SNS COLLEGE OF TECHNOLOGY

(An Autonomous Institution)
COIMBATORE-35
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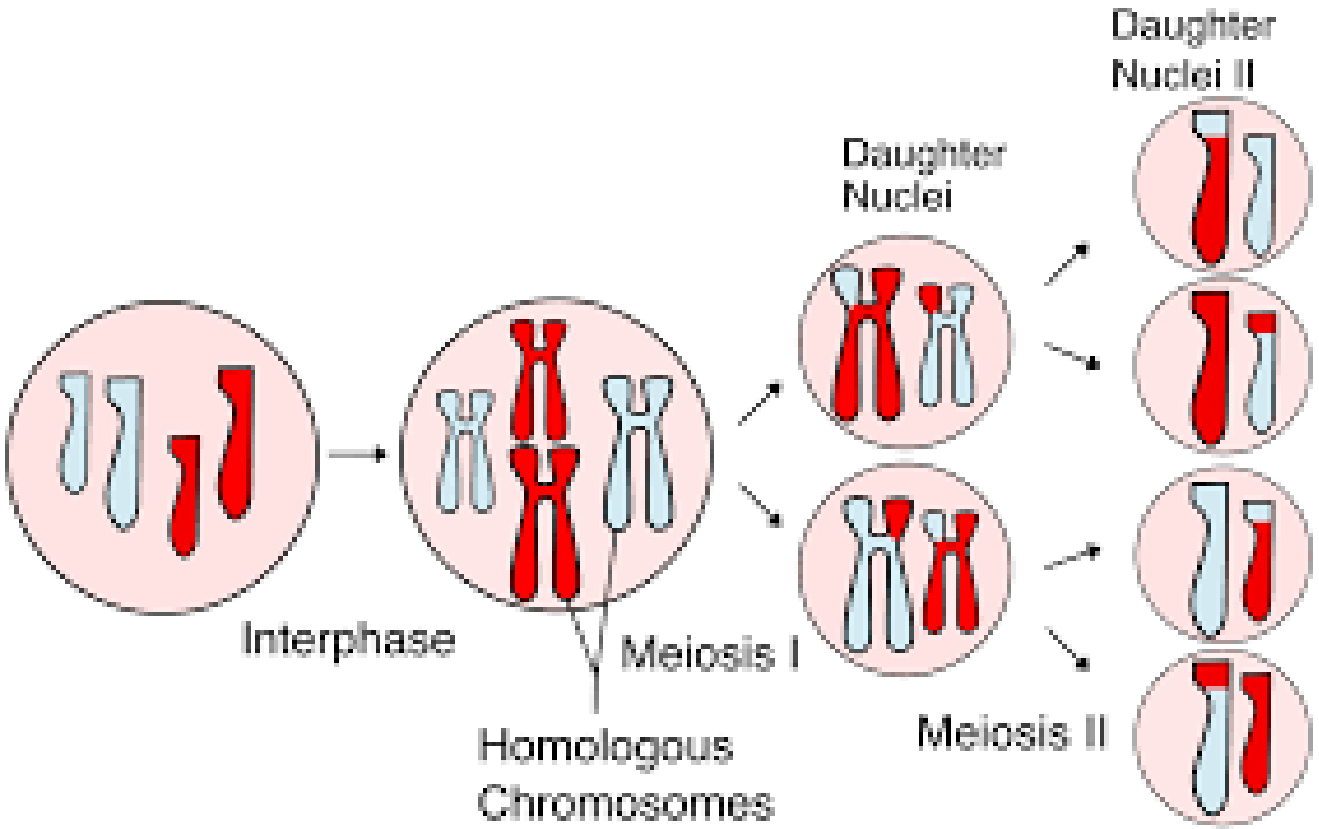
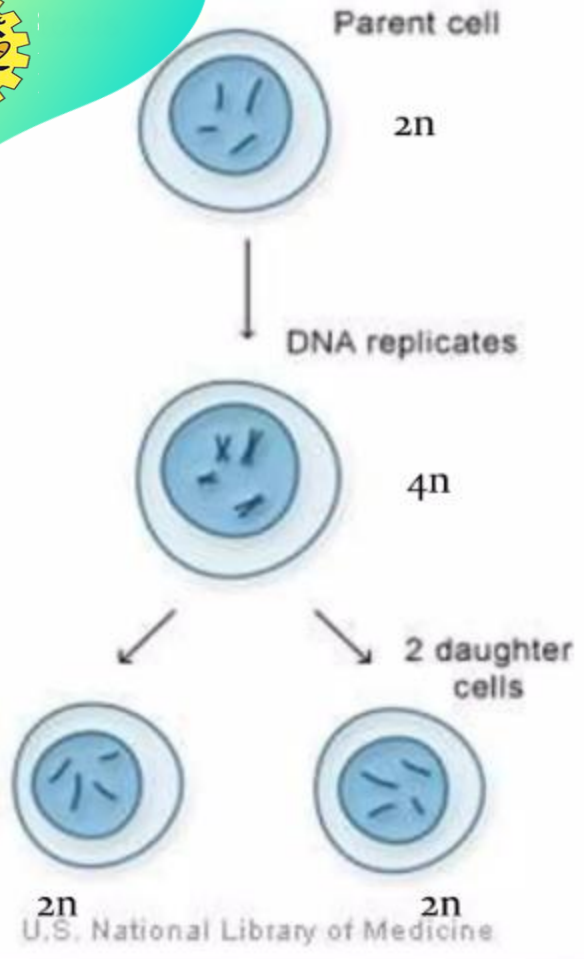
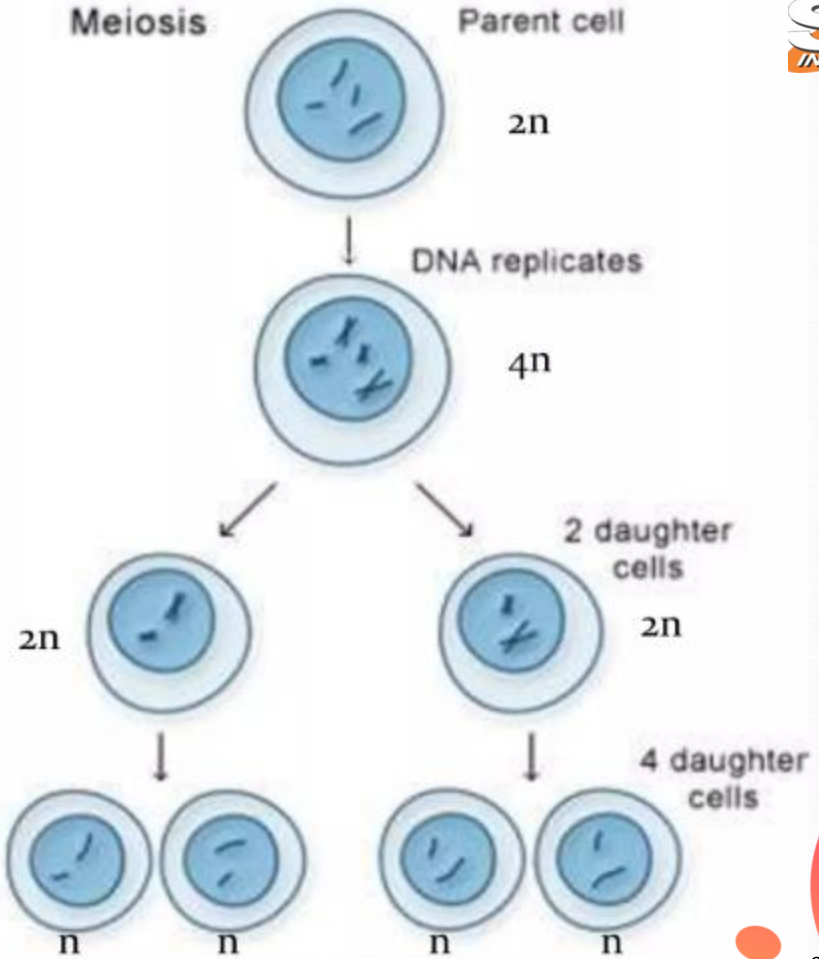
UNIT II: GENETICS AND IMMUNE SYSTEM

