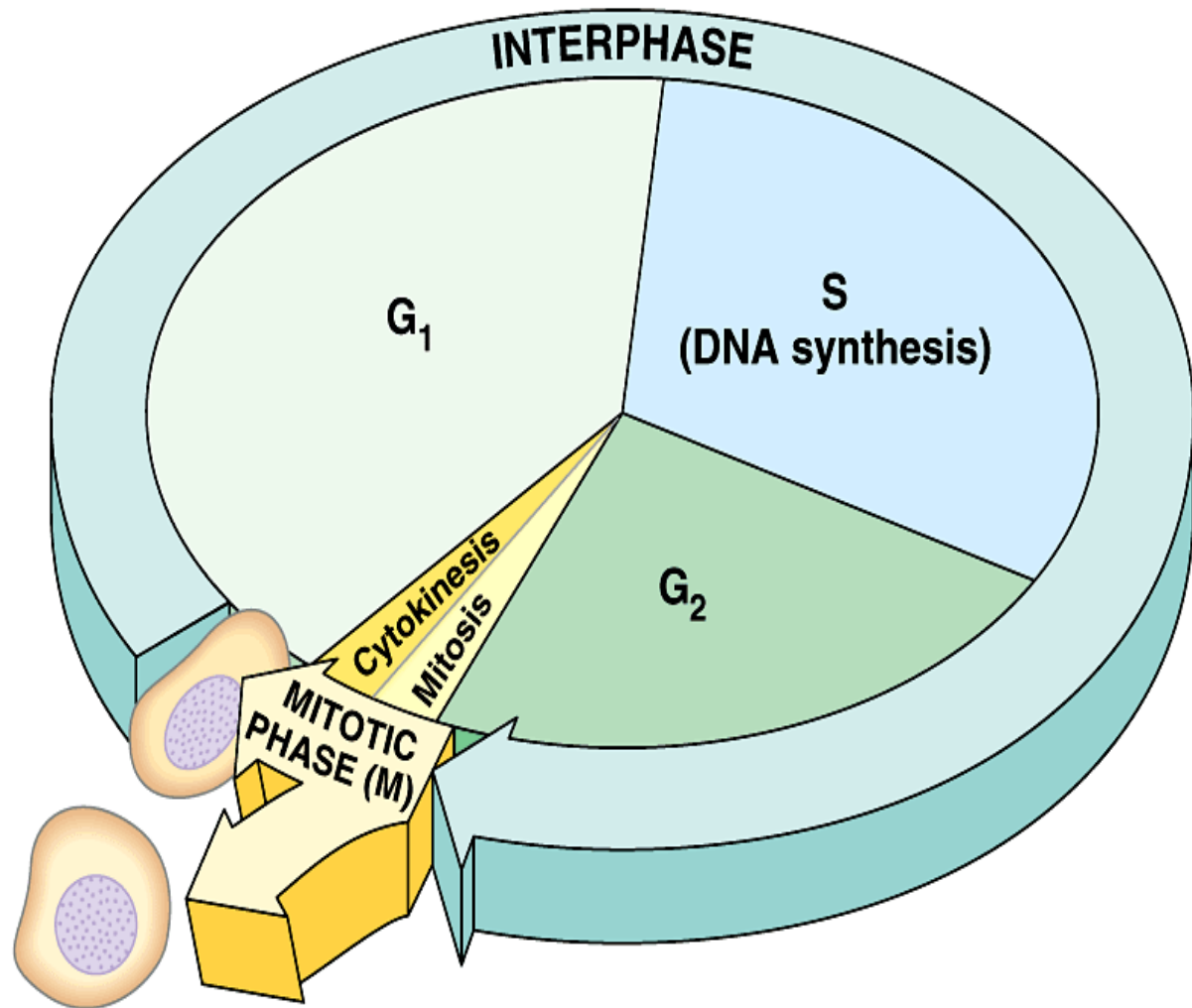


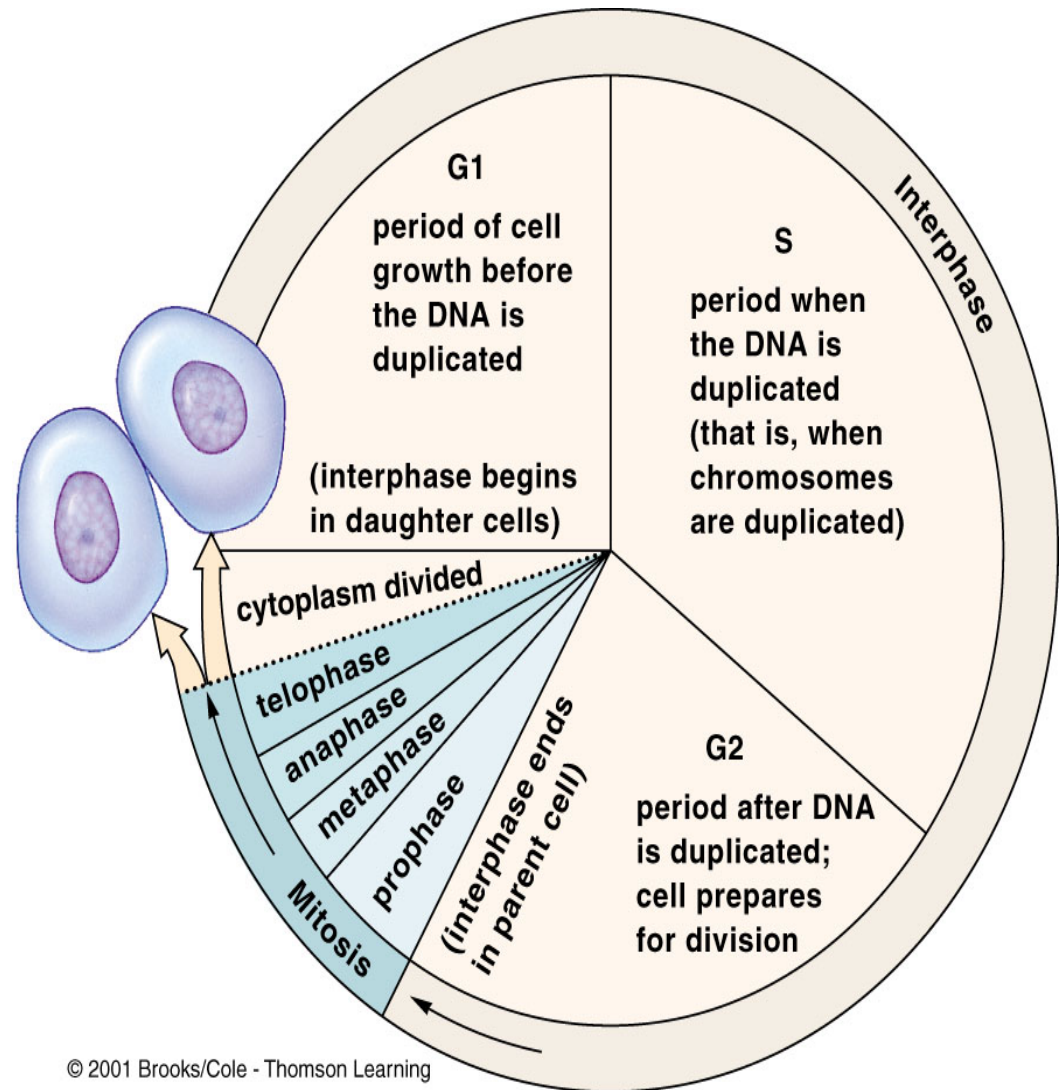
# The Cell Cycle

- Cell Cycle
  - Interphase
    - G<sub>1</sub>
    - S phase
    - G<sub>2</sub>
  - M phase
    - Mitosis
      - Prophase
      - Metaphase
      - Anaphase
      - Telophase
    - Cytokinesis



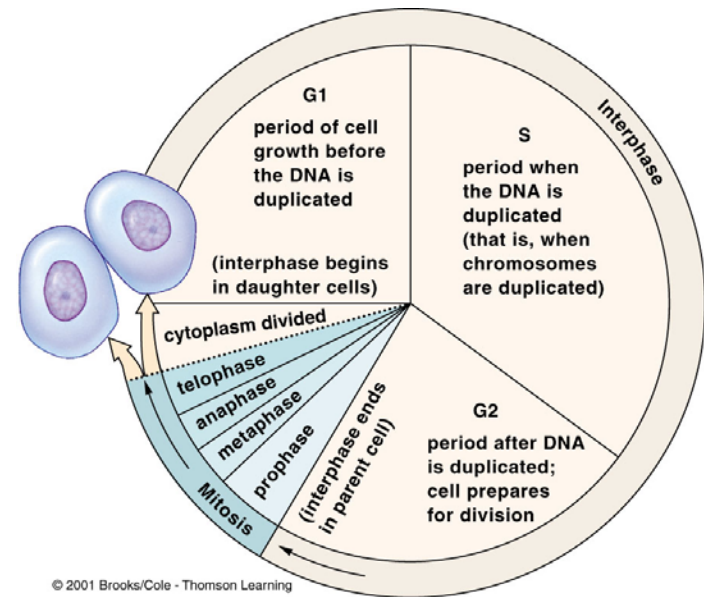
