

Q. Give an account of Modern concept of gene. Giving proper illustration.

INTRODUCTION → After the discovery and rediscovery of Mendel's laws in 1900. Sutton studied his classic work through-ly. He was also families with chromosome behaviours during meiosis and notice the similarity between segregation of during meiosis and segregation of Mendel's factors or determine during gametogenesis. He also found that there is link between the chromosome of an egg and sperm. He concluded that chromosomes are of carrier of hereditary particle of factors ~~or~~ or determines of chromosome. During the second decade of the present century many fundamental concepts of genetics were established by Morgan, Sturtevant, Bridge and Muller. They suggested that the chromosome are composed of units or genes which are carriers of hereditary characters. The term gene was coined by Johnson in 1909.

Since then various characteristics and various kinds of genes have been discovered by a number of workers.

The modern concept of gene

can be study discussed under the following headings:

① **Classic concept of gene** → In the later 30s of the present century many fundamental concepts of genes and genetics were established. This is known as the classic concept, the main points of which are the following:

② Inheritance involves the transmission of gene from parent to offspring.

③ Genes are situated in chromosome.

④ There are several genes in each chromosome.

⑤ Each gene occupies a fix position in the chromosome.

⑥ Genes in a chromosome are arranged in a single linear order.

⑦ A single gene may occur in several different terms or states called alleles.

⑧ The two alleles of gene may frequently be related to each other as dominant and recessive.

⑨ Some genes have more than two alleles this is known as multiple allelism.

⑩ Frequently a gene may show a certain change from one form or state to another.

⑪ Carriers or one chromosome may be transfer to another.

⑥ Duplication of each chromosome during Mitosis is preceded by self duplication of genes of that chromosome.

⑦ Genes express themselves through the production of chemical substances which subsequently control cell metabolism.

⑧ **The gene in terms of DNA** → The genes in modern age has been illustrated in terms of DNA. According to this view gene is that portion of DNA molecule that produces and trait. Sarries (1959) coined the following term to describe the sub division of genes.

⑨ **Cistron** → It is the functional unit of DNA molecule and refers to called gene. It can be also called a genetic unit of DNA molecule.

⑩ **Muton** → Each gene or system is composed of several subunits or functional sized arranged in a linear fashion arranged in series. Each subunit is capable of undergoing mutation and hence, ^{called} them muton. Thus a number of muton constitute a gene.

⑪ **Racon** → It is the subunit capable of undergoing recombination to give rise to new forms it is termed as Racon.

⑩ Chemical structures of Genes →

Cytochemical studied on micro organisms by a number of workers such as Griffith (1945), Avery (1946), Hershey and Chase (1952). Leo established, belong on that DNA is primary genetic material responsible for DNA. DNA occurs universally in all kind of cells. It is composed of deoxyribose sugars, phosphoric acid and Nitrogen bases namely Adenine, Guanine, Thymine and Cytosine.

The following evidence

to the point fact DNA is the genes.

- a) The total DNA content is the same in all the diploid cells of organism of the same species.
- b) The haploid cells contain half the amount of DNA present in the somatic cell.
- c) In polyploid cells the DNA complement increases proportionately.
- d) Mitosis brings about an equal distribution of DNA to daughter cells.
- e) Composition of DNA is similar in organisms of the same species.
- ① Structure of DNA is in tune with the fact that genes are arranged in linear fashion in chromosome.
- ② DNA is capable of self duplication with utmost accuracy. This is essential for preservation and transmission of genetic information from generation to

generation.

⑥ DNA is capable of controlling and regulatory protein synthesis essential for expression of traits.

⑦ Genes are known to be very stable DNA is the most stable compound there.

⑧ There are physical and chemical agents which alter the chemical structure of DNA.

⑨ **Multiple alleles** → Most genes occur in two alternative forms or states which influence the same trait. Alternatively, they occupy the same locus in homologous chromosomes. Such different forms of the same gene are referred to as alleles. Some genes occur in more than two allelic forms which are collectively referred to as multiple alleles. The set of multiple alleles are the mutant forms of the same gene. Such genes have been discovered in rabbit, *Drosophila* in other organisms.

⑩ **Split genes** → Generally the genes coding for the synthesis of particular polypeptides have a continuous sequence of nucleotides. But there are reports that the sequence is not continuous in many cases. This has been called as split genes. There are two forms of split genes.

⑪ **Hexon gene** → The DNA of adenovirus

is double stranded. It occurs ~~in~~ in about 25 bases. Eight genes are called lactogen, because they transcribe mRNA in lacte in virus life. The total length of the 8 mRNA is than the length of the original transcript. In mRNA there is 3 loops which represent the un-pair regions. This is known as the hexon gene.

(v) **Oral bumin gene** → It has been reported in chicken. It is not continuous but is made up of pieces scattered in the chromosome.

(vi) **Overlapping gene** → There is general conception that one gene is responsible for the coding of one protein. But there are reported that one gene may code several polypeptides. Such genes have been called overlapping genes. They have been reported by Beattie and workers (1926) in bacterial viruses.

(vii) **Suppressor gene** → This gene inhibits the phenotypic expression of 6th chromosome gene. They may not be linked to the genes whose action they suppress. Their action is probably indirect.

CONCLUSION → Before the development of microbial and biochemical genetics. Several were made between 1900 and 1905 to understand the nature of genes. It is possible to study the gene with stranded genes the techniques by observing recombination. Phenotype and mutation contain DNA which is the hereditary material.

According to the modern concept of gene it is a segment of DNA that series as code for a particular portion. The genes must there to be linear in structure and consists of many subunit called as nucleotides. The nucleotides is the functional unit of mutation.