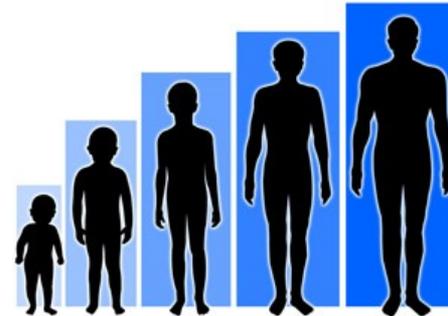
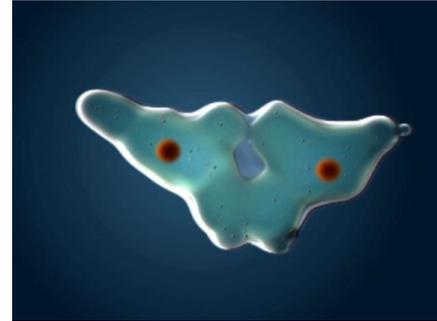


THE CELL CYCLE

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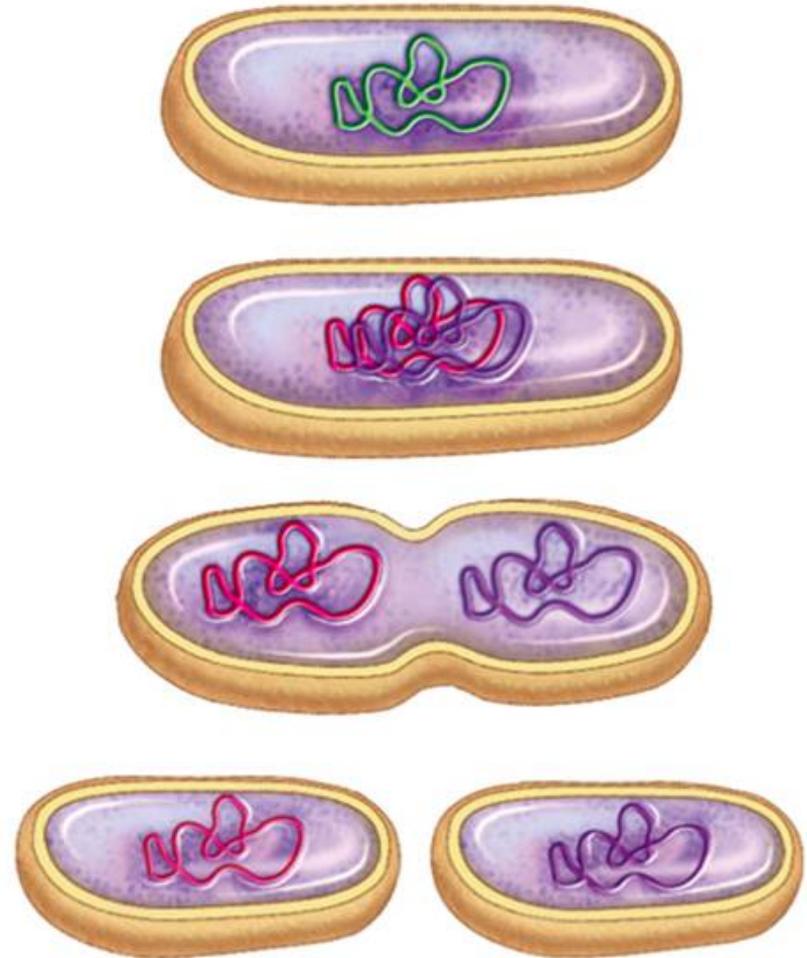
Cell Division

- aka “mitosis”
- Purposes
 - ▣ Reproduction
 - Unicellular
 - ▣ Growth and Development
 - Multicellular
 - ▣ Tissue renewal
 - Multicellular



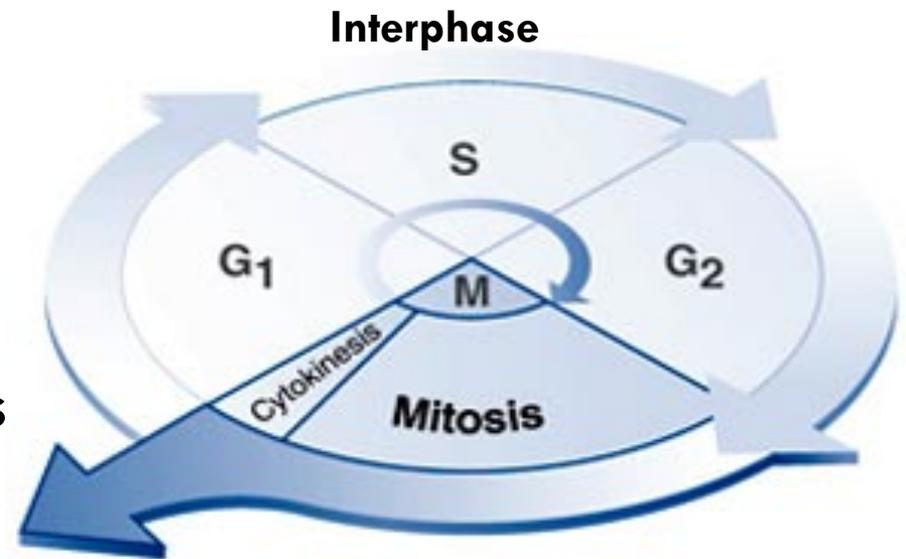
Binary Fission

- “Division in half”
- Bacteria
 - ▣ Chromosome duplicates
 - ▣ Cell grows
 - ▣ Divides
- Asexual



