

Mutation

Dr. Amrutha Gopan Assistant Professor School of Fisheries Centurion University of Technology and Management Odisha type" is called "mutation" and the organism in which it occurs is called a "mutant".

Genetic recombination cannot create new alleles in the first instance: the ultimate source of all genetic variation is mutation. Centurion WICITations are caused by alterations in the structure, arrangement or quantity of DNA. Characteristically they are random (almost), rare, recessive, and harmful.



Chromosome mutations

Chromosome mutation may change the order of the genes within the chromosome, e.g., by deficiency, deletion, inversion, duplication, or translocation. Gene or point mutations may result from changes in the base sequence in a gene.



inations caused by changes to ploidy level

Changes in the number of chromosomes can also cause mutation.

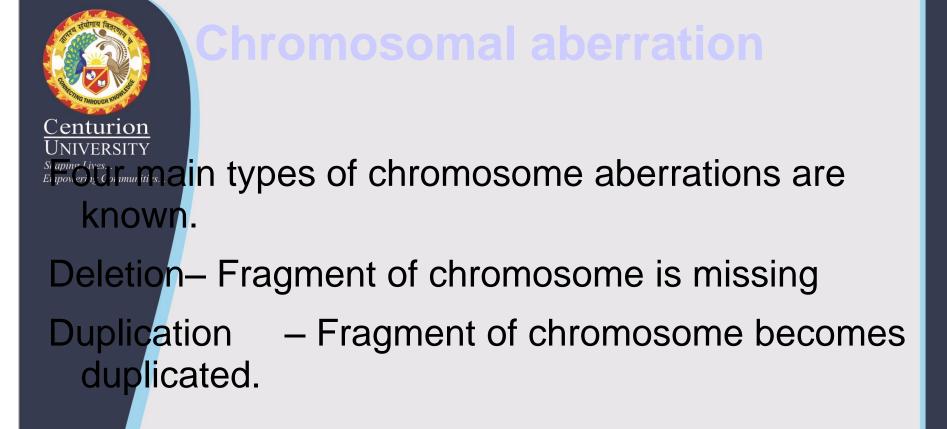


Aneuploidy

There are several reports of aneuploids in salmonids.

E.g., a male brook trout that was trisomic for a chromosome carrying a LDH-B enzyme locus was reported.

Centurion UNIVERSITY Shaping Lives Empowering Communities	_	both of a pair of homologous missing from a diploid set
2.Monosomics (2n-1)	_	one chromosome from a diploid set missing.
3.Trisomics (2n+1)	_	one extra chromosome.



– Fragment detaches and reinserts in

Translocation – A segment from one chromosome becomes connected to a non homologous chromosome.

Inversions can be classified into two main types.

centromeric regions are difficult to detect.

They do apparently occur in fishes quite frequently, but their presence can only be established by analyzing the inheritance of the linked genes.

Pericentric inversions

Prove Structure inversions involving the centromere are place at equal distances from the centromere one cannot detect the inversion without the analysis of marker genes.

When the sites of breakage are located asymmetrically, the relative length or even the absolute number of chromosomal arms will be changed.



Gene Mutations

types.

Substitutions.

Tautomerism.

sition is an exchange of a purine with another or a pyrimidine with another pyrimidine.

A transversion refers to the substitution of a pyrimidine with a purine or vice versa.

Tautomerism

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Like many organic molecules, the bases may change their shape (isomerism).

The following structural changes occur in DNA

pyrimidine dimers, in which two adjacent pyrimidines on a DNA strand are coupled by additional covalent bonds and thus lose their ability to pair.

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Chemical changes of single bases, such as alkylation or deamination, thus causing changes in the pairing properties of the DNA.

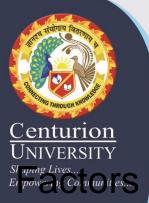
Crosslinks between the complementary DNA <u>Centuron</u>ds, which prevent their separation in UNIVERSITICATION.

Intercalation of mutagenic agents into the DNA, causing frameshift mutations.

Single-strand breaks.

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Double-strand breaks



Induced Mutation

mutagenic agents or mutagens. A mutagen, by definition, is an agent which increases the frequency of mutation.

Mutation which occur at a frequency above the base (spontaneous rate) are described as induced.

he most well-known mutagens are

<u>Centurion</u> UNIVERSITY Shaping Lives ... Employer Gamera ergy irradiations, and

chemicals.

High energy irradiations

These are the most frequent cause of mutation.

Most of the natural mutations are caused by cosmic rays from outer space and irradiations from radioactive elements.

Mutations may be artificially induced in organisms by Centurionsing them to X-rays, protons, neutrons and Supervision beta and gamma rays from radioactive sources such as radium, cobalt-60, etc.

Chemical mutations

mutagenic, and these may be classified into three groups according to their modes of action.

Mutagens which affect nonreplicating DNA.

Base analogs, which are incorporated into replicating DNA due to their structural similarity with one of the naturally occurring bases.

ed mutations in fish

markedly increased by X-rays and chemical treatment

X-irradiation of fish gametes results in the appearance of various genic and chromosomal mutations

Chemical mutagens, particularly nitrosoethylurea (NEU) are highly effective in inducing mutations in fishes.