

Chapter 7: Evolution

Origin of Life:

Hypothesized early conditions on Earth.

Miller-Urey experiment: Simulated early Earth conditions and observed formation of amino acids.

RNA world: Idea that RNA was the first genetic material.

Biological Evolution:

Changes in populations over generations due to genetic variations.

Variations arise due to mutations, gene migration (gene flow), and genetic drift.

Theories of Evolution:

Lamarck's Theory: Principle of use and disuse; inheritance of acquired characters.

Darwin's Theory: Natural selection; survival of the fittest.

Adaptive Radiation: Organisms from a common ancestral species evolve and radiate into different forms in different habitats. Example: Darwin's finches.

Evolution by Stages: Complex structures develop in stages over time. E.g., eyes, wings.

Human Evolution:

Humans (*Homo sapiens*) are believed to have evolved from primates.

Various stages: Dryopithecus, Ramapithecus, Australopithecines, Homo habilis, Homo erectus, Neanderthal man, and finally Homo sapiens.

Hardy-Weinberg Principle: Describes a population that is not evolving. If a population does not meet the criteria of the principle, it's evolving.

Sources of Genetic Variation:

Gene migration or gene flow

Genetic drift (random change in allele frequencies, especially in small populations)

Mutation

Recombination

Speciation: Process by which new species develop. Can occur due to:

Reproductive isolation

Geographical isolation

Molecular Phylogeny: DNA sequencing used to determine evolutionary relationships.

Evolution and Classification:

Evolutionary relationships can be traced through classification systems, especially in phylogenetics.

Evolution Impact: On other areas of biology, like comparative anatomy and molecular biology.