Structure of prokaryotic cells and of viruses

Prokaryotic cells

Prokaryotic cells are much smaller than eukaryotic cells.

Prokaryotic cells:

- Do not contain a nucleus or nuclear envelope
- Have a singular circular piece of DNA that is not complexed with proteins
- Do not contain any membrane-bound organelles, such as mitochondria, chloroplasts etc.
- Have a cell wall surrounding the cell-surface membrane, but it is made of a glycoprotein called murein
- Have ribosomes that synthesise proteins, but these are smaller than the ribosomes in eukaryotic cells

In addition, some prokaryotic cells:

- Contain plasmids
- Have flagella that enable the cell to move
- Have a slimy capsule surrounding the cell, which stops the cell drying out, helps to protect the cell from being engulfed by white blood cells, and stores toxins

Viruses

Viruses contain genetic material, either DNA or RNA. Surrounding the genetic material is a protein coat, called a capsid, made of many protein units

On the outside of a virus is an attachment protein, which fits into a protein in the membrane of a living host cell, enabling the virus to enter the cell. Once inside, it 'hijacks' the cell's organelles which start to make new viral proteins and the cell starts making many new viruses, which are then released from the host cell, destroying the host cell in the process.

Methods of studying cells

Microscopes

An optical microscope works by passing a beam of light through a specimen, magnifying and focusing the image using lenses. This means that the specimen needs to be quite thin. Sometimes a stain is added to make part of the specimen a different colour from the rest, so that the structures can be seen more clearly.

Magnification – is making things larger

Resolution – is the ability to see two objects that are close together as separate objects.

An optical microscope cannot resolve two objects that are closer together than half the wavelength of the light being using in the microscope. Optical microscopes cannot be used to study the tiny organelles within the cells or the structure of prokaryotic cells.

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