Dna mutations

Mutation is the process that involves the change or damage of a DNA to extend so as to alter the genetic setup of that gene (Blamire , 2000). The relationship between genes and DNA are best understood by mutation studies. The effects of large deletions and arrangement in a segment of DNA may result in the loss or gain of a gene or so a function. Resultantly the mRNA transcribed from that particular changed or damaged gene will carry an entirely different genetic message (Blamire , 2000). The polypeptide created as a result of the translation of the changed mRNA will carry a different sequence of amino acids. The function of the protein made by this polypeptide will be changed or lost as well (Blamire , 2000). To put in simpler language, mutation alters the function of the enzyme that catalyses a particular genetic function resulting in the change of inherited characters through different generations. It results in the alteration of DNA sequence and consequently results in changes in the genetic and physical appearance of an organism. Thus the phenotype of the organism carrying the DNA which went through mutation will be changed.

The agents which cause DNA mutation are termed as mutagens. These can be either physical agents or chemical ones (Matulef 2004). There are specific chemical mutagens created and calibrated to create specific genetic changes. They can either mimic the original nucleotide bases in a DNA molecule or remove parts of the nucleotide resulting in improper base pairing during DNA replication. They can also cause genetic changes by adding hydrocarbons to various nucleotides. High energy radiations can also alter the DNA molecule and cause mutation (Matulef 2004). The ultraviolet radiation from the sun is another cause for the same. Ultra violet rays in the presence of sunlight gamma rays and such ionizing radiation etc can

increase the frequency of mutation above the natural level. Much differently to these kinds of mutagen induced ones, mutations can also occur spontaneously.

Mutation may arise on account of different reasons. In a chromatid, DNA helix runs continuously from one end to another in a highly super coiled form. Therefore loss or gain (deletion or insertion/duplication) of a segment of DNA results in alteration in chromosomes (Montelone, 1998) Since genes are located in chromosomes such an alteration may result in abnormalities or aberrations. Chromosomal aberrations are commonly seen in cancer cells. Moreover Mutation may also arise due to change in a single base pair of DNA. This is commonly known as point mutation. A classic example of this is sickle cell anemia UHCC (1999). It is classified into three types based on what erroneous codon code for. They include Silent mutation, Missense mutations and Nonsense mutations. In addition to that it could also be due to frame shift mutation where the DNA base pairs are either inserted or deleted. Hypercholesterolemia is an apt example for this type of mutations (Montelone, 1998) It could also be beneficial as this is responsible for the creation of nylonase. As far as the type of mutation are concerned, they include ; base pair substitutions and Frame shift mutations. The later one includes the inclusion or deletion of one or more nucleotides in the coding region of a gene. The former is much more complex including transitions and transversions (Montelone, 1998)

References

Blamire J, (2000), Mutation, Brooklyn College, Retrieved July 2 2009, http://www. brooklyn. cuny. edu/bc/ahp/BioInfo/MUT/Mut. Definition. html

Montelone, B A (1998), Mutation, Mutagens, and DNA Repair Outline, Kansas

State University, Retrieved July 2 2009, http://www-personal. ksu. edu/~bethmont/mutdes. html

UHCC (1999), First Successful Embryo Biopsy for Sickle Cell Anemia, The University Hospital of Columbia and Cornell, Retrieved July 2 2009, http://nyp. org/news/hospital/pgd-for-sickle-cell. html

Matulef K (2004), Ask a Geneticist, Stanford School of Medicine, Retrieved July 2 2009, http://www. thetech. org/genetics/ask. php? id= 160