

# Warm Up (10/1-10/2)

**\*\*Turn in your lab and take out your 8.1 WKST\*\***

1. Organize the following from basic to complex: tissue, organ, molecule, cell, organism, organ system, organelle, atom
2. Considering the wide range of cell sizes, why can't most organisms be just one giant cell?

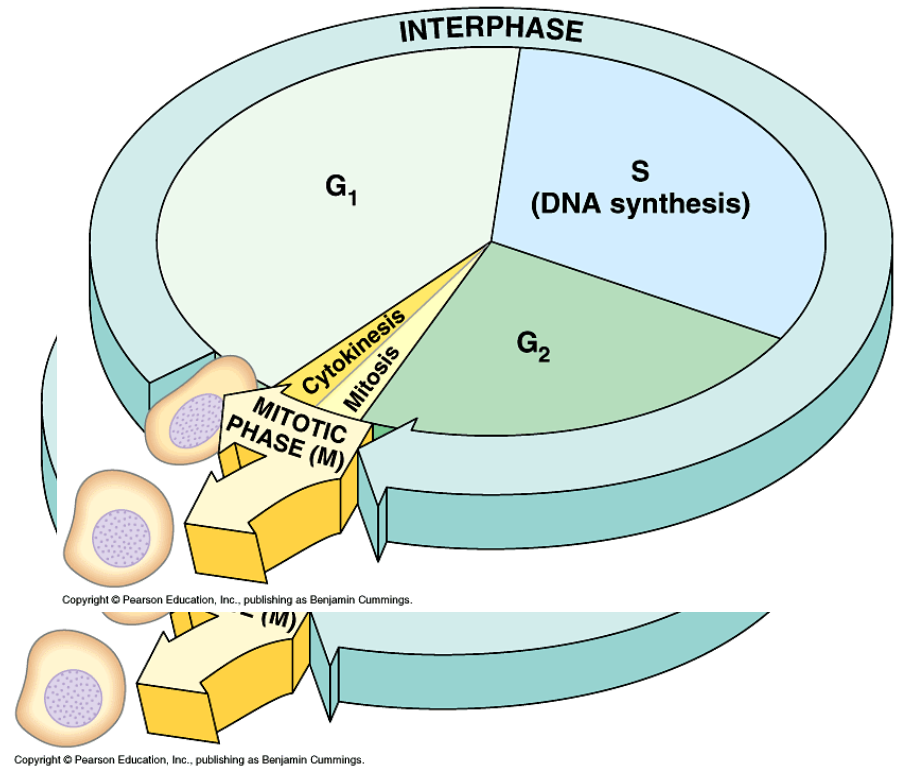
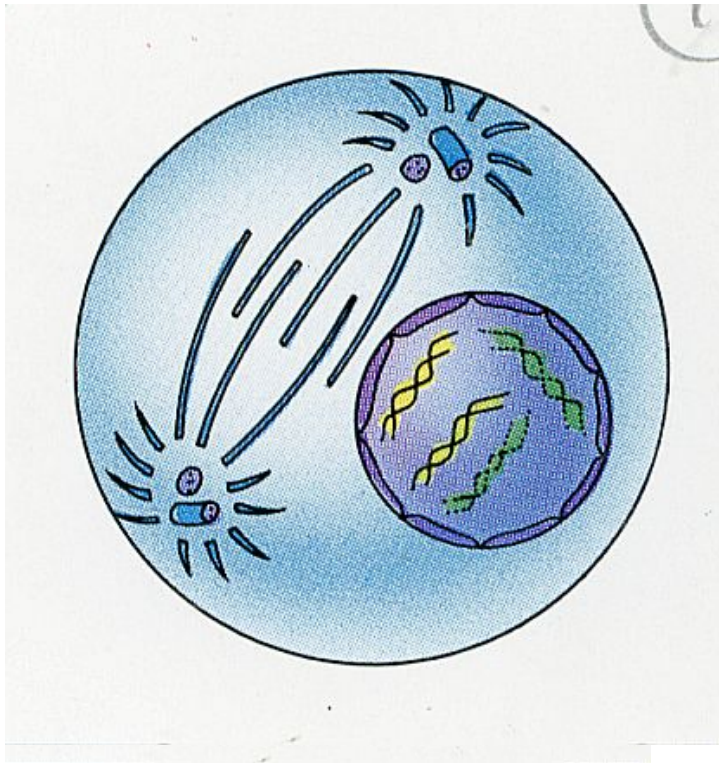
# Agenda

- Warm up
- Grade HW
- 8.2 Notes: Cell Growth and Reproduction
- Ch 8 Quizlet Live
- The Cell Cycle cut and paste graphic organizer

**Homework: 8.2 Section Assessment (pg 210 #1-5)**

**Due Wed/Thurs**

# 8.1 Cell Growth and Reproduction



# What limits a cell's size?

## 1. Diffusion

- More distance= less efficient

## 2. DNA

- Bigger cell= more DNA to support the protein needs of the cell

## 3. Surface area- to- volume ratio

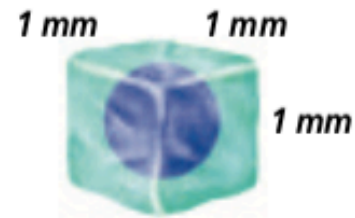
- As cell grows larger, its volume increases much faster than its surface area

# Surface Area- To- volume

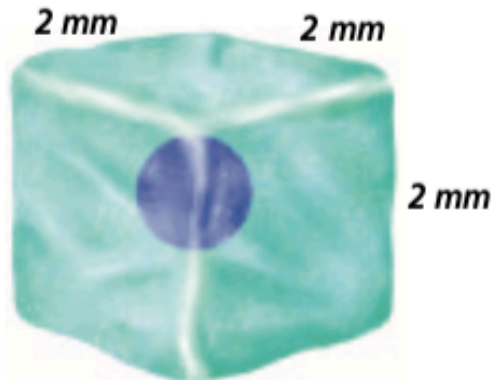
If cell size doubled, the cell would require eight times more nutrients and would have eight times more waste to excrete. There would also not be enough surface area for the plasma membrane to carry out diffusion.

