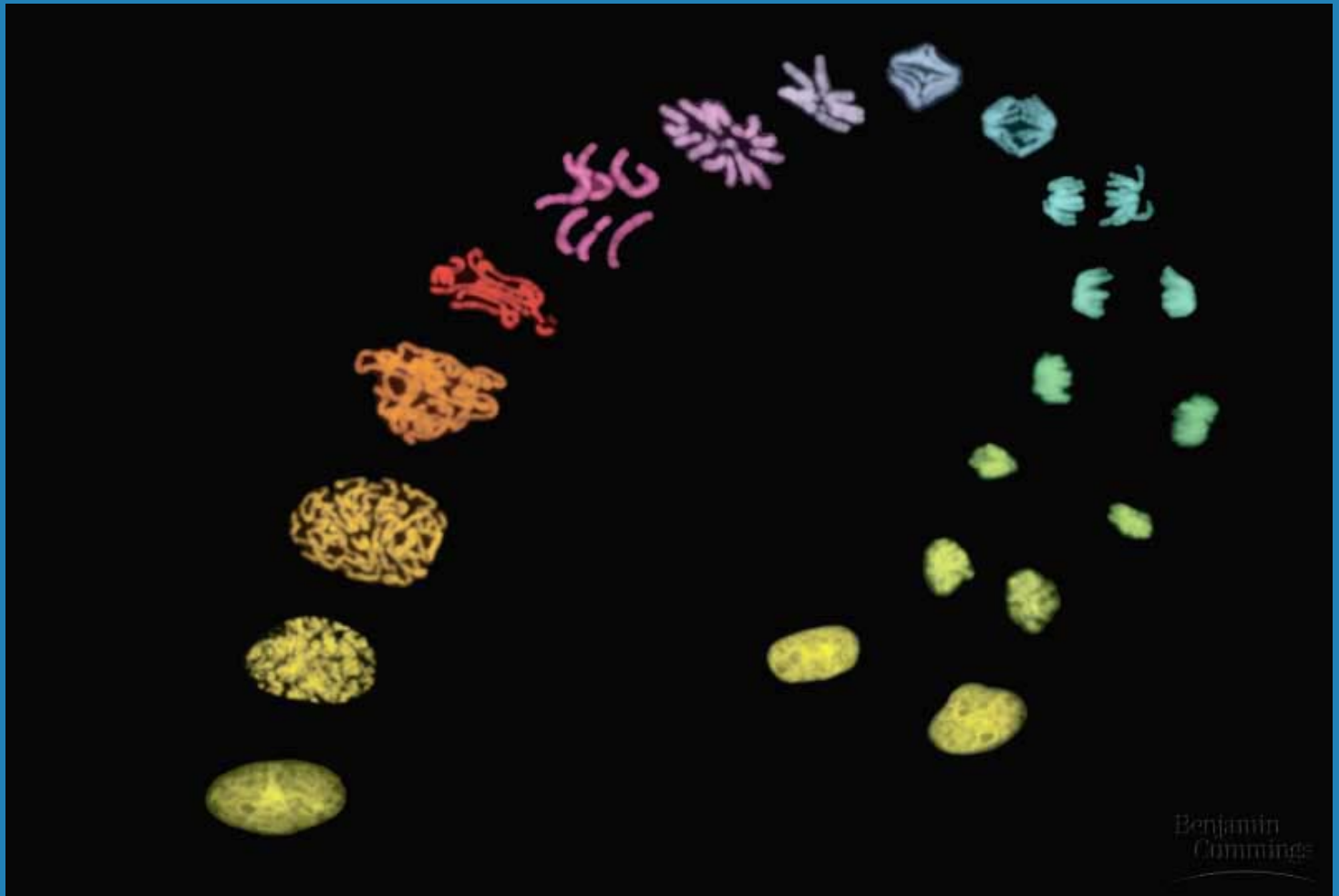
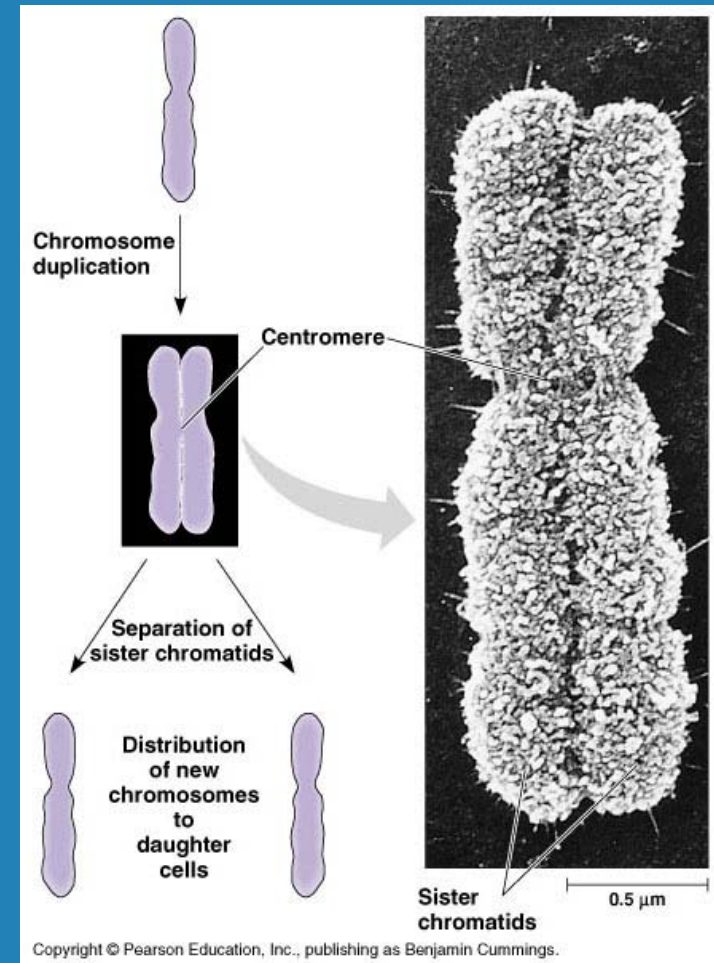


