**Course: Advanced Bioinformatics**

**Module title: Evolution Introduction**

**Module no. : 42**

This module provides evidence about the evolution introduction of MSA.

**Kingdom:** All living organisms are first placed into different kingdoms. There are five different kingdoms to classify life on Earth, which are Animals, Plants, Fungi, Bacteria, and Protists (single-celled organisms).

**Phylum:** The animal kingdom is divided into 40 smaller groups, known as phylum. Here, animals are grouped by their main features. Animals usually fall into one of five different phylum which are Cnidaria (invertebrates), Chordata (vertebrates), Arthropods, Molluscs and Echinoderms.

**Class:** The phylum group is then divided into even smaller groups, known as classes. The Chordata (vertebrates) phylum splits up into Mammalia (Mammals), Actinopterygii (Bony Fish), Chondrichthyes (Cartilaginous Fish), Aves (Birds), Amphibia (Amphibians) and Reptilia (Reptiles).

Order

Each class is divided into small groups again, known as orders. The class Mammalia (Mammals), splits into different groups including Carnivora, Primate, Artiodactyla and Rodentia.

**Family:** In every order, there are different families of animals which all have very similar features. The Carnivora order breaks into families that include Felidae (Cats), Canidae (Dogs), Ursidae (Bears), and Mustelidae (Weasels).

**Genus:** Every animal family is then divided into small groups known as genus. Each genus containsanimals that have very similar features and are closely related. For example, the Felidae (Cat) family contains genus including Felis (small Cats and domestic Cats), Panthera (Tigers, Leopards, Jaguars and Lions) and Puma (Panthers and Cougars).

**Species:** Each individual species within the genus is named after its individual features and characteristics. The names of animals are in Latin so that they can be understood worldwide, and consist of two words. The first word in the name of an animal will be the genus, and the second name indicates the specific species.

Natural Theory of Selection by Darwin is based on four postulates:

1. Individuals within species vary in their characteristics.
2. Some of these variations are heritable.
3. In every generation, more young are produced than can survive to reproduce.
4. The survival and reproduction of individuals is not random: Individuals who survive and go on to reproduce are those with the most favorable variation. They are naturally selected.

**Consequence:** Populations change over time - they adapt to their environment

**DNA Mutation:** Random generation of diversity which results in replication errors, non-random, differential survival and reproduction of variants.