**Figure 8.9**

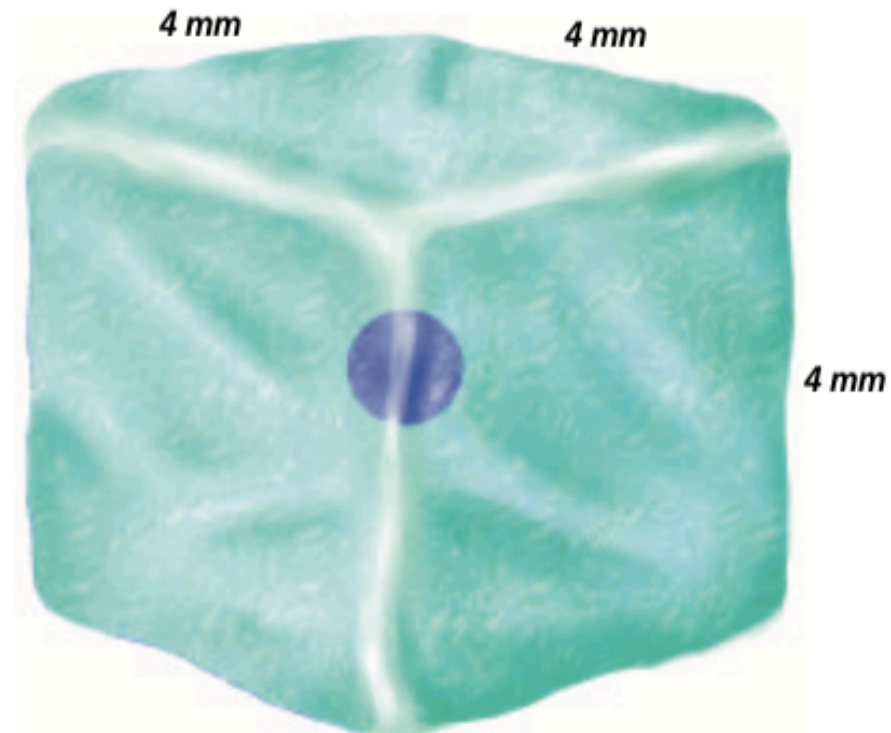
Surface area-to-volume ratio is one of the factors that limits cell size. Note how the surface area and the volume change as the sides of a cell double in length from 1 mm to 2 mm.