Chapter 6 – The Cell Cycle



Cell Division: Key Roles

- Ω **Genome:** cell's genetic information
- Ω **Somatic (body cells) cells**
- Ω **Gametes (reproductive cells):** sperm and egg cells
- Ω **Chromosomes:** DNA molecules
- Ω **Diploid (2n):** 2 sets of chromosomes
- Ω **Haploid (1n):** 1 set of chromosomes
- Ω **Chromatin:** DNA-protein complex
- Ω **Chromatids:** replicated strands of a chromosome
- Ω **Centromere:** narrowing "waist" of sister chromatids
- Ω **Mitosis:** nuclear division
- Ω **Cytokinesis:** cytoplasm division
- Ω **Meiosis:** gamete cell division



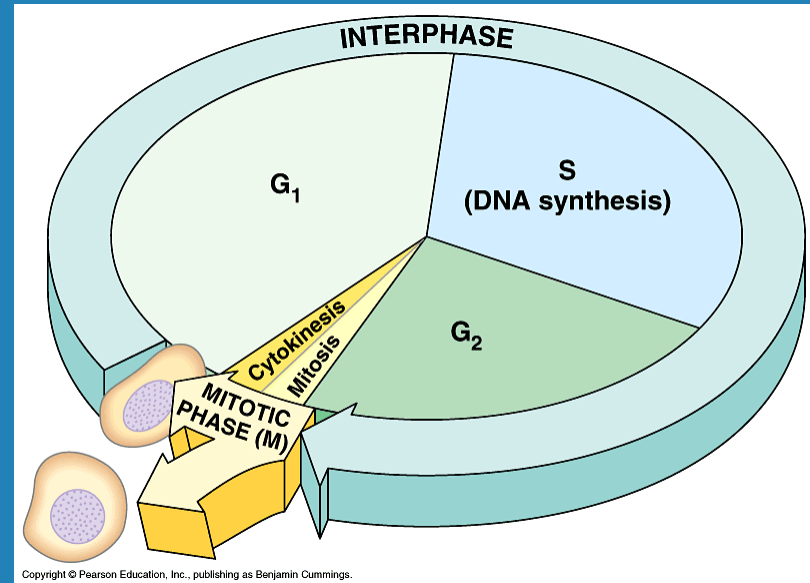
The Cell Cycle

∞ Interphase (90% of cycle)

