

LABORATORY ACTIVITY NO. 4

THE CELL

Scope of Laboratory Activity

This laboratory activity consists of five (5) worksheets:

- Worksheet no. 1 The Cell Structure
- Worksheet no. 2 The Cell Division
- Worksheet no. 3 Cell Membrane Transport Mechanisms
- Worksheet no. 4 Osmosis
- Worksheet no. 5 Microscopic Examination of the cell structures

Overview

The cell is the basic unit of a living organism. The cell is known as the body's building blocks. However, unlike the building blocks of a house, cells are too small to see individually. Even the tiniest dot you can make with a pen is much bigger than the biggest of your body's cell. Your body is made up of millions and millions of cells.

Objectives

After completing this worksheet, the student will be able to:

1. Identify the basic structure, location, functions and parts of the cell.
2. Describe the phases of cell division
3. Explain the cell membrane transport mechanisms
4. Identify cell structures through microscopic examination

Materials Needed

1. Compound microscope
2. Histologic sections of cells
3. Colored pencils
4. Ammonia or Cologne or any substance with strong odor
5. 3 petri dishes
6. Teaspoon
7. Granulated sugar
8. Ink/Potassium Permanganate Crystals
9. Cold and hot water
10. Medicine Dropper

Worksheet no.1 The Cell Structure

1.1 Complete the following table to fully describe the various parts. Insert your response in the spaces provided under each heading.

Cell Structure	Location	Function
	External boundary of the cell	Confines cell contents; regulates entry and exit of materials
Lysosomes		
	Scatted throughout the cell	Controls release of energy from foods; forms ATP
	Projections of the cell membrane	Increase the membrane surface area
Golgi apparatus		
Nucleus		
	Two-rod shaped bodies near the nucleus	Direct formation of the mitotic spindle
Nucleolus		
Smooth ER	In the cytoplasm	Site of steroid synthesis
Rough ER		
	Attached to membrane systems or scattered in the cytoplasm	Synthesize proteins
Chromatin		
	Scattered in the cytoplasm	Detoxifies alcohol; hydrogen peroxide, etc.
Inclusions		

1.2 Label correctly all cells parts

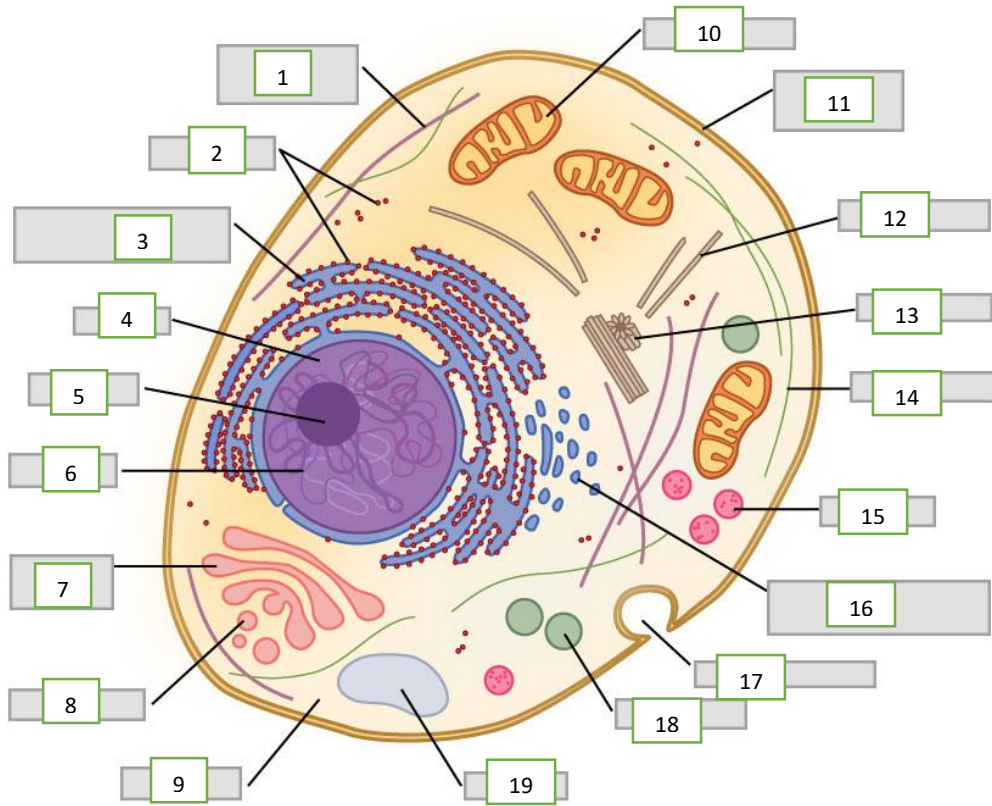


Figure 1 Prototypical Human Cell

- | | |
|-----------|-----------|
| 1. _____ | 11. _____ |
| 2. _____ | 12. _____ |
| 3. _____ | 13. _____ |
| 4. _____ | 14. _____ |
| 5. _____ | 15. _____ |
| 6. _____ | 16. _____ |
| 7. _____ | 17. _____ |
| 8. _____ | 18. _____ |
| 9. _____ | 19. _____ |
| 10. _____ | 20. _____ |