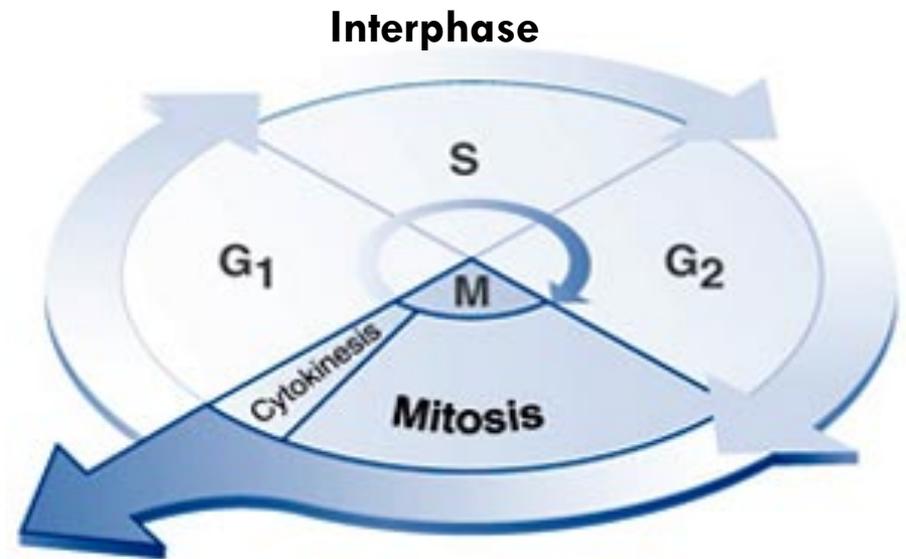
Cell cycle (overview)

- Interphase
 - ▣ 90% of cell life
 - ▣ Cell grows
 - ▣ Copies chromosomes
- Mitosis
 - ▣ Nucleus & chromosomes divide
- Cytokinesis
 - ▣ Cell divides

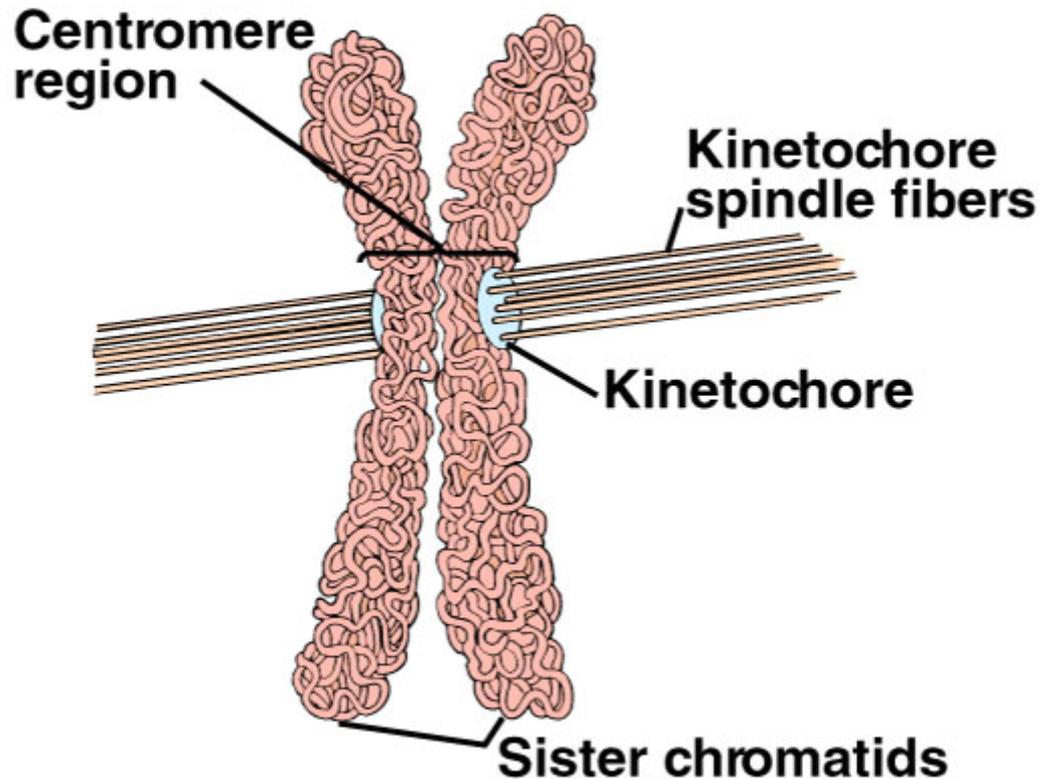


Interphase

- Three steps
 - G_1
 - Gap 1
 - S
 - Chromosomes replicate
 - G_2
 - Gap 2
- Growth happens in all
- Chromosomes “spaghetti-like”