# Interphase

- Interphase is when the cell is carrying out all its routine activities and rests only before dividing.
- It consists of 3 parts:
  - G1
  - S phase
  - G2



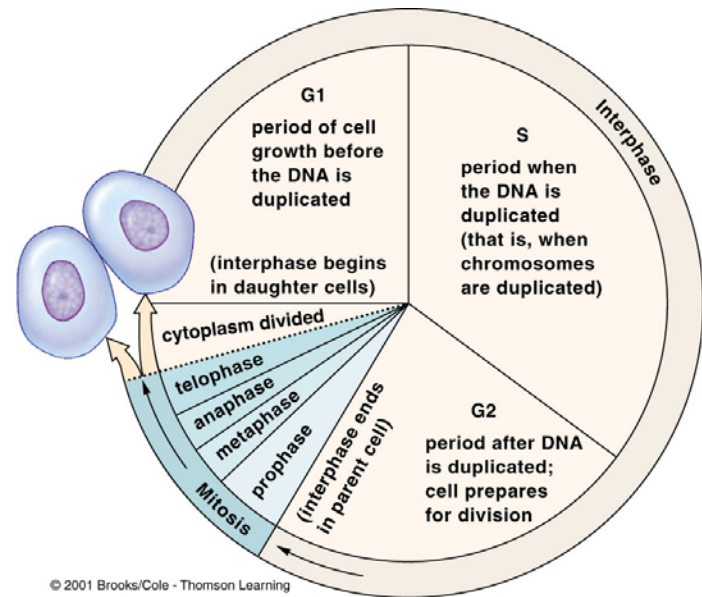
# G1 (gap 1) phase

- Prepares for the next cell division.
- Cell is metabolically active.
- The cell synthesizes proteins rapidly and grows vigorously.
- Cells that permanently cease dividing are said to be in the G0 phase.