TOPIC: **Mitosis and meiosis-evidence of e laws of inheritance**

TOPIC OUTLINE


Daughter
Nuclei II
Daughter
Nuclei
Interphase
Meiosis I
Meiosis II
Homologous
Chromosomes


Parent cell
2n
DNA replicates
4n
2 daughter cells
2n
2n
U.S. National Library of Medicine


Meiosis
Parent cell
2n
DNA replicates
4n
2 daughter cells
2n
2n
4 daughter cells
n
n
n
n

- Some 35 years of mendels work walter sutton proposed a connection between inheritance and distribution of chromosomes during meiosis and gamete formation.
- He proposed that all chromosomes have stable structure and individuality which is maintained between generations. Thus he articulated "chromosomal theory of ineritance".

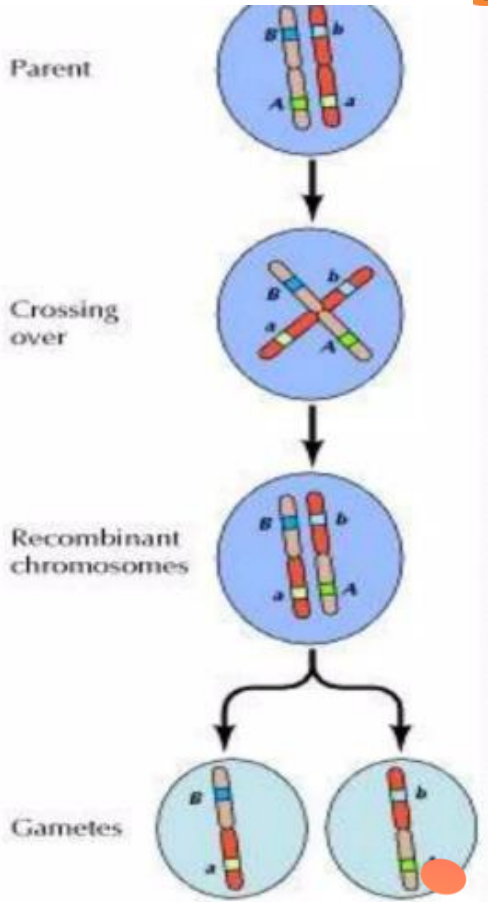
  Definite proof was still lacking.
- T.H.Morgan's experiments on *Drosophila* discovered exactly how heredity was related to chromosome. He demonstrated that traits exists on specific chromosome.
- Thus chromosomes are physical carriers of heriditary information and this information exists in the form of genes.