Surface area =  $6 \text{ mm}^2$   
Volume =  $1 \text{ mm}^3$

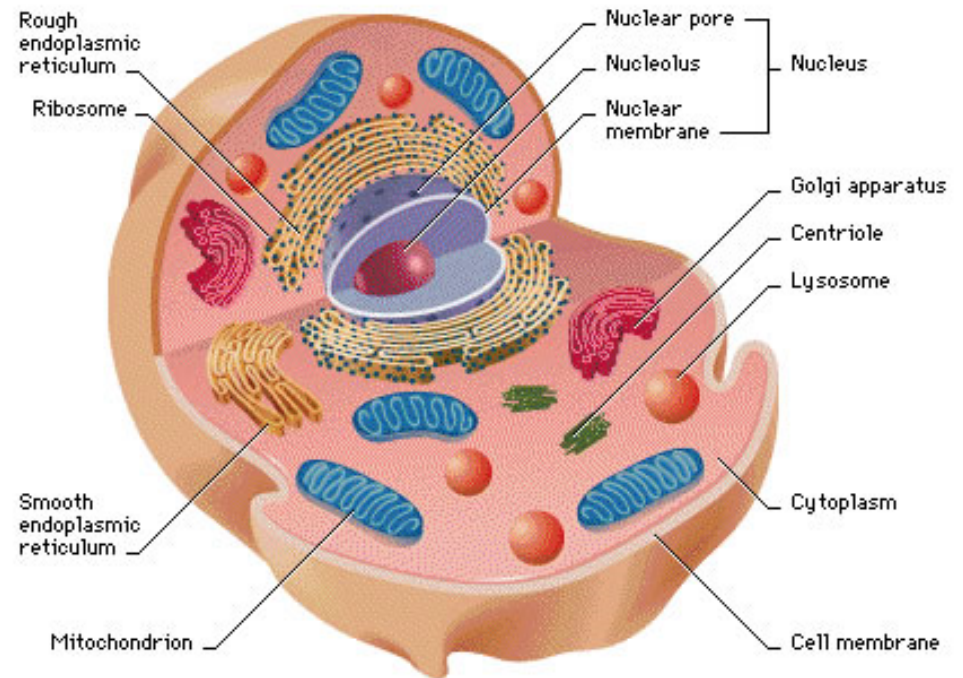


Surface area =  $24 \text{ mm}^2$   
Volume =  $8 \text{ mm}^3$



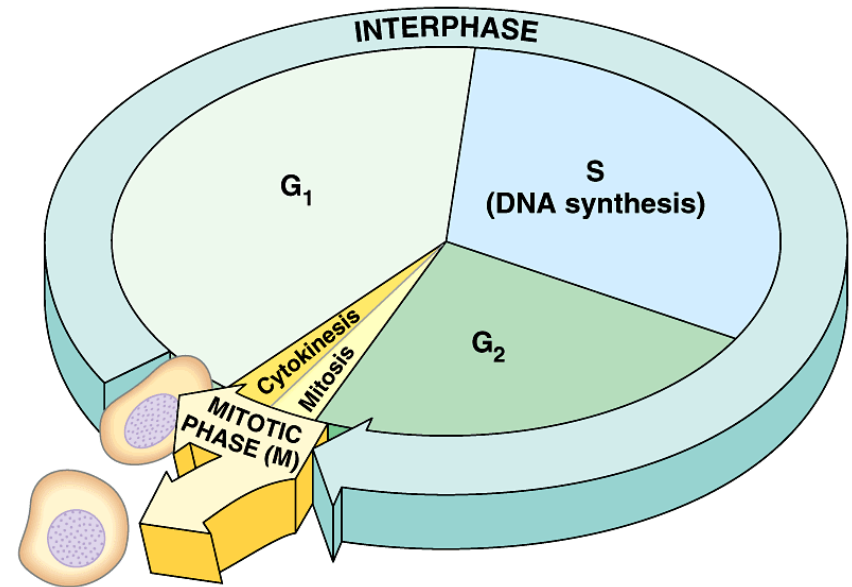
# Review of Cell Features

- Cell Membrane
- Cytoplasm
- Nucleus
- Nuclear Membrane
- Chromosomes



# Cell Life Cycle

1. Cell Growth (G<sub>1</sub>)
  2. DNA Synthesis (S)
  3. Preparation for Cell Division (G<sub>2</sub>)
  4. Mitosis
- Non-mitosis stages (G<sub>1</sub>, S, G<sub>2</sub>) are called interphase



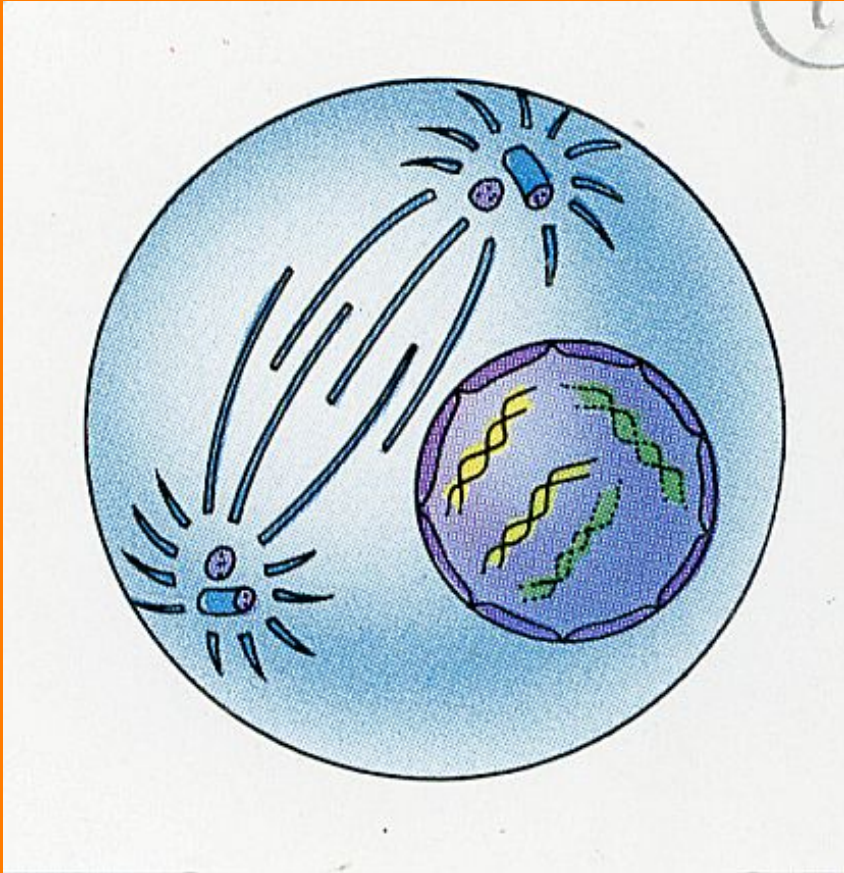
Copyright © Pearson Education, Inc., publishing as Benjamin Cummings.

# Interphase

- ( $G_1$ ):, cell grows and builds organelles
- Synthesis phase (S): cell copies DNA
- ( $G_2$ ): cell creates structures called microtubules for mitosis