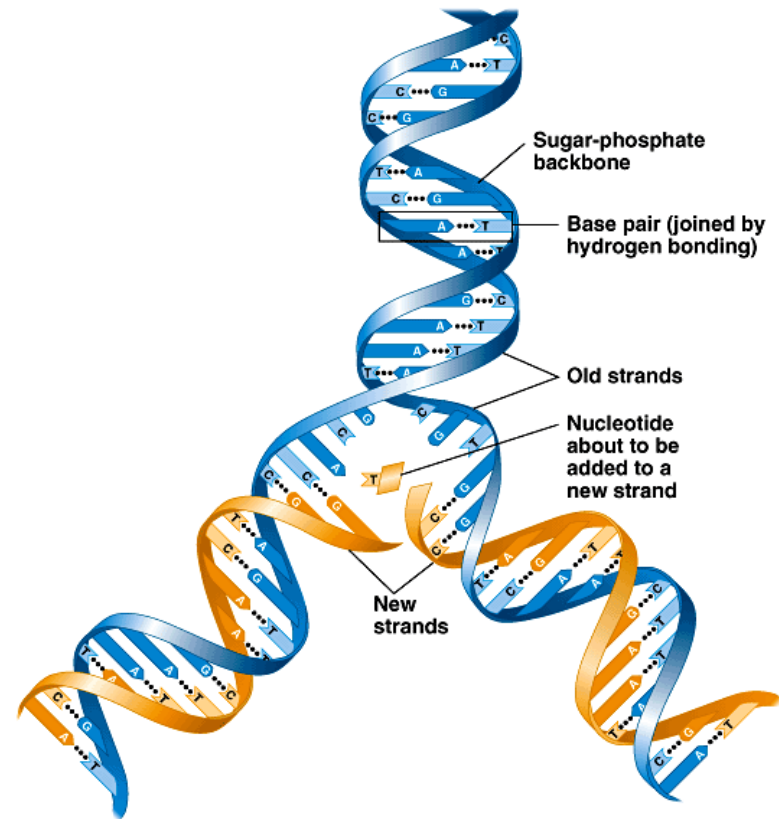
# S (synthetic) phase

- During the S phase the DNA replicates itself.
- New histones are made and assembled into chromatin.



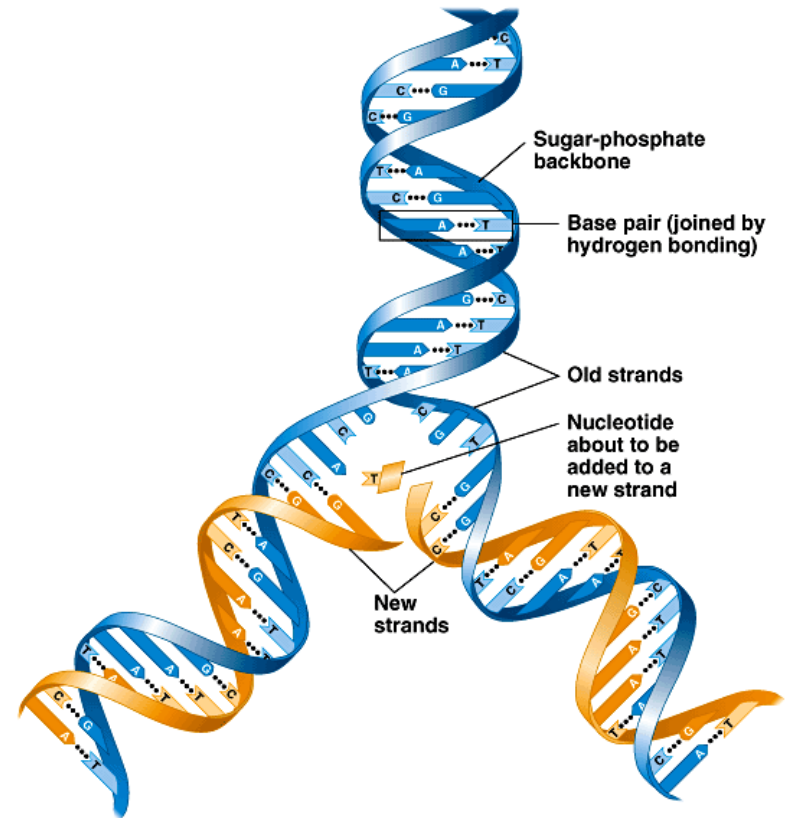
# S (synthetic) phase

- Each new cell needs a set of chromosomes.
- DNA must be copied exactly to make 2 identical cells.
- An enzyme Helicase untwists and separates the DNA molecules exposing the nitrogenous bases.
- The exposed bases serve as a template.
- Nucleotide base pairing is complementary



