EVOLUTION

MECHANISM OF EVOLUTION

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The evolution occurs due to the changes in the gene pool- the collection of genes. There are four key mechanisms that cause changes in gene pool of a population. These include:

1. Mutation
2. Gene Flow
3. Genetic Drift
4. Natural Selection

MUTATIONS

Mutations are defined as the changes in the DNA sequence of a living organism. The mutations occurring in the germ cells, i.e., the egg or sperm cells only are passed on to future generations. These mutations are inherited from the parents and are present in every cell throughout a person's life. These are the mutations that lead to evolution. The acquired mutations occur during a person's life and are present only in some cells. These are caused due to environmental factors such as ultraviolet radiation and do not pass on to future generations. They are not a part of evolution.

GENE FLOW

The transfer of genes from one population to another is called gene flow.

For eg., pollen moving from one place to another by the action of wind or people moving to different cities or countries. When a person from one country moves to the other and mates with a person there, a transfer of genes occurs between the individuals. This is how the gene flows between different populations. Gene transfer can be horizontal, i.e., the transfer of genetic material from one population to another by asexual means. This phenomenon is prevalent in prokaryotes.

GENETIC DRIFT

It refers to the change in the allele frequency of a population as a matter of chance. It is a random event whose effect is larger in smaller populations and smaller in larger populations. The two examples of genetic drift are the bottleneck effect and the founder effect.

- **Bottleneck Effect:** It occurs when there is a sudden decrease in the population due to some environmental factors, such as an earthquake, tsunami, epidemics, etc. In this event, some genes are depleted from the population. This causes a drastic reduction in the genetic diversity of the original gene pool. That means that the genetic makeup of the surviving population becomes different from that of the original one.
- **Founder Effect:** When a small number of individuals separated from a larger population make up a new population, there is a loss of genetic diversity. They do not carry the genetic diversity of the previous population. Due to this, some genetic traits become more prevalent than others, which results in genetic diseases in future generations.

NATURAL SELECTION

Some individuals with certain traits have higher survival and reproductive rate than others. They pass on these genetic features to their offspring which brings an evolutionary change into the future generations. This selection of the genetic qualities that prove beneficial for survival in future generations is known as natural selection.

Darwin's Finches is one classic example of natural selection. Darwin's finches have evolved into 15 different species depending upon their adaptation and feeding habits.