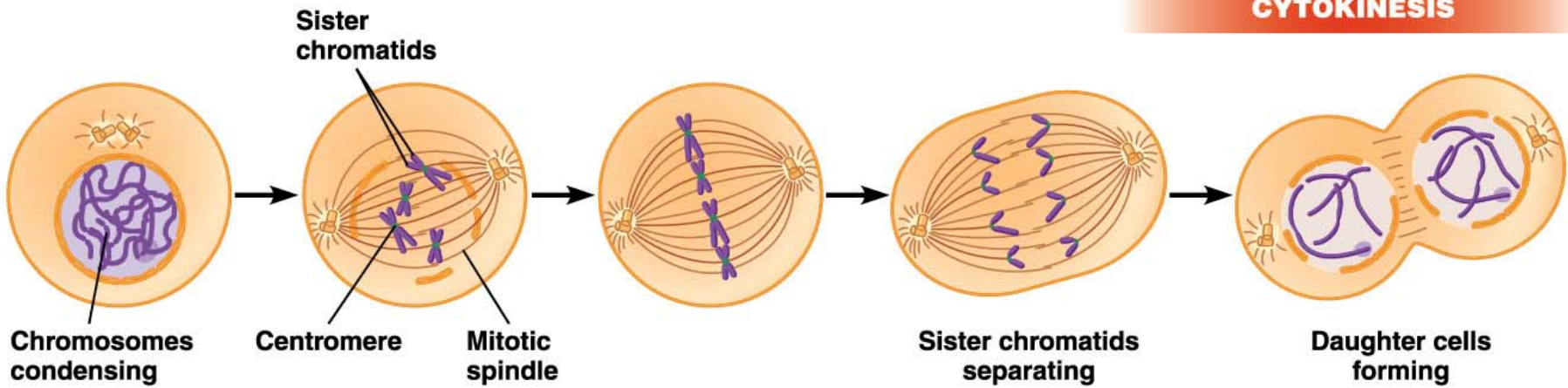
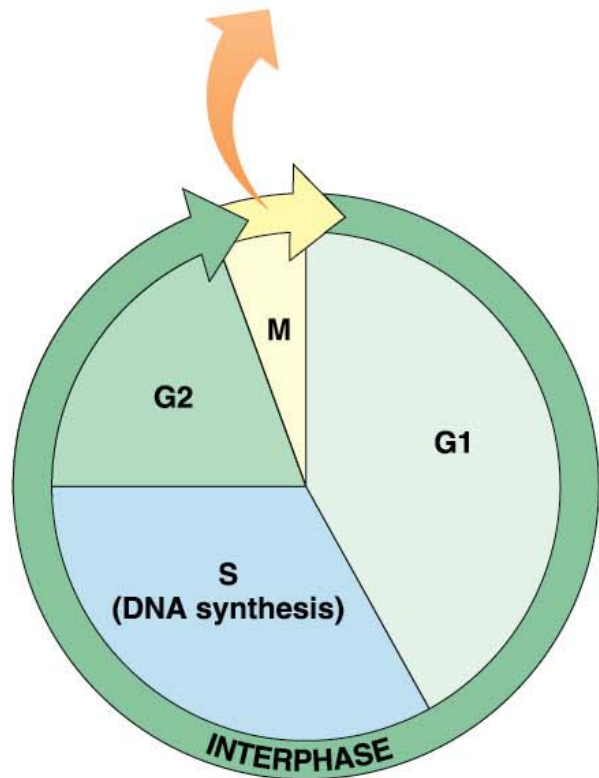


MITOSIS

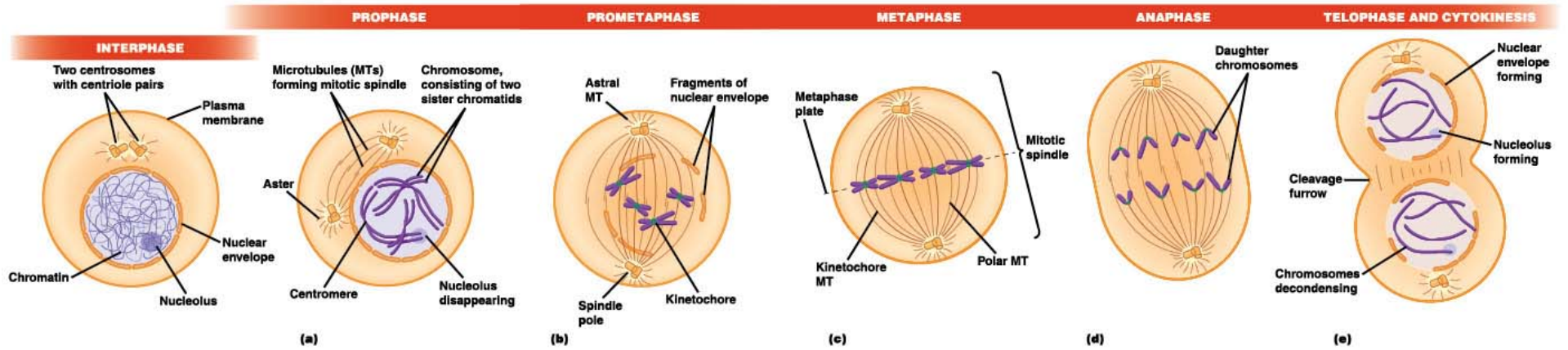
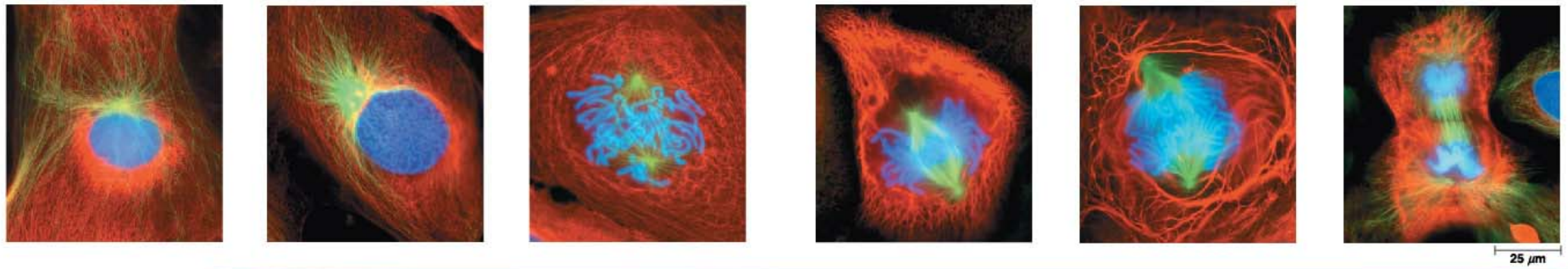
CYTOKINESIS

