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GENETICS

GENERAL SCIENCE

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GENETICS

Introduction

- The branch of biology that deals with the **genes, genetic variation** and **heredity of living organisms is called genetics.**

Gregor Johann Mendel - Father of Genetics

- **Mendel(1822-1884)** was an **Austrian monk** who discovered the **basic principles of heredity through his experiments.**
- His experiments are the foundation for **modern genetics**.

Monohybrid Cross – Inheritance of One Gene

- **Crosses** involving **inheritance of only one pair of contrasting characters** are called monohybrid crosses.

Monohybrid cross

- These factors occur in pairs and may be alike as in pure breeding **tall plants (TT) and dwarf plants (tt).**
- This is referred to as **homozygous**. If they are unlike (**Tt**) they are referred to as heterozygous.

Mendel's Laws

- Based on his experiments of monohybrid and dihybrid cross, Mendel proposed three important laws which are now called as **Mendel's Laws of Heredity**.

Karyotype

- The number of chromosomes in any living organism (animal or plant) is constant.
- In human, each cell normally contains **23 pairs of chromosomes**.
- Out of which **22 pairs are autosomes** and the **23rd pair is the allosome** or sex chromosome.

Structure of DNA

- DNA is the hereditary material as it contains the genetic information.
- It is the most important constituent of a chromosome.

DNA Replication

- DNA replication is one of the basic process that occurs within a cell.
- DNA molecule produces exact copies of its own structure during replication process.

Mutation

- The term mutation was introduced by **Hugo De Vries** in 1901 when he observed phenotypic changes in the evening primrose plant, Oenothera lamarckiana.

Chromosomal mutation

- The **sudden change** in the **structure** or **number of chromosomes** is called chromosomal mutation. This may result in
- Changes in the structure of chromosomes
- Changes in the number of chromosomes

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