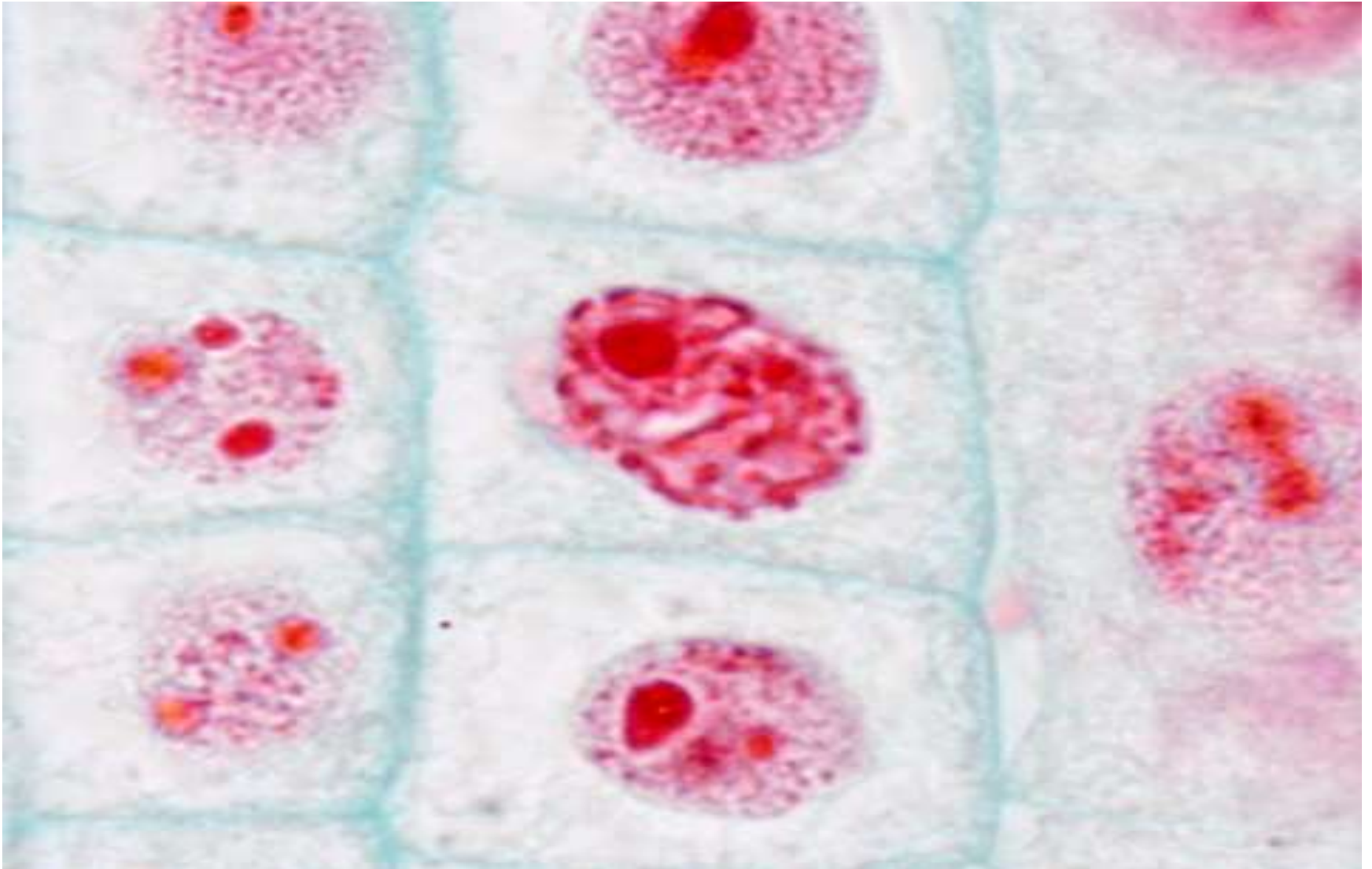


# Mitosis Stage 1: Prophase



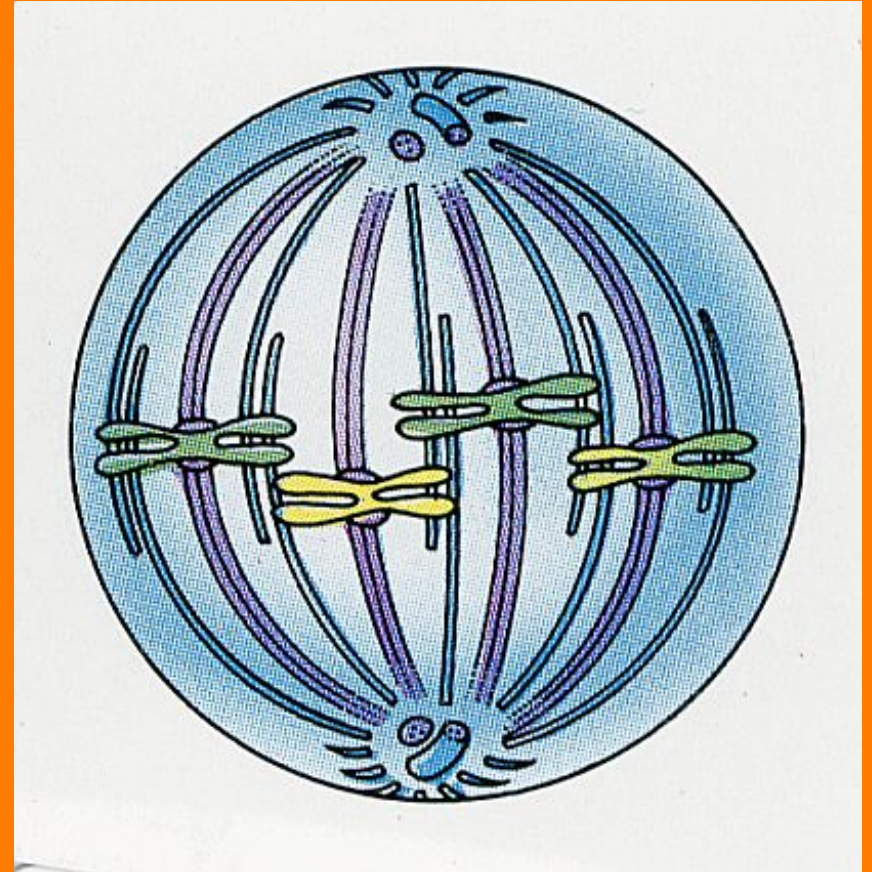
- Chromatin (long strands of DNA) condense into chromosomes  
<https://youtu.be/9kQpYdCnU14>
- Nuclear membrane breaks down
- Microtubules organize into a spindle
- Centrioles move to opposite ends of the cell

