# Honors Biology Chapter 9 Student Notes

Cytokinesis in Animal and Plant Cells

Cytokinesis – is the division of the cytoplasm.

* Accompanies most cells but not all
* As a result, if cytokinesis doesn’t occur, you have a multinucleated cell.
* Cytoplasm division begins in anaphase and continues into telophase
* Cytokinesis is different in plant and animal cells because of differences in cell structure.

Cytokinesis in Animal Cells

* A cleavage furrow 🡪an indentation of the membrane between the two daughter nuclei forms just as anaphase draws to a close.
* The cleavage furrow
  + Deepens when a band of actin filaments called a contractile ring, slowly forms a circular constriction between the two daughter cells.

Cytokinesis in Plant Cells

* The rigid cell wall doesn’t allow cytokinesis by furrowing.
* Instead it involves the building of a new cell wall between the daughter cells
* Forms a cell plate🡪newly formed plasma membrane that expands outward until it reaches the old plasma membrane and fuses with the new membrane.
* The new membrane releases molecules that form a new cell wall.
* Cell wall is strengthened by cellulose

Functions of Mitosis

* Permits growth
* Required during development
* Necessary for fertilized egg
* Occurs after birth as a child becomes an adult
* Repair in juries🡪Allows cuts to heal or a broken bone to mend

Control of the Cell Cycle

Have 2 things:

1. Signal
   1. Is an agent that influences the activity of the cell
2. Growth factors
   1. Are signaling proteins that are received at the plasma membrane

Signals ensure that the cell cycle stages follow one another in the normal sequence.

Cell Cycle Checkpoints

3 check points controlled by cyclins 🡪internal signaling proteins

Specific cyclins must be present for the cell to move on to the G1 phase, to the S phase and to the G2 phase.

1. G1 checkpoint
   1. Primary checkpoint
   2. Cycle is stopped when DNA is damaged
   3. Stopped by p53 (p🡪protein 53 molecular weight g)
   4. First p53 attempts to repair, rising levels bring apoptosis 🡪programmed cell death
2. G2 checkpoint
   1. Stops cycle if DNA does not replicate or does not finish replicating
   2. Prevents the initiation of the M stage
   3. Also offers DNA repair if damaged
3. M Checkpoint
   1. Stops if chromosomes are not properly attached to spindle or aligned properly

Apoptosis

* Programmed cell death
* Cell loose contract with neighboring cells
* Nucleaus fragments and plasma membrane develop blisters
* Cell fragments are engulfed by WBC or neighboring cells

Apoptosis and Cell Division

* Keep the body stable and homeostasis by regulating the number of cells in the body
* Cell division 🡪increases
* Apoptosis 🡪decreases
  + # of somatic cells (body cells)
* Both mitosis and apoptosis are a normal part of growth and development
  + Examples:
    - Tadpole becomes a frog🡪tail disappears because of apoptosis
    - Webbed feet or hands

\*\*Cell division is occurring now in developing skin cells and RBC.

\*\*Apoptosis is occurring to prevent a tumor from developing and viruses from spreading.