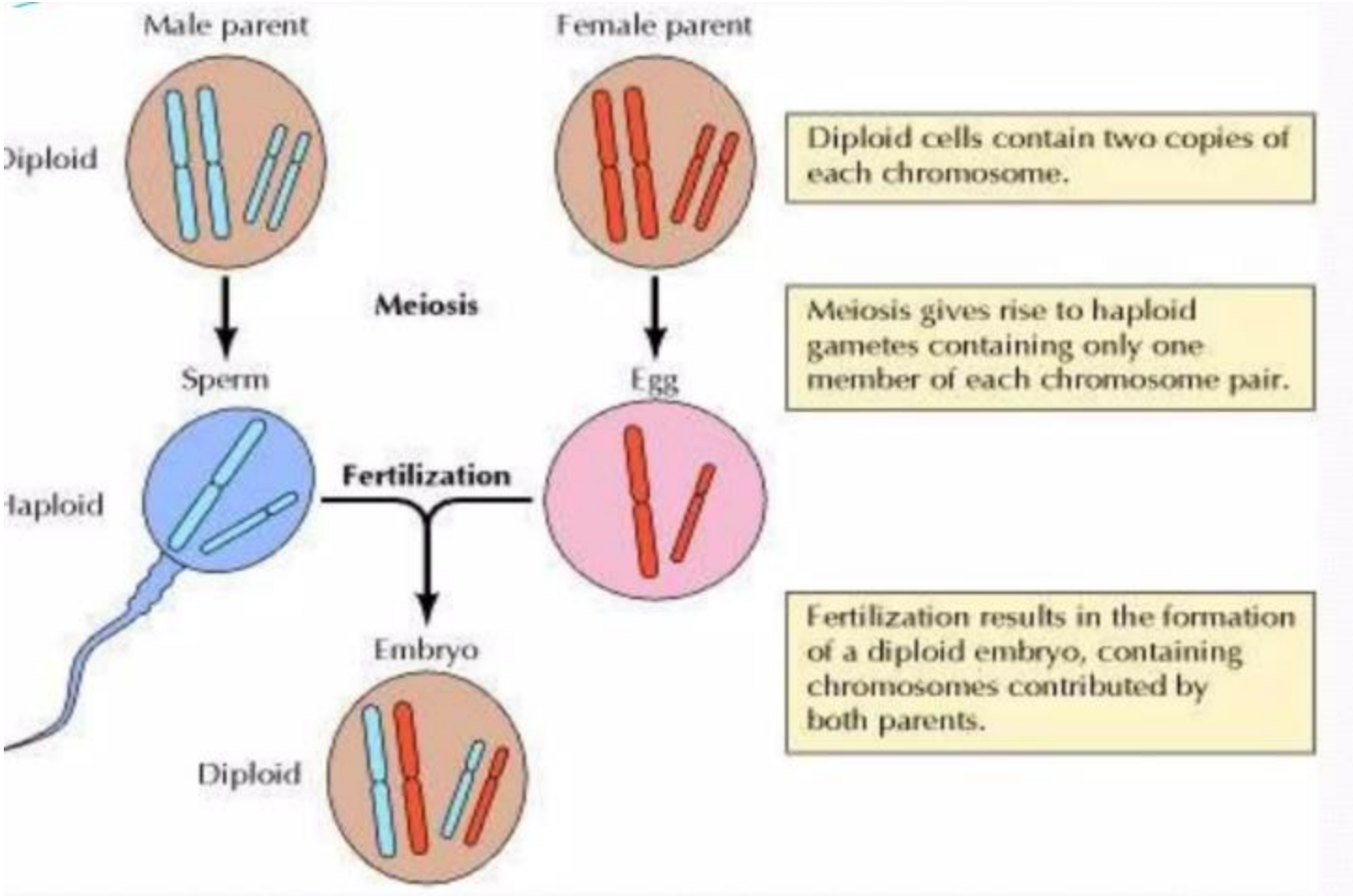
- Mitosis occurs in somatic cells.
- Prior to each mitotic division, a copy of every chromosome is created.
- Thus, following divison each succesive duplicate cell will have the same genetic composition as its parent.
- This is because of inheritance of same set of chromosome and similar biological environment.
- Thus all mitotic progeny are genetically similar.
- This work well in wound healing and expansion from an embryonic state.

In case of meiosis due to sexual reproduction , recombination and independent assortment, genes get mixed up and produces millions of possible genotypes.

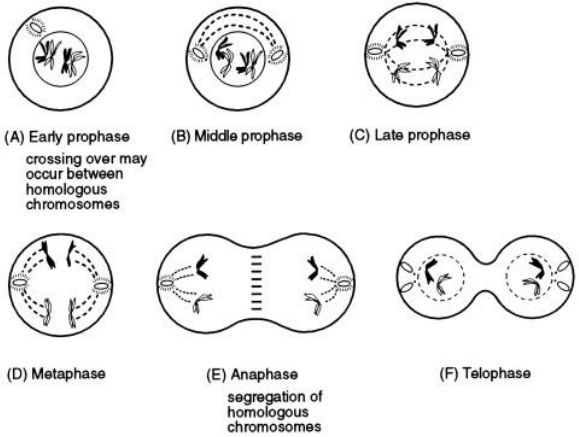
Crossing over between chromatids during prophase I of meiosis mixes up pieces of chromosomes between homologous pairs (recombination).

Chromosomes during meiosis means there are 2^n possible combinations in gametes where n is the number of chromosomes in each gamete.