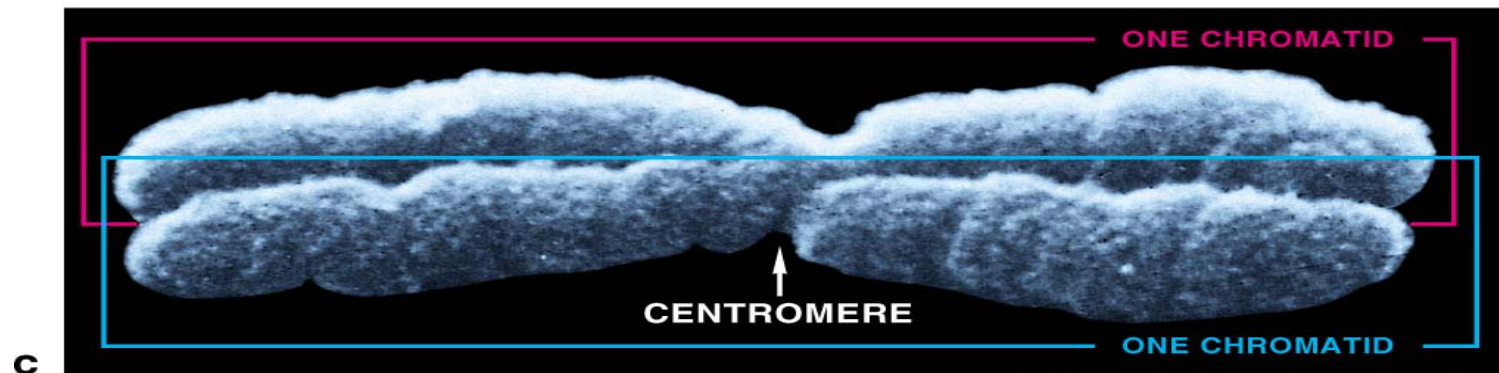
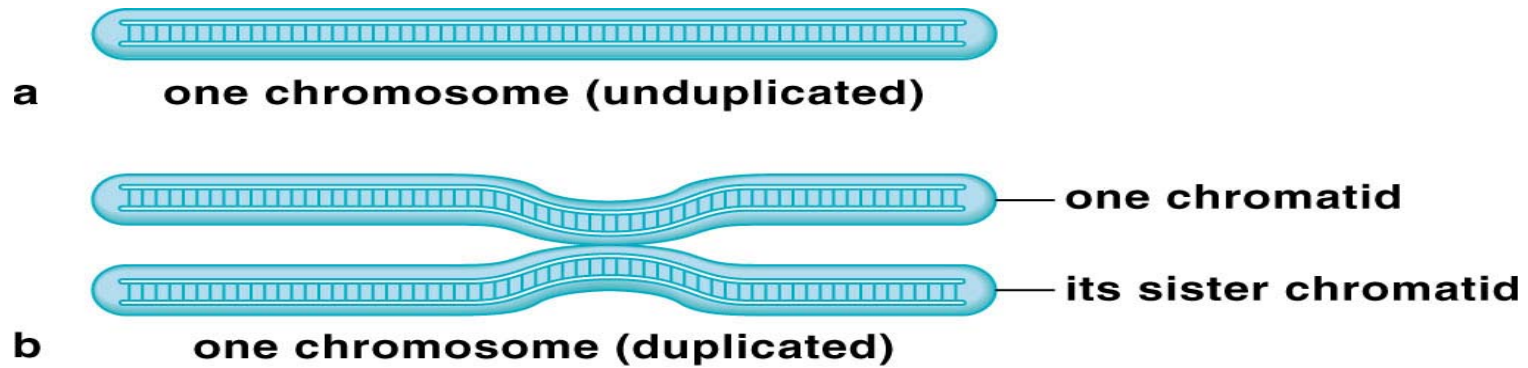
# DNA Replication

- The nucleoside triphosphates are linked together by an enzyme DNA polymerase.
- DNA synthesis is unidirectional resulting in a leading and a lagging strand.
  - DNA ligase joins the lagging strand segments.
  - The resulting DNA is identical to the original DNA each consists of one old and one newly assembled nucleotide strand this is known as Semiconservative replication.



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# DNA Replication

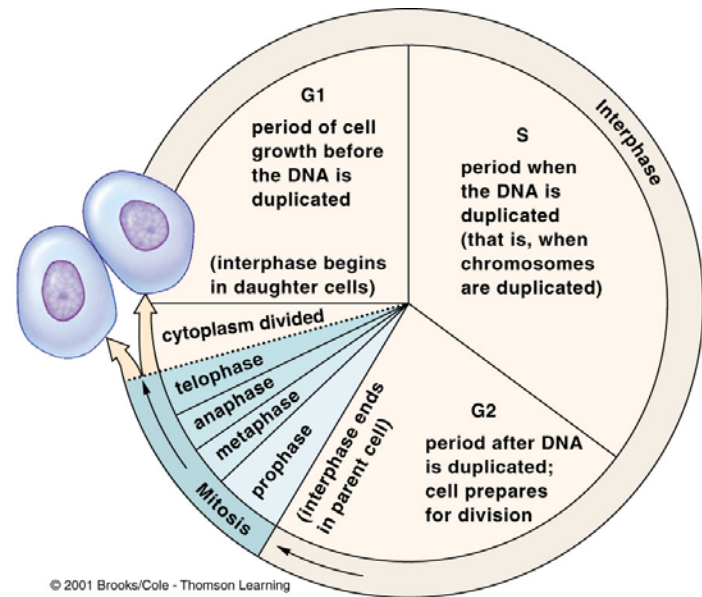


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- After replication histones imported from the cytoplasm associate with the DNA to form the new chromatin.
- Chromatin strands condense to form chromatids united by a centromere.