# Prophase

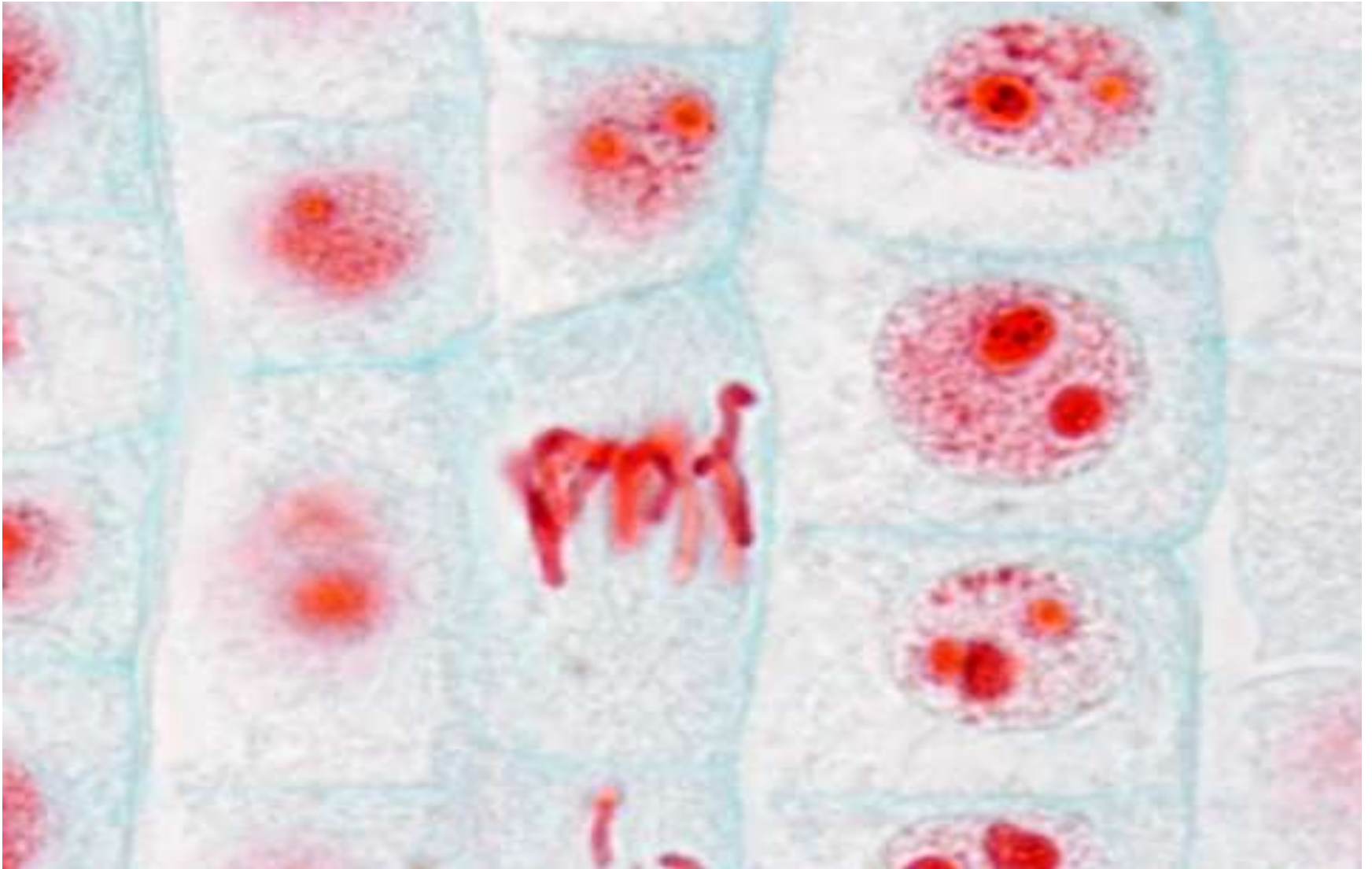


# Mitosis Stage 2: Metaphase

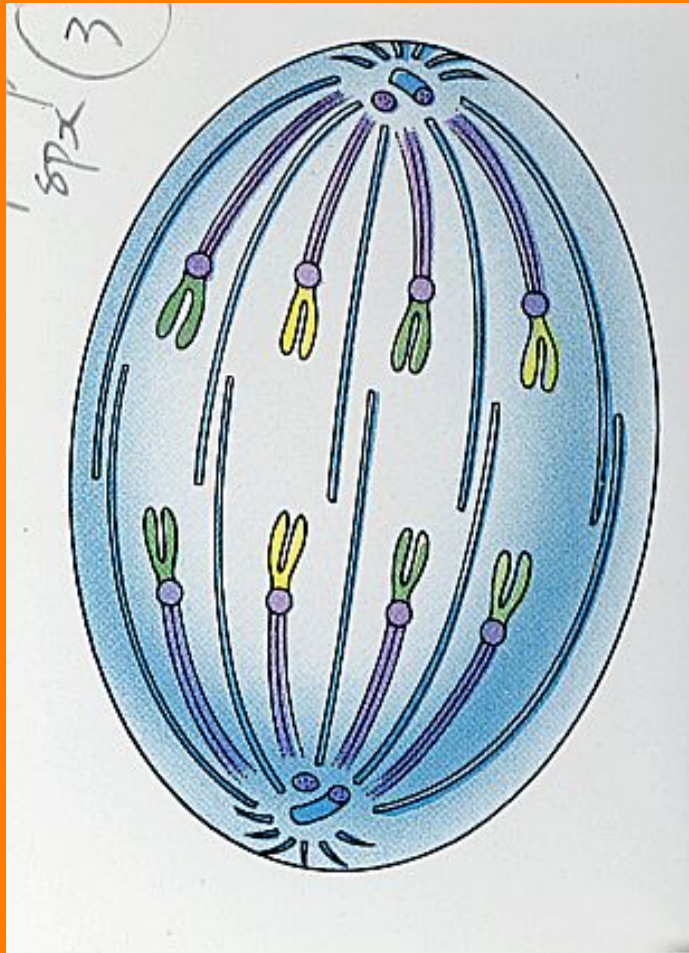
- Chromosomes fully condensed
- Nuclear membrane gone
- Chromosomes line up at center
- Spindle fibers link opposite poles and chromosomes



