**AP BIOLOGY 2021-22 September 30, 2021**

**Today’s Agenda (Day 32)**

1. Housekeeping Items

🡪 Request for Item: pH Household Activity

1. Homework Check:

🡪 Chapter 6 Reading Guide

1. Class Activity:

🡪TODAY: pH Lab

🡪FRIDAY: Chapter 6 PPT Review

1. Section 6.5 – Mitochondria and chloroplasts change energy from one form to another
2. Section 6.6 – The cytoskeleton is a network of fibers that organizes structures and activities in the cell

HOMEWORK:

* READ: Chapters 6 – 10
* COMPLETE: Chapter 7 Reading Guide
* STUDY: Ch 6 & 7 Test

Chapter 6 Vocabulary

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Actin | Basal body | Cell fractionation | Cell wall | Central vacuole |
| Centrioles | Centrosome | Chloroplasts | Chromatin | Chromosomes |
| Cilia | Collagen | Communicating junctions | Contractile vacuoles | Cortex |
| Cristae | Cytoplasm | Cytoplasmic streaming | Cytoskeleton | Cytosol |
| Desmosomes | Dynein | Electron microscope | Electrons | Endomembrane system |
| Endoplasmic reticulum | Endosymbiont theory | Eukaryotic cell | Extracellular matrix | Fibronectin |
| Flagella | Glycoproteins | Golgi apparatus | Granum | Integrins |
| Intermediate filaments | Light microscope | Lysosome | Microfilaments | Microtubules |
| Middle lamella | Mitochondria | Mitochondrial matrix | Motor proteins | Myosin |
| Nuclear envelope | Nuclear lamina | Nucleolus | Nucleus | Peroxisome |
| Phagocytosis | Plasma membrane | Plasmodesmata | Plastids | Primary cell wall |
| Prokaryotic cell | Proteoglycans | Pseudopodia | Ribosomes | Rough ER |
| Scanning electron microscope | Secondary cell wall | Smooth ER | Stroma | Thylakoids |
| Tight junctions | Transmission electron microscope | Transport vesicles | vacuoles |  |

REMINDERS:

* Chapter 7 Reading Guide – Oct. 12
* TEST: Chapter 6 & 7 **🡪 Oct. 14**

**BIOLOGY 2021-22 ACTIVITIES**

**pH in the Kitchen**



**PURPOSE**:

Students will be able to determine the pH of various kitchen products by using both pH paper and a natural indicator.

**MATERIALS:**

1. pH paper
2. 6 test tubes
3. permanent marker
4. transfer pipets
5. water
6. vinegar
7. lemon juice

8. milk

9. milk of magnesia

10. floor cleaner

11. red cabbage juice in beaker

12. waste container

13. Paper towel

14. Stirring Rod

**SAFETY:**

You will need:

1. Goggles b. Lab Aprons c. Closed-toed shoes

**PROCEDURE:**

1. Label each test tube A, B, C, D, E, or F..
2. Using the transfer pipet provided with each kitchen product, place the following amounts of each product into their respective test tubes as listed in the table below:

**\*\* PLEASE DO NOT MIX UP THE PIPETS\*\***

|  |  |  |
| --- | --- | --- |
| **Test Tube** | **Substance** | **Amount** |
| A | Lemon Juice | One full dropper |
| B | Vinegar | One full dropper |
| C | Milk | One full dropper |
| D | Water | One full dropper |
| E | Milk of Magnesia | One full dropper |
| F | Floor Cleaner | One full dropper |

1. Take your strip of pH paper and tear it into 6 equal pieces.
2. On a piece of paper towel, lay out the 6 pieces of pH paper and under each piece, label them A, B, C, D, E, and F.
3. Dip the end of a stirring rod into test tube A. Gently touch the tip to the piece of pH paper labeled A. Observe and record what happens in the data table.
   1. The color changes can be EXTREMELY fast- be watchful!
4. Repeat step 5 with test tubes B-F and record your observations in your data table.
5. After you have tested the pH of each substance with pH paper, place one full dropper of red cabbage juice into each test tube.
6. Observe and record what happens in your data table.

**DATA:**

|  |  |  |  |
| --- | --- | --- | --- |
| **pH Paper Observations** | | | |
| **Test Tube** | **Substance** | **Color of pH paper** | **Approximate pH** |
| A | Lemon Juice |  |  |
| B | Vinegar |  |  |
| C | Milk |  |  |
| D | Water |  |  |
| E | Milk of Magnesia |  |  |
| F | Floor Cleaner |  |  |
| **Red Cabbage Juice Observations** | | | |
| **Test Tube** | **Substance** | **Color of Solution** | **Acidic or Basic?** |
| A | Lemon Juice |  |  |
| B | Vinegar |  |  |
| C | Milk |  |  |
| D | Water |  |  |
| E | Milk of Magnesia |  |  |
| F | Floor Cleaner |  |  |

**ANALYSIS AND CONCLUSION**: *PLEASE ANSWER IN COMPLETE SENTENCES!! ☺*

1. If the pH paper turns red, is the substance acidic, basic, or neutral? Does the red cabbage juice test agree with the pH paper or not?

2. If the pH paper turns blue, is the substance acidic, basic, or neutral? Does the red cabbage juice test agree with the pH paper or not?

3. If the pH paper does not change color or the red cabbage juice does not change color, what does this tell you about the substance that was tested?

