

Topic: Chromosome; structure
B.Sc. Botany Hons. III
Paper: V Group: A

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Autosomes and sex chromosomes:

- In a diploid cell there is two of each kind of chromosome termed as homologous chromosomes, except for the sex chromosomes. For example, in human, there are 23 pairs of homologous chromosomes (i.e., $2n = 46$).
- The human male has 44 non-sex chromosomes, termed autosomes and one pair of heteromorphic or morphologically dissimilar sex chromosomes, i.e., one X chromosome and one Y chromosome.
- The human female has 44 non-sex chromosomes (autosomes) and one pair of homomorphic (morphologically similar) sex chromosomes designated as XX.

Morphology:

- Chromosome morphology changes with the stage of cell division, and mitotic metaphase chromosomes are the most suitable for studies on chromosome morphology.

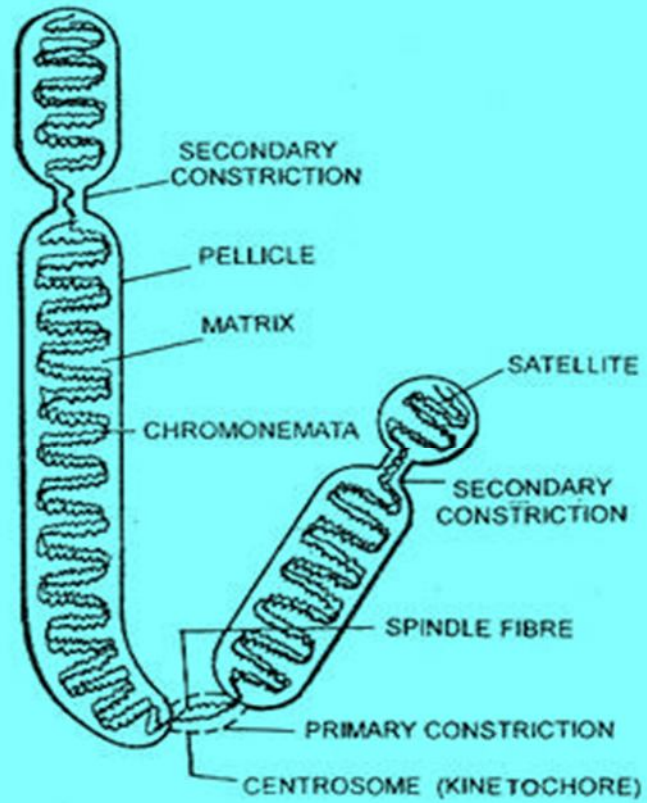
➤ In mitotic metaphase chromosomes, the following structural feature (except chromomere) can be seen under light microscope:

- Chromatid,
- Chromonema,
- Chromomeres,
- Centromere
- Secondary constriction or Nucleolar organizer,
- Telomere
- Satellite

Structure and regions recognized in chromosomes:

Structurally, each chromosome is differentiated into three parts—

- (a) Pellicle,
- (b) Matrix
- (c) Chromonemata.



Structure of chromosome at anaphase stage of mitosis.

(a) Pellicle:

It is the outer envelope around the substance of chromosome. It is very thin and is formed of achromatic substances. Certain scientists Darlington (1935) and Ris (1940) have denied its presence.

(b) Matrix:

It is the ground substance of chromosome which contains the chromonemata. It is also formed of nongenic materials.

(c) Chromonemata:

Embedded in the matrix of each chromosome are two identical, spirally coiled threads, the chromonemata. The two chromonemata are also tightly coiled together that they appear as single thread of about 800Å thickness. Each chromonemata consists of about 8 microfibrils, each of which is formed of a double helix of DNA.