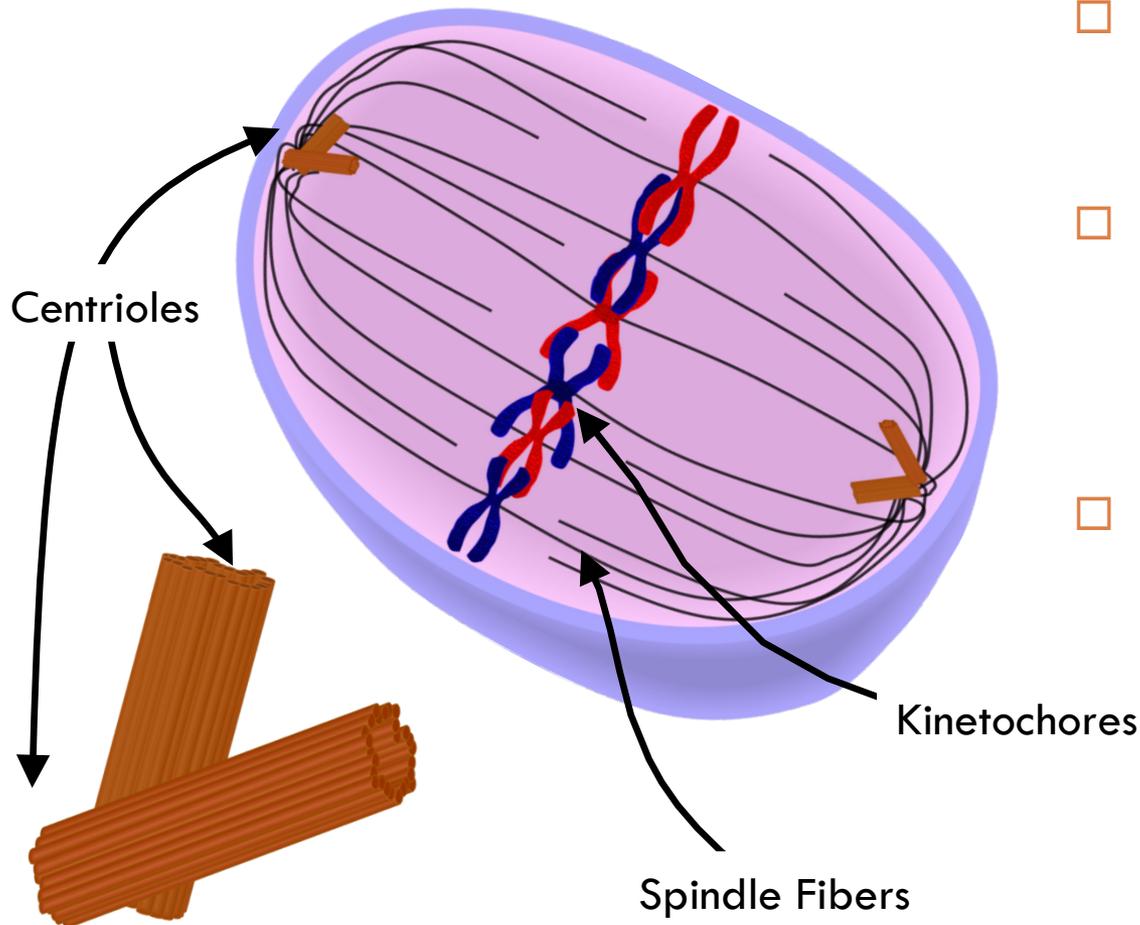


Anatomy of mitosis



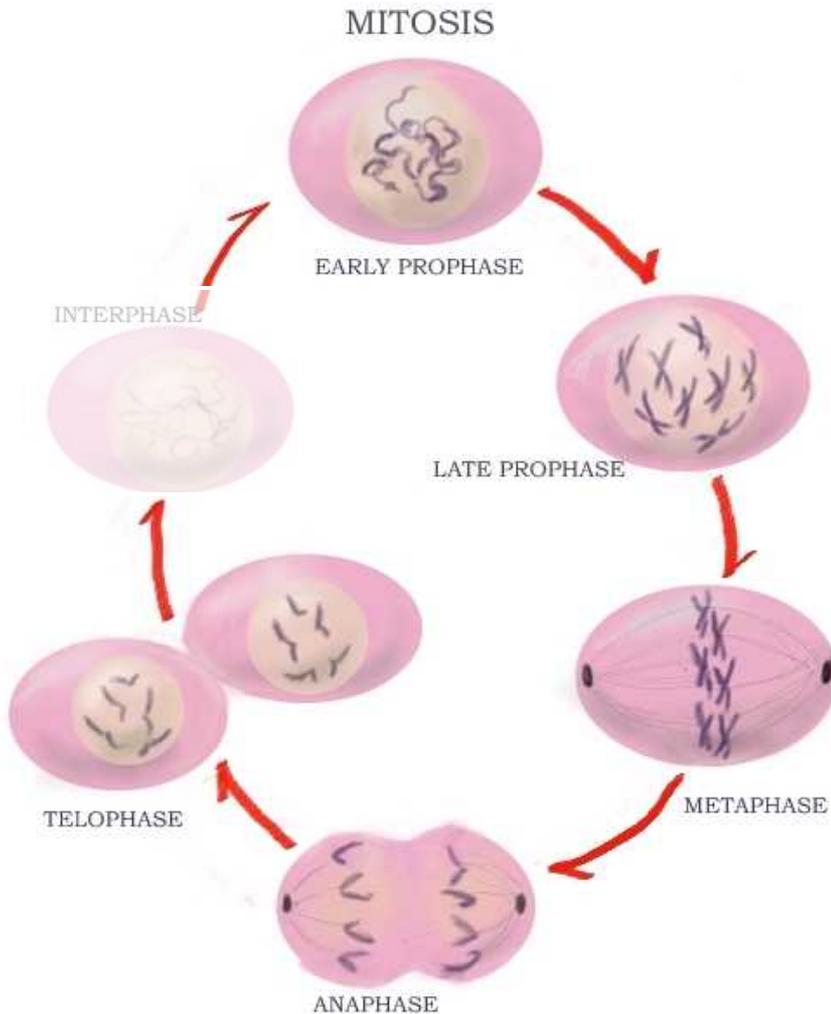
- Sister chromatids
 - ▣ Identical copies of DNA
- Centromere
 - ▣ Holds SCs
- Kinetochore
 - ▣ Attachment

Anatomy of mitosis



- Centriole pairs
 - Anchor & Winch
- Kinetochores
 - Microtubules attach to chromosome
- Spindle fibers
 - Attach the two

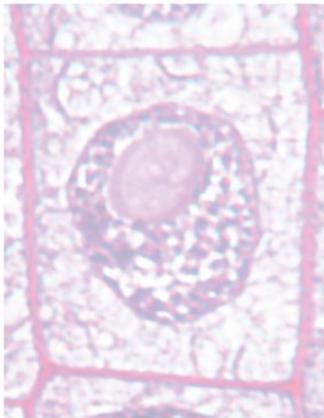
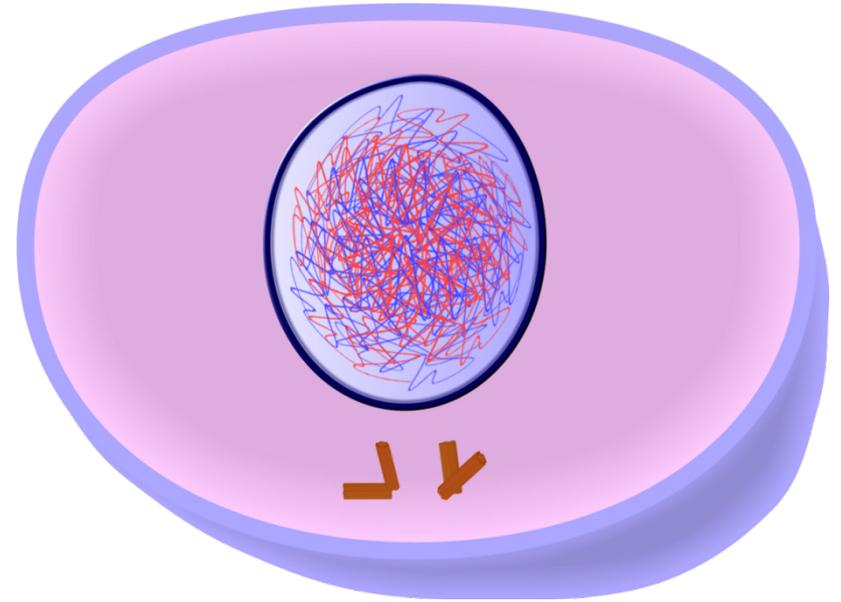
Phases of mitosis



