

Cells: animal cells, bacteria and viruses

Introduction

This activity will revise the structure of an animal cell and the microorganisms that can cause disease. Students colour in labels and structures on a typical animal cell, a bacterial cell and a virus. It will take about 15 minutes.

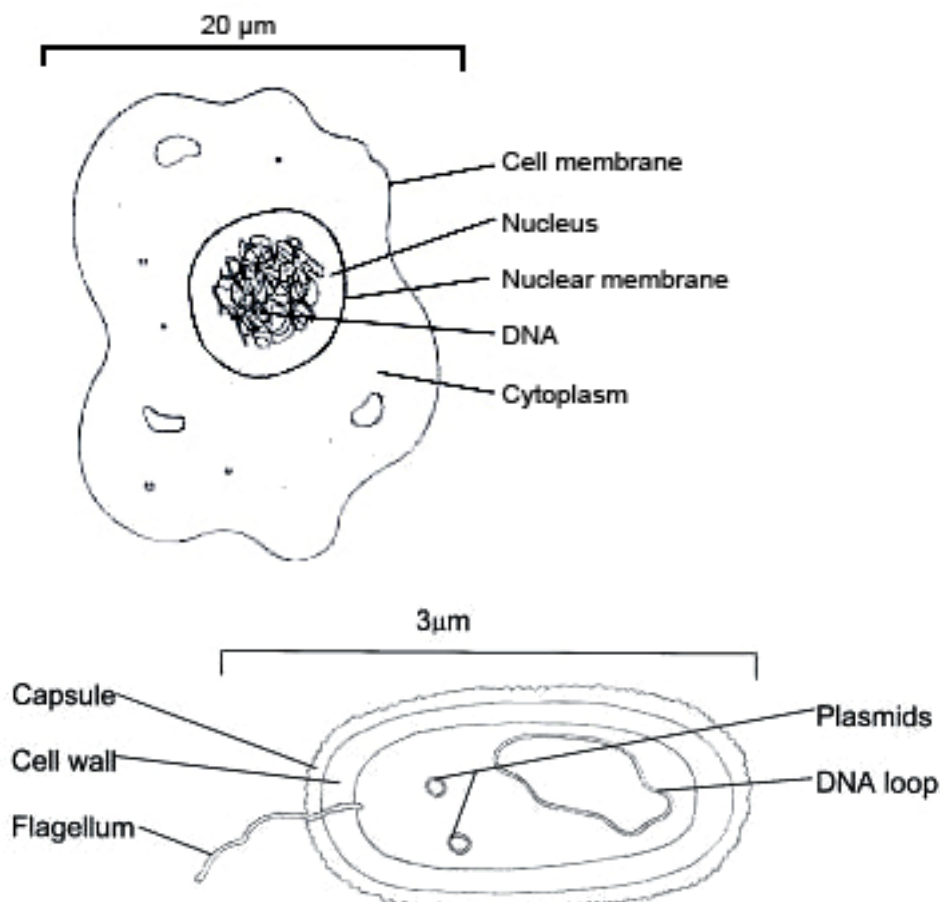
Resources

Students will need coloured pencils or pens and may need a biology textbook for reference.

Answers to questions

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1.

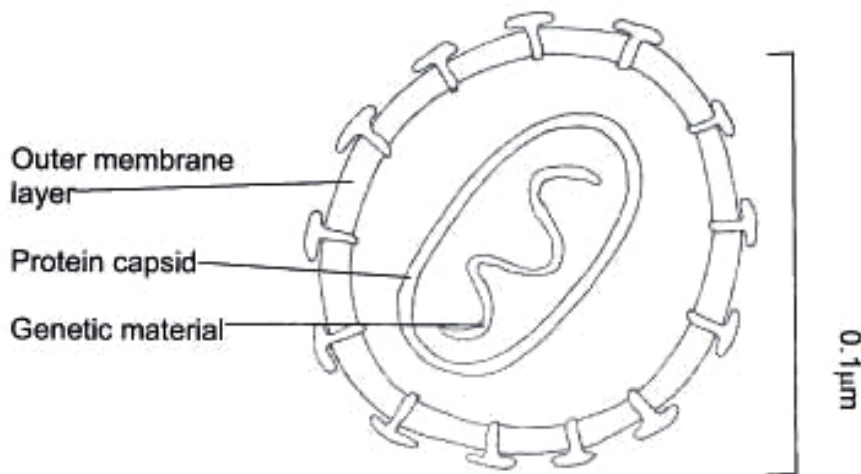


Science Explanations

Aa Many diseases (of humans other animals and plants) are caused by small organisms (microbes) such as bacteria fungi and viruses which are present in the environment and can be passed on from already infected individuals.

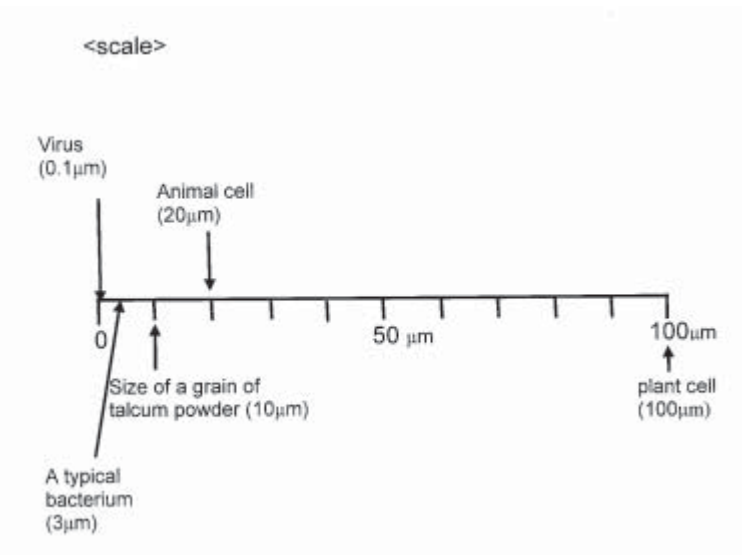
Ab Bacteria or fungi may enter the body and reproduce in certain organs or tissues. Viruses are not independent organisms but are packets of genetic information which cannot survive on their own but can invade healthy cells and make them produce copies of the virus usually killing the cell in the process. The symptoms of a disease are caused by damage to the tissues by the toxins produced by the microbes or sometimes by the immune system itself.