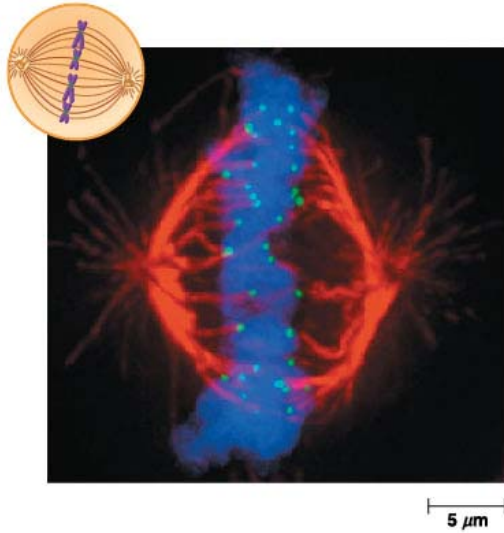


(a) The M (mitotic) phase

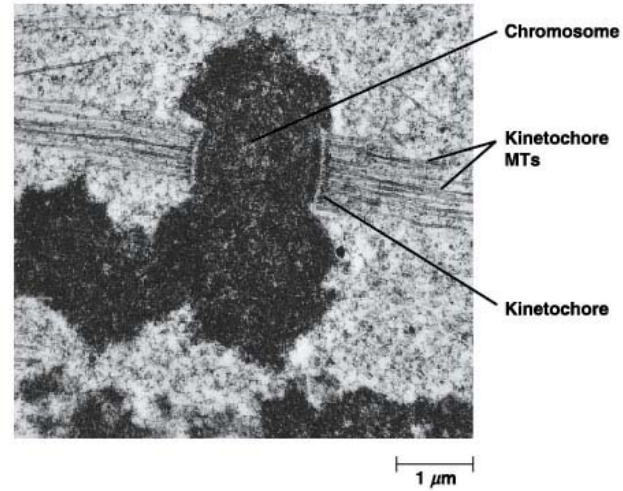


(b) The cell cycle

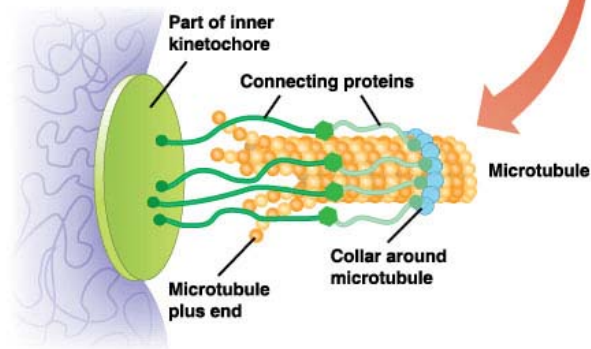
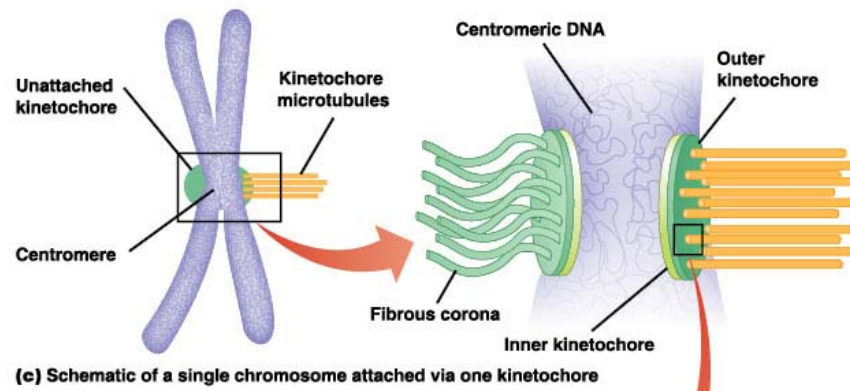


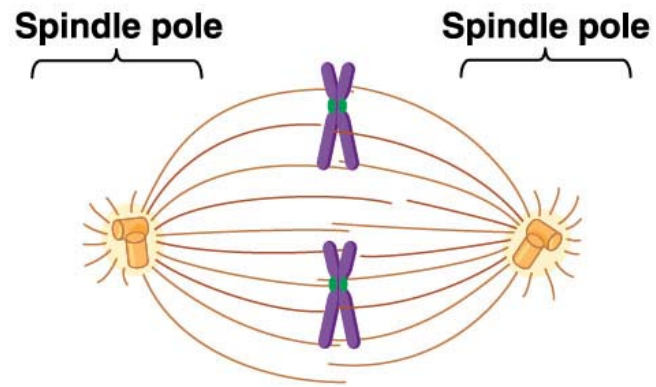


(a) Metaphase spindle with chromosomes (fluorescence)

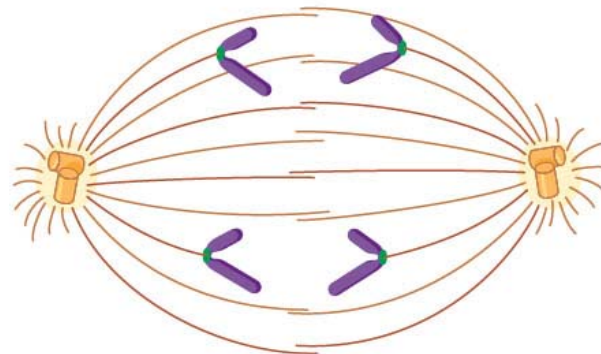


(b) Single chromosome attached to the spindle (TEM)