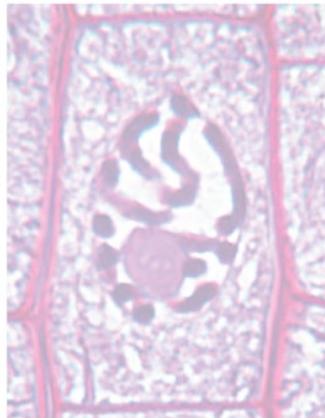
- Really a continuum
- Pneumonic Device
 - ▣ Party people make a trend

Interphase

- Chromosomes relaxed
 - ▣ Chromatin



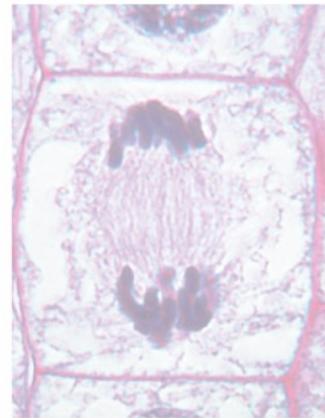
Prophase



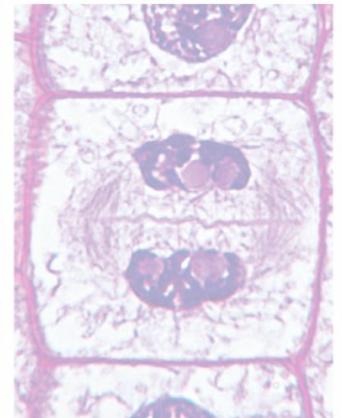
Prometaphase



Metaphase



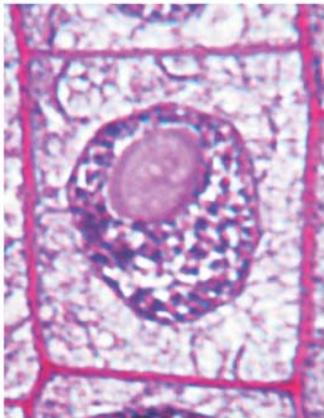
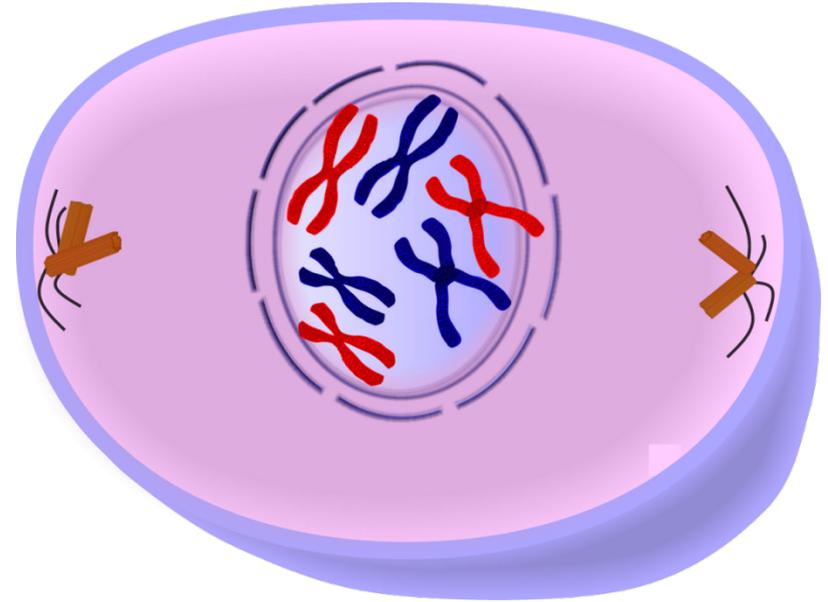
Anaphase



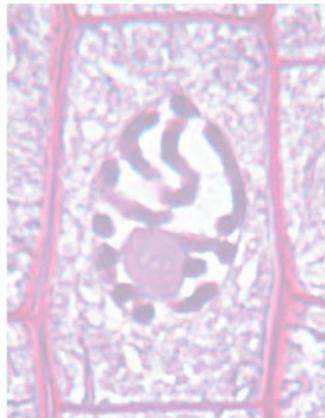
Telophase

Prophase

- Chromosomes condense
 - ▣ Visible
- Nuclear envelope breaks down
- Spindle fibers form at centriole pairs



