

CHROMOSOME

(1)

Chromosomes are fibrous structure. Chromosomes are normally present in nucleus. They are invisible during Interphase. They become visible during cell division. They are well studied / illustrated during Metaphase of Mitotic Cycle. They are carrier of unit of heredity i.e. hereditary units i.e. Gene. They are vital in evolution, variation and mutation.

History:

W. Fleming (1879) → Firstly described chromosome. He coined the term Chromatin.

W. Roux (1883) → Chromosomes are involved in transfer of hereditary characters.

Boveri (1887) → For each ^{every} species chromosome number is constant.

W. Walbyer (1888) → Coined the word Chromosome.

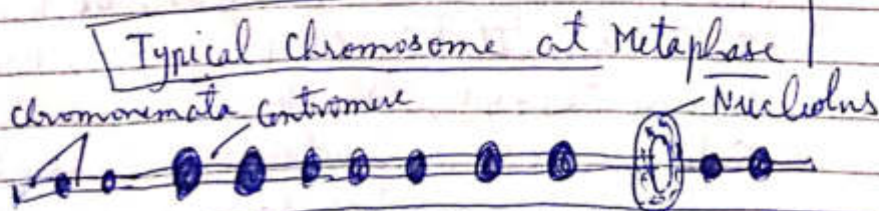
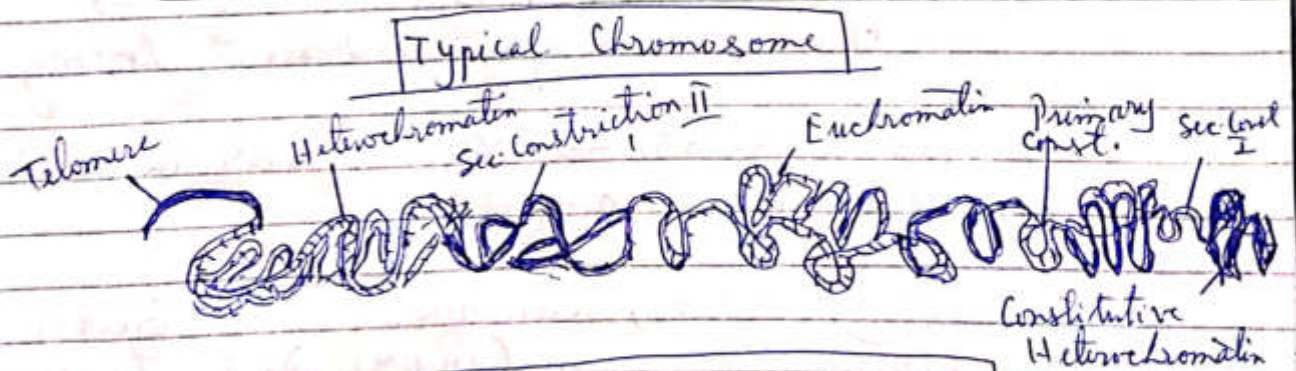
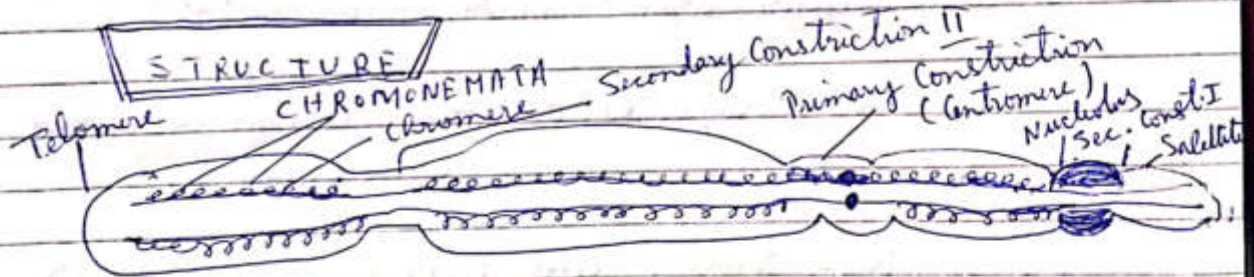
W. S. Sutton and T. Boveri (1902) → Chromosomes are physical basis of heredity.

Morgan (1933) → Chromosomes are involved in transfer of gene.

Heiz (1935), Kunwanda (1939), Guitler (1940), Kufmann (1948), De Robertis (1964), Sileo & Wettstein (1965), Good Enough & Levine (1974), Du Praw (1965, 1968), Solari (1965), Bradbury et al. (1981) are contributors of valuable information regarding chromosome.

Properties of Chromosomes:

1. Filamentous structure
2. Present in nucleus.
3. Invisible in active nucleus.
4. Visible in during cell division.
5. Carry hereditary ~~the~~ units gene from cell to cell
6. ^{from} and generation to generation.
7. They are Autoduplicating.
8. No Number of chromosomes are fixed for a certain species.
9. They may be of different types.
10. They are different in Eukaryotes, Prokaryotes & viruses.
11. They may be involved in mutation also.
12. Remains throughout the life of cell



Diagrammatic Presentation of Chromosome

Chromo → colour

Chromosomes are made up of Chromonema i.e. a coiled thread imbedded in a matrix which are enclosed by membrane like structure known as Pellicle. The chromosome passes following regions.

- A) Chromonema
- B) Primary constriction or Centromere
- C) Secondary constriction (d) Nuclear organiser regions
- E) Telomeres (f) Chromomere, (g) Satellite

A) Chromonema →

They are made up of chromatids. Normally chromatids are two in number, but may vary according to stage & species of organisms. They may or may not be coiled, if coiled may be Paraneimic (loose and easily separable) or Plectonemic (Tight or cannot be separated easily)

B)

B) Primary constriction or Centromere : or Kinetochore.

The structure & function of centromere is different from the other parts of chromosome. This is unclained structure of chromosome. This is fixed for a particular chromosome. They determine the shape of chromosome during Anaphase of cell division. They are site of development as well as attachment of spindle fibres. Hence may be locus of for div. activity. Generally there are only one centromere in a chromosome, but their number may vary one to many.

c) Secondary Constriction:

These are thin areas in addition to Primary constriction / centromere. They are I & II.

i) Secondary Constriction - I is mainly known as Nucleolar organizer, where the nucleolus appears after completion of cell division. It possess the genes coding for Ribosomal RNA of 18 S & 28S and induces for nucleolus formation.

(B) ii) Secondary Constriction II →

It is different from Secondary Constriction - I. It is constant for a chromosome. It is useful for identification of chromosome. It represent the breakage & reunion of chromatids.

(D) Telomere: These are tip of chromosome. They prevent the sticking of chromosomal arms. They are specially designed for attachment of envelope of nucleus. They are different from other parts of chromosomes.

(E) Centromere Chromomere: Beaded structures present on chromatids.