# Metaphase



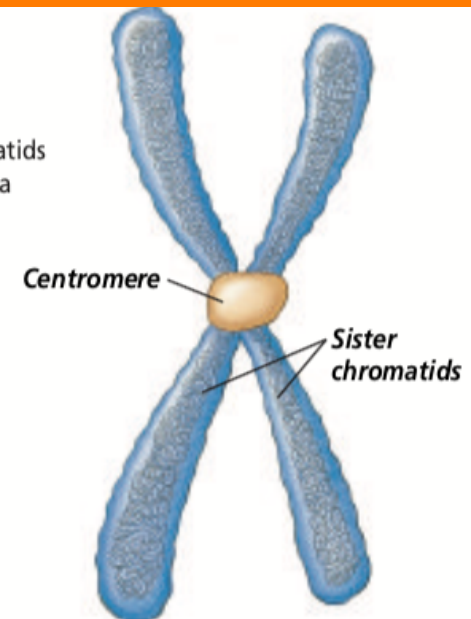
# Mitosis Stage 3: Anaphase



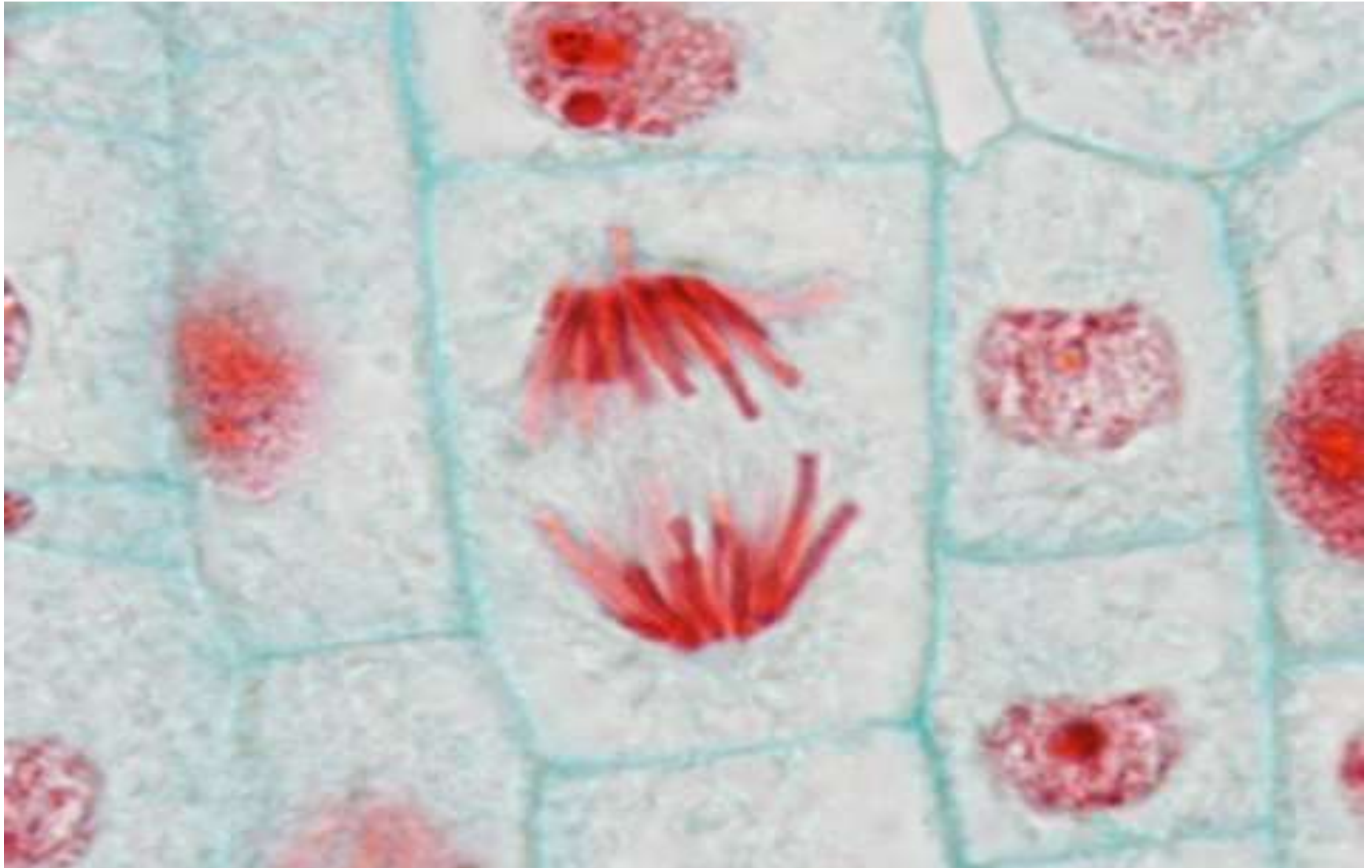
- Spindle fibers shorten, pulling sister chromatids apart
- Each side of the cell has a full set of chromosomes

**Figure 8.12**

The two sister chromatids are held together by a centromere.