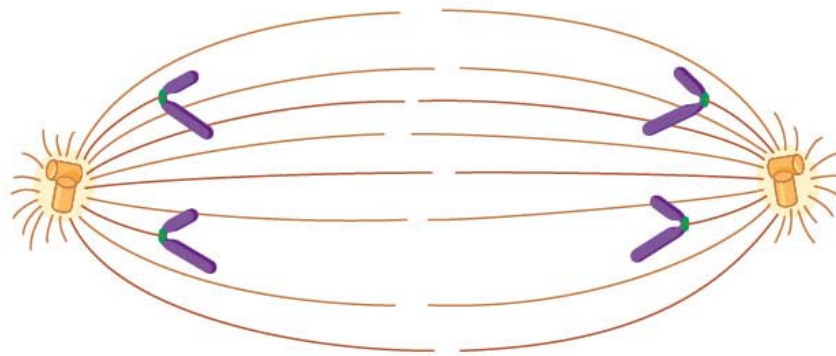


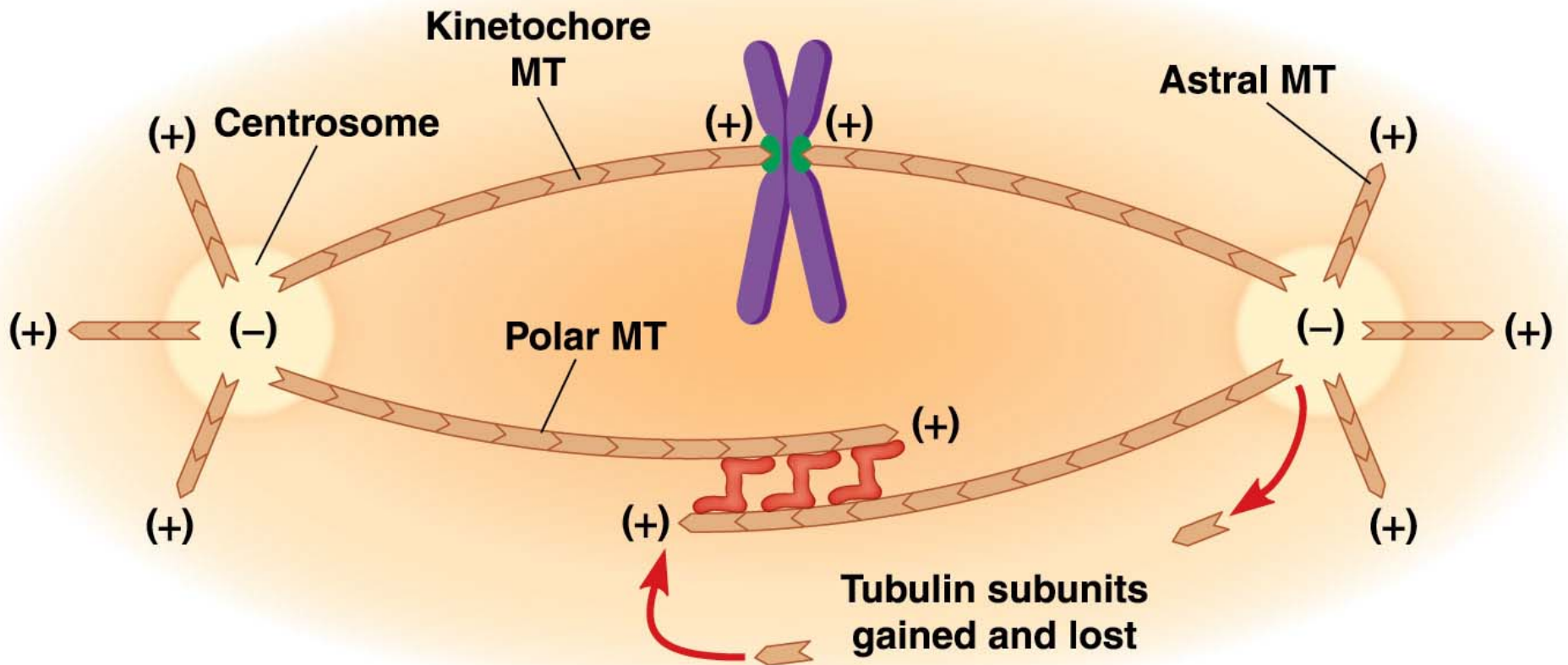


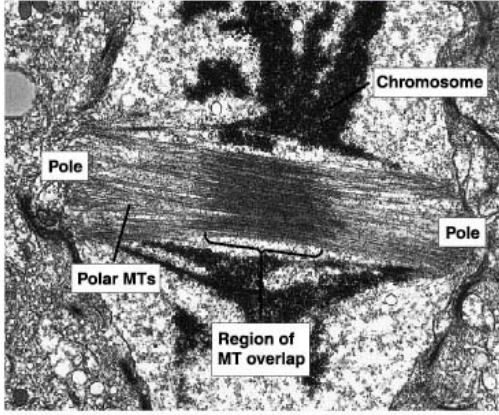
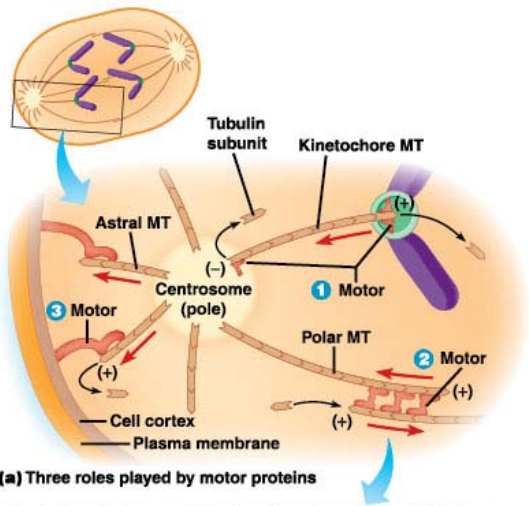
**Anaphase A
(chromosome-to-pole
movement)**