- G₁ phase~ growth
- S phase~ synthesis of DNA
- G₂ phase~ preparation for cell division

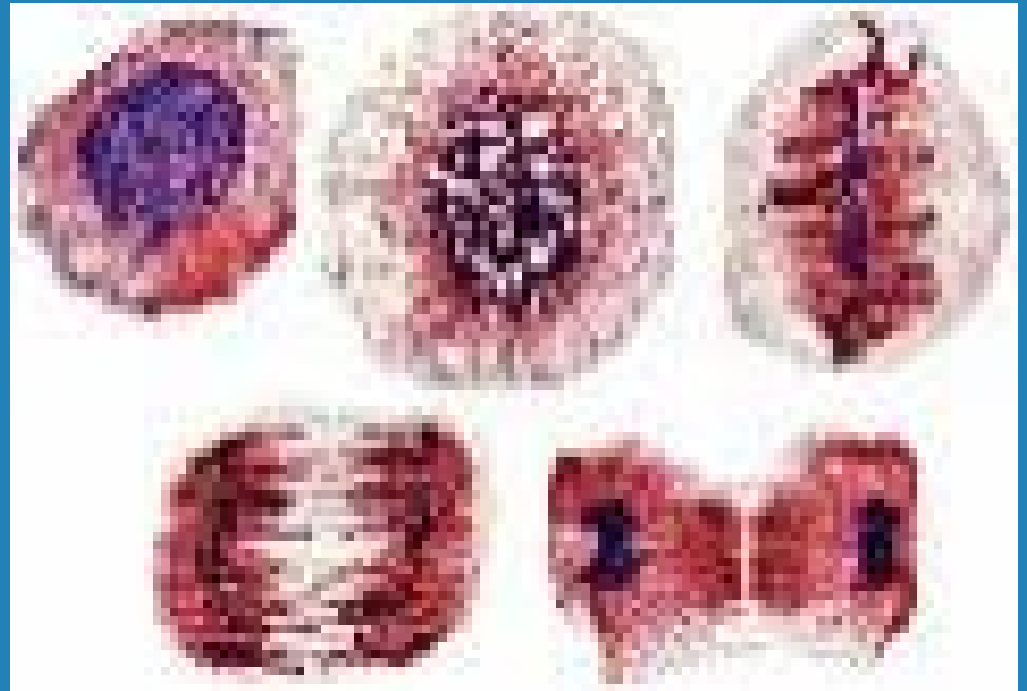
∞ Mitotic phase

- Mitosis~ nuclear division
- Cytokinesis~ cytoplasm division



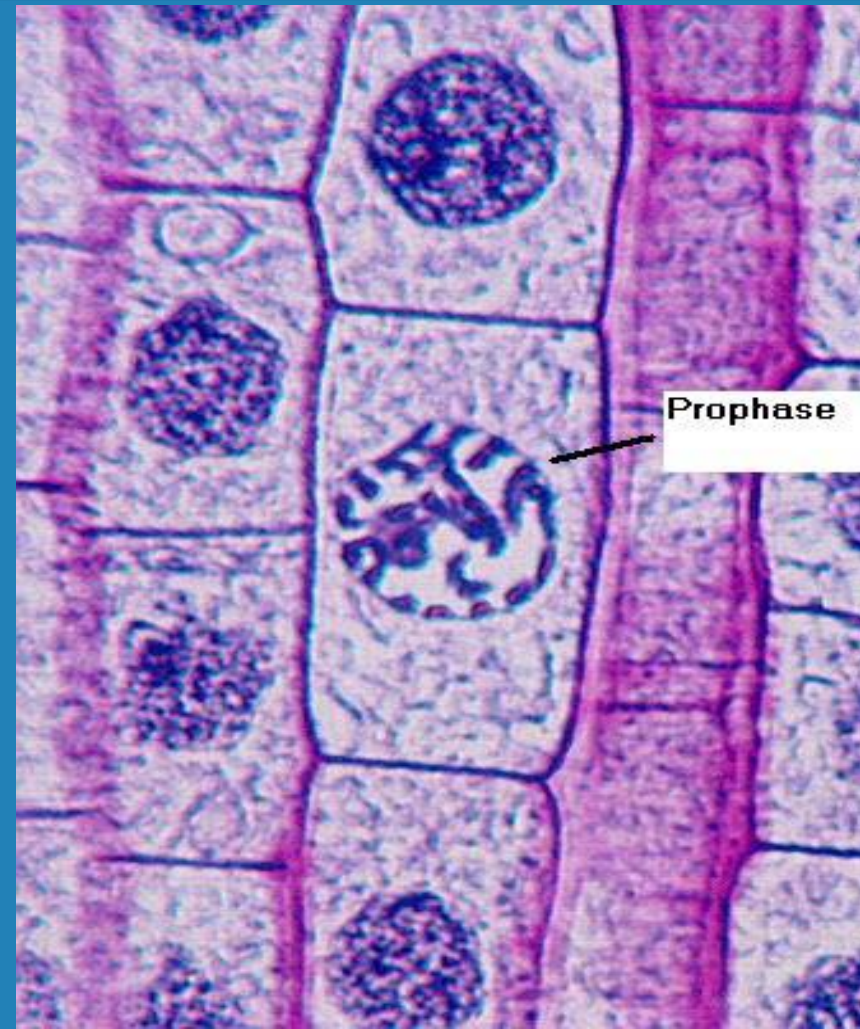
