

Mutation

Mutation:

A heritable alternation or change in the genetic material of cell.

Causes of Mutation:

1.Natural Factor:

Most mutation is naturally occurring. When cell divide it makes copy of DNA sometimes copy is not perfect so small difference from original DNA is mutation.

2) External Factor:

Mutation can also be caused by

a) specific chemicals

b) radiation.

These causes break the DNA and when cell repairs the DNA then it might be not perfect.

How does mutation occur?

Mutation alters the structure of chromosome. Sometimes, a point mutation occurs.

point mutation:

"Alteration involve only one or few base pair in a coding sequence "

Explanation:

Point mutation are mutational changes which

1. Effect the message itself
2. Producing alteration in the sequence of DNA nucleotide.
3. While some point mutation occur due to the spontaneous pairing error that occur during DNA replication.

Where does point mutation occur ?

1. Sometime point mutation occur in a gamete or cell.
2. This cell give rise to gametes.
3. Thus the mutation is transmitted to offspring and to future generations.

Examples:

1. Sickle cell anemia
2. Phenylketoneuria

Effects of Mutation:

Sometimes mutation has adverse effect on phenotype in this way the mutant condition is known as *genetic* *disorder* or hereditary disease.

Example:

- Sickle cell anemia:
- 1.It affects a single nucleotide in the gene.
- 2.This gene codes for one of the polypeptide of hemoglobin.

Types of Mutation

There are two types of mutations i. e,

1-point mutation

2-chromosomal aberrations

Point Mutation :-

Defination

A point mutation or substitution is a genetic mutation where a single nucleotide base is changed, inserted, or deleted from a sequence of **DNA** or **RNA**

Causes

Point mutation are frequently the result of mistakes made during **DNA replication** although modification of DNA such

As through exposure to X Rays or to ultraviolet radiation

Example

Sickle cell anemia

Explanation

It is an inherited red blood cell disorder in which there are not enough healthy red blood cells to carry oxygen

Throughout your body.it occurs when a person inherits two abnormal copies of the B globin gene that make haemoglobin one from each parent. This gene occurs in **chromosome 11**

Types of point mutation

There are two types of point mutation

1-Base pair substitution

2-Base pair insertions or deletions or frame shift mutations

Base Pair Substitution

The replacement of one nucleotide and its partner from complementary DNA strand with another pair of nucleotide is called a base pair substitution

Mutagenesis:

Creation of mutations is called mutagenesis

Who discovered it?

In the 1920, Hermann Muller discovered x-rays causes genetic changes in the drosophila

Who obtained first mutant Drosophila?

1. Muller obtained, and also he used this drosophila in his genetics studies.

2. Muller found dangerous aspects of his discovery. X-rays and other forms of radiation cause many lethal effects.

How many ways mutagenesis occur?

It occur in no.of different ways,

1.Errors during

a)DNA replication

b)Repair

c) Recombination

can lead to following mutations

a) Base-pair substitutions

b)Insertions

c) deletions

Spontaneous mutation:

"Mutation resulting from DNA Replication, repair and recombination “

Mutagen:

Chemical or physical agent that cause mutation.

How it cause mutation?

Mutagen interact with DNA to cause mutation.

Categories of Mutagens:

There are two categories of mutagens;

- 1.physical mutagens
- 2.Chemical mutagens

1.physical mutagens:

X-rays and ultraviolet light are the examples of physical mutagens.

UV rays of sunlight can produce mutation in DNA.

2.Chemical Mutagens:

They have several categories. some are base analogues. Base analogues are similar to normal DNA bases. But they pair incorrectly.

Does ist attack of mutagens produce mutation?

1.Never,ist attack of x-rays or UV rays can't cause mutation.

2.while continuously exposed to such radiation cause mutation.