Name Date Class

Section 7.2

The Plasma Membrane

North Carolina Objectives **Objective 2.03** Investigate the cell as a living system including: Movement of materials into and out of cells

Before You Read

A window screen in your home allows air to pass through while keeping insects out. In this section you will learn about a cell structure that has the same basic function: allowing some things to pass through while keeping other out. On the lines below, list some things that you think would be allowed to pass into a cell, some that would be allowed to pass out of the cell, and some that would be kept out of the cell.

Read to Learn

Maintaining a Balance

The **plasma membrane** is the flexible boundary of a cell that separates a cell from its surroundings. It allows nutrients to enter the cell and waste to be removed. Keeping this healthy balance within a cell is called homeostasis.

To maintain homeostasis, the plasma membrane allows some molecules into the cell and keeps others out. This is called **selective permeability.** Some molecules are allowed in at any time. Other molecules are only admitted at certain times and in limited amounts. Others are not allowed in at all.

Structure of the Plasma Membrane

Earlier you learned that lipids are large molecules made up of glycerol and three fatty acids. A **phospholipid** (fahs foh LIH pid) is made up of glycerol, two fatty acids, and a phosphate group. The plasma membrane is made up of two layers of phospholipids arranged back to back in what is called a phospholipid bilayer.

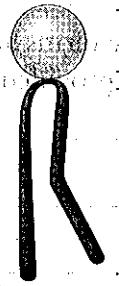
The phosphate group is an important part of the plasma membrane. The group is found in the head of the phospholipid molecule. The head is polar. The tails of fatty acid chains hang from the head. The tails are nonpolar. The two phospholipid layers are arranged so the polar heads are facing out, and the nonpolar tails are facing in.

Reading Check

1. What is the function of the plasma membrane?

Think it Over

2. Which part of a phospholipid molecule contains the phosphate group? Which is nonpolar?



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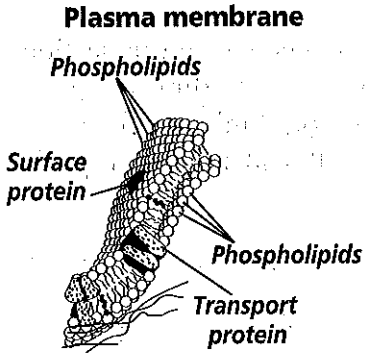

Reading Check

3. Name three elements that float in the plasma membrane.

What is the fluid mosaic model?

Water, which all living things need, is also polar. The polar phosphate heads on the surface of the membrane allow the polar water to interact with the membrane. Because they are nonpolar, fatty acid tails avoid water. This makes a barrier that is water-soluble on the outside of the membrane, but water-insoluble inside the membrane. This prevents water-soluble molecules from easily moving through the plasma membrane.

This organization of the plasma membrane is called the **fluid mosaic model.** It is fluid because the phospholipids are not fixed in one place, but float in the membrane. Protein molecules also float with the phospholipids. The model is called a mosaic because of the patterns the proteins create on the membrane's surface.

Specific proteins called **transport proteins** work to regulate which molecules are allowed to enter and which are allowed to leave the cell. Other proteins help cells identify chemical signals. Proteins on the inner surface of the membrane help support the cell structure.

Cholesterol also floats on the surface of the membrane. It helps keep the fatty acid tails from sticking together. Cholesterol is an important part of a healthy diet partly because of the role it plays in the plasma membrane.

After You Read

Mini Glossary

fluid mosaic model: structural model of the plasma membrane where phospholipids and proteins float within the surface of the membrane

phospholipid (fahs foh LIH pid): a large molecule with a glycerol backbone, two fatty acid chains, and a phosphate group

plasma membrane: the flexible boundary of a cell

selective permeability: a process in which a membrane allows some molecules to pass through while keeping others out

transport proteins: proteins that move needed substances or waste materials through the plasma membrane into or out of the cell

1. Read the key terms and definitions in the Mini Glossary above. Circle one key term. Then, in the space provided, write the definition of the term in your own words.

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The Plasma Membrane, *continued*

2. Use the partially completed outline below to help you review what you have read. Fill in the blanks where missing information is needed.

I. Parts of a phospholipid molecule

A. 2 fatty acids

B. 1 _____

C. 1 _____

II. Fluid mosaic model of plasma membrane

A. Called fluid because _____

B. Called mosaic because _____

3. Choose one of the following headings in the Read to Learn section: **Maintaining a Balance** or **Structure of a Plasma Membrane.**

Turn the heading into a question. Write the question in the space below. Then write your answer to that question on the lines that follow.

Question:

Answer:

_____

_____

_____

Visit the Glencoe Science Web site at **science.glencoe.com** to find your book and learn more about the plasma membrane.