

# YAKEEN NEET 2.0

**2026**

**Cell Cycle and Cell Division**

**Botany**

**Lecture – 02**

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## ***Topics to be covered***

1

NCERT (READ) BEFORE M-PHASE

2

G0 phase

3

PROPHASE (M PHASE)

4



Lecture-1

पूरा Revise

KARAUNGA  
अभी

BUT  
पहले  
क्रुद्ध  
वातकरनी है !

$$\begin{array}{r} 10 \times 70000 \Rightarrow 700000 \\ 50,00000 \Rightarrow 1 \text{ Student} \\ \hline 4500 \\ \hline = 1 \text{ PHONE} = 100 \end{array}$$

## G<sub>0</sub> PHASE

CELL CYCLE

★  $G_1 \rightarrow S \rightarrow G_2 \rightarrow M \text{ PHASE}$   
INTERPHASE

★ NOT A PART OF CELL CYCLE

★ CELL METABOLICALLY ACTIVE BUT NOT DIVIDE  
: INACTIVE / QUIESCENT PHASE.

★  $G_1 \rightarrow S \rightarrow G_2 \rightarrow M \text{ PHASE}$   
 $G_0$  (EXIT CELL CYCLE)  
ENTER

PERMANENT  
(NOT DIVIDE)  
HEART CELL,  
NERVE CELL)

TEMPORARY  
CAN BACK TO  $G_1$

★ CELL DONOT PROLIFERATE (DIVIDE) UNL  
CALLED ON TO DO SO / IT DEPENDS  
REQUIREMENT

ARE

NOTE: MITOSIS OCCUR IN DIPLOID CELL (ANIMAL)

$(2n) = 10 \rightarrow (2n) = 10$   
 $(2n) = 10$

EXCEPTION: SOME SOCIAL INSECT (HONEY BEE)  
MALE / DRONE (n)  $\rightarrow$  mitosis

PLANT  $\rightarrow$  MITOSIS IN BOTH (N) & (2n) CELL

$N \rightarrow N$   
 $2n \rightarrow 2n$

NOTE:  $G_1$ : INTERVAL B/W MITOSIS & INITIATION OF DNA REPLICATION

INTERPHASE: RESTING STAGE (CELL PREPARING FOR DIVISION)

ALL EVENTS OF CELL CYCLE: CONTROLLED BY GENES.

# M PHASE

★ EQUATIONAL DIVISION.

★ DRAMATIC PHASE: ?

★ PROGRESSIVE PHASE:

a) KARYOKINESIS (NUCLEUS  
DIVIDE)

b) CYTOKINESIS

PROPHASE

METAPHASE

ANAPHASE

TELOPHASE

THERE IS NO GAP  
B/W DIFFERENT  
STAGES.  
SO IT IS CONTINUOUS  
(PROGRESSIVE)  
PROCESS



# PROPHASE

INTERPHASE (S & G <sub>2</sub> )		PROPHASE
INTERWINED DNA	MORE	LESS
	TANGLED (अलझा)	UNTANGLED (सुलझा DNA)
CHROMOSOMAL MATERIAL (DNA)	LEAST CONDENSED, INDISTINCT (NOT CLEARLY VISIBLE)	MORE CONDENSED  DISTINCT (CLEARLY VISIBLE)
	DECONDENSED FORM OF CHROMOSOME (CHROMATIN)	CONDENSED FORM OF CHROMATIN (CHROMOSOME)

## INTERPHASE

## M PHASE

$$G_1 - S \rightarrow G_2$$

⑤

daughter cell

(DNA)

(DNA)

PARENT =  
(DNA) PROGENY  
(DNA)

\* M PHASE

Cell organelle (interphase)



$G_1 \rightarrow S \rightarrow G_2$ 

Although cell growth (in terms of cytoplasmic increase)

is a continuous process, DNA synthesis occurs only during one specific stage in the cell cycle. The replicated chromosomes (DNA) are then distributed to daughter nuclei by a complex series of events during cell division. These events are themselves under genetic control.

MOHAN  
SONAM  
Inner pocket (NUCLEUS)

PRO  
MET  
ANA  
TELO

Cell organelle,  
Centriole,  
HISTONE PROTEIN



### 10.1.1 Phases of Cell Cycle

A typical eukaryotic cell cycle is illustrated by human cells in culture. These cells divide once in approximately every 24 hours (Figure 10.1). However, this duration of cell cycle can vary from organism to organism and also from cell type to cell type. Yeast for example, can progress through the cell cycle in only about 90 minutes.

The cell cycle is divided into two basic phases:

