

1.5 The origin of cells

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

A cell is a highly complex structure and no natural mechanism has been suggested for producing cells from simpler subunits

No example is known of increases in the number of cells in a population, organism or tissue without cell division occurring

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

Unless cells arrived on Earth from somewhere else in the universe, they must have arisen from non-living material. But how is that possible???

HYPOTHESES			
Production of carbon compounds	Assembly of carbon compounds into polymers	Formation of membranes	Development of a mechanism for inheritance
Stanley Miller & Harold Urey passed steam through a mixture of methane, hydrogen and ammonia. Electrical discharges simulated lightning. Amino acids and other carbon compounds needed for life were produced	In deep sea vents, inorganic chemicals are present. These chemicals (eg iron sulphide) represent readily accessible supplies of energy, a source of energy for the assembly of these carbon compounds into polymers	If phospholipids occurred naturally, they would have formed bilayers. Therefore small vesicles could have formed. This would have allowed different internal chemistry from that of the surroundings to develop	Living organisms have genes made of DNA and use enzymes as catalysts. Prior to DNA, RNA might have existed that can store information and can replicate and act as a catalyst itself

- The origin of eukaryotic cells can be explained by the endosymbiotic theory

Endosymbiosis states that mitochondria were once free-living prokaryotic organisms able of aerobic cell respiration. Larger prokaryotes that could only respire anaerobically, took them in by endocytosis. Instead of killing and digesting the smaller prokaryotes, they allowed them to continue to live in their cytoplasm. They persisted over millions of years of evolution to become the mitochondria inside eukaryotic cells today...