# Interphase G2 (gap 2) phase

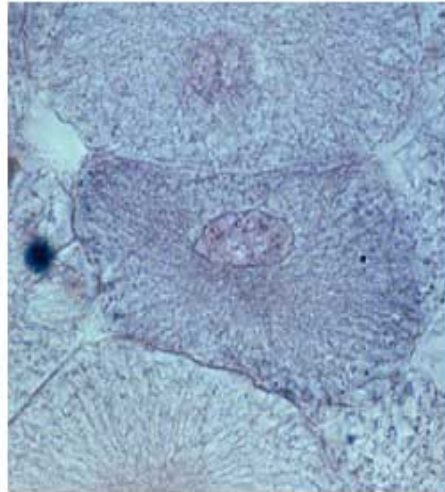
- This phase is very brief.
- Cell finishes preparing for mitosis.
- Centriole replication is complete.
- Cell continues to grow and work.



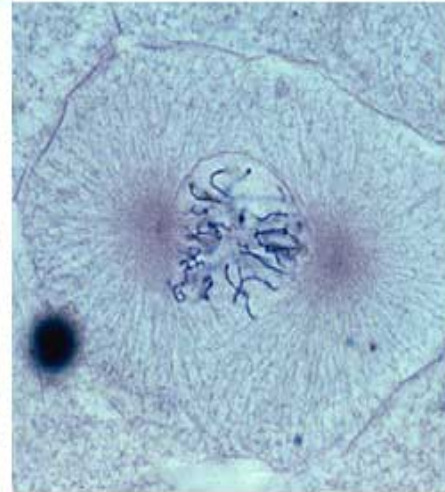


# M (Mitotic) Phase

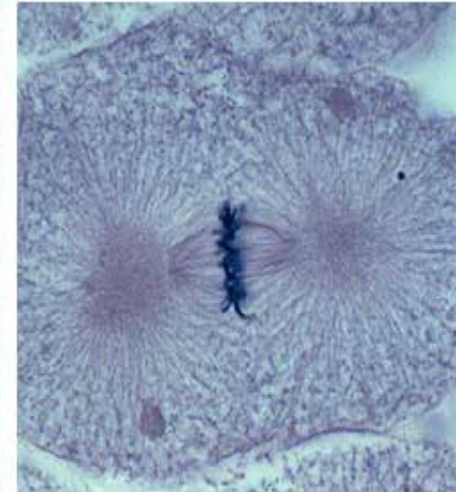
Prophase  
Metaphase  
Anaphase  
Telophase  
Cytokinesis