Mitosis

- ∞ **Prophase**
- ∞ **Metaphase**
- ∞ **Anaphase**
- ∞ **Telophase**



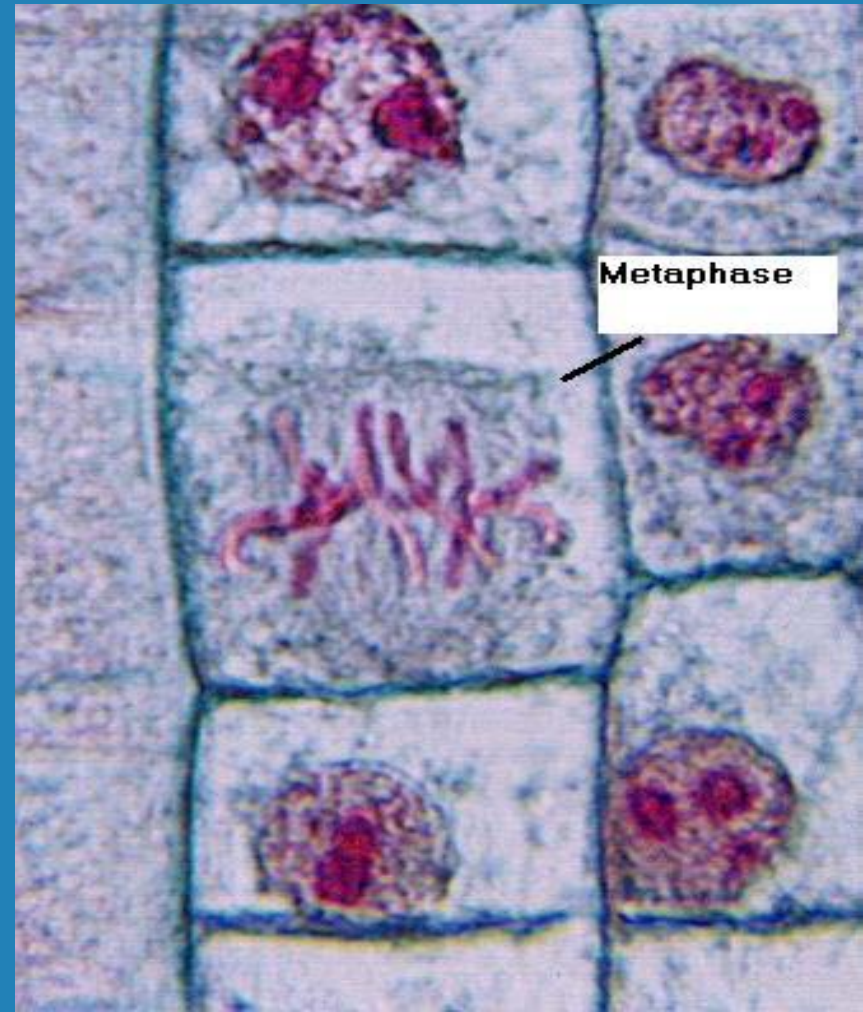
Prophase

- ⌚ **Chromosomes visible**
- ⌚ **Nucleoli disappear**
- ⌚ **Sister chromatids**
