10. CELL CYCLE AND CELL DIVISION

Phases of Cell cycle

Human cell di rid4es 15rot0! in approximately 24 hours, which may yaty in different organisms_ In yeasts it takes about 90 minutes to complete the cell division process,

(a). kite These· It is the phase between two successive &I phases. Interphase lasts for 95% of a tell cycle. This phase is called as resting phase but during this period the cells prepare its self for nuclear division by cell growth_

(W. M Phase· When the actual cell division or mitosis occurs_ It starts with karyokinesis (nuclear diwision) or duplication of chromosome and end with cytokinesis or division of cell matrix [cytoplasm division I.

- GL phase represents the interval between mitosis and initiation of DNA replication.
- During S phase, replication or synthesis of DNA. takes place and amount of DWI, get doubles per cell.
- During G2 phase protein is synthesized in preparation for mitosis.
- In adult animals, some cells do not divide or may divide occasionally. These cells do not divide further and exits the Phase to enter an inactive stage called Quiescent Stage OGII) of cell cycle.
- Mitosis cell division is also known as equational division,

Prophase is the first phase of mitosis followed by G2 phase. It involves followir events-

{a) Initiation of condensation of chricionosornal materials.
IVIcivernent of centrioles towards opposite poles of the reel I_
(c) At the end of prophase, .ellitletplaSenit reticulunt nuclear membrane„ Eolgi complex disappears.

Metaphase starts with cornplete disappearance of nuclear membrane. The most suitable stage for study& morphology of chromosomes_ It invDlyes

(a) Condensation of chromosomal materials in to compact and distinct chromosomes made up of two sister chromatids attached with spindle fibres with kinetochores.
(bli Chromosomes arrange at centre of call called metaphase plate.

Anaphase invokes the

(a) Splitting of each chromosome at centromere into two sister chromatic's-

(IA Two chromatids start moving towards opposite poles_

Telophase is the last stage of mitosis which invo IVES

(a) Chromosomes reach at opposite poles and loose Its Identity as discrete unit.
(bli Nuclear membrane reassembles around the chromosome clusters.
{ci N ucleolus„.Golgi complex and ER reappear.

Cytakinesis is the dhrision of cytoplasm of a cell after karyokinesis (division of chromosomell into two daughter cells.

Meiosis

The cell division that reduce the number of chromosome half and results in the production of haploid daughter cells. It helps In production of haploid phase of life cycle of sexually reproducing organism_ It involves following events.

(a) Two sequential cycles of nuclear argil cell division called meiosis I and rnelosis II but single cycle of ONA replication.
{bli It involves pairing of homologous chromosome and recombination 'Dither".
(c) Four haploid cells are formed at the end of meiosis II,

Meiosis I	Meiosis II
Prophase I	Prophase II
Metaphase I	Metaphase II
Anaphase I	Anaphase II
Telophase I	Telovha5e II

Poltiosis I

Prophase I of Meiosis is the first gage pf meiosis and iS defined by five different phases; Leptotene, Zygotener Pachytene, Diplolterie and Diakinesis.
In metaphase I, the bivalent chromosome align et equatorial plate and micractubules from the opposite poles of the spindle attached to the pair of homologous chromosomes.
In Anaphase I, hcirnologom chromosome separate but 5i5Aer chromatids remain attached at centromere,
During Telophase f. nuclear membrane and nucleolus reappears and cytokinesis follows. This is Called as dyad of the cells.
The stage between two meiotic divisions Is called Intarldnesis and It Is short lived that follows Prophase II.

Melosis II

II is initiated immediately after cytokinesis before chromosome gets elongated,

ttt prophase II, nuclear membrane disappears and chromosome becomes compact.
At metaphase PP stage, the chromosomes align at equator and rnicrotubules attach with kinetochores of sister chromatids_
Anaphase II start with Splitting of centromere of each chromosome to move towards opposite poles.
Meiosis ends with Telophase II in which two groups of Chromosomes get enclosed by nuclear membrane followa her cyrokinesis to form tetrad of cells (four daughter cells).