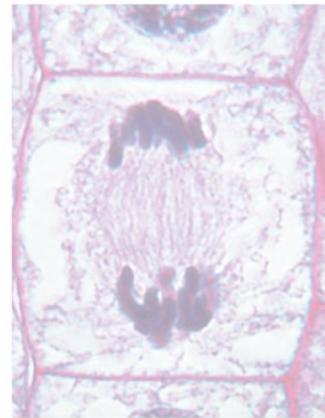
Prophase



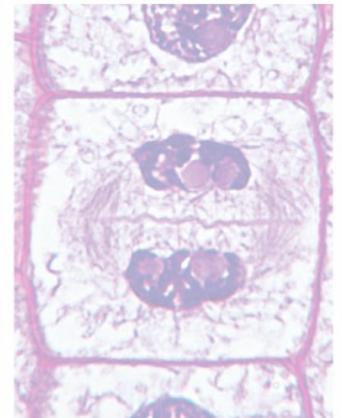
Prometaphase



Metaphase



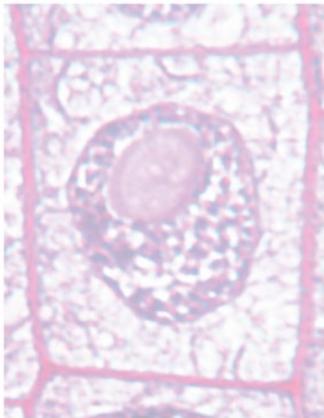
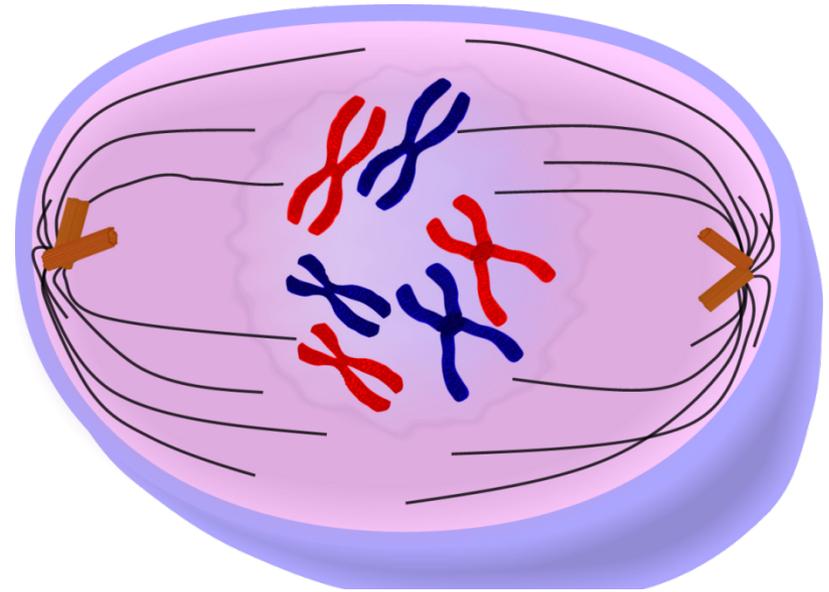
Anaphase



Telophase

Prometaphase

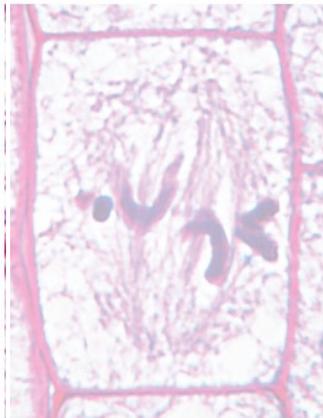
- Nuclear envelope disappears
- Spindle fibers grow
- Chromosomes move towards center



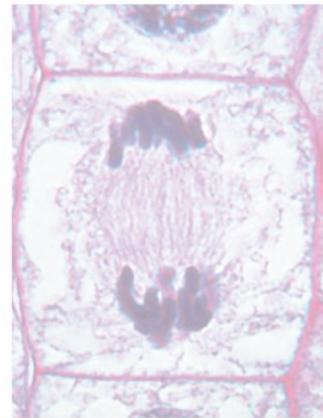
Prophase



Prometaphase



Metaphase



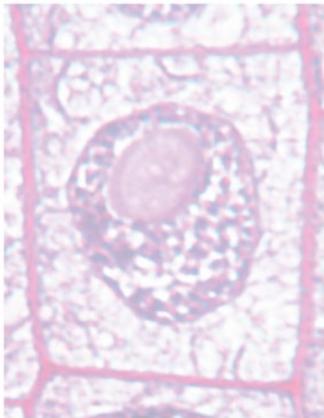
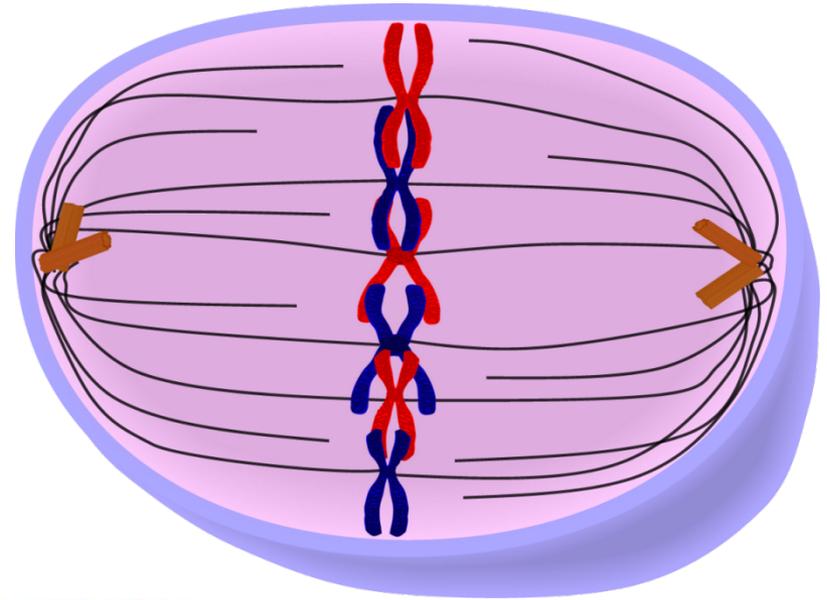
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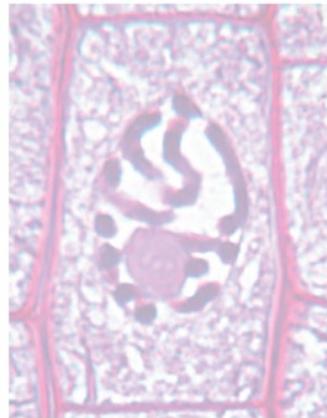
Telophase

Metaphase

- Chromosomes in line
 - ▣ Metaphase plate
- Centriole pairs 180°
- Spindle fibers attach