- ⌚ **Mitotic spindle forms**
- ⌚ **Centrosomes move**



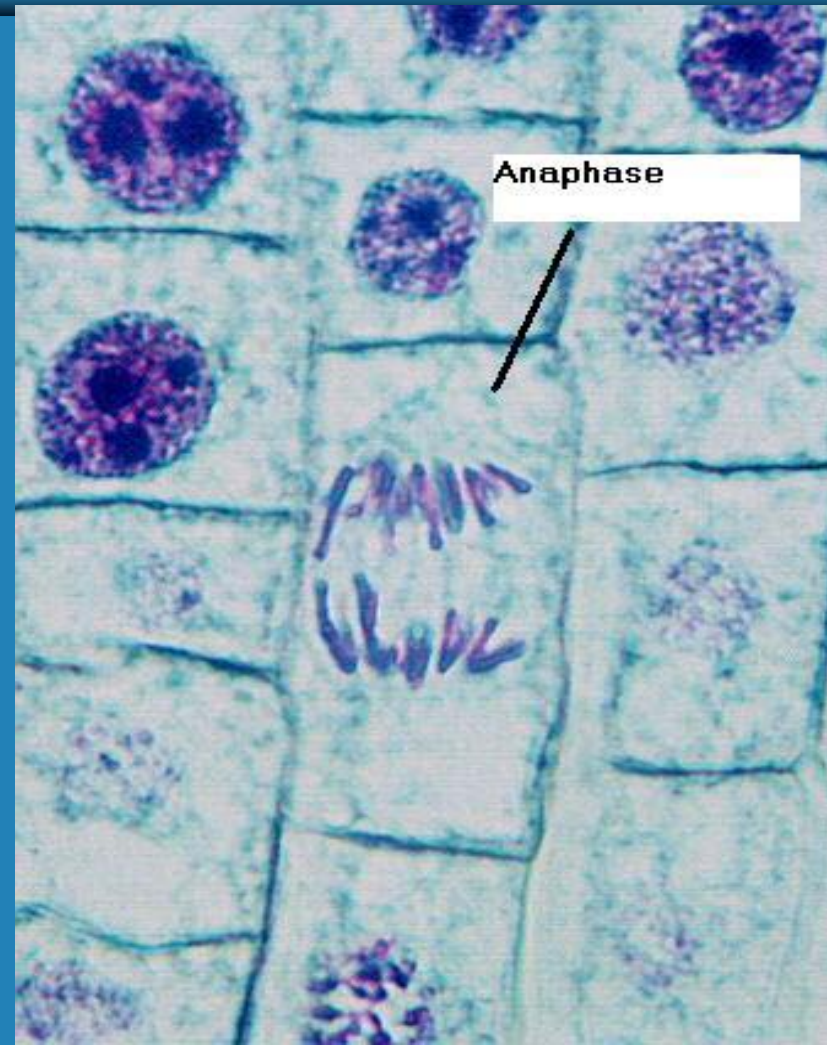
Metaphase

- ☞ **Centrosomes at opposite poles**
- ☞ **Centromeres are aligned**
- ☞ **Kinetochores of sister chromatids attached to spindle**



