Meiosis

- The term meiosis was coined by Farmer and Moore in (1905)
- The cell which under goes meiosis is known as meiocyte.
- Meiosis causes reduction in chromosome, so also known as Reduction division.
- Meiosis is a special types of cell division a diploid cell divides into four haploid cells
- Meiosis involves two divisions of nucleus and one division of chromosomes
- Meiosis is the specialized pair of cell division that reduced the chromosome number from diploid ($2n$) to haploid (n) during gamet formation.
- Meiosis occurs in Reproductive cells of Gonads. (An organ produce gamet)
- Meiosis is divided into two main Phases:-
  1. Meiotic - I (Heterotypic division)
  2. Meiotic - II (Homotypic division)

1. Meiotic-I (Heterotypic division)

- It is divided into two division
  - [A] Karyokinesis - Nuclear division
  - [B] Cytokinesis - Cytoplasmic division

[A] Karyokinesis :-

It is divided into four phases :-

i) Prophase-I
ii) Metaphase-I
iii) Anaphase-I
iv) Telophase-I

i) Prophase - I

- It is longest stage of Meiosis.
- It is divided in five sub Phases.
  - (i) Leptotene
  - (ii) Zygotene
  - (iii) Pachytene
  - (iv) Diplotene
  - (v) Diakinesis

(i) Leptotene :-

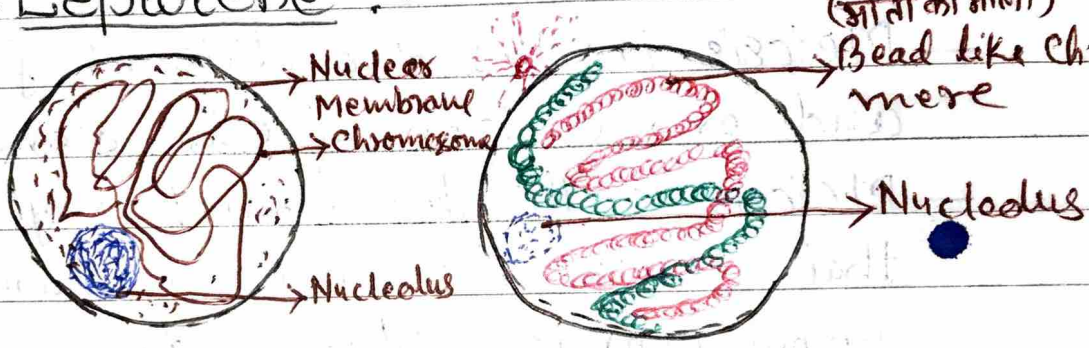

Fig - Interphase Fig :- Leptotene

- The nucleus is increased in sized
- Chromosomes becomes distinct (स्पष्ट) and long
- Chromosomes in diploid (2n) number.
- Chromosome contain a series of beaded structure called chromomere.

(ii) Zygotene :-

- Two homologous Chromosome attacks each other and being to pair, this pair is called Synapsis.
- Each pair consist of a mother chromosome and a father Chromosome.
- The pair so formed are known as bivalent (A pair of Synapsed (junction) homologous chromosome)

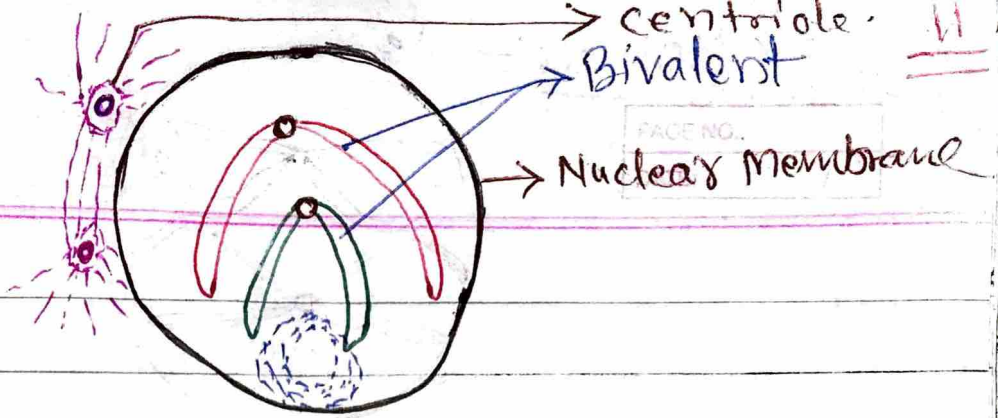

Fig :- Zygotene

— The chromosome become shorter & thicker.
— The nucleolus increase in Size.
— The centriole move to the opposite poles.