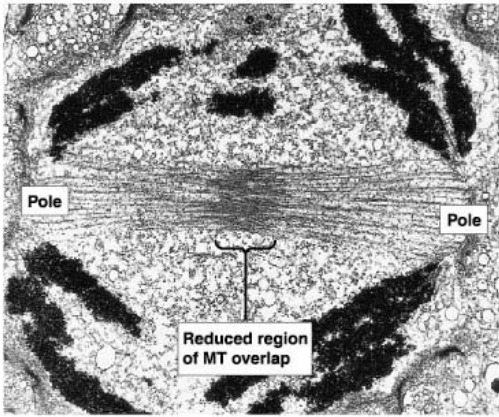
**Anaphase B
(pole-pole separation)**



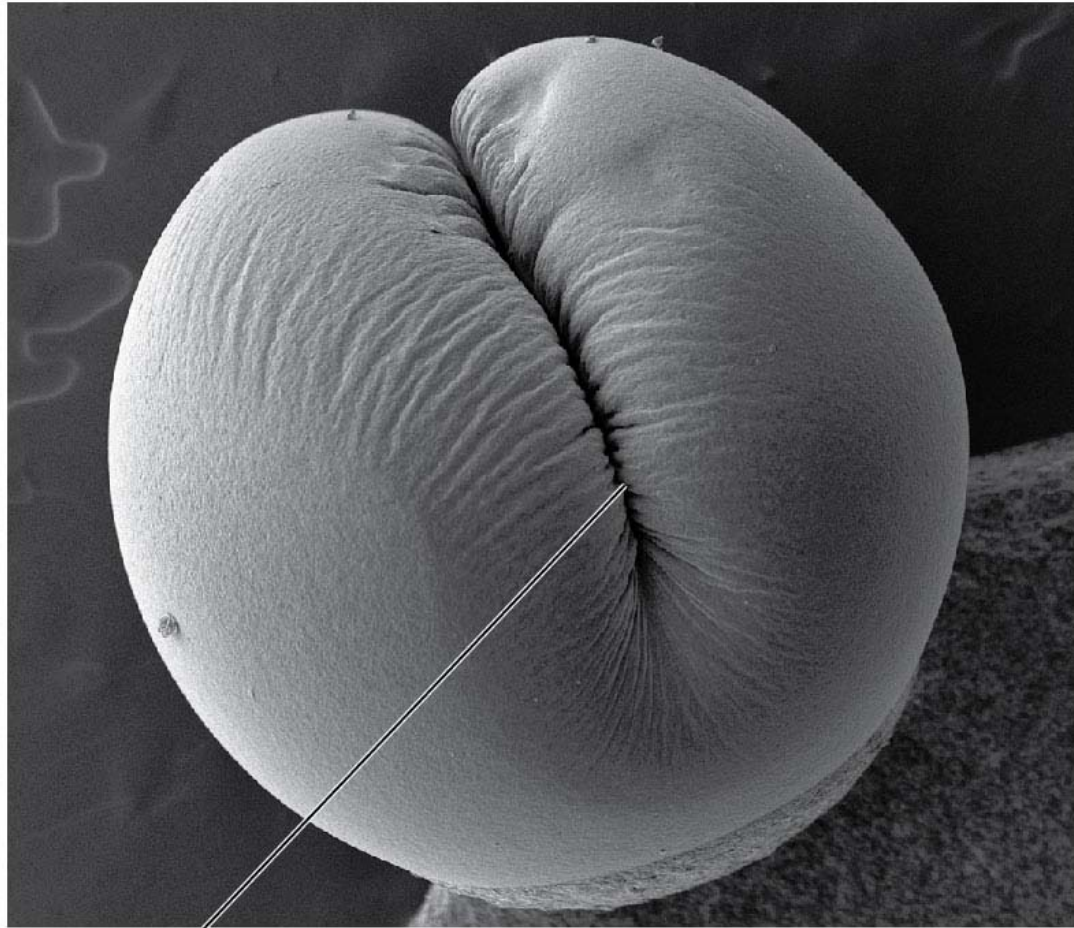




(b) Polar microtubules during metaphase 2 μm

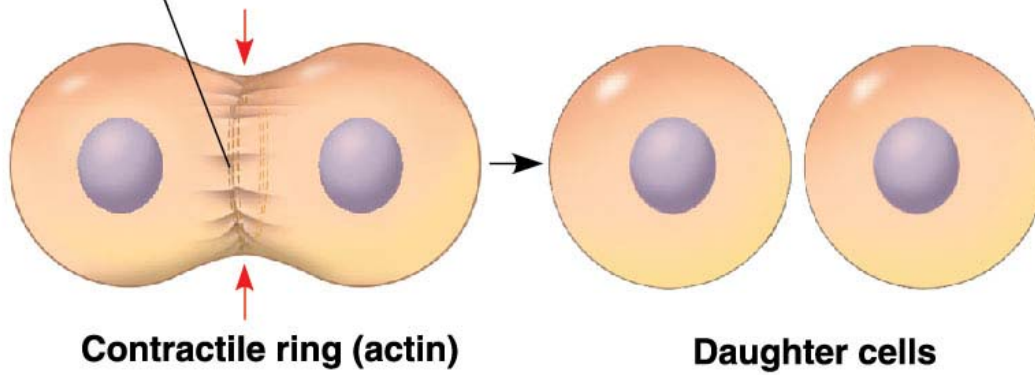


