

Evolution is the process by which different kinds of living organisms have developed and diversified from earlier forms throughout Earth's history. It explains how life has changed over time through mechanisms such as mutation, natural selection, genetic drift, and gene flow. The idea that species change over time has ancient roots, with early concepts introduced by philosophers like Anaximander and Empedocles. However, the modern understanding of evolution began with Charles Darwin, who proposed the theory of natural selection in his 1859 book *On the Origin of Species*. According to this theory, individuals with traits better suited to their environment are more likely to survive and reproduce, passing those traits to future generations. Mutations are random changes in an organism's DNA that may introduce new characteristics. Genetic drift involves random changes in gene frequencies in small populations, while gene flow refers to the movement of genes between populations due to migration or interbreeding.

There is a wide range of evidence supporting evolution. The fossil record shows a clear timeline of changes in species over millions of years. Comparative anatomy reveals similarities in body structures among different species, suggesting common ancestry. Embryology demonstrates that many organisms share similar stages of development in the womb. Additionally, molecular biology shows that all living organisms have similarities in DNA and proteins, further supporting the idea of a shared evolutionary origin.

Over billions of years, life has undergone remarkable transformations. The earliest simple life forms, such as prokaryotes, appeared around 3.5 billion years ago. About 1.5 billion years ago, more complex eukaryotic cells evolved. Around 600 million years ago, multicellular organisms emerged, followed by a great diversification of marine life. Reptiles and early mammals appeared about 250 million years ago, and after the extinction of the dinosaurs 65 million years ago, mammals became dominant. Modern humans, *Homo sapiens*, evolved approximately 200,000 years ago, after a long lineage of ancestral species like *Australopithecus*, *Homo habilis*, and *Homo erectus*, marked by increasing brain size, upright walking, and the development of complex tools.