

Cell Cycle

Cell cycle - The sequence of events by which the cell duplicates its genome and synthesises its ^{other} constituents and eventually divide into two daughter cells.

Here, **Genome** - set of genetic information of an organism/cell

Cell Cycle \leftarrow Interphase \rightarrow (S-phase)
M-phase

Cell growth - Increase in cytoplasm is a continuous process
DNA synthesis - takes place only during S-phase of Interphase

Phases of Cell Cycle

Interphase $\left\{ \begin{array}{l} G_1 \\ S \\ G_2 \end{array} \right.$

M-Phase $\left\{ \begin{array}{l} \text{Karyokinesis} \\ \text{Cytokinesis} \end{array} \right.$

• **Preparatory phase** - cell prepares to divide

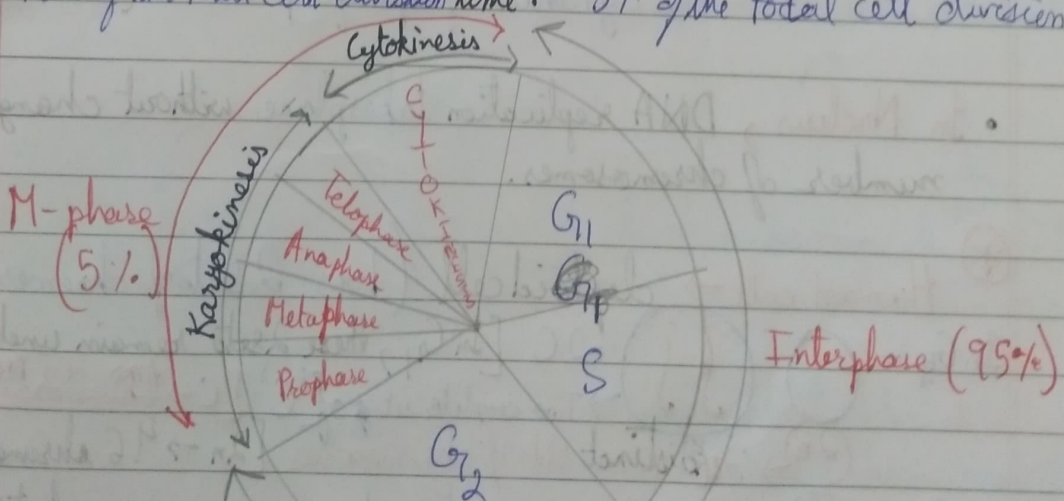
• Also known as **Resting phase** (because cell isn't dividing, only preparation for division happens)

• 95% of the total cell division time

• Most dramatic phase because actually takes place during M-phase

• Also known as **Mitotic phase** (because cell division takes place)

• 5% of the total cell division time



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Not all cells ~~div~~ undergo cell division
Such cells ~~will~~ escape the cell cycle & enter G_0 phase
(or G_1 not in)

In G_0 phase :- (Resting phase)

- The cells rest in this phase either temporarily/permanently. ~~Some cell may~~ ~~they can~~ even ~~re-enter~~ re-enter the cell cycle later
- The cells here may perform specialized functions without undergoing replication.

Interphase :-

1. G_1 phase :- (Growth 1 phase)

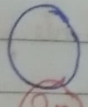
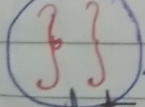
- cell growth (cytoplasm)
- Organelle duplication of ER
- Synthesis of proteins, nucleotides etc

2. S phase :- (Synthesis phase)

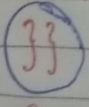
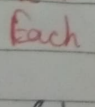
- cell growth (cytoplasm)
- In cytoplasm, \rightarrow Centrioles of centrosome duplicates
 \rightarrow Synthesis of specific proteins (Histones)
- In Nucleus, DNA replication takes place without changing number of chromosomes.

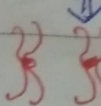
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Human cell \rightarrow diploid cell (has 2 sets of chromosomes)

In G_1 :-   = 2C [In G_1 , these 2 sets remain unchanged]

$(2n) \rightarrow$ Two complete sets of 'C' [C \rightarrow Amount of DNA chromosome]
 \rightarrow 2 distinct sets of chromosomes [2n \rightarrow 46 chromosomes]

In S :-  Each  is going to produce one more copy of itself attached to same centromere

 \downarrow
point of attachment of two chromatids
= 4C

