

1.5 The origin of cells

Cell division and the origin of cells

Cells can only be formed by division of pre-existing cells

- The first cell to form us is the zygote (fusion of sperm and egg)
- We can trace the origin of cells back to hundreds of millions of years.
- The creation of new cells is at the moment impossible.

Spontaneous generation and the origin of cells

Verifying the general principles that underlie the natural world: the principle that cells only come from pre-existing cells needs to be verified.

- Spontaneous generation is the formation of living organisms from non-living matter.
- Cells only come from pre existing cells because:
 - They have a complex structure and no natural mechanism has been suggested for producing cells from simpler units
 - No example is known of increases in the cell number in a population without cell division occurring.
 - Viruses are produced from simpler subunits but they don't consist of cells.

Spontaneous generation and Pasteur's experiments

Evidence from Pasteur's experiments that spontaneous generation of cells doesn't occur now in Earth.

- Louis Pasteur boiled water containing yeast and sugar.
- He showed that if this solution was kept in a sealed flask it would remain unchanged.
- He passed air through a pad of cotton wool in a tube to filter out microscopic particles which included bacteria and fungi spores.
- If the pad was placed in the solution a large number of microorganisms would grow within 36 hours.
- In another experiment Pasteur placed samples of broth in flasks with long necks and then melted the glass of the neck in different shapes.
- He boiled the broth in some of the flasks to kill any microorganisms but left others unboiled
- No organism appeared in the boiled flasks even after long periods of time.
- The broth in the boiled flasks were in contact with air but nothing grew on it.

Origin of the first cells

The first cells must have arisen from non-living material.

1. **Production of carbon compounds such as sugars and amino acids:** Miller and Urey passed steam through a mixture of methane, hydrogen and ammonia. The mixture was thought to be