(c) Polar microtubules during anaphase 2 μm



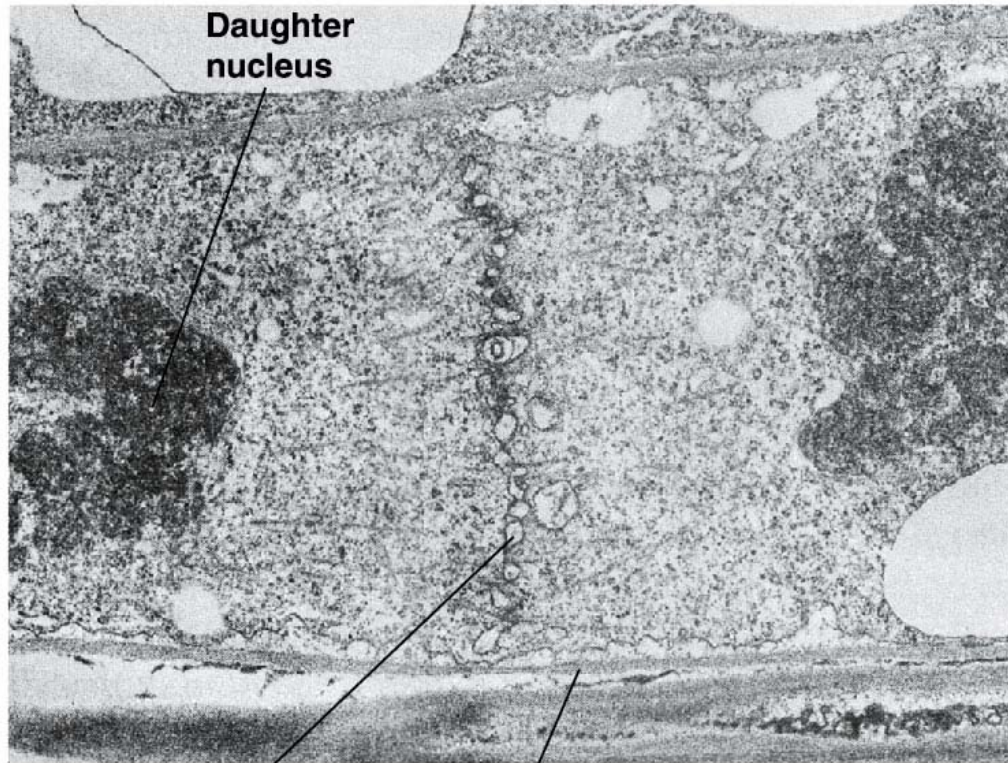
Cleavage furrow

500 μm

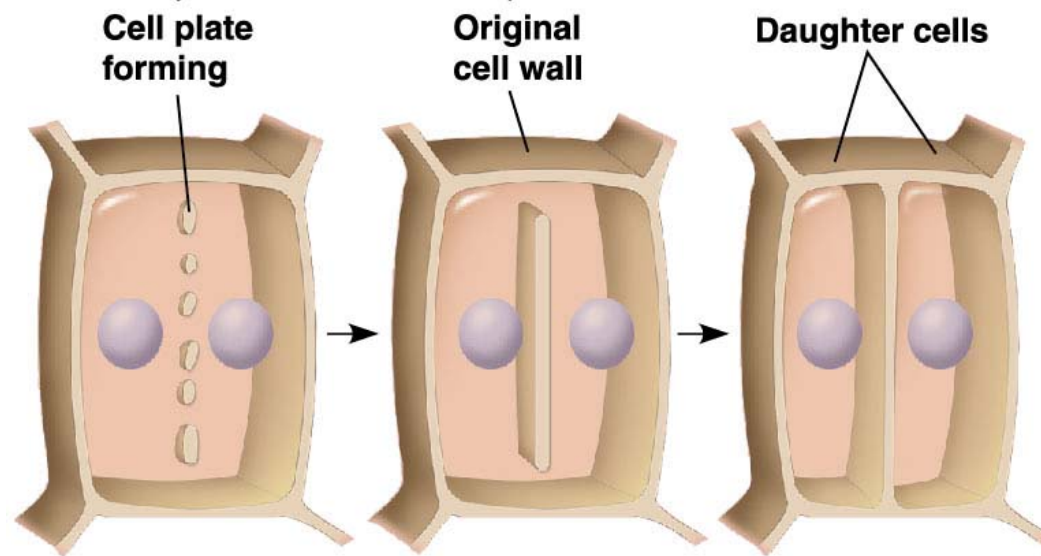


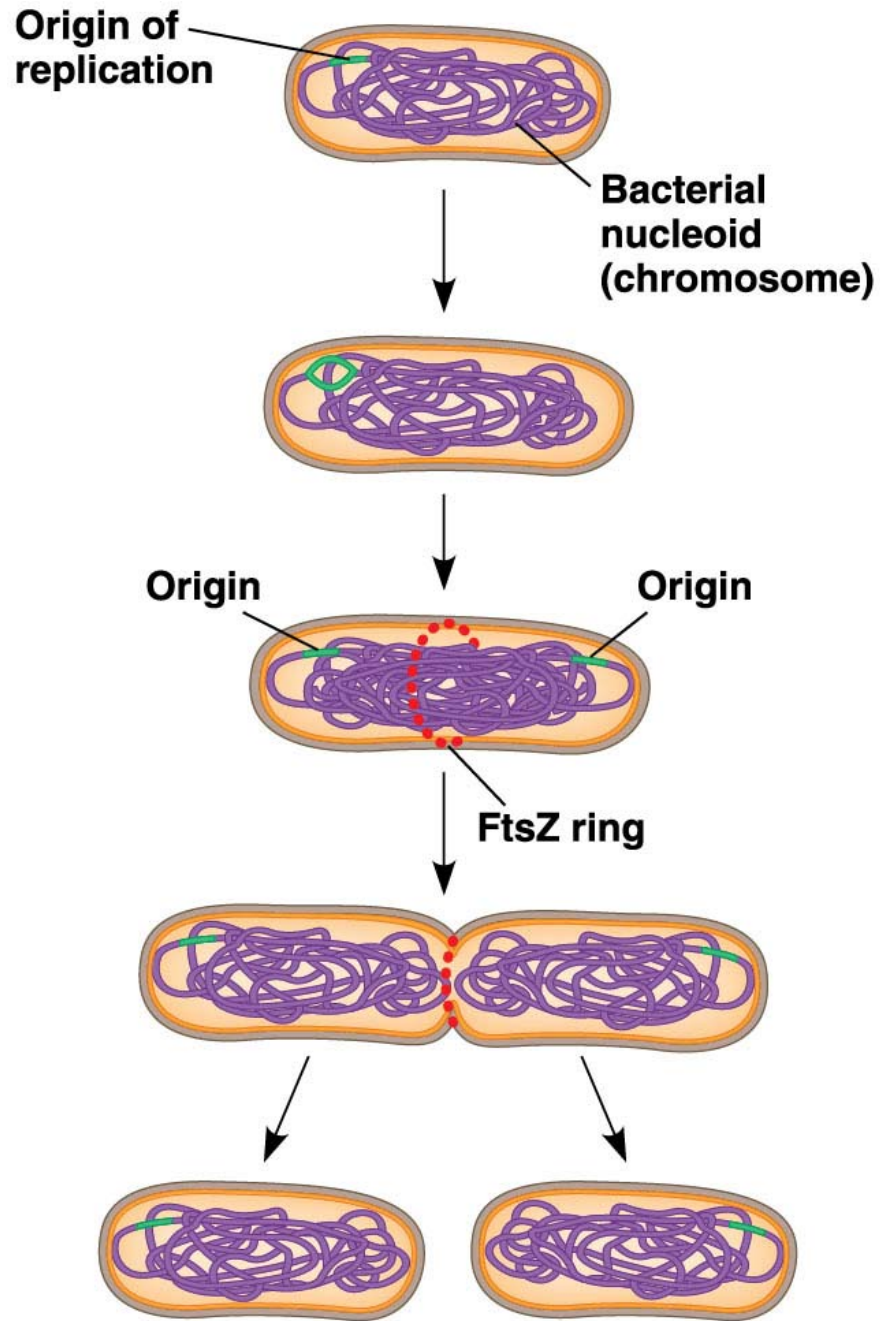
Contractile ring (actin)

