Welcome Students, today's Paper Title for the content is Molecular Biology and Evolution.The Title of the Unit is Concept of Evolution, Origin of Life and Speciation. The module name is Basic Concept of Organic Evolution and Micro- Evolution, the module number is 22. My Self, Juliana Silveira e D'Souza, Assistant Professor from Government College of Arts, Science and Commerce, Quepem, Goa.

The outline of this content is to define Evolution, Organic Evolution, Principles of organic evolution define Microevolution, Know the features of microevolution, evolutionary forces, mechanism of microevolution, Successional and Divergent micro evolution with examples.

On completion of this e- content, the students should be able to define evolution, organic evolution micro- evolution, describe the features of evolution, micro- evolution, explain mechanism of micro-evolution, comment on the evolutionary forces, distinguish between successive and divergent micro-evolution.

What is Evolution? Evolution is distant with modification. According to Charles Darwin- the origin of species, Evolution is the process by which organisms have changed over time. Evolution can be defined as a change in the genetic composition of a population from generation to generation. Main principles of organic evolution are- that all the present-day plants and animals are descended from a common single ancestor. It explains the development of more complex forms of life from simpler and earlier forms. It is the gradual sequence of changes from a simple to a more complex state. It is the descent with modification.

The evolutionary theory says that, a fish gave rise to frog, frog to a lizard and lizard to birds and mammals and men originated from monkeys. This explains that evolution is a slow process. The process of a very small change requires thousands of years hence a man during his short period of life cannot see or feel the evolutionary change. The evolution of organisms, plants and animals is called Organic Evolution.The above illustration explains the evolutionary process - the frog evolved from fish, lizard from frog and then lizard to bird and mammal and the ape to the man.

Micro- Evolution - Micro- Evolution refers to the alteration in a gene pool of the population over time resulting in small changes of an organism in the same species. Microevolution is the change in allele frequencies that occurs over time within a population. This change is due to four different factors namely - Mutation, Natural Selection, Gene flow and Genetic drift. This change happens over a relatively short period of time and it operates below the species level.

Mutation - Some green beetles, randomly mutated to brown genes (although since any particular mutation is rare this force alone cannot account for a big change in gene frequency over one generation). The green beetles mutated to brown genes and led to brown coloration.

Natural selection favoured beetles with brown genes, they escaped predation and survived to reproduce more frequently than beetles with green genes so that more brown genes got into the next generation, the predator preyed on the green beetles and this lead to the increase in the brown gene beetles.

Migration - some beetles with brown genes immigrated from another population or some beetles carrying green genes emigrated the brown genes emigrated and resulted in an increase in the frequency of brown genes due to immigration.

Genetic drift - when the beetles reproduced just by random luck, more brown genes then green genes, ended up in the offspring. brown genes occur slightly more frequently in the offspring that accounts to 29 percent, than in the parent generation which is accounting to 25 percent. In the first generation the green gene beetles accounts to 75 percent and in the second generation the green

gene beetles, account to 71 percent and if we notice the brown gene beetles in the first generation the accounts to 25 percent and in the second generation it is 29 percent.

Mechanism of Micro- Evolution -In micro-evolution mutations are termed as micro mutations or little mutations. Mutations may be spontaneous or induced. Recombination introduces new combinations of already existing genes. Changes produced by mutation or recombination may be beneficial or may not be beneficial. The changed genotype interacts with the environment. Natural Selection operates on the variations introduced in a gene pool of the population by mutations and recombination. Only those variations which increase the reproduction rate of the organisms become more numerous in the population as a result the off springs of population are found to be different genetically as well as phenotypically. This changed population or descendant population is the product of micro- evolution. Micro evolutionary forces operating for a shorter period of time produce sequential evolution and microevolutionary forces operating for generations, result in the evolution of new populations from the existing one.

Two types of Micro- Evolution - Successional microevolution occurs within a single population, it is the successional replacement of the pre-existing populations by the new ones.

Divergent microevolution is the split of parental population into more new populations with the appearance of genetic diversions.- examples galapagos finch beaks - modification in the beaks due to different feeding behaviors, peppered moth - the progressive replacement of light-colored moth by dark moths in industrial regions in England.

Summary - Microevolution is the evolutionary change happening below the species level, Microevolution produces differences between different populations of a species the most common driving force of evolution is natural selection in response to different environments.