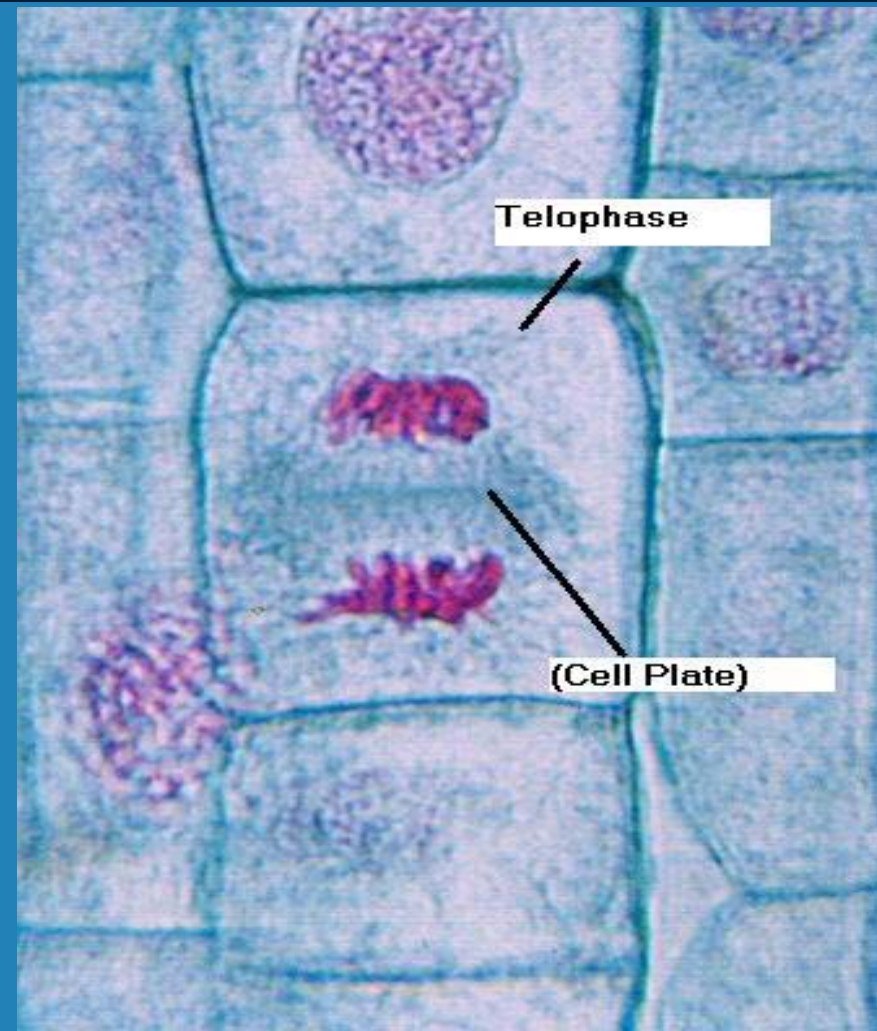
Anaphase

- ⌚ Paired centromeres separate; sister chromatids liberated
- ⌚ Chromosomes move to opposite poles
- ⌚ Each pole now has a complete set of chromosomes