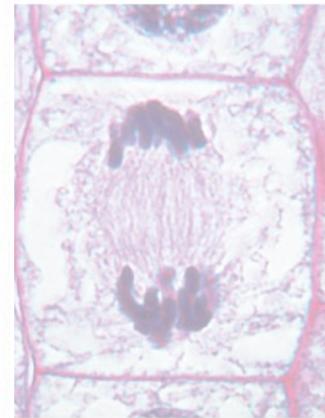
Prophase



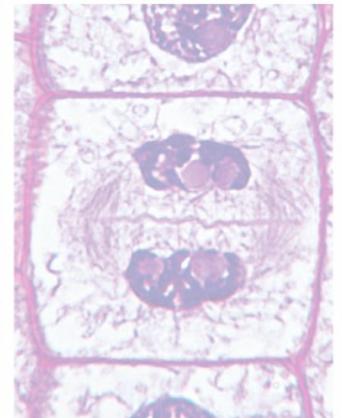
Prometaphase



Metaphase



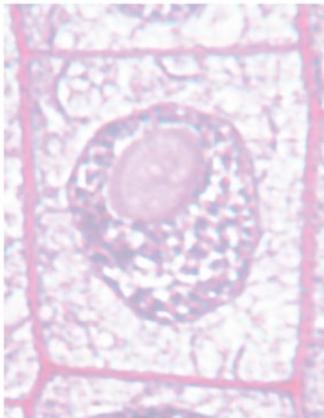
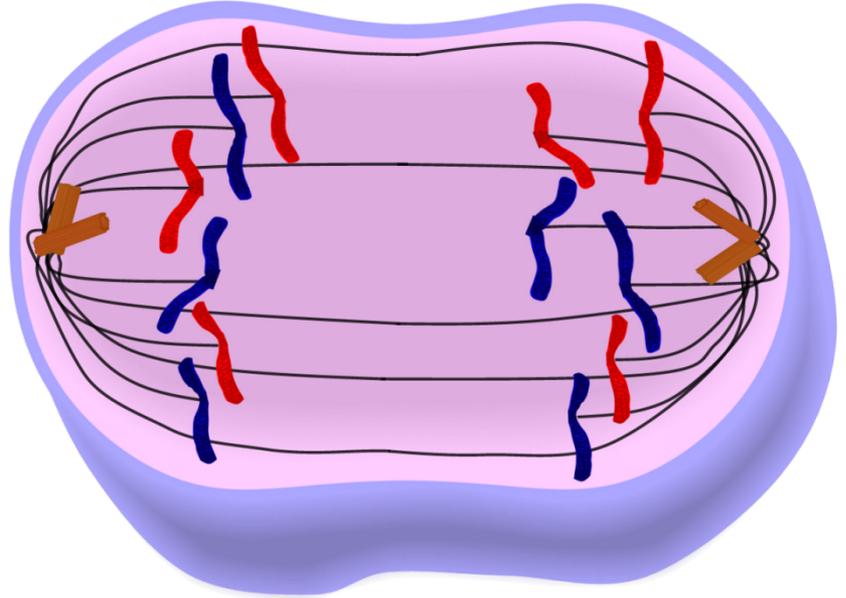
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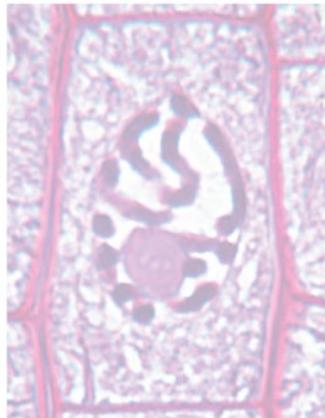
Telophase

Anaphase

- Centromeres split
- Sister chromatids pulled apart
 - ▣ “daughter chromosomes”
- Constriction of spindle fibers



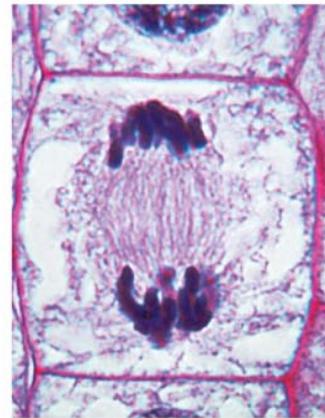
Prophase



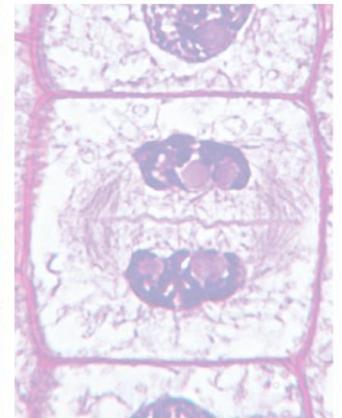
Prometaphase



Metaphase



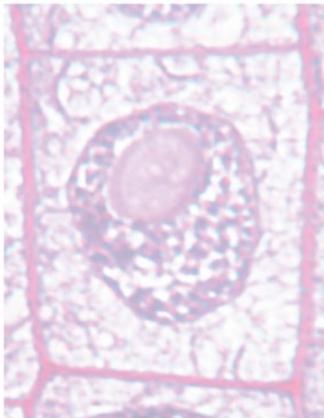
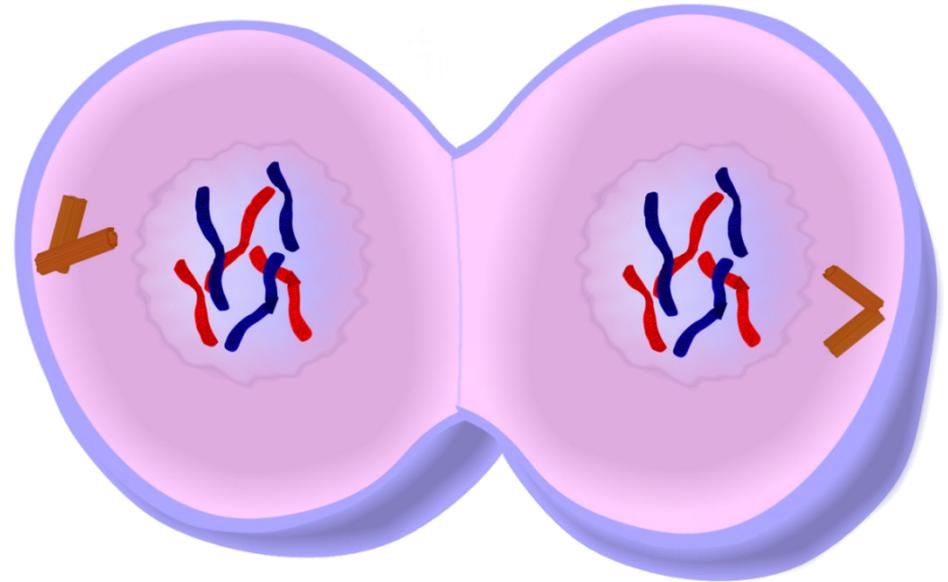
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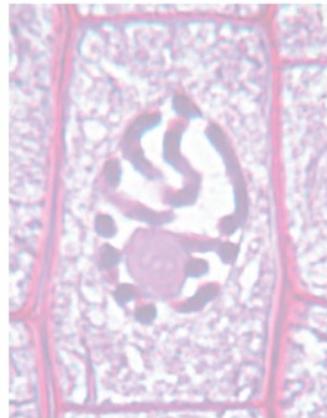
Telophase