(iii) Pachytene :-

— Each chromosomes of Bivalent begins to split (विभाजित होना) longitudinally into two Similar Chromatids
— Each bivalent now contains four chromatids.
— This stage is Called Tetrad Stage.

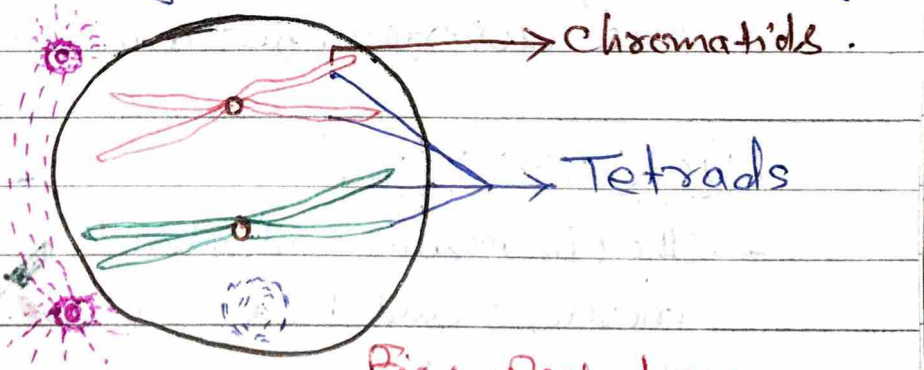

Fig :- Pachytene

— The exchange of genetic material between two homologous (Paternal & maternal) Chromosome is called Crossing over.
— The characteristic (प्राकृतिक लक्षण) Phenomenon during Pachytene is the recombination (exchange of genetic material) of genes.
— The mutual exchange of chromatid segment between Parental and maternal chromosome is called crossing over

12 (iv) Diplotene:-

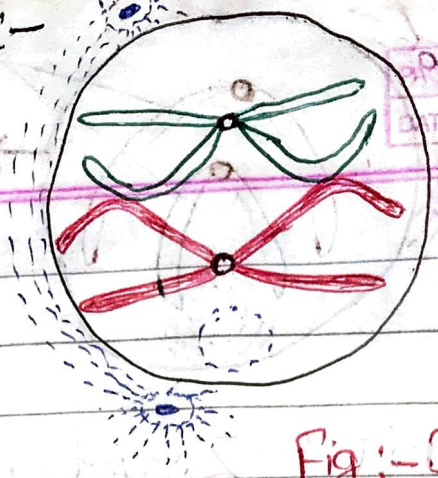

Fig:- Diplotene

- The paired Chromosomes begin to separate, but united at the points of interchange of chiasmata
- Chiasmata formation is the result of crossing over.
- The points where two of the four Chromatids of a bivalent cross each other are known as chiasmata.
- In meiosis Chiasmata formation occurs in diplotene.
- Progression of diplotene nuclear membrane disorganized and nucleolus disappear.

Diakinesis:-

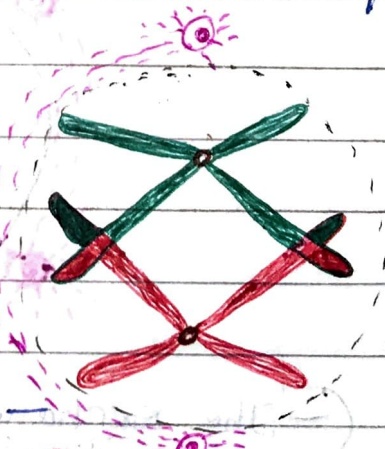

Fig:- Diakinesis.

- The Chromosome contraction increases and the no. of Chiasmata becomes reduced by a Process called Terminalization (समाप्ति)
- During terminalization (समाप्ति), Chiasmata move from their interstitial (Situated) Position towards telomere
- End of diakinesis Complete disappearance of nuclear membrane & formation of spindle fibres.

Kin:- Interphase