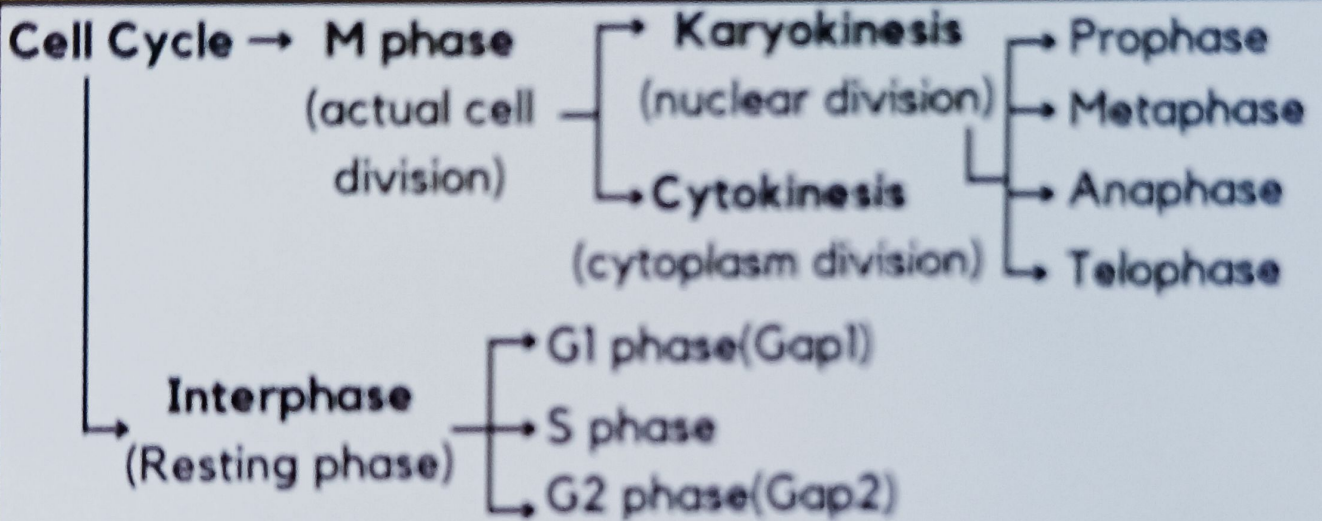


CELL CYCLE & DIVISION

CELL CYCLE

Sequence of events through which cell duplicates its genome, synthesizes other cell constituents and divides into two daughter = Cell growth + DNA replication + Cell division.

Time taken : Yeast = 90 min, Human = 24hrs.



• G1 Phase

- Interval between mitosis & DNA replication
- Cell grows in size

• S phase

- Synthesis phase
- DNA replication occurs (in nucleus)
- Chromosome number does not increase
- Centriole replication (cytoplasm)

• G2 Phase

- Protein synthesis
- Cell growth

• G₀ phase

- Quiescent stage
- Inactive stage after G1
- No cell division/proliferation

ANIMALS	PLANTS
Only diploid cell divide by mitosis (except male honey bees)	Both haploid & diploid cells show mitotic division

M-PHASE

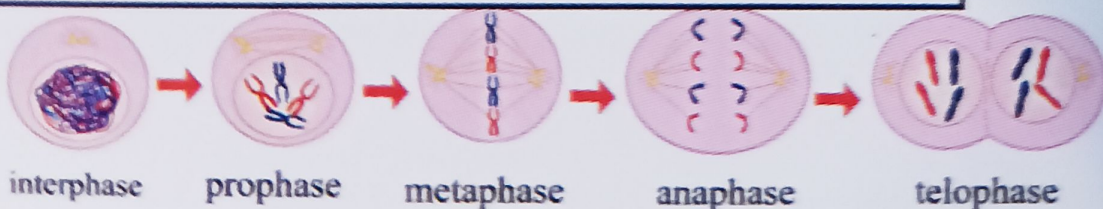
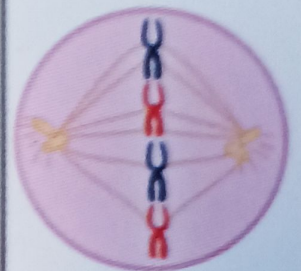
- Reorganisation of cell components
- Equational division
- Includes Karyokinesis & Cytokinesis.

Prophase (Divisions of Karyokinesis)

- Chromosomal material start condensing (untangles)
- Chromatin condensation
- Centrosome moves towards opposite poles (radiates out microtubules - asters)
- Mitotic Apparatus= 2 asters + Spindle fibres
- **End of prophase** - Golgi complex (-), endoplasmic reticulum (-), nucleolus(-), nuclear envelope(-)

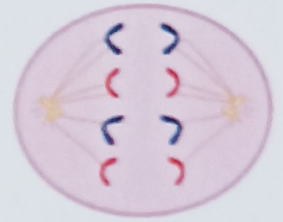
Metaphase

- Nuclear envelop completely disintegrates
- Condensation of chromosomes complete
- Spindle fibers attach to kinetochores.
- Chromosomes align to the cell center (equator), spindle fibers connected to poles. Metaphase plate.



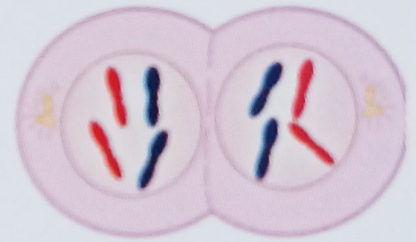
Anaphase

- Chromosomes split → daughter chromatids
- Chromatids moves towards opposite poles
- Centromere directed towards pole, chromosome trailing behind



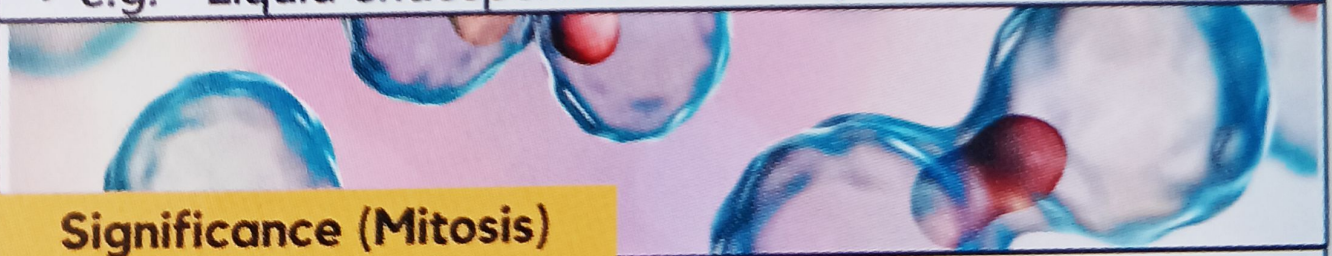
Telophase

- Chromosome decondense at poles (lose identity as discrete elements)
- Nuclear envelope & daughter nuclei form.
- Nucleolus, Golgi body, ER reforms



Cytokinesis

- Furrow in plasma membrane extends → joins (Animal cells)
- Plant cells- cell wall grows outward & meets lateral walls (precursor-cell plate) → represents middle lamella
- Sometime cytokinesis does not occur forms → syncytium
- e.g. - Liquid endosperm of coconut,



Significance (Mitosis)

1. Produces daughter cells with identical genetic makeup
2. Helps in growth in multicellular organisms
3. Only mode of multiplication in unicellular organisms
4. Restores nucleo-cytoplasmic ratio.
5. Important in cell repair & replacement.