Telophase

- Nuclear envelopes reappear
- Chromosomes uncoil
- Spindle fibers disappear



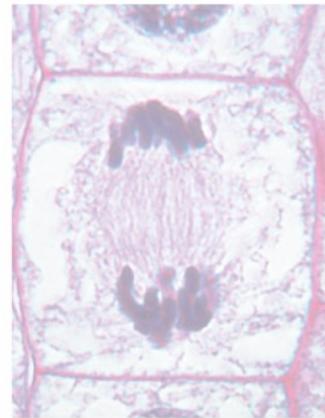
Prophase



Prometaphase



Metaphase



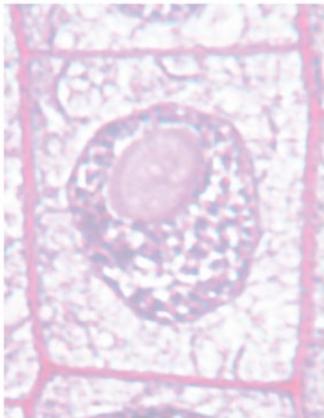
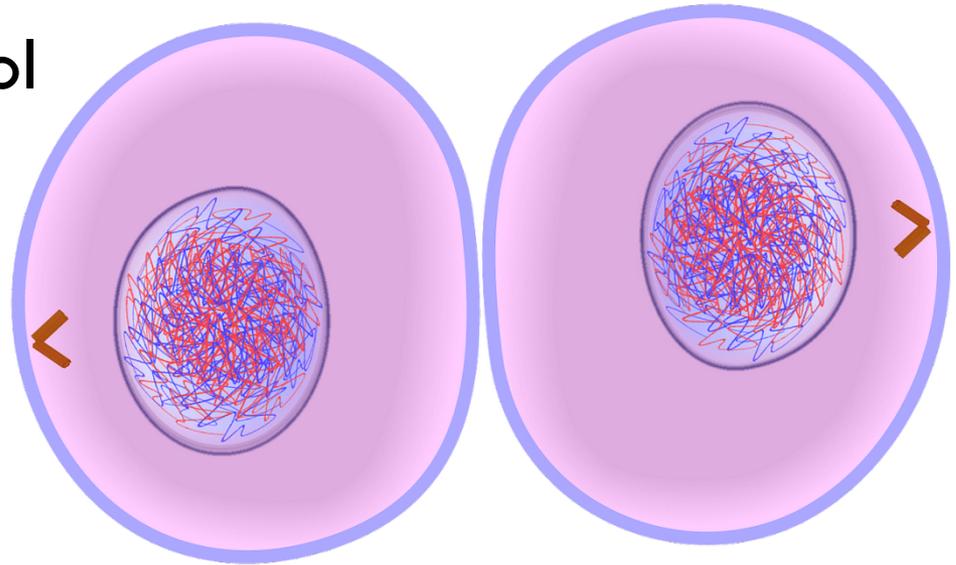
Anaphase