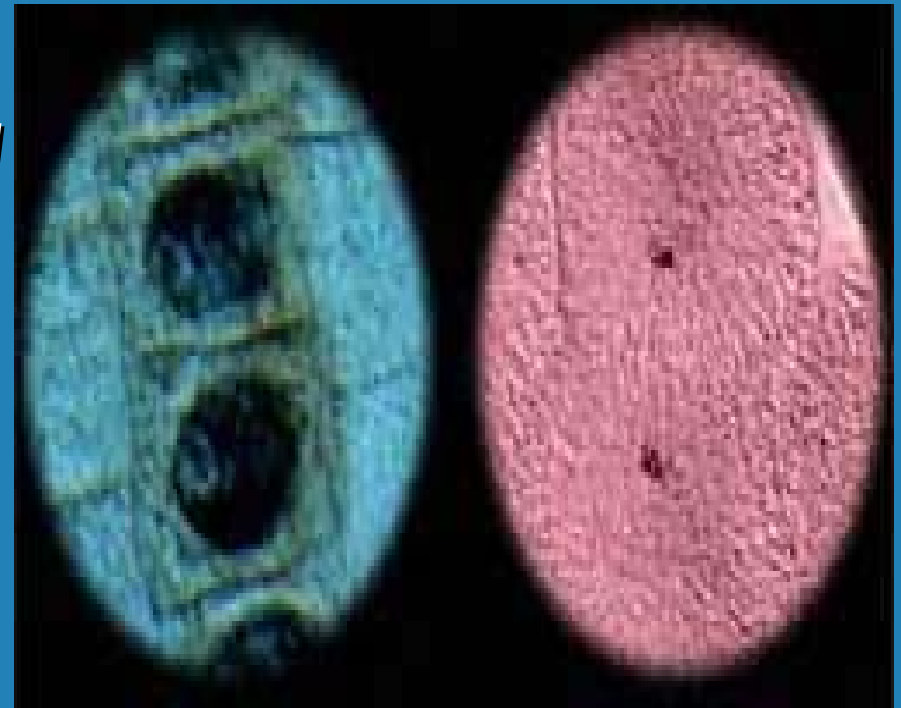
Telophase

- ⌚ **Daughter nuclei form**
- ⌚ **Nuclear envelopes arise**
- ⌚ **Chromatin becomes less coiled**
- ⌚ **Two new nuclei complete mitosis**



Cytokinesis

- ∞ **Cytoplasmic division**
- ∞ **Animals:**
cleavage furrow
- ∞ **Plants:**
cell plate

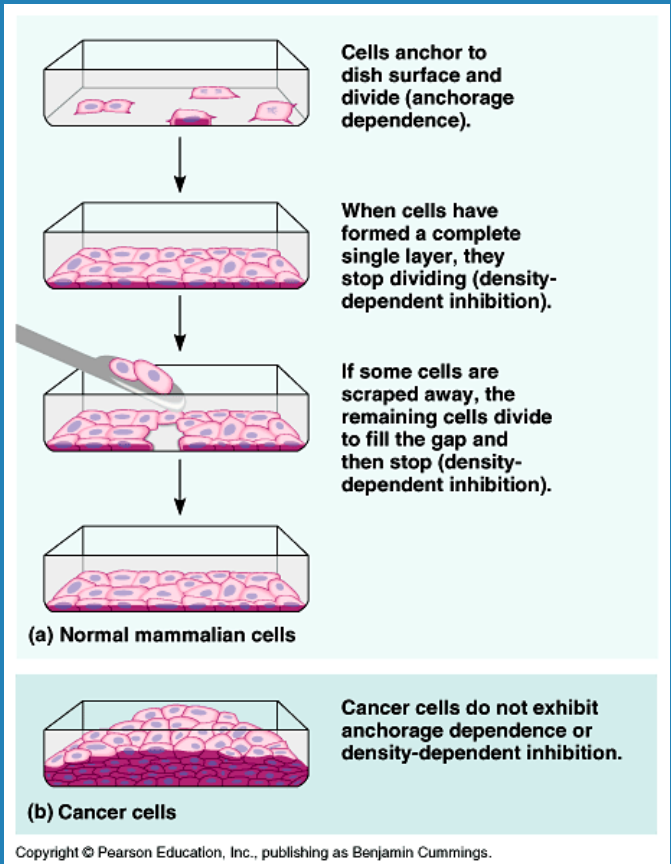


Cell Cycle regulation

Ω Growth factors

Ω Density-dependent inhibition

Ω Anchorage dependence





Cancer

- ∞ **Transformation**
- ∞ **Tumor: benign or malignant**
- ∞ **Metastasis**