

Lecture 2/Gametogenesis- Assistant prof. Eman Ali Hashim

Objective: Mitosis & Meiosis

Features of first meiotic division

Purpose of two meiotic divisions

Nondisjunction

Spermatogenesis & Oogenesis

Gametogenesis is completed by three divisions one mitotic and two meiotic divisions .

Results of these divisions are :

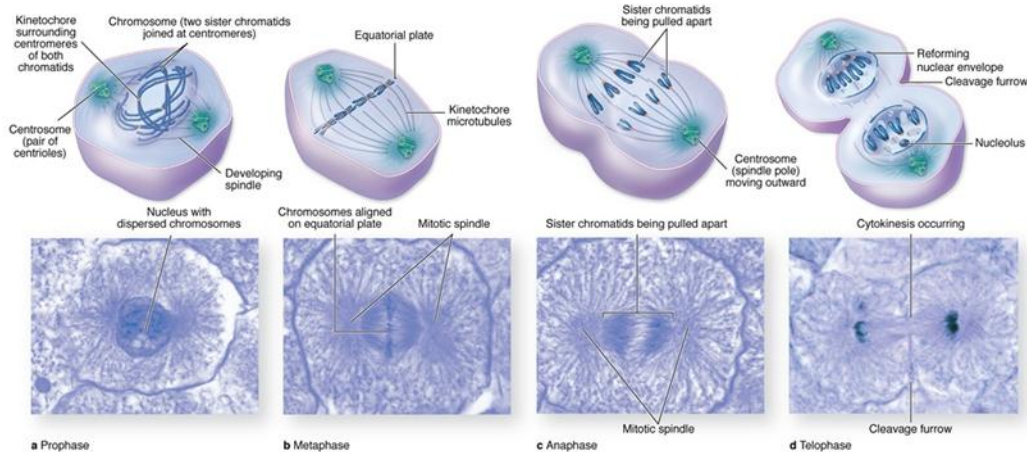
Oogonia 1. primary oocyte 2. secondary oocyte 3. ovum

Spermatogonia 1. primary spermatocyte 2. secondary spermatocyte 3.spermatids .

Mitosis is continuous process is divided into 4 phases

Prophase, Metaphase, Anaphase & Telophase .

Mitosis requires the presence of a structure called the mitotic apparatus, which comprises a spindle of longitudinally arranged microtubules extending between a pair of centrioles at each pole of the dividing cell . It is visible within cytoplasm only during the M phase of the cell cycle ?since it disaggregates shortly after completion of mitosis .



First meiotic division, main characteristic features:

Pairing of homologous chromosomes.

Pairing is exact and point for point except for X- Y combination.

Cross over

Interchange of chromatid segments between two paired homologous chromosomes

X appearance chiasma.

First meiotic division : Replication of DNA before the 1st meiotic division .

The cell has double DNA & 46 chromosomes which are doubled structured.

Second meiotic division: It occurs shortly after finishing 1st meiotic division, No DNA synthesis occur.

A. Pairing begins

(4n DNA)

B. Pairing of chromatid

C. Chiasma

D. Pulling apart of

Double- structured chromosomes .

E. Anaphase of first meiotic division.

F. Cells resulting from 1st meiotic division.

G. Cells resulting from 2nd meiotic division.

Purpose of the two meiotic divisions are :

1. Genetic variability through the process of cross over.
2. Each germ cell has haploid number of chromosomes 1/2 DNA amount .

Nondisjunction

Abnormalities in chromosomes number may originate during meiotic divisions.

Sometimes, separation dose not occur.

Gametes are either with extra (24) or less (22) chromosomes than normal.

Results of fertilization with these gametes :

-An individual with 47 chromosome ,Trisomy (Down syndrome)

-An individual with 45 chromosome ,Monosomy (Turner syndrome).

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Nondisjunction of chromosomes during meiosis