Daughter cells

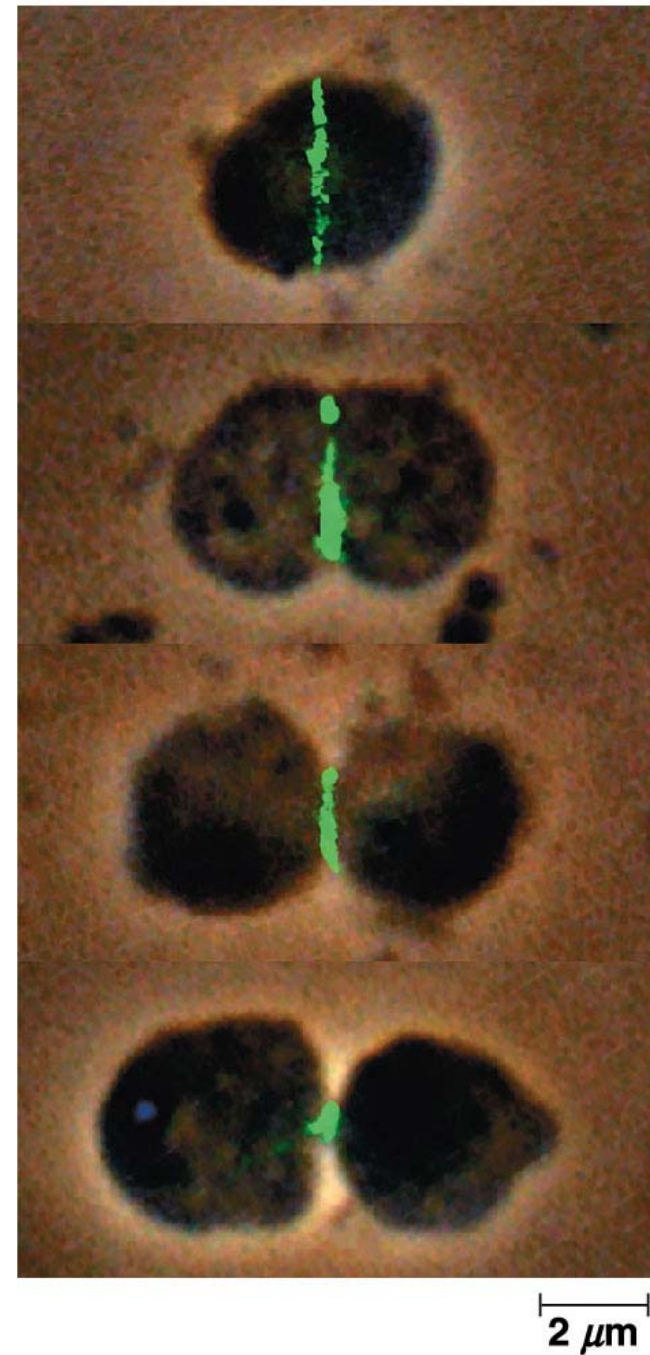


5 μm





(a) Cell division in a bacterium



(b) FtsZ in dividing chloroplasts

G2-M Transition

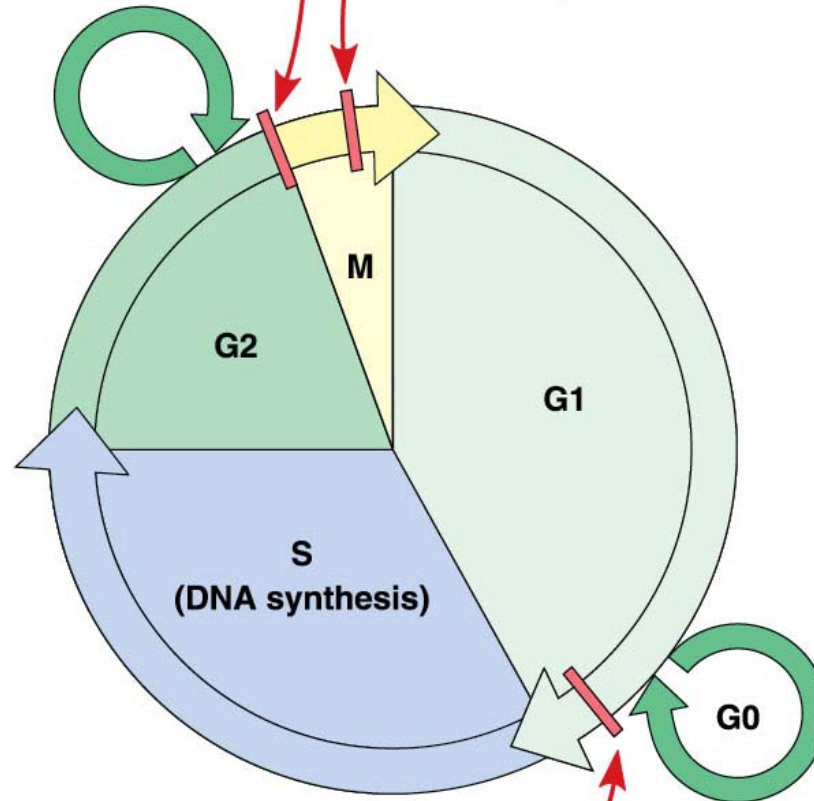
Influenced by:

- Cell size
- DNA damage
- DNA replication

Metaphase-Anaphase Transition

Influenced by:

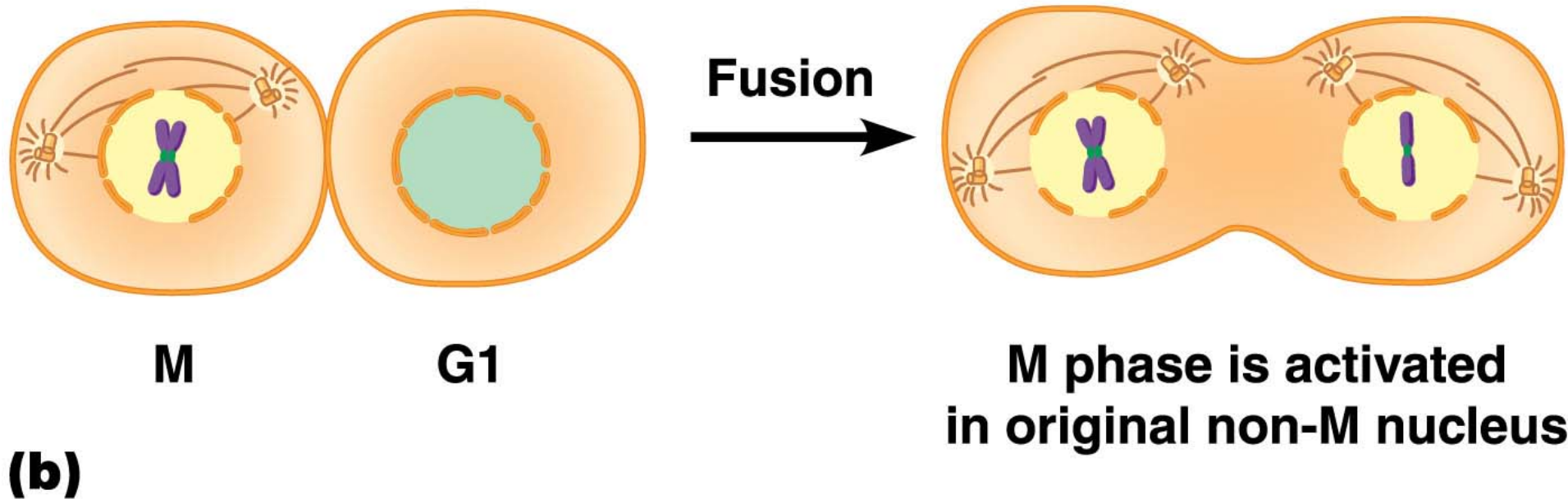
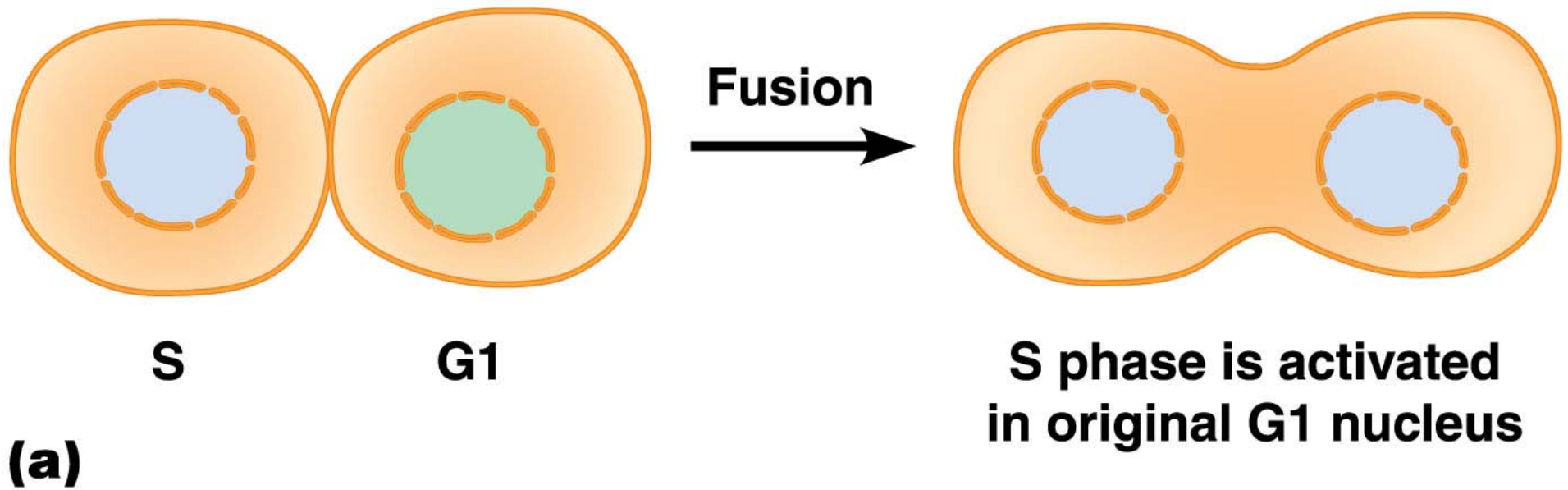
- Chromosome attachments to spindle