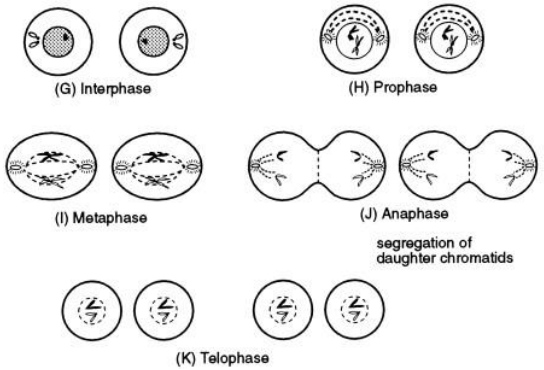


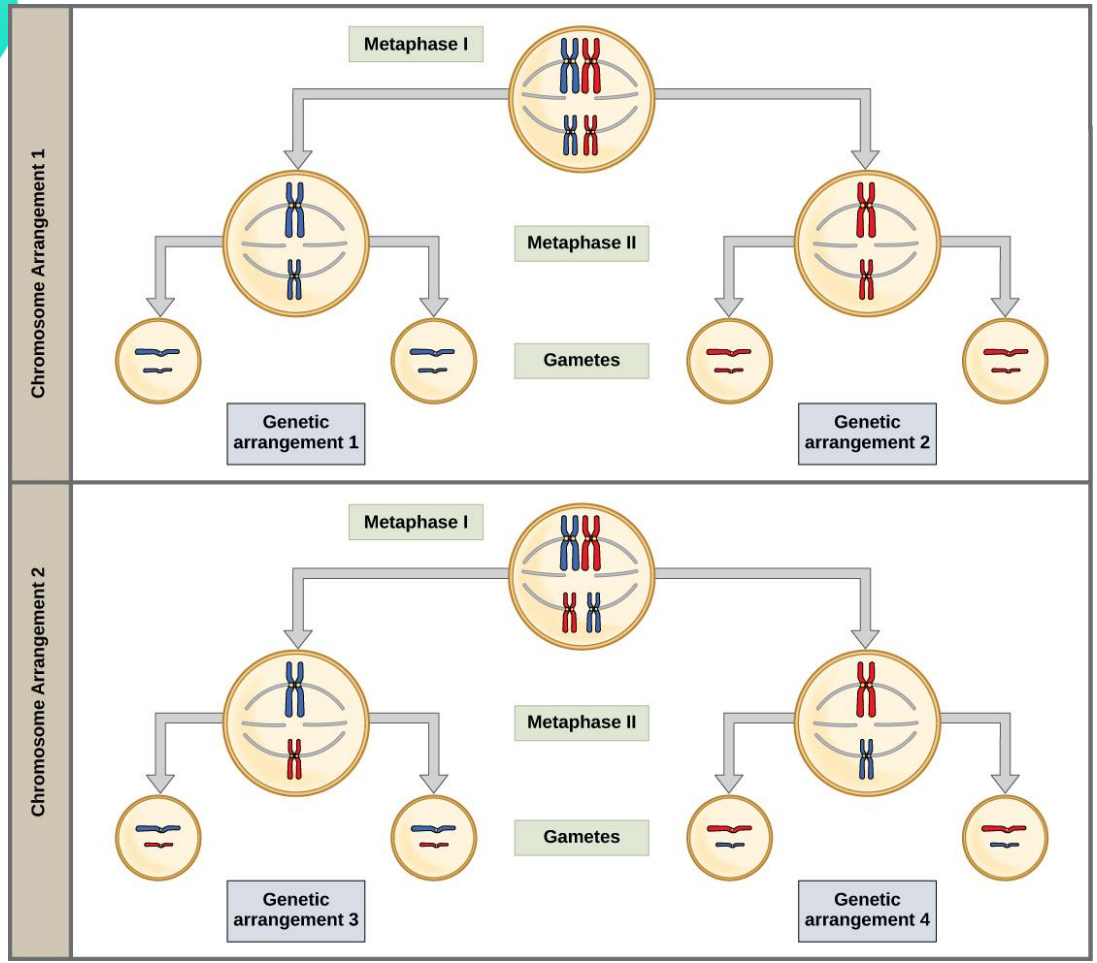

Male parent
Female parent
Diploid
Meiosis
Sperm
Egg
Haploid
Fertilization
Embryo
Diploid
Diploid cells contain two copies of each chromosome.
Meiosis gives rise to haploid gametes containing only one member of each chromosome pair.
Fertilization results in the formation of a diploid embryo, containing chromosomes contributed by both parents.

MEIOSIS I



MEIOSIS II




Chromosome Arrangement 1
Metaphase I
Metaphase II
Gametes
Genetic arrangement 1
Genetic arrangement 2
Chromosome Arrangement 2
Metaphase I
Metaphase II
Gametes
Genetic arrangement 3
Genetic arrangement 4

RECAP….

…THANK YOU