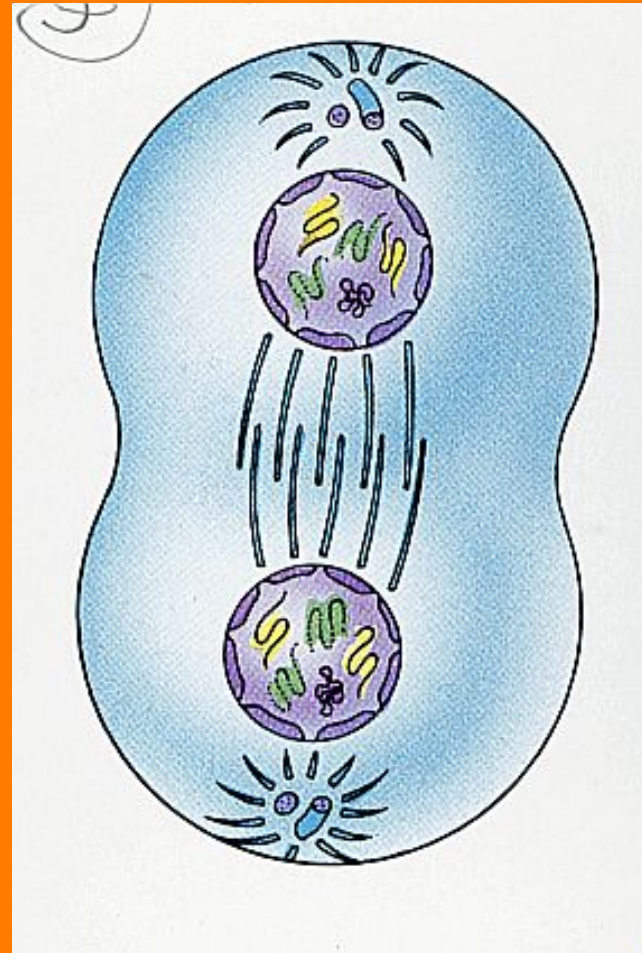


# Anaphase

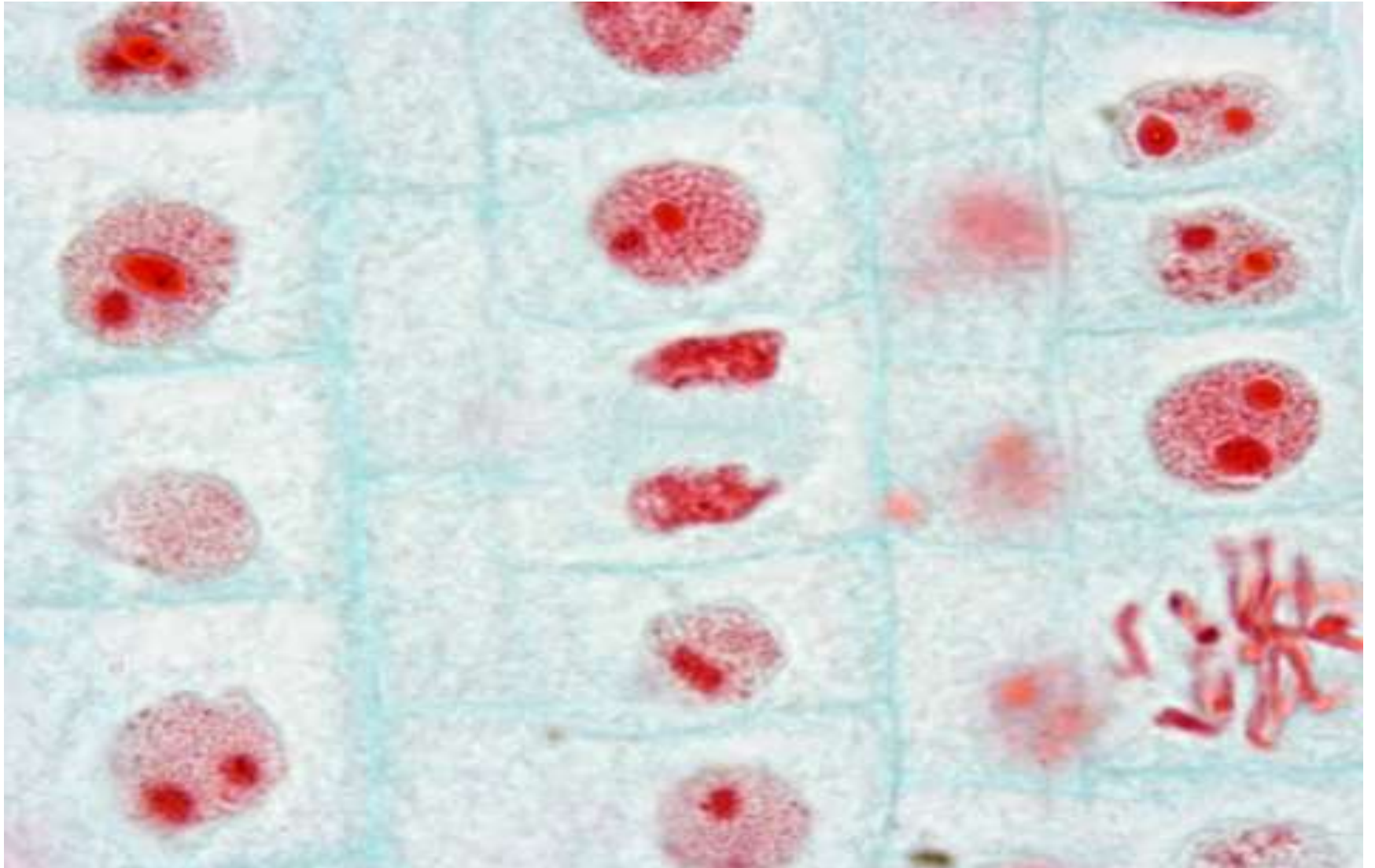


# Mitosis Stage 4: Telophase

- Nuclear membrane reforms in each new cell
- Chromosomes un-coil
- Spindle and fibers dissolve
- Cytokinesis begins