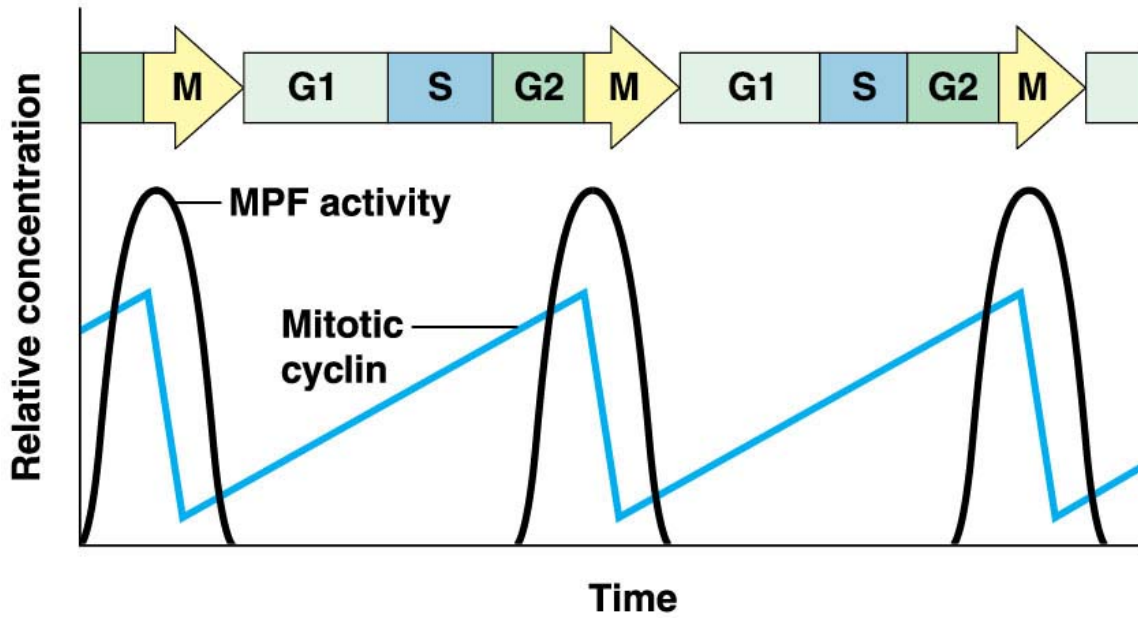


Restriction Point (Start)

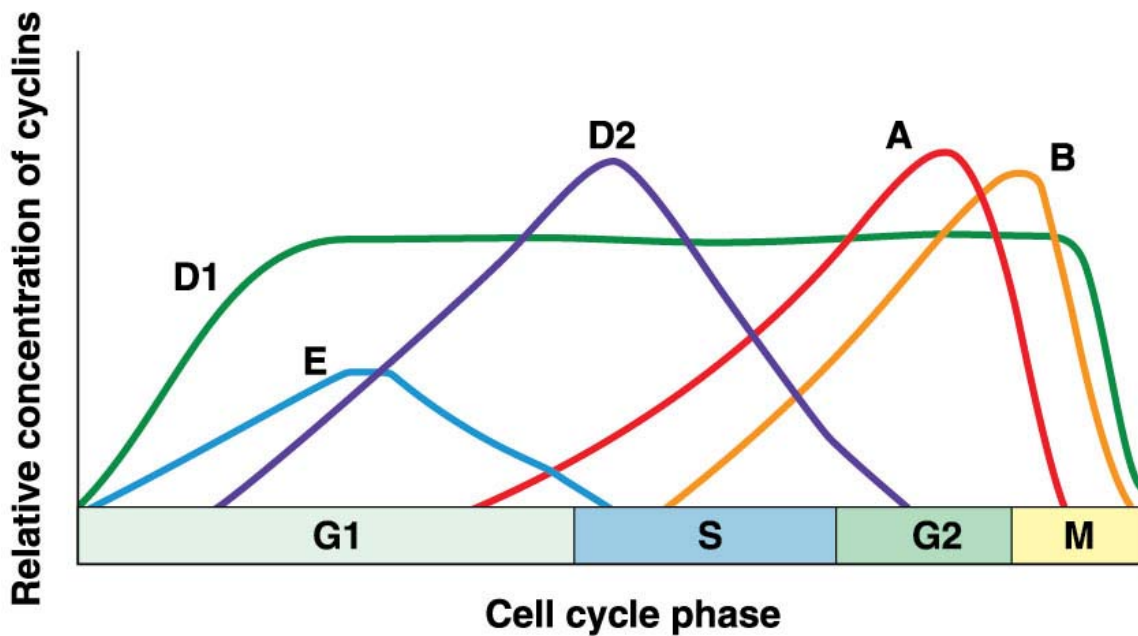
Influenced by:

