Understanding Membranes

The cell membrane is the barrier that separates the cytoplasm from the external world. The cell membrane consists primarily of phospholipids in a bilayer. Phospholipids are amphipathic with a polar head (phosphate group) and a hydrophobic tail (2 hydrocarbon chains). Due to the chemical properties of the heads being attracted to water and the tails having a desire to avoid water, phospholipids self assemble into micelles. Cell membranes form from a phospholipid bilayer where the lipid tails interact with each other and the phosphate heads face the external water environment or the internal cytoplasm of the cell.

The cell membrane does not solely consist of phospholipids but also have proteins and cholesterol inserted into the bilayer. As the image of the bilayer above indicates, the molecules are constantly moving and flow in a lateral motion. Cholesterol modulates the fluidity of this motion. Proteins associated with the membrane may sit on either side (peripheral proteins) of the membrane or pass through both layers of the membrane (transmembrane proteins). The model that describes the components of the cellular membrane is referred to as the Fluid Mosaic Model. This model states that the cell membrane is a mosaic of 1)Phospholipids 2)Proteins 3) cholesterol that move about in a side to side motion.

The fluid mosaic of phospholipids, proteins and cholesterol that create the

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selective barrier between the interior and the exterior of the cell. Small uncharged molecules pass through the double layer of phospholipids. Polar, charged or large molecules have great difficulty passing through the membrane and require the aid of transmembrane proteins. An example of a transmembrane protein that facilitates movement of a polar substance is aquaporin, which permits the free movement of water.