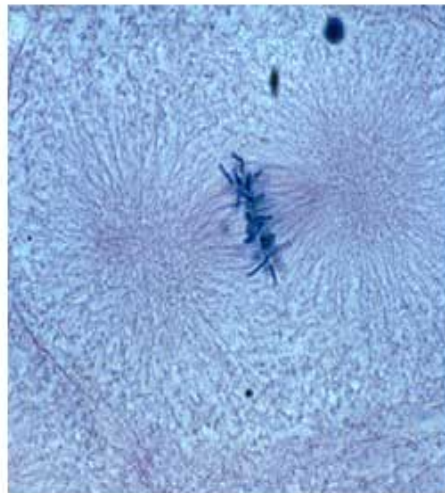
Interphase



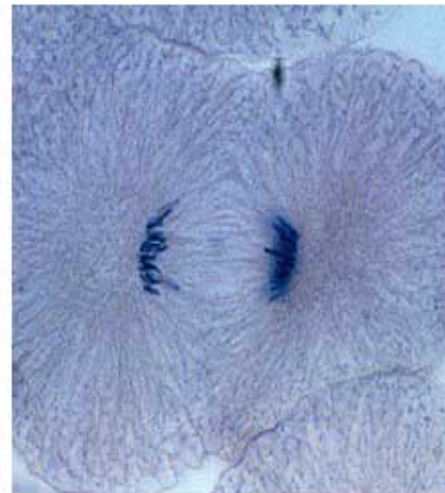
Prophase



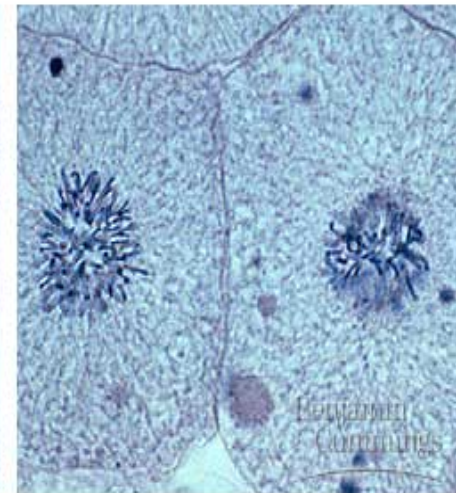
Metaphase



Anaphase



Early Telophase

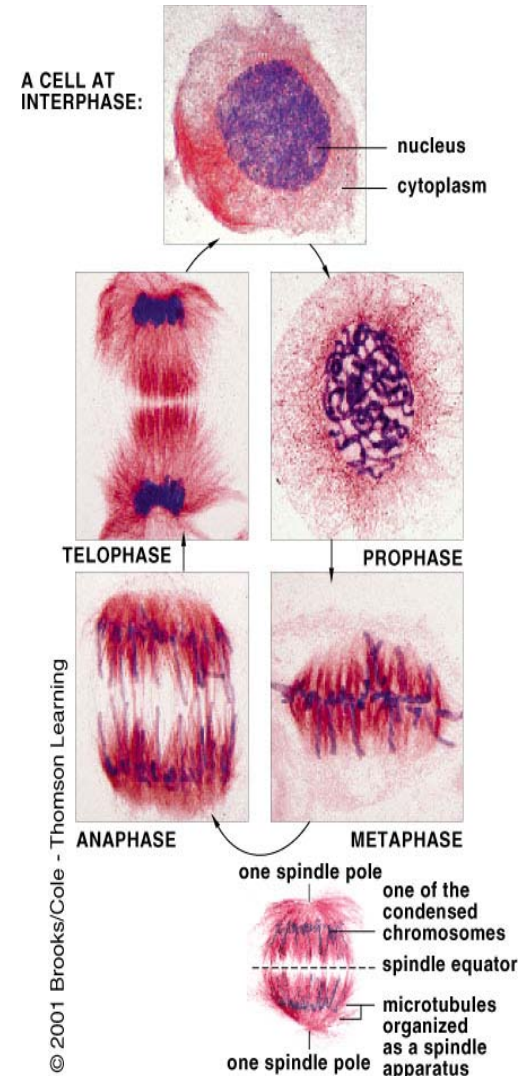


Late Telophase

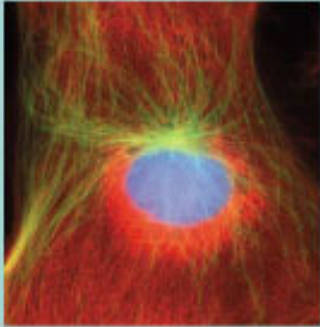
# Mitosis

## Is Nuclear Division Not Cellular division!

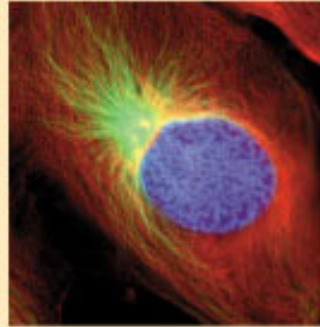
- Mitosis is the division of the nucleus.
- Mitosis consists of four phases, it is actually a continuous process with one phase merging smoothly into the next.



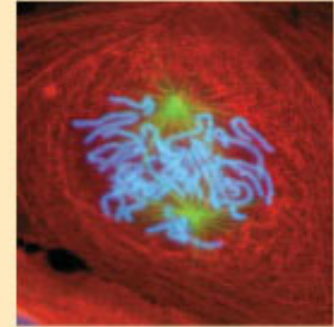
# Interphase, Prophase, Prometaphase



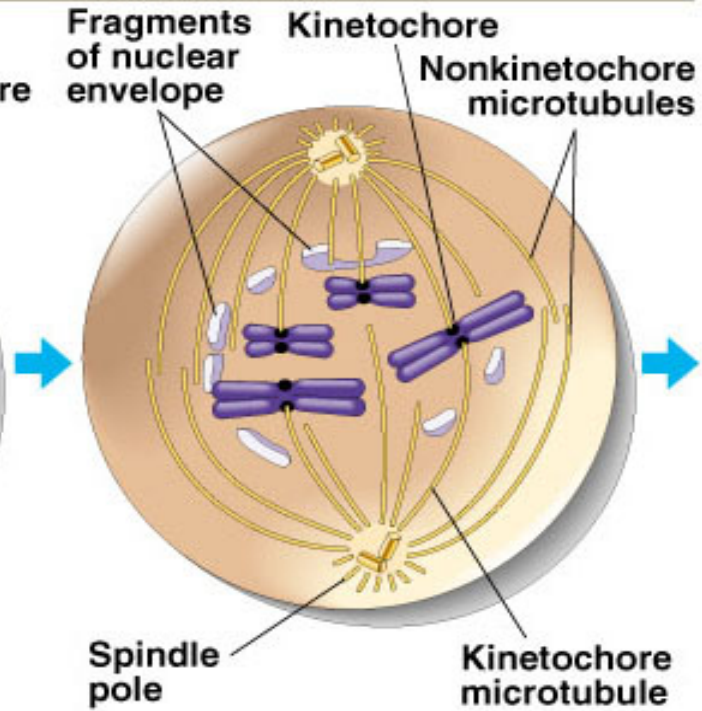
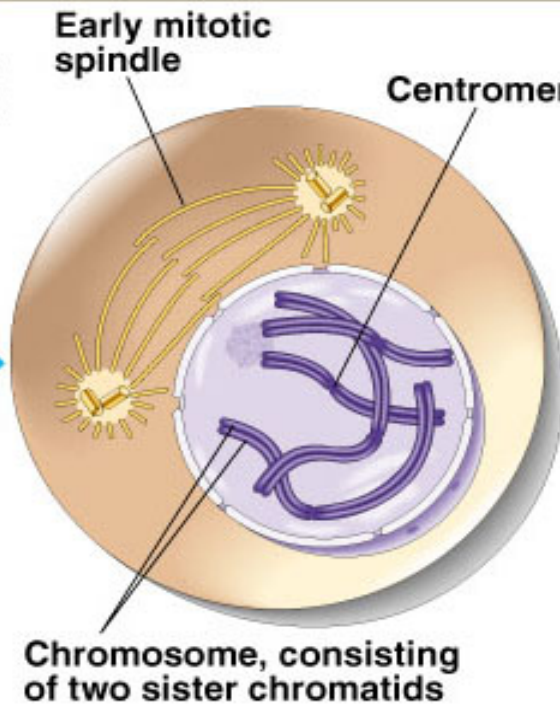
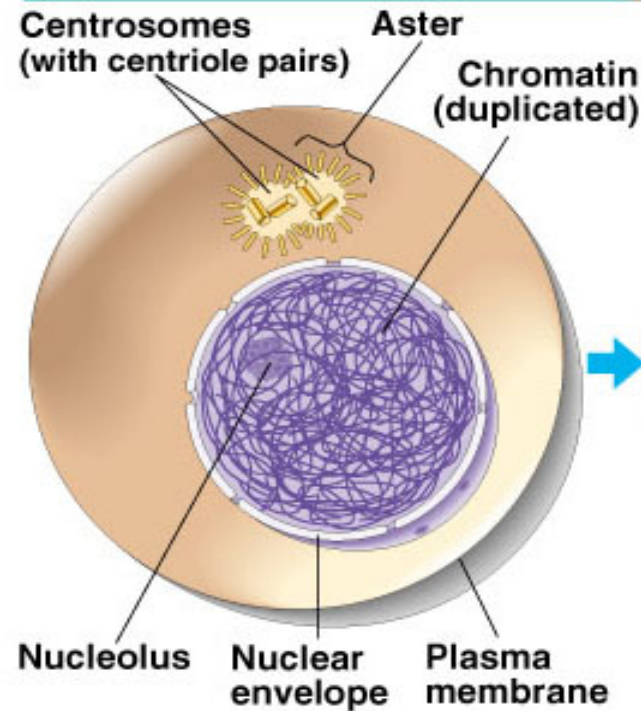
**G<sub>2</sub> OF INTERPHASE**



