TOPIC 2.2- Cell Structure and Function

Living systems are organized in a hierarchy of structural levels that interact.

1. Explain how subcellular components and organelles contribute to the function of the cell.
    - Organelles and subcellular structures, and the interactions among them, support cellular function—
        a. Endoplasmic reticulum provides mechanical support, carries out protein synthesis on membrane-bound ribosomes, and plays a role in intracellular transport.

        1) What are the two types of endoplasmic reticulum?

        2) What is the rough endoplasmic reticulum covered in that makes it "rough"?

        b. Mitochondrial double membrane provides compartments for different metabolic reactions.

        1) Draw and label the compartments of the mitochondria.

        2) What is the purpose of cristae?

        3) What molecule do mitochondria use to make energy?

c. Lysosomes contain hydrolytic enzymes, which are important in intracellular digestion, the recycling of a cell's organic materials, and programmed cell death (apoptosis).

1) What is phagocytosis and how does it relate to the lysosome?

d. Vacuoles have many roles, including storage and release of macromolecules and cellular waste products. In plants, it aids in retention of water for turgor pressure.
    1) What is the difference between a vacuole in a plant cell compared to an animal cell?

    2) *Define* the three different types of turgor pressures.
        a) Hypertonic-

        b) Isotonic-

        c) Hypotonic-

2. Describe the structural features of a cell that allow organisms to capture, store, and use energy.
    - The folding of the inner membrane increases the surface area, which allows for more ATP to be synthesized.
      1) What is the folding of the inner membrane called?

      2) How does ATP synthase work?

    - Within the chloroplast are thylakoids and the stroma. The thylakoids are organized in stacks,called grana.

      1) Draw and label the chloroplast with thylakoids and stroma.

    - Membranes contain chlorophyll pigments and electron transport proteins that comprise the photosystems.
      1) Which photosystem contains the chlorophyll?

      2) What type of reaction is occurring?

- The light-dependent reactions of photosynthesis occur in the grana.
  12) Explain the 7 steps of light dependent reactions.

- The stroma is the fluid within the inner chloroplast membrane and outside of the thylakoid. The carbon fixation (Calvin-Benson cycle) reactions of photosynthesis occur in the stroma.
  1) Describe the process of carbon fixation.

- The Krebs cycle (citric acid cycle) reactions occur in the matrix of the mitochondria.
  1) What type of organisms use the Kreb cycle (aerobic or anaerobic), and what does it release?

- Electron transport and ATP synthesis occur on the inner mitochondrial membrane.
  1) What is the role of the inner mitochondrial membrane in ATP synthesis?