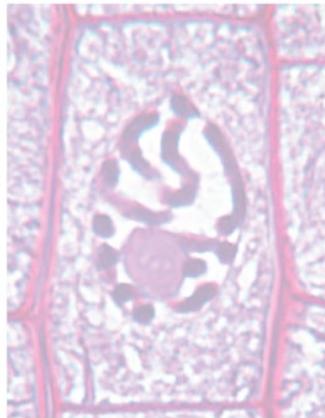
Telophase

Cytokinesis

- Division of the cytosol



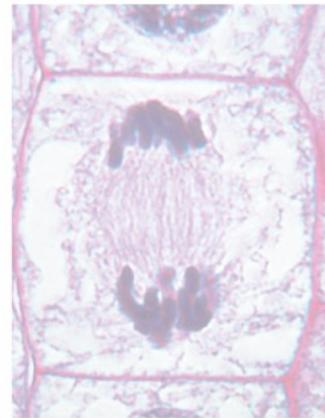
Prophase



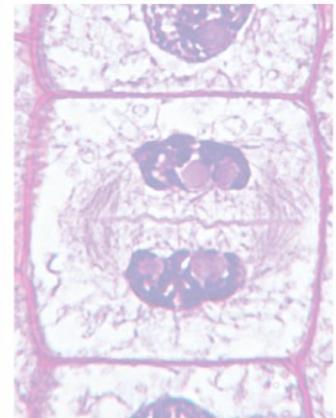
Prometaphase



Metaphase



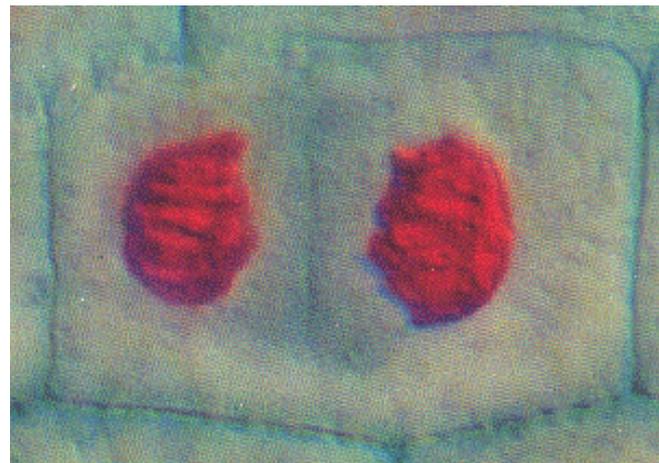
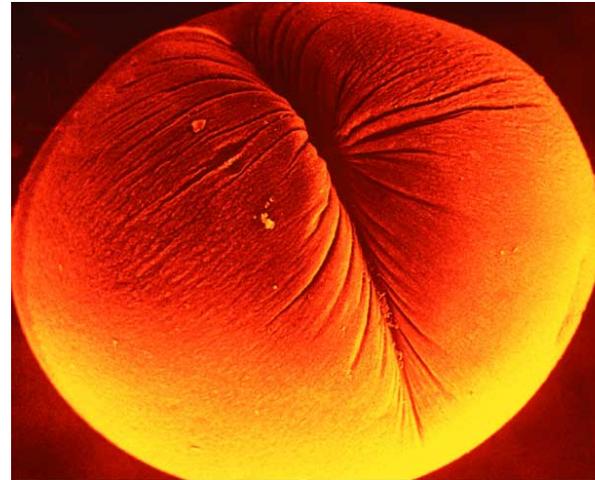
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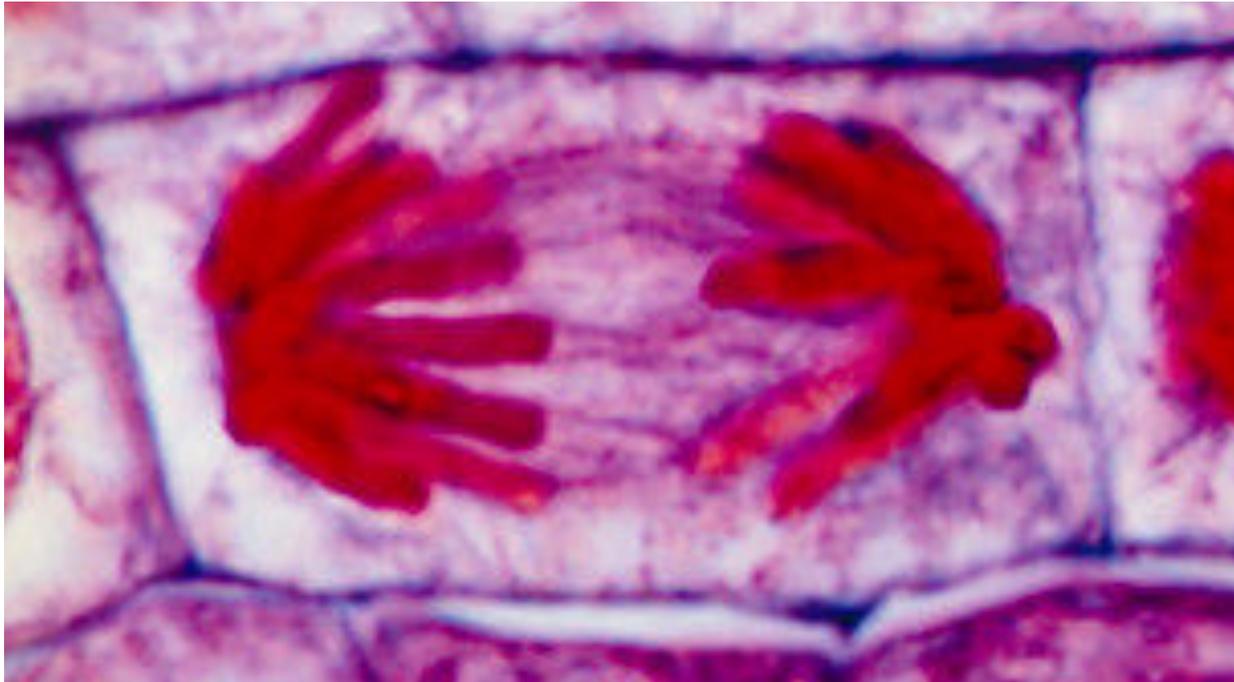
Telophase

Cytokinesis

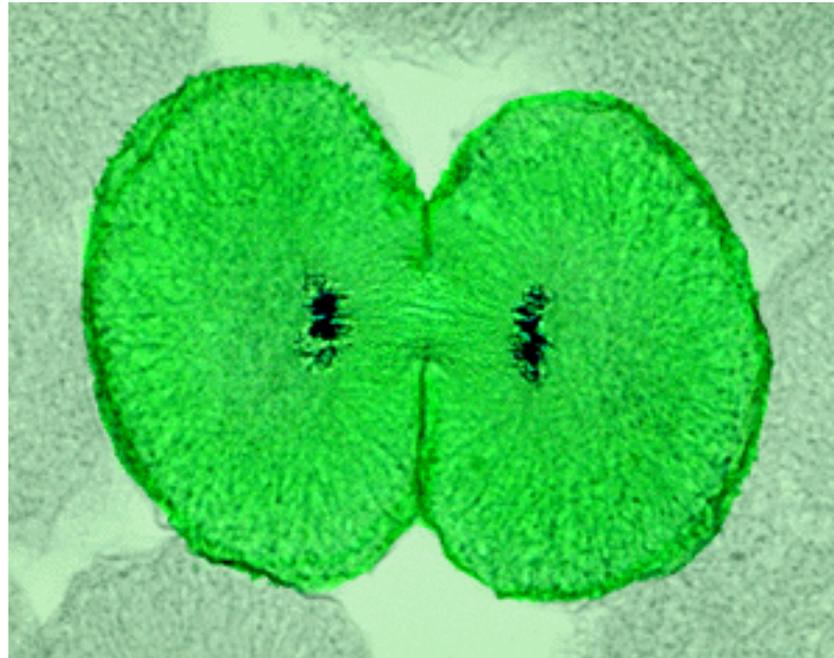
- Animals
 - ▣ Cleavage furrow forms
- Plants
 - ▣ Cell plate forms



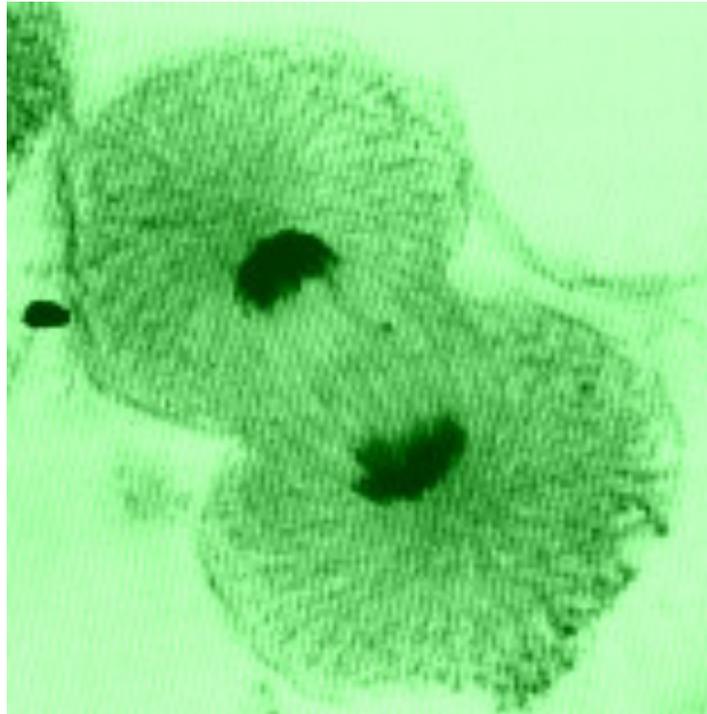
What phase is this?



What phase is this?



What phase is this?



What phase is this?