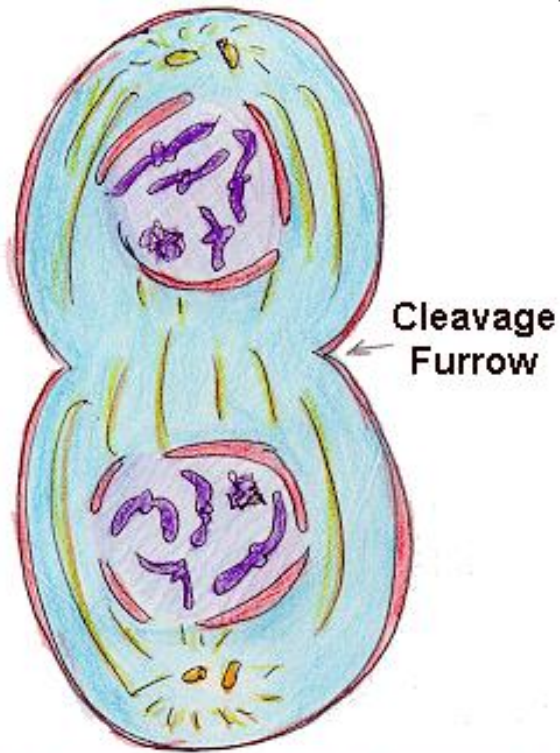


# Telophase



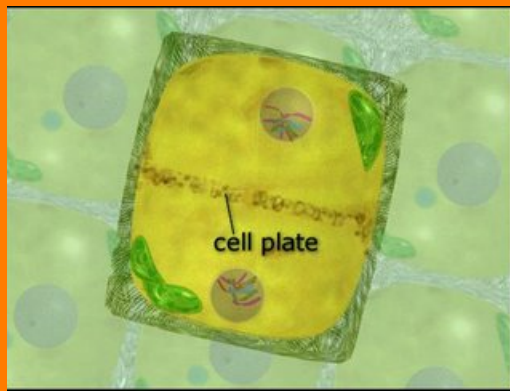


# Cytokinesis



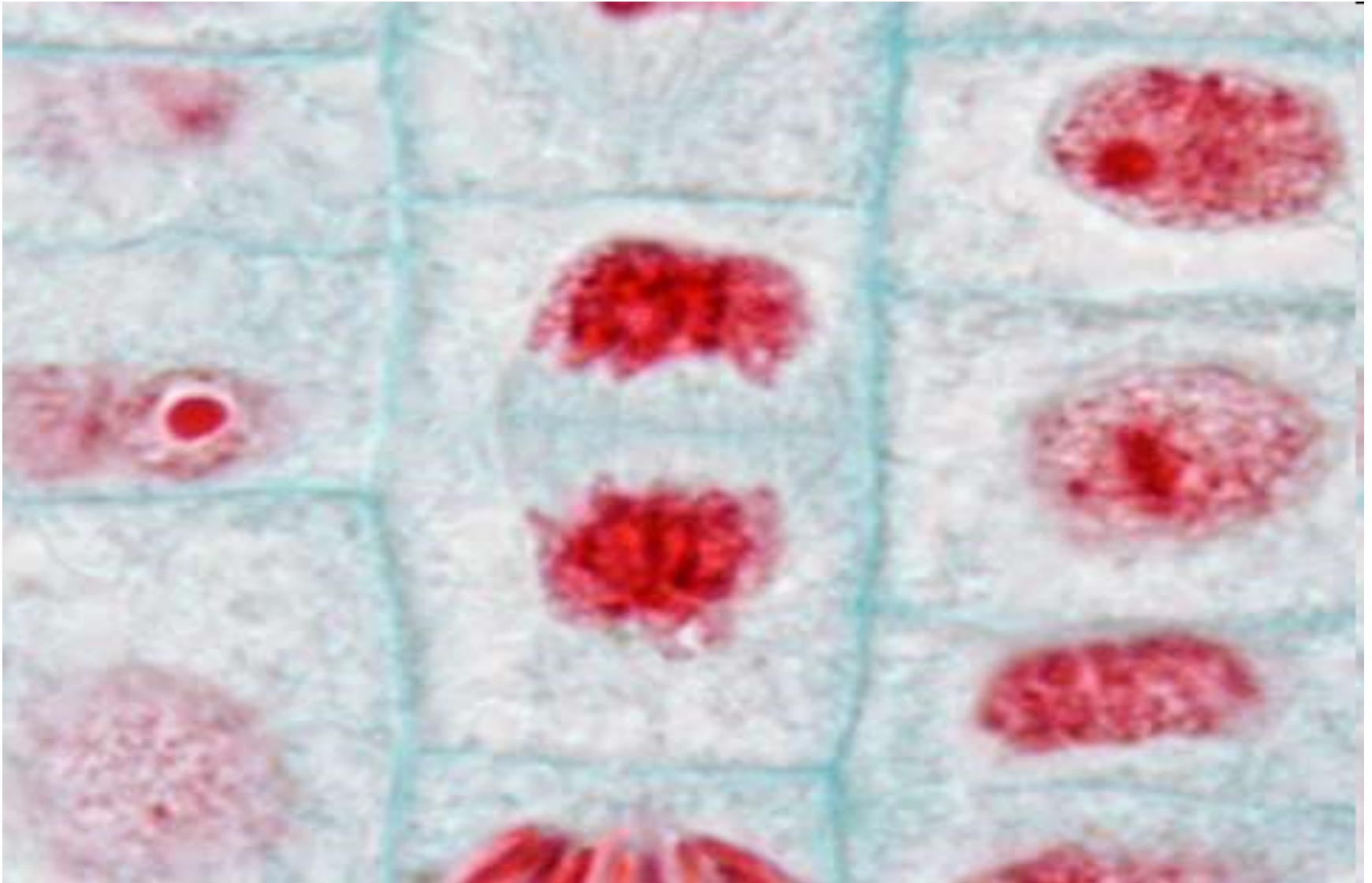
**Telophase and Cytokinesis**

- Occurs after mitosis, but before interphase
- Cell membrane grows toward the center of the cell, “pinching” it in two
- New cells are half the size of original



**\*\*Plant cells: New cell wall is formed via cell plate\*\***

# Cytokinesis



<https://youtu.be/C6hn3sA0ip0>

# Results of Mitosis

