

UNIT: Tissues, Organs, and Systems of Living Things Review

Key Concepts:

- Cell theory
- Organelle
- Cell cycle
- Mitosis
- Cancer
- Differentiation
- Stem cell
- Tissue
- Organ
- Organ System

Cell Parts:

- Nucleus
- Nucleolus
- Chromatin
- Nuclear membrane
- Ribosome
- Endoplasmic reticulum
- Golgi apparatus
- Mitochondria
- Chloroplast
- Vacuole
- Lysosome
- Cell membrane
- Cell wall

Cell Cycle, Mitosis

- Interphase (G_1 , S, G_2 , G_0)
- Prophase
- Metaphase
- Anaphase
- Telophase
- Spindle fibres
- Chromosomes

- Chromatids
- Centrioles
- Cytokinesis

Differentiation and Tissues:

- Zygote
- Differentiation
- Genes
- Embryonic stem cells
- Adult stem cells
- Necrosis
- Apoptosis
- Muscle
- Epithelial
- Nervous
- Connective

Organs Systems:

Know the function of each organ system and the specific role of the organs or structures listed below.

- Cardiovascular (heart, veins, arteries, capillaries)
- Respiratory (lung)
- Digestive (stomach, intestine)
- Excretory (kidney, bladder)
- Nervous (brain, spinal cord)
- Lymphatic (spleen, lymph nodes)
- Endocrine (pancreas, glands)

- Reproductive (testes, ovaries)
- 1 disease from any system and how it affects that system

Plants

- Root, shoot
- Stem, leaf, flower
- Dermal tissue
- Vascular tissue
- Ground tissue
- Meristematic tissue
- Xylem
- Phloem
- Photosynthesis (equation, location)
- Pistil
- Stamen

Key Diagrams:

- Animal and Plant Cells
- Parts of the Microscope
- Cell Cycle
- Mitosis (Cells in Each Stage)
- Types of Animal Tissues
- Plant organs
- Leaf structure
- Types of Plant Tissues
- Flower structure and parts

Review Questions:

1. Two basic tasks that every cell must accomplish are to produce energy and remove waste. Explain how cells accomplish this using your knowledge of organelles.
2. Membranes are an important part of many organelles. Name 5 types of organelles that contain membranes and state the function of each.



Figure 1: Cells

3. a) Classify the cells in Figure 1 plant or animal cells.
b) Explain your reasoning.
4. a) What happens in "S" phase of the cell cycle?
b) Explain why this step in the cell cycle is essential to produce a multicellular organism.

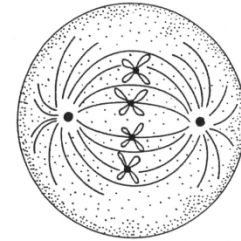


Figure 2: Metaphase

5. Label the following parts of a cell in metaphase on the diagram: centrioles, sister chromatids, spindle fibres, centrioles.
6. Explain how cancer cells differ from normal cells.
7. a) Explain the difference between necrosis and apoptosis.
b) Give a specific example how or where each may occur.
8. a) What type of cells are formed when the zygote undergoes mitosis?
b) What is unique about these cells compared to the cells of an adult?
9. How are adult stem cells different from embryonic stem cells?
10. What are genes and why are they important in cell specialization?
11. Tissues is defined as a group of cells working together to perform a specific function. Use a specific example to illustrate this definition.
12. a) Rank the following terms from the lowest to highest level of organization in an animal or plant: tissue, molecule, organelle, organ, cell, organism, organ system
b) What is the difference between a tissue and an organ?
13. The heart is a complex organ of the cardiovascular system. It contains both nervous tissue and muscle tissue. Explain the function of each type of tissue and describe how these cells are specialized to serve each purpose.

14. a) What is an organ system?
b) Use an example from an animal or plant to illustrate your definition. Include examples of specific organs in your definition
15. For each of the following organs, name the organ system they belong to and state their function.
- | | | |
|------------|----------------|-----------|
| a) kidneys | e) pancreas | i) root |
| b) stomach | f) spinal cord | j) flower |
| c) lungs | g) spleen | |
| d) testes | h) leaf | |
16. Scientists working to stop the growth of cancer cells often target specific steps in the cell cycle to stop uncontrolled growth. What are 2 steps that could be blocked to prevent cells from dividing?
17. The alveoli of the lungs and the walls of the intestines are structured to increase their surface area. How would increasing their surface area help these organs carry out their function?
18. Organ systems often interact. Give an example of 2 systems that interact and explain how they work together.
19. a) Humans stop growing after puberty and mitosis slows, but it never completely stops in adults. Explain why.
b) What types of tissues are likely to be undergoing mitosis in adults?
20. Most structures in the plant consist of dermal, ground and vascular tissue. Explain how each of these tissue types serves a specific purpose in either the leaf, stem or root.
21. Stem cell research is a controversial area of scientific exploration, partly due to the fact that embryonic stem cells are taken from human embryos created for *in vitro* fertilization but not required. Do you support or oppose stem cell research? Write a paragraph to explain your view.
22. Describe how the following cell types are adapted to serve their specific purpose: nerve cells, muscle cells, adipose (fat) cells, and epithelial cells.
23. a) What factors stimulate embryonic stem cells to specialize during development?
b) Environmental pollutants, pharmaceuticals and recreational drugs (e.g. alcohol) can affect the development of an embryo. What affect could chemicals have on the developing embryo?