Quadrant II – Transcript and Related Materials

Programme : Bachelor of Science (First Year)

Subject : Zoology

Paper Code : ZOC 102

Paper Title : Diversity of Chordates and Genetics

Unit : 10

Module Name : Types of gene mutations- Frame shift mutations

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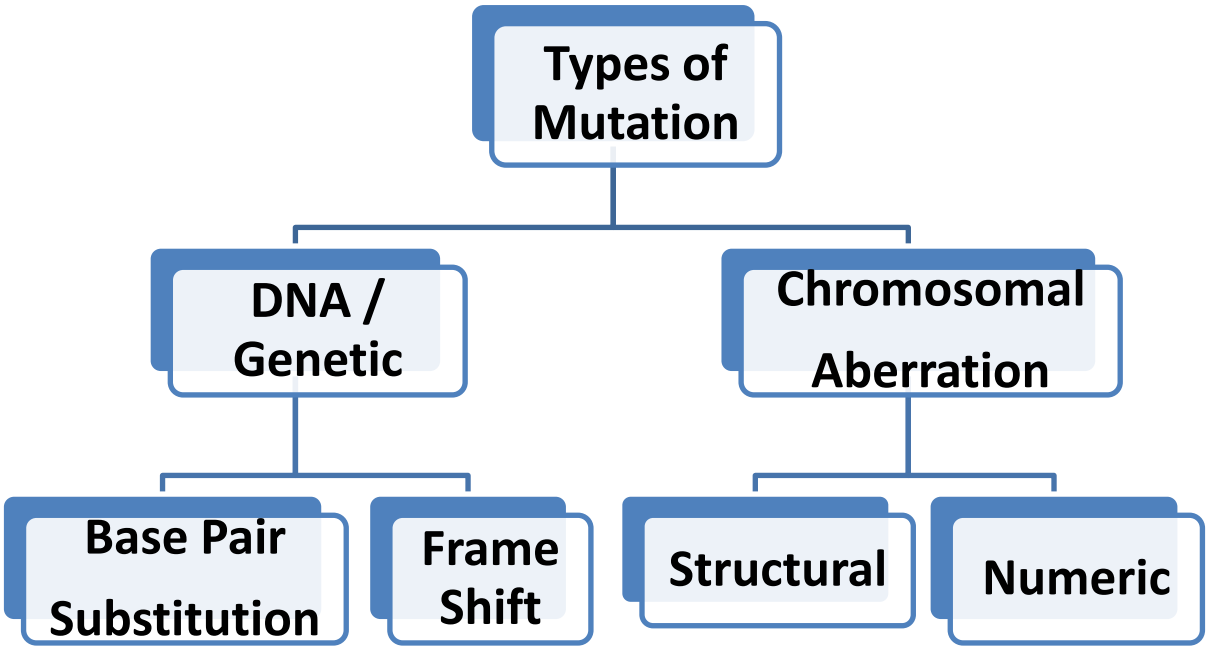
Notes

Mutation

A mutation is an alteration in the nucleotide sequence of the genome of an organism, virus, or extra chromosomal DNA. The Mutation can be classified into two types i.e. 1. Mutation in DNA or Nucleotide bases and 2. Mutation in Chromosome. The mutation at DNA/Nucleotide level may be change or replacement of Nucleotide base called as base pair substitution o may be addition or deletion of nucleotides called as frame shift Mutation



Frame shift Mutation

Frameshift mutation are caused by the addition or subtraction of nucleotides from the DNA sequence. Because the genetic code is read in triplets, addition or subtraction of 1 or 2 nucleotides causes a shift in the reading frame. Incorrect amino acids are inserted and often premature termination occurs when an nonsense codon is read. Frameshifts therefore cause, in general, very severe phenotypic effects. Addition or subtraction of 3 nucleotides does not generally cause a mutation because the reading frame is not shifted. An extra amino acid is inserted or removed but this does not usually lead to perturbed protein structure. The Frame shift mutation can be further classified into five types.

A) Insertion

B) Deletions:

C) Duplication

D) Inversion

E) Translocation.

A) Insertion: Addition of one or more Nucleotide Base Pairs in a DNA Sequence is referred as Insertion.

B) Deletion: Removal or deletion of one or more Nucleotide Base Pairs in a DNA Sequence is referred as Deletion.

C) Duplication: When a set of Nucleotide Base Pairs is present more than once in a DNA Sequence resulted due coping of DNA Segment is called as Duplication.

D) Inversion: When an order of the nucleotide sequence in particular DNA segment is reversed by 180, it is referred as Inversion.

E) Translocation: when a single or set of Nucleotide base pairs are shifted from one loci to another loci in a DNA sequence, it is termed as Traslocation.