- Growth factors
- Nutrients
- Cell size
- DNA damage





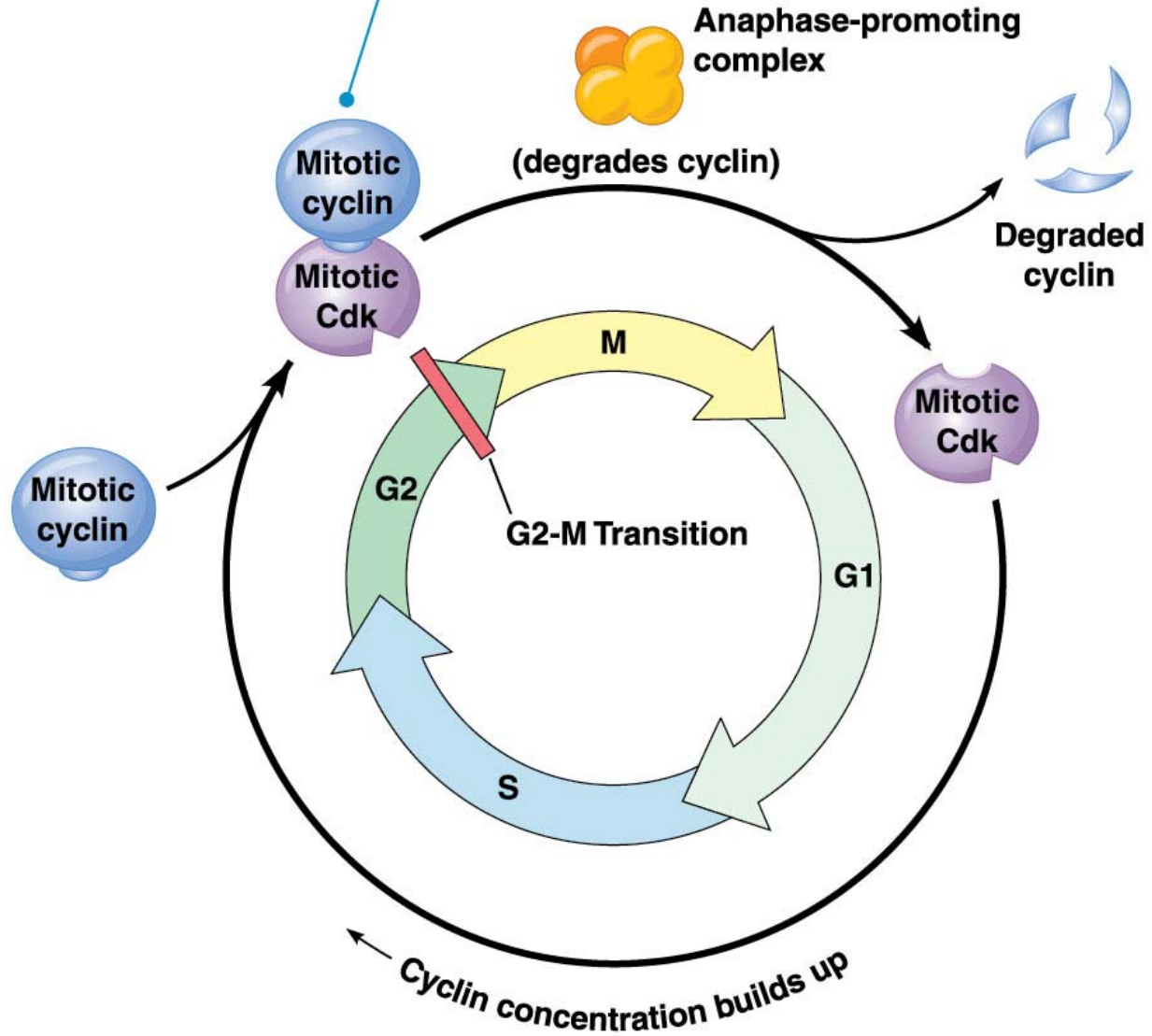
(a) Level of M phase cyclin (cyclin B) during the cell cycle



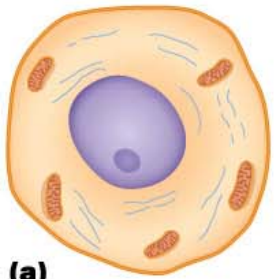
(b) Level of different cyclins during the cell cycle

Active mitotic Cdk-cyclin stimulates:

1. Nuclear envelope breakdown
2. Chromosome condensation
3. Mitotic spindle formation
4. Targeted protein degradation

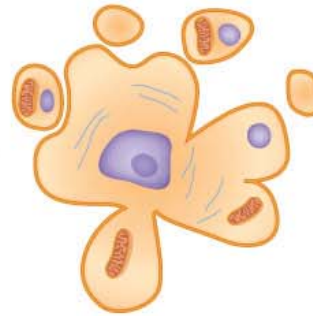
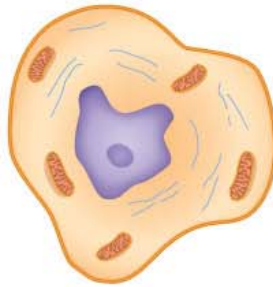


1 As a cell begins to undergo apoptosis, its chromosomes condense and its cytoplasm shrinks.

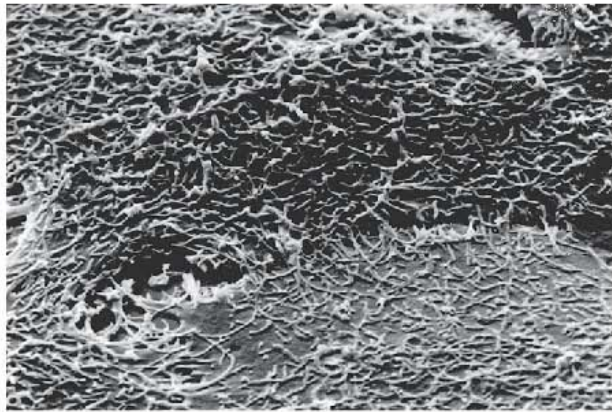
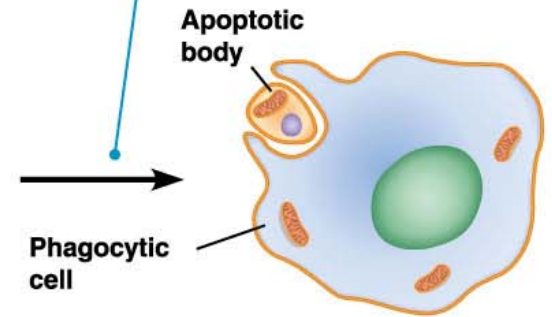


(a)

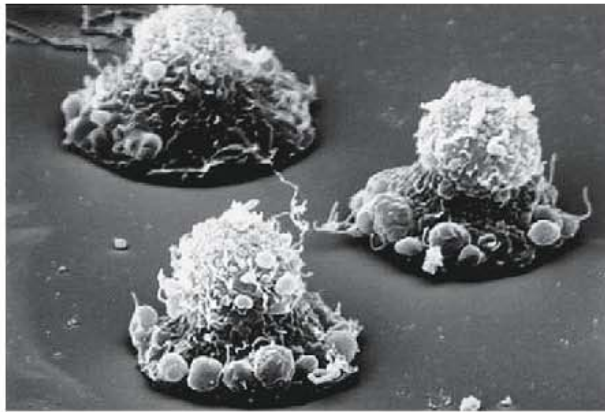
2 Eventually, the nucleus becomes fragmented, its DNA is digested at regular intervals ("laddering"), the cytoplasm becomes fragmented, and the cell extends numerous blebs.



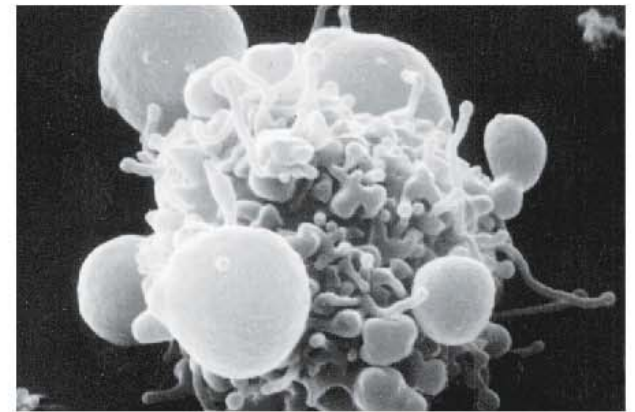
3 Ultimately, the remnants of the dead cell (apoptotic bodies) are ingested by phagocytic cells.



(b)



(c)



(d)