Peer-Teaching of Signal Transduction Pathways

Each group will be assigned a pathway and will be given several minutes to look over their notes and prepare a presentation. Arrange the phrases into the order in which they occur and then prepare to teach the pathway to the rest of the class.

A. Signal transduction pathway for steroid hormones
   1. Receptor – hormone complex enters nucleus of the cell
   2. Steroid hormone diffuses through the plasma membrane of the target cell
   3. Receptor – hormone complex binds to DNA to turn on transcription of targeted gene
   4. Hormone binds with receptor in the cytoplasm of the cell
   5. mRNA moves into cytoplasm and initiates translation of protein
   \((2, 4, 1, 3, 5)\)

B. Intracellular calcium as a signal transduction pathway
   1. Phospholipase C is stimulated or activated
   2. \(\text{Ca}^{++}\) is released from intracellular calcium stores and protein kinase C is activated
   3. Hormone binds to receptor in plasma membrane
   4. \(\text{Ca}^{++} / \text{calmodulin}\) complex activates enzymes and protein kinase C phosphorylates enzymes
   5. \(\text{IP}_3\) is produced and diacylglycerol is produced
   6. G protein in plasma membrane is activated
   \((3, 6, 1, 5, 2, 4)\)

C. cyclic AMP as a signal transduction pathway
   1. G protein in plasma membrane of target cell is activated
   2. Hormone binds to receptor in plasma membrane
   3. Adenylyl cyclase is activated
   4. Cyclic AMP activates protein kinase A
   5. Protein kinase A phosphorylates enzymes
   6. Adenylyl cyclase converts ATP to cyclic AMP
   \((2, 1, 3, 6, 4, 5)\)
Cell Cycle

Each group will be assigned one of the main parts of the cell cycle. You will then teach the rest of the class about what the most important aspects of your part is. Think about questions like when does it happen? What is the purpose? And how does it occur?

Interphase:

- 3 stages
- S phase = DNA synthesis
- Two growth stages (G1, G2) are regulated by cyclins and CDKs
- Cell is usually in G1 when its not dividing, some cells are in G0 (brain cells) and never re-enter the cell cycle

Mitosis:

- Division of the chromosomes into two separate nuclei (eukaryotic)
- Stages:
  - Prophase—chromosomes begin to condense, mitotic spindle begins to form
  - Prometaphase—nuclear envelope fragments, duplicated chromosomes condense even more
  - Metaphase—sister chromatids line up on the metaphase plate
  - Anaphase—chromatids separate into chromosomes, migrate toward opposite poles
  - Telophase—two nuclear envelopes form daughter nuclei
- Terms: microtubules, centrosome, centromere, kinetochores

Cytokinesis:

- The division of the cytoplasm
- Responsible for organizing organelles into the two daughter cells
- Cleavage furrow formed by a contractile ring of actin filaments
Not in plants because of the cell wall, instead a cell plate forms to produce two daughter cells. The cell plate is formed by coalescing vesicles