Essay on mechanisms of microevolution

Science, Genetics

Different species on earth have a common ancestry despite their variations. The process through which species on earth acquire different characteristics over successive generations is referred to as evolution. It is the gradual change of inherited characteristics from one generation to another over a given period of time (Havilland et al 24). Evolutionary scientists presume that all life on earth can trace their origin from one common source but then acquired different characteristics through various evolutionary mechanisms. Evolution is described in two broad perspectives, micro and macroevolution. Macro evolution refers to changes that occur at the species level. Macroevolution occurs over prolonged life periods resulting large biological transformation (Havilland et al 16). The appearance of feathers on theropod dinosaurs transforming them into birds is a good example of macroevolution. It results to new species evolving a process known as speciation.

Microevolution refers to changes in frequencies in alleles within a given population over a period of time. While microevolution occurs over short periods, macroevolution occurs over extended duration of time and can be termed as extended or compounded microevolution.

Natural selection is the process in which biological observable traits reduce or increase in individual organisms in successive generations as a result of genetic variation of their preceding generation (Havilland et al 29). When random mutations change the genome of a given organism in a population and then these mutations are inherited by successive generation, the species that inherits the best traits is able to cope better with its environment than that which inherits inferior traits. This inheritance of superior and inferior traits continues through various generations with the

individual organisms with inferior traits dying out resulting to a population with superior traits that are more able to cope with the particular environment. Natural selection determines which organism will have better chances of surviving in a given ecological niche. For instance, a rabbit which acquires a trait of running faster than other rabbit species will have a higher probability of running away from predators thus having better chances of survival. The most vital though is whether such an organism will have the ability to reproduce more than the other organisms.

Mutations refer to alterations in DNA reproduction. It can also simply be referred to as an error in copying DNA (Havilland et al 25). Mutation can be described on the basis of the type of cell altered or by the amount of DNA that is mutated. Mutations based on the type of cells are of two types, germinal or somatic mutations. While somatic mutations influence all other body cells apart from those that produce the sperm and the egg, germinal mutations affect those cells that mature into gametes. It is the latter cells that have an effect on the evolutionary process as they enable the passage of genetic material from one organism to another. New alleles are also passed on to successive generations via germinal mutation. While the other three forces alter the frequency of alleles, mutation is the only one that introduces new genetic material or allele without which the process of evolution would never occur.

Genetic drift is related to mutation. While mutation facilitates the introduction of new alleles to the offspring of the next generation, genetic drift determines the frequency within which various organisms of the same species will acquire the alleles. The frequency variation of the alleles is

determined solely by chance. Genetic drift is influenced by the population (Havilland et al 30). Organisms with more individuals in the population are more likely to pass there alleles to the successive generation eventually superseding the minority population which eventually is diminished. There instances though when the organisms less in number are favored by the environment and manage to pass on to the next generation. This shows that genetic drift and natural selection are interrelated.

This is the process through which genes are exchanged between populations belonging to similar species (Havilland et al 35). Gene flow may alter the allele frequency in a given population. It can either increase or decrease allele frequency or introduce new genetic material to a given population. The introduction of new alleles or the increase in alleles may favor or disadvantage the receiving or the donating population. If the receiving population receives more alleles, they might have a better chance of survival. If a population receives new but weak alleles, then that might cause their extinction or fixation to the population with the stronger genes depending on the environment. This is where isolation takes place where a given population undergoes a temporal isolation by being fixated to a stronger population but of the same species.

Work cited

Havilland William A., Harald E. L. Prins, Dana Walrath and Bunny McBride. Anthropology:

The Human Challenge. London: Cengage Learning, 2010. Print.