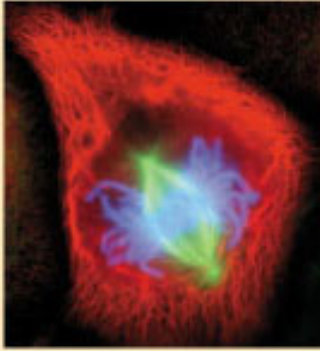
**PROPHASE**



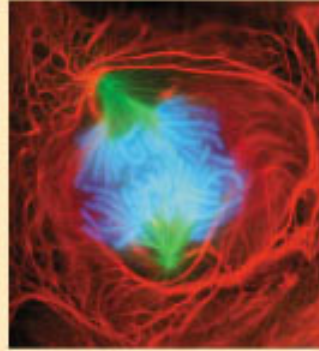
**PROMETAPHASE**



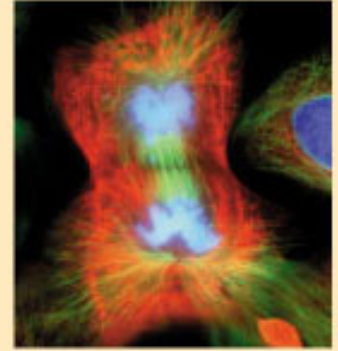
# Metaphase, Anaphase, Telophase/Cytokinesis



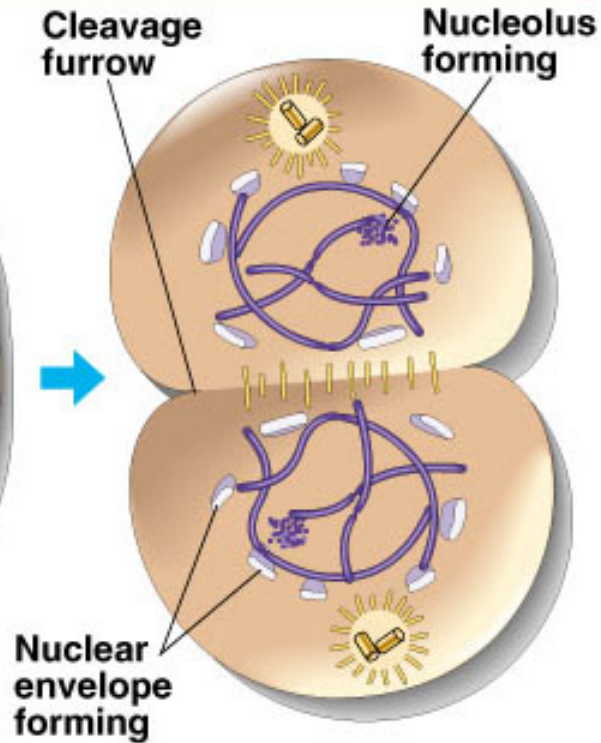
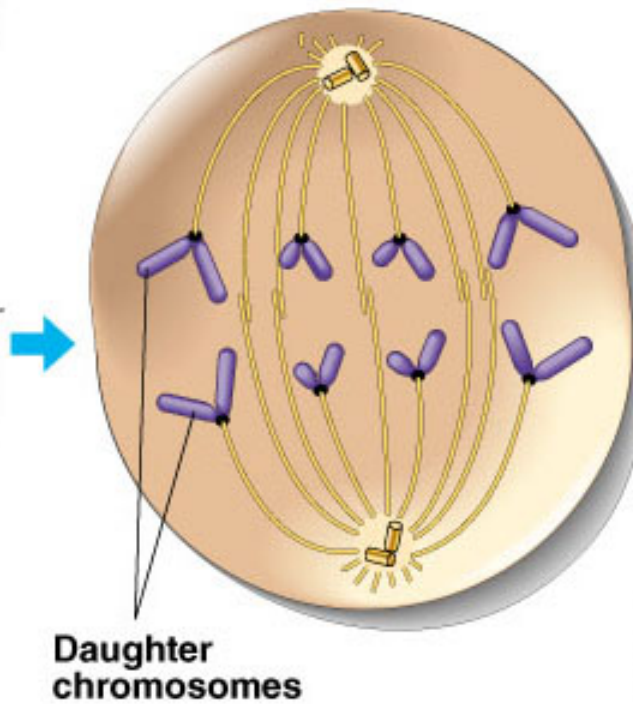
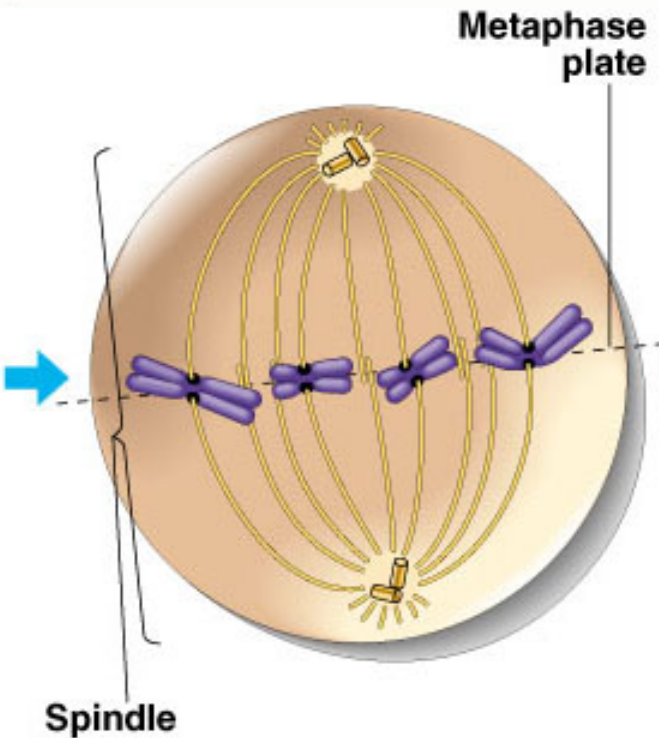
**METAPHASE**