4. Which substance was the most acidic and what was its pH reading? Which was most basic and what was its pH reading?

5. Which is more accurate- the pH paper or the red cabbage juice and why?

6. Did anything in this lab surprise you? Why?

**AP BIOLOGY 2021-22 READING GUIDE**

# Chapter 7: Membrane Structure and Function

## Concept 7.1 Cellular membranes are fluid mosaics of lipids and proteins

1. The large molecules of all living things fall into just four main classes. Name them.

1. Explain what is meant when we say a molecule is amphipathic.

1. In the 1960s, the *Davson-Danielli model* of membrane structure was widely accepted. Describe this model and then cite two lines of evidence that were inconsistent with it.

1. Who proposed the ***fluid mosaic model*** of membrane structure? When? Describe this model.

1. What is meant by ***membrane fluidity***? Describe the movements seen in the fluid membrane.

1. Describe how each of the following can affect membrane fluidity:

* 1. decreasing temperature

* 1. phospholipids with unsaturated hydrocarbon chains

* 1. cholesterol

1. Membrane proteins are the ***mosaic*** part of the model. Describe each of the two main categories:

***integral proteins***

***peripheral proteins***

1. Use Figure 7.9 to briefly describe major functions of membrane proteins.

|  |  |
| --- | --- |
| **Function** | **Description** |
| Transport |  |
| Enzymatic activity |  |
| Signal transduction |  |
| Cell-cell recognition |  |
| Intercellular joining |  |
| Attachment to cytoskeleton and ECM |  |

1. Membrane carbohydrates are important in cell-cell recognition. What are two examples of this?
2. Distinguish between ***glycolipids*** and ***glycoproteins***.

1. Label the following structures:

**glycolipid glycoprotein integral protein**

**peripheral protein cholesterol phospholipid**

**ECM fibers cytoskeleton microfilaments**

## integrins

A screenshot of a video game

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### **Concept 7.2 Membrane structure results in selective permeability**

1. Distinguish between ***channel proteins*** and ***carrier proteins*.**

1. Are transport proteins specific? Cite an example that supports your response.

1. Peter Agre received the Nobel Prize in 2003 for the discovery of ***aquaporins***. What are they?

1. Consider the following materials that must cross the membrane. For each, tell how it is accomplished.

|  |  |
| --- | --- |
| **Material** | **Method** |
| CO2 |  |
| glucose |  |
| H+ |  |
| O2 |  |
| H2O |  |

### **Concept 7.3 Passive transport is diffusion of a substance across a membrane with no energy investment**

1. Define the following terms:

**diffusion concentration gradient passive transport osmosis isotonic hypertonic hypotonic turgid flaccid plasmolysis**

1. Use as many words from the list above to describe why a carrot left on the counter overnight would become limp. Underline each word you use.
2. What is ***facilitated diffusion***? Is it active or passive? Cite two examples.

1. Label the ***hypotonic solution***, ***isotonic solution***, and ***hypertonic solution***. What is indicated by the *blue arrows*? Label them. Which cell is ***lysed***? ***Turgid***?***Flaccid***?***Plasmolyzed***? Apply all these labels.

Shape

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1. Why doesn’t the plant cell burst?

### **Concept 7.4 Active transport uses energy to move solutes against their gradients**

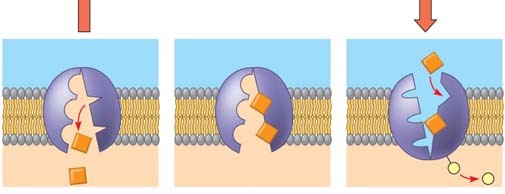
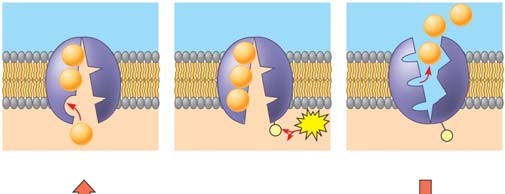
1. Describe ***active transport***. What type of transport proteins are involved, andwhat is the role of ATP in the process?

1. The ***sodium-potassium pump***is an important system for you to know. Use the following diagram to understand how it works. Use the following terms to label these figures, and briefly summarize what is occurring in each figure:

***extracellular fluid*, *cytoplasm*, *Na+*, *K+*, *ATP*, *ADP*, *P*, *transport protein*.**

## Summary

1.



2

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3

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4

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5

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6

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1. On the diagram below, add these labels: ***facilitated diffusion with a carrier protein***, ***facilitated diffusion with a channel protein***, ***active transport with a carrier protein***, ***simple diffusion***. For each type of transport, give an example of a material that is moved in this manner.

Chart, diagram

Description automatically generated with medium confidence

1. What is ***membrane potential***? Which side of the membrane is positive?

1. What are the two forces that drive the diffusion of ions across the membrane? What is the combination of these forces called?

1. What is ***cotransport***? Explain how understanding it is used in our treatment of diarrhea.

***Concept 7.5 Bulk transport across the plasma membrane occurs by exocytosis and endocytosis***

1. Define each of the following and give a specific cellular example.

**endocytosis**

**phagocytosis**

**pinocytosis**

**exocytosis**

## receptor-mediated endocytosis

1. What is a ***ligand***? What do ligands have to do with receptor-mediated endocytosis?

1. Are the processes you described in question 23 active or passive transport?

Explain your response.

*Testing Your Knowledge: Self-Quiz Answers*

Now you should be ready to test your knowledge. Place your answers here:

1.\_\_\_\_\_\_\_ 2.\_\_\_\_\_\_\_ 3.\_\_\_\_\_\_\_ 4.\_\_\_\_\_\_\_ 5.\_\_\_\_\_\_\_

Reproduce the diagram for question 6, and draw arrows as instructed.