- ✓ ● Interphase 23
- ✓ ● M Phase (Mitosis phase) 1 hour

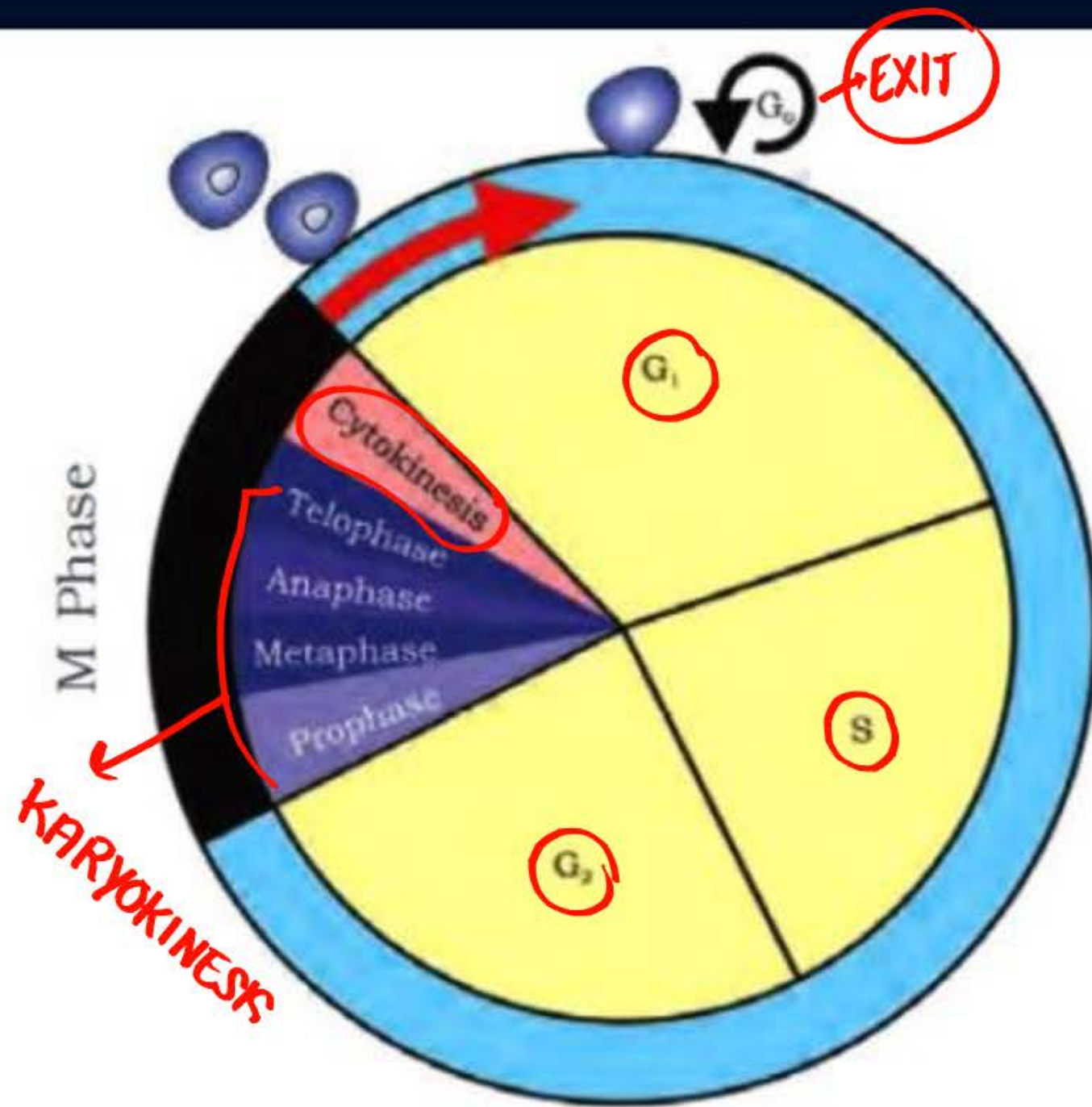


Figure 10.1 A diagrammatic view of cell cycle indicating formation of two cells from one cell



The M Phase represents the phase when the actual cell division or mitosis occurs and the interphase represents the phase between two successive M phases. It is significant to note that in the 24 hour average duration of cell cycle of a human cell, cell division proper lasts for only about an hour. The interphase lasts more than 95% of the duration of cell cycle.

23 hour.



The M Phase starts with the nuclear division, corresponding to the separation of daughter chromosomes (karyokinesis) and usually ends with division of cytoplasm (cytokinesis). The interphase, though called the resting phase, is the time during which the cell is preparing for division by undergoing both cell growth and DNA replication in an orderly manner. The interphase is divided into three further phases:

- G<sub>1</sub> phase (Gap 1)
- S phase (Synthesis)
- G<sub>2</sub> phase (Gap 2)

Cytoplasm  
Increase  
(cell organelle  
synthesis)

Cell is  
not  
dividing



\*  $G_1$  phase corresponds to the interval between mitosis and initiation of DNA replication. During  $G_1$  phase, the cell is metabolically active and continuously grows but does not replicate its DNA. S or synthesis phase marks the period during which DNA synthesis or replication takes place. During this time the amount of DNA per cell doubles. If the initial amount of DNA is denoted as  $2C$  then it increases to  $4C$ . However, there is no increase in the chromosome number; if the cell had diploid or  $2n$  number of chromosomes at  $G_1$ , even after S phase the number of chromosomes remains the same, i.e.,  $2n$ .

In animal cells, during the S phase, DNA replication begins in the nucleus, and the centriole duplicates in the cytoplasm. During the  $G_2$  phase, proteins are synthesised in preparation for mitosis while cell growth continues.

TUBULIN!



PERMANENT  
G<sub>0</sub>

Some cells in the adult animals do not appear to exhibit division (e.g., heart cells) and many other cells divide only occasionally, as needed to replace cells that have been lost because of injury or cell death. These cells that do not divide further exit G<sub>1</sub> phase to enter an inactive stage called *quiescent stage (G<sub>0</sub>)* of the cell cycle. Cells in this stage remain metabolically active but no longer proliferate unless called on to do so depending on the requirement of the organism.

Temporary in G<sub>0</sub>

DIVIDE



# Homework from **YAKEEN NEET 2.0 2026** Module



EX-1 (TOPIC WISE)

Q1 to Q24



**THANK**  
**YOU**