1.3 Answer the following questions:

A. Identify the following organelles with their cellular functions

The site of ATP synthesis: _____

The site of protein synthesis: _____

3Collects secretory products and the cell's packaging center: _____

Major site of lipid synthesis: _____
 Formed proteins that provide structural support for the cell: _____
 Give rise to spindles used by chromatids during cell division: _____

B. What is the most abundant nutrient that constitutes a cell? _____

Worksheet no. 2 Cell Division

4.1 Identify the phases of mitosis. Write your answer in the space provided

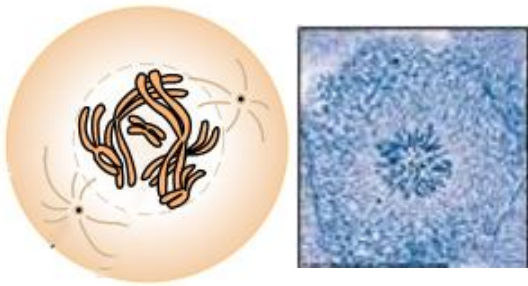


Figure 2 _____

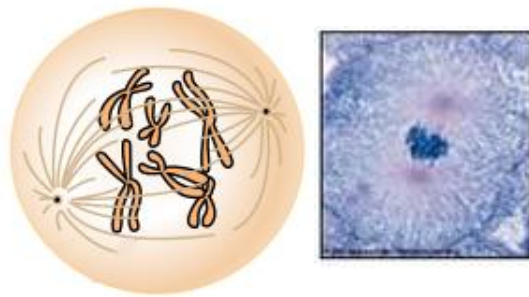


Figure 3 _____



Figure 4 _____

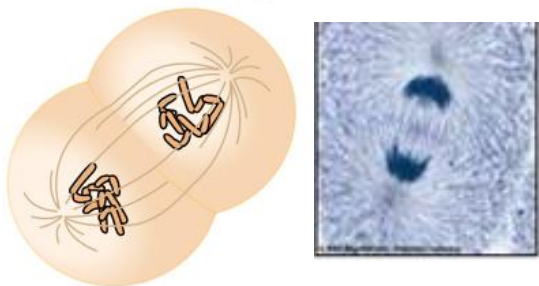


Figure 5 _____

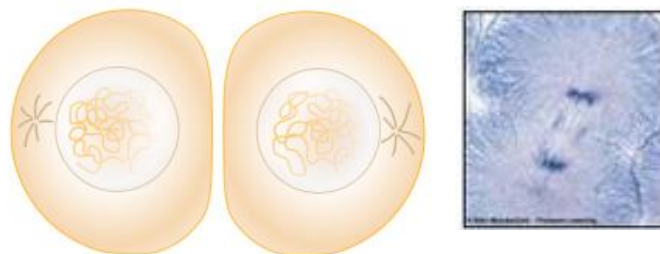


Figure 6 _____

4.2 Answer the following questions

a. What is the significance of chromosomes?

b. Define cell differentiation:

c. Describe in general terms how differentiation occurs:

Worksheet no. 3 Cell Membrane Transport Mechanisms

3.1 Diffusion of gases

Procedure

1. Prepare the materials: Ammonia or cologne or any substance with strong odor.
2. Open the bottle containing the ammonia or cologne.
3. Spray or apply on a body part.
4. Answer the question:
 - a. Explain why the odor of ammonia or the cologne can be detected in other parts of the room soon after the bottle was opened or when it was applied in a body part.

