

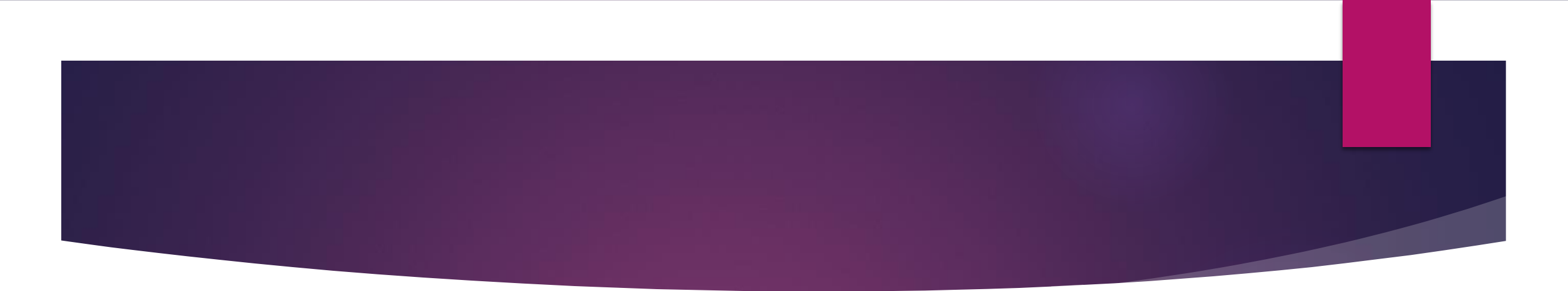
Chromosomes

Lecture Delivered By

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What is Chromosome?

- ▶ Chromosomes are the rod-shaped, filamentous bodies present in the nucleus, which become visible during cell division.
- ▶ They are the carriers of the gene or unit of heredity.

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- ▶ Chromosome are not visible in active nucleus due to their high water content, but are clearly seen during cell division.

Etymology

Originated from the **Greek** word (***chroma*** mean colour) and (***soma*** mean body).

Comprehensive Definition

“A **chromosome** is an organized structure of DNA and protein found in cells.

It is a single piece of coiled DNA containing many genes, regulatory and other nucleotide sequences. Chromosomes also contain DNA-bound proteins, which serve to package the DNA and control its functions”.

Discovery

- ▶ First described by **Strausberger** in 1875.
- ▶ The term “Chromosome”, however was first used by **Waldeyer** in 1888.

Structure of Chromosome

. Typically a chromosome is made of two chromatids, a centromere and a secondary constriction.

- ▶ **Sister chromatids** are two identical copies of the chromosome connected by a centromere.
- ▶ The two chromatids of one homologous chromosome with respect to those of the other homologue are called **Nonsister chromatids**.

Centromere

- ▶ The region where two sister chromatids of a chromosome appear to be joined during cell division is called **Centromere**.
- ▶ In humans, the centromere contains 1–10 million base pairs of DNA.

Types of Chromosomes Based on the number of Centromere

- ▶ Based on the number of Centromere, chromosomes are grouped into four types.
- ▶ Chromosomes without centromere are called **Acentric Chromosomes**.
- ▶ Chromosomes with one centromere and called **Monocentric Chromosomes**.
- ▶ Chromosomes having two centromeres are called **Dicentric Chromosomes**.
- ▶ Chromosomes having more than two centromeres are called **Polycentric Chromosomes**.

Types of Chromosomes

▶ Autosomes

Chromosomes that are not directly concerned with reproduction and sex determination are called autosomes.

The term "autosome" was coined by T.H. **Montgomery** in 1904.

Heterosome

These chromosomes are directly associated with reproduction and differ from autosomes in size, form and behaviour.

Functions of Chromosomes

- ▶ In charge of all the processes.
- ▶ “Packaging material” that binds DNA and protein together.
- ▶ Protein synthesis steps are the responsibility of genes.
- ▶ Very important roles in the development of an individual.
- ▶ They are the 'vehicles of heredity'.

Functions of Chromosomes

- ▶ Chromosomes protect the genetic material (DNA) from being damaged during cell division.
- ▶ Essential for the process of cell division and are responsible for the replication, division and creation of daughter cells.
- ▶ Centromeres perform an important function in chromosome movement during cell division.