measles, German measles (Rubella), whooping cough, herpes, rabies, influenza, hepatitis B and AIDS.**

PROTOZOA: simple, single-celled animals which live in water, soil and in the bodies of other animals. Most are harmless, but some are parasites and can cause serious diseases.

Examples of diseases caused by protozoa are: **dysentery and malaria.**

FUNGI: primitive forms of plants without chlorophyll, e.g. mushrooms, moulds and yeasts. Some moulds are important in medicine. For example, the mould penicillium, which grows as blue veins in cheese, is used to make the antibiotic, penicillin. Some microscopic fungi can infect humans.

Examples of illnesses caused by fungi are: **ringworm, thrush and athlete's foot.**

The simplified structures of a bacterium and a virus are illustrated in Figure 1.

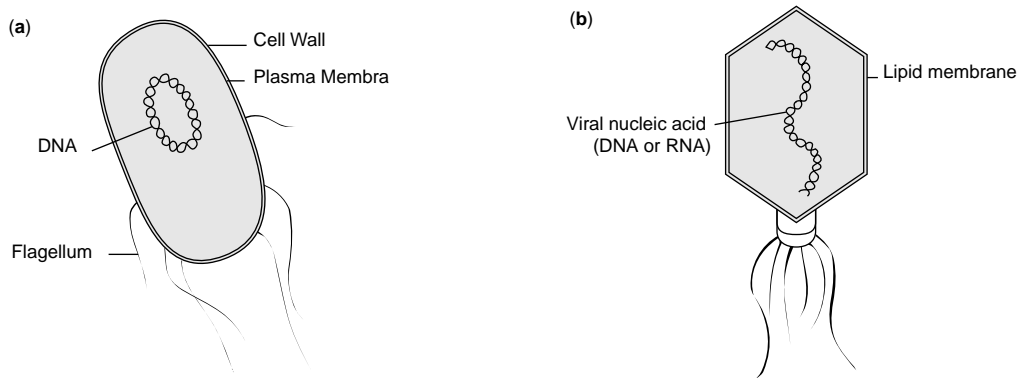


Figure 1. Simplified structure of (a) bacteria and (b) virus

Class discussion 1

Introduce the class to the concept of disease, including the idea of infectious diseases. Describe in turn the following infectious agents: (i) bacteria; (ii) viruses; (iii) protozoa; (iv) fungi.

Ask members of the class to name specific diseases that are caused by each of these infectious agents, and list their suggestions on a blackboard or flipchart. (This could be done before or in place of the previous discussion, if felt to be more appropriate.)

(10 minutes)

Group work

Split the class into four groups and assign one of the topics below to each. Each group should study the page references given and coordinate a role play to illustrate the topic. The 'plays' should then be presented to the whole class. (Alternatively, groups could be asked to reproduce the story diagrammatically in a series of posters.)

1. The discovery of penicillin, pages 14–17
2. The development of a vaccine against smallpox, pages 32–35
3. The discovery of aspirin, pages 68–71
4. The discovery of anaesthetics, pages 78–82

(20–30 minutes for group discussions plus homework time for rehearsals if required; 2–3 minutes per play)

Class discussion 2

Sum up each of the discoveries and ask the class to vote on which they consider to be the most important.

This could be expanded into a further session if members of the class are asked to prepare for a debate, with one volunteer required to speak in favour of each of the four discoveries.

(5 minutes)