Ba All living things (organisms) are composed of cells. Most of the chemical reactions that are needed for organisms to stay alive grow and reproduce take place in cells. The mechanisms are similar in the cells of all living organisms.



Size of microorganisms

2.



You could ask students to add a couple of other structures that they have found the size of to the scale.

3. Animal/human cells do not have a cell wall, so will not be affected by a chemical which disrupts cell wall synthesis. (A plant cell wall is made of a completely different material, so would also not be affected by penicillin).

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Introduction

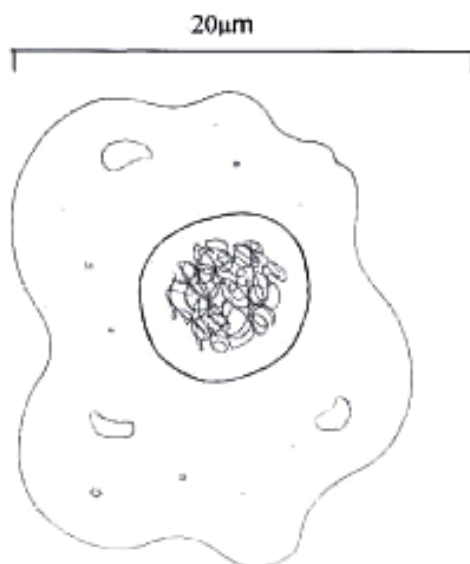
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The activity

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Questions

1. Colour in the bubble writing naming structures present in the different cells. Then colour that structure in the drawing using the same colour. Use your SIS textbook or a biology textbook for the information you need.



A typical animal cell

The cell membrane allows certain molecules to pass in and out of the cell.

The nucleus contains the genetic material, DNA. The nucleus is surrounded by the nuclear membrane.

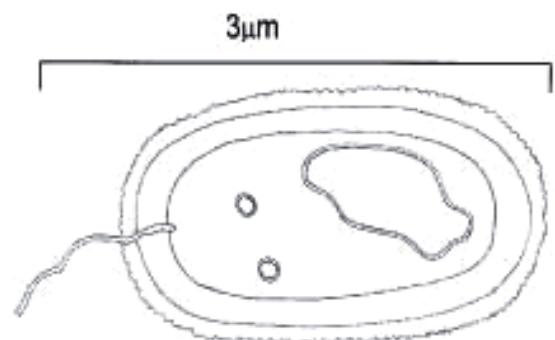
The cell cytoplasm contains specialised structures which carry out cell processes such as respiration.

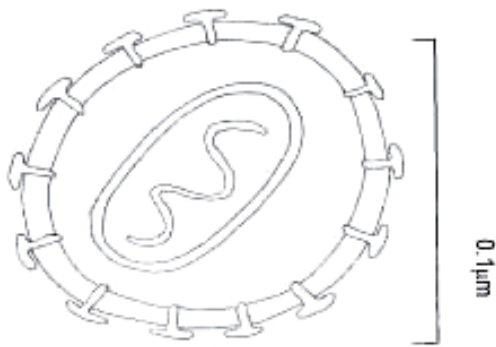
A generalised bacterium

Some bacteria have an outer mucus capsule. The cell wall is rigid, giving the cell a characteristic shape.

The genetic material is in one large DNA loop, and sometimes there are small circular DNA plasmids.

Some bacteria have a flagellum for movement.





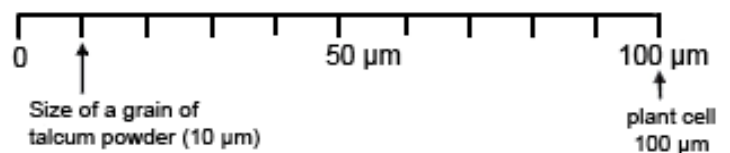
Some viruses, such as HIV have an outer membrane layer made up of molecules from their host's cell membranes. The genetic material (either DNA or RNA) is inside a protein capsid.

Size of microorganisms

Most cells and microorganisms are too small to be seen with the naked eye. The smallest object that can be seen without any magnification is about $100\mu\text{m}$ in diameter, for example a plant cell. A printed full stop is about $300\mu\text{m}$ in diameter, so three plant cells would fit into a full stop.

Units of measurement

$\text{cm} = 1/100 \text{ m}$
 $\text{mm} = 1/1000 \text{ m}$
 $\mu\text{m} = 1/1000\,000 \text{ m}$
 $\text{nm} = 1/1000\,000\,000 \text{ m}$



- Add the size of a virus, animal cell and bacterium to the scale above to show their relative size.
- Antibiotic drugs interfere with the chemical reactions of bacterial or fungal cells. For example, penicillin prevents the bacteria making the material for their cell wall. Use the diagrams of structure of microorganisms in no.1 to explain why penicillin kills some strains of bacteria, but not human cells.