- b. Give an example where the above mechanism (diffusion of gases) can be found in the human body. _____

3.2 Diffusion through liquid

Procedure

1. Prepare the materials: 3 petri dishes teaspoon, granulated sugar ink/Potassium Permanganate crystals, cold and hot water, medicine dropper
2. Prepare 3 petri dishes.
3. Put in 50ml of ice water in the first dish, 50ml of hot water in the second dish and 1 teaspoon of sugar plus 50ml of tap water in the third dish (well-stirred).
4. Add equal amount of ink using dropper or Potassium permanganate crystals to each of the dishes.
5. Leave the containers undisturbed while observing the results.
6. Find out the following:
 - a. The container where the ink/crystals dissolved first.
 - b. The container where the ink/crystals dissolved last
7. Answer the following questions
 - a. In which container did the color disperse first? _____
 - b. In which container did it disperse last? _____

- c. What is the effect of temperature on diffusion? _____
 Why is this so? _____

- d. What is the effect of the presence of other molecules on the diffusion of a given substance? Explain your answer. _____

Worksheet no. 4 Osmosis

4.1 Differentiate Osmosis and Diffusion

4.2 Define Net Osmosis

4.3 Concentration of Solutions

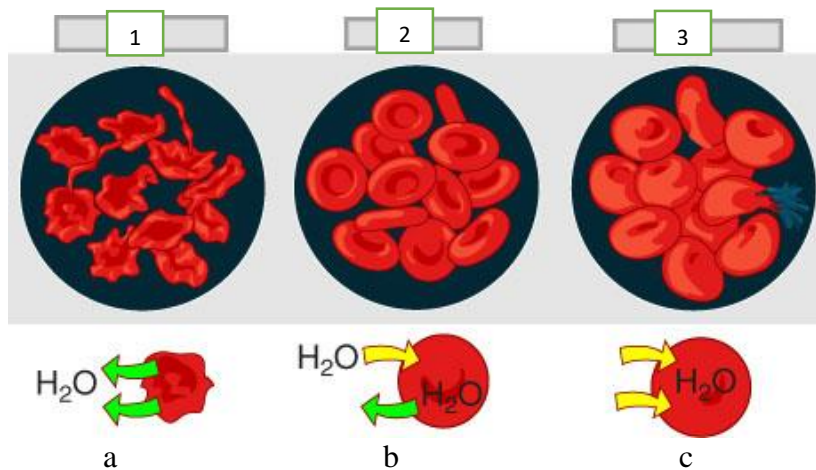


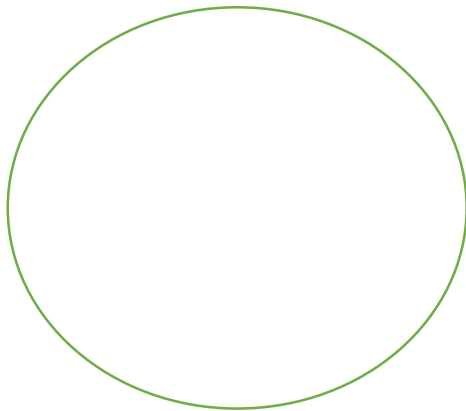
Figure 7 Microscopic Fields (a-c) containing red blood cells that shows direction of net osmosis by means of arrows

- a. Identify the type of solution in Figure 7
1. _____
 2. _____
 3. _____
- b. Answer the following questions
1. Which microscopic field contains a hypertonic solutions? _____
 2. The cells in this field are said to be _____.

3. Which microscopic field contains an isotonic bathing solution? _____
4. What does isotonic mean? _____
5. Which microscopic field contains a hypotonic solution? _____
6. What is happening to the cell in this field and why? _____

Worksheet no. 5 Microscopic Examination of the cell structures

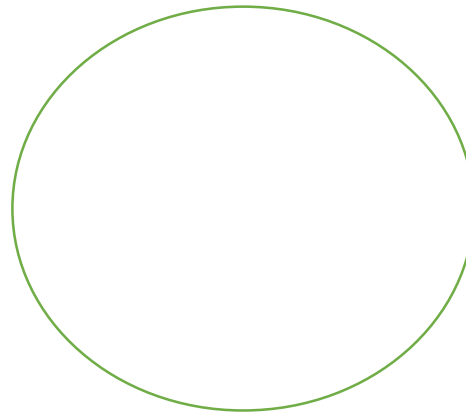
1. Examine the prepared microscopic slides of the cells under LPO.
2. Draw five cells to show the general cells arrangements and color the cells
3. Shift to HPO. Draw one cell and label the cell membrane, cytoplasm and the nucleus
4. 2 points each



LPO

Specimen: _____

Magnification = _____ x _____



HPO

Specimen: _____

Magnification = _____ x _____

YOU MAY NOW PROCEED TO THE NEXT LABORATORY ACTIVITY



References

Adapted Images

Figure 2 to Figure 6

<https://www.philpoteducation.com/mod/book/view.php?id=777&chapterid=1122#/>

<https://www.pinterest.ph/paigemecece/project-8-cell-cycle/>

Figure 1 and Figure 7 OpenStax (2017) Anatomy and Physiology

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