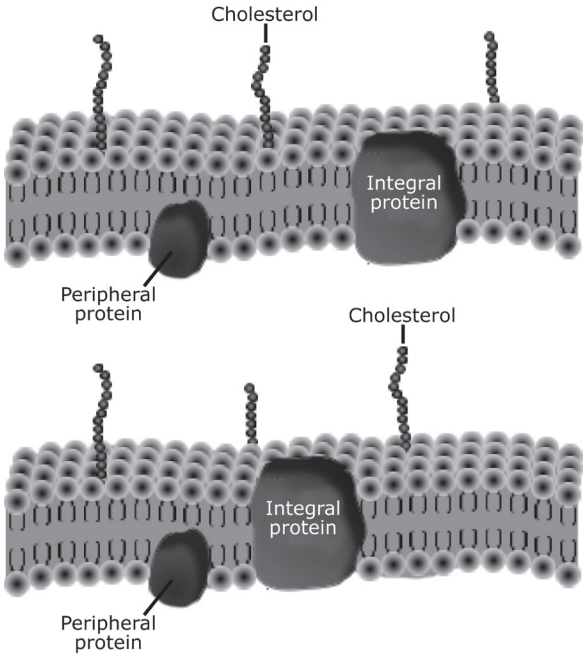

Figure 4.15.1

Cellular movement can be on a large or small scale. Although we usually think of "movement," as something we can easily see or do, there are many different kinds of movement in biology. Some movement—a dog running or a fish swimming—is obvious. However, there are other types of movements which occur in cells continuously that are more important. The type of movement which occurs within the cell membrane is an example. Notice that from the top panel to the bottom panel, the proteins within the cell membrane have changed positions. This type of movement is in part related to how the cell is able to regulate what comes in and goes out of the cell. This is an example of movement on a very small scale, but it is extremely important nonetheless. We will talk about other types of movement later in the taxonomy chapters.

4.16 INSIDE OF THE CELL

The inside of the cell is filled with a jelly-like fluid called **cytoplasm**. Floating inside of the cell within the cytoplasm are structures called **organelles.** Organelles are structures inside a cell that perform various functions critical to the cell's life. Also inside the cell, and within the cytoplasm, is the **nuclear material** (DNA). If the cell is a eukaryotic cell, the DNA is housed within its own compartment, the nucleus. If the cell is a prokaryotic cell, the DNA is free in the cytoplasm.

4.17 REVIEW OF CELL STRUCTURE

To review, all cells have a plasma membrane, cytoplasm, and nuclear material. In eukaryotes, there are membrane-bound organelles and a nucleus in the cytoplasm. In prokaryotes, the DNA is not housed in its own separate compartment. It is critical to understand that prokaryotic cells and eukaryotic cells are separated from one another on the basis of whether or not the DNA is contained in a nucleus. The Kingdoms Archaea and Bacteria contain the prokaryotes. The Kingdoms of Protista, Fungi, Plantae, and Animalia are all composed of organisms which are eukaryotic cell types.

4.18 CELL MEMBRANE

In eukaryotes and prokaryotes with no cell wall, the cell membrane is the outermost layer of the cell. In eukaryotes and prokaryotes with a cell wall, the cell membrane is inside the wall. Either way, the cell membrane is a major protective structure for the cell. The cell membrane also regulates which molecules or substances flow in and out of all cells and give the cell its shape. Essential molecules like oxygen are freely allowed into the cell, just as common waste products like carbon dioxide are freely allowed out of the cell.

The majority of the molecules of the cell membrane are made up of lipids and proteins. However, there are also carbohydrates and cholesterol in the cell membrane.

4.19 PHOSPHOLIPID

The lipid of the cell membrane is a special one called a **phospholipid**. A phospholipid is special because of its structure; it contains the glycerol base as all lipids do, with two fatty acid chains and one phosphate group attached to the glycerol. A phosphate