Cell division

Cell cycle :- The orderly (क्रमानुसार) Sequence (सिलसिला, क्रम) of events by which the cell duplicates its contents and divideds into two daughter cells is called cell cycle.

Types of cell division :-

1. Amitosis
2. Mitosis
3. Meiosis

1. Amitosis :- Nucleer division by a process other than Mitosis.

- It is simplest mode of cell division.
- described by REMAK (1841).
- This type of division starts with elongation of nucleus.
- Nucleus becomes dumbell shaped, and divided into two daughter cell.
- Nucleus division is followed by the division of cytoplasm.

  eg :- PPLO, Blue green algae, Bacteria and diseased cell, old cell, foetus membrane.
- It is called direct division

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Cell division which produces two daughter cells possessing the same chromosomes as in the parent cell.]

Mitosis :-

- Mitosis was discovered by Flemming in 1882 in animal cell and in Plant cells by strassburger in 1875.
- In this Phase parent cell divide to form two daughter cell.
- It occurs in somatic cell
- It is called indirect division

Mitosis cell division can be divided into two phases :- i.e.

1) interphase
2) M Phase or Mitosis Phase or division Phase

1) Interphase :-

- Interphase is phase between two cell division.
- In this phase cell prepares itself for division so, called Preparatory phase.
- It is longest phase of cell cycle.
- It is also called resting Phase.
- In this phase, cell metabolically extremely active.
- Synthesis of Protein, enzyme, DNA and RNA takes Place.
- Centriole duplicates into two.
- Thus two centriole are formed.

Inter Phase divided into three Sub-phases :-

<1> G_1 Phase
<2> S Phase (Synthesis Phase)
<3> G_2 Phase

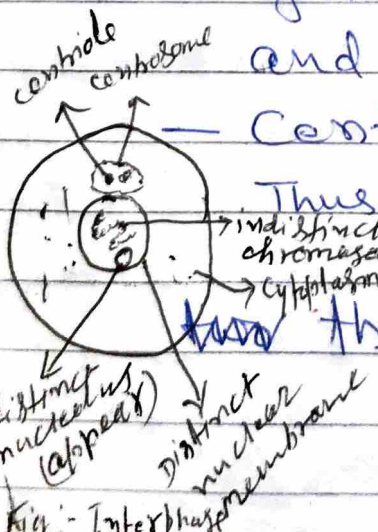

Fig :- Interphase

G_0 Phase → is the condition of a cell whose division has been arrested at G_1 Phase.
— During G_0 the nucleus and cell can not divide further

⟨1⟩ G_1 Phase :-

- Cell growth occurs in this phase.
- Mitochondria, Chloroplasts, lysosomes E.R, Golgi complex, vacuole and vesicles are produced.
- Structural and functional proteins are formed.
- Nucleolus produced rRNA, mRNA and tRNA
- RNA Synthesis inhibited by actinomycin (रोकना) (Protein)
- Ribosome get Synthesized
- Metabolic rate of cell is very high.
- It may be called Pre DNA Synthesis Phase.
- In humen G_1 Phase get completed in 6 hours.

⟨2⟩ S - Phase

- Replication of DNA takes Place (DNA get double) OR DNA Synthesis occurs in this Ph (अपने ही ऊपर मुड़ा हुआ)
- Protein molecules called histones are synthesized that cover each strand of DNA.
- Each chromosome is in the form of two Chromatids. (two identical (समान) halves of chromosome share common centromere)
- In humen S-Phase get completed in 7 hours.

⟨3⟩ G_2 - Phase :-

- Centriole replicates in this Phase.
- Mitotic spindle (axis) begins to forms
- This Phase may be called Post DNA Synthesis Phase.
- In humen G_2 Phase get completed in 6 hours.

M-Phase :- (division or Mitosis Phase)

In this Phase nuclear and cytoplasmic division takes Places.

[A] Karyokinesis – Nuclear division
[B] Cytokinesis – cytoplasmic division.

[A] Karyokinesis :-

The division of the nucleus during cell division is called karyokinesis. It is divided into four phases :-

(i) Prophase
(ii) Metaphase
(iii) Anaphase
(iv) Telophase

(i) Prophase :-

- It is longest Phase of karyokinesis.
- Chromosomes appear as pairs of chromatids joined by centromere.
- The nuclear membrane disintegrate (विखंडन) and disappear (विलुप्त होना) into the cytoplasm.
- Nucleolus start disappearing.
- Each centriole separates and move towards the opposite Pole of the cell.
- Around each centriole astral (Star like around centriole) rays are formed in the cytoplasm & spindle fibre also get formed.

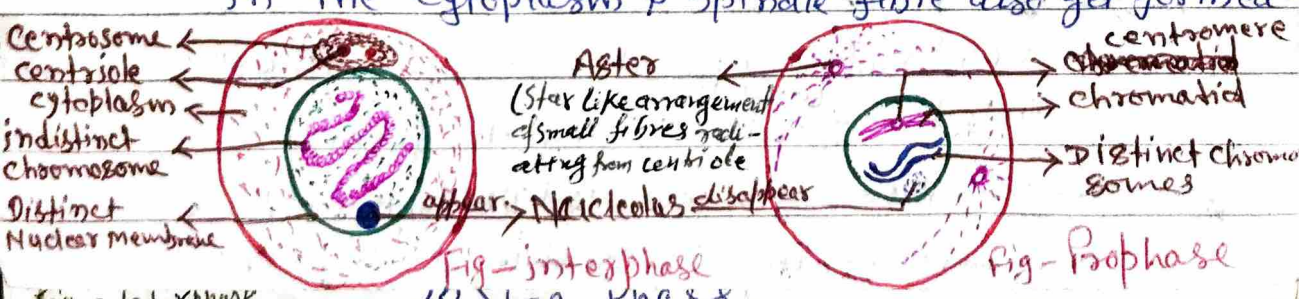

Fig – interphase
Fig – Prophase

Fig. - Interphase

(3) G2 Phase