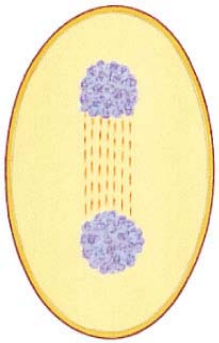
**ANAPHASE**



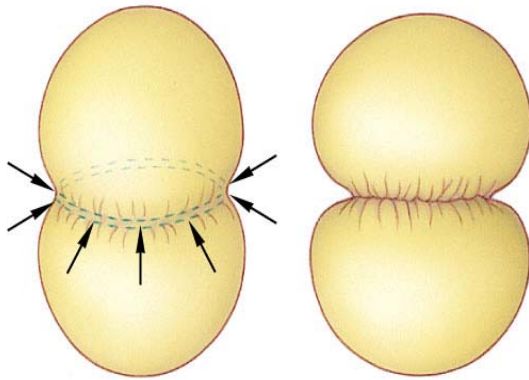
**TELOPHASE AND CYTOKINESIS**



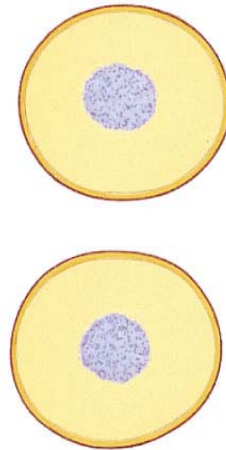
# Cytokinesis



**a** Mitosis is over, and the spindle is now disassembling.

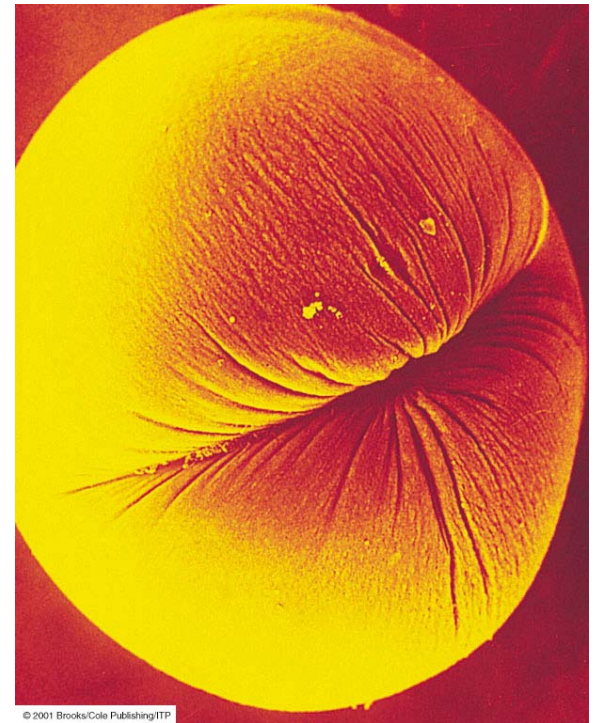


**b** Just beneath the plasma membrane, a band of microfilaments at the former spindle equator contract, so that their diameter closes all around the cell.



**c** The contractions continue and cut the cell in two.

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