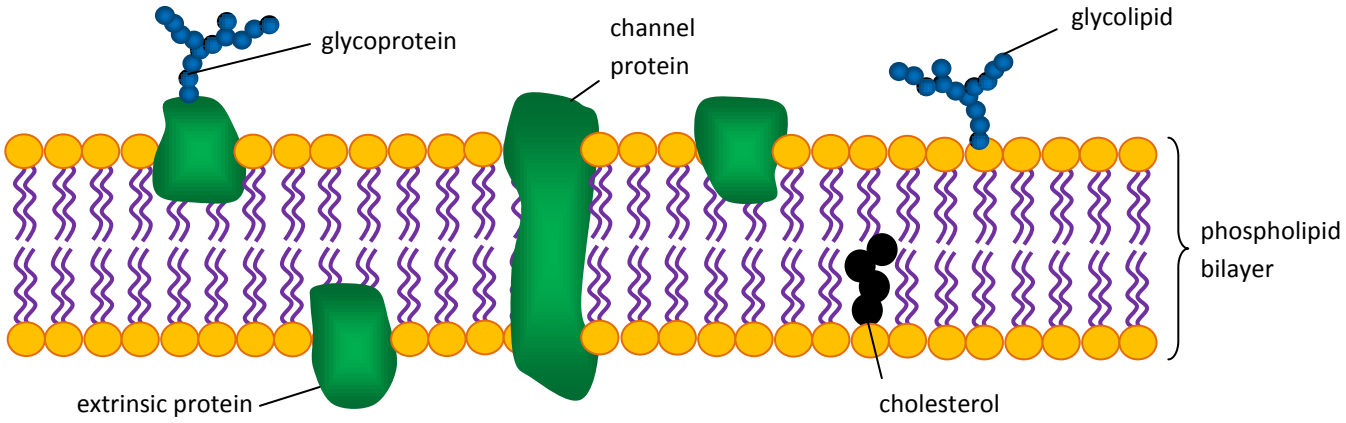
1.6 Fluid Mosaic Model

Components of the fluid mosaic model of the common membrane structure

Cell membranes are not just simple phospholipid bilayers. They contain many other key features which make it a fully-functional biological membrane. The **fluid mosaic model** shows the components found in a membrane. It is now widely excepted as the model which explains how membranes form and function. Its main features are:

- a phospholipid bilayer giving its basic structure
- various protein molecules floating around in the bilayer, some completely free, others bound to other components
- some proteins (**extrinsic**) partially embedded in the bilayer on the inside or the outside face, other proteins (**intrinsic**) completely spanning the bilayer



Some of the phospholipid molecules which make the bilayer, and some of the proteins that are part of the membrane have carbohydrate chains attached to them. When a phospholipid has a carbohydrate part attached to it, it is called a **glycolipid**. When a protein has a carbohydrate part attached to it, it is called a **glycoprotein**.

The **cholesterol** gives the membranes of many eukaryotic cells some mechanical stability. This steroid fits nicely between the fatty acid tails and makes the barrier more complete, so that water molecules and other substances cannot pass through the membrane so easily. **Channel proteins** allow the movement of some substances across the membrane. Molecules of sugars, such as glucose, are too large and too hydrophilic to pass directly through the membrane and so they use these channel proteins instead. **Carrier proteins** actively move substances around the membrane.

Other features found on membranes might include **receptor sites**. These can allow hormones to bind with the cell so that a cell response can be carried out. These are also important in allowing drugs to bind, and so affect metabolism. **Enzymes** and **coenzymes** are also present, which are used in some stages of respiration (in the membranes of the mitochondrion) and in photosynthesis (in the membranes of the chloroplasts).

Membranes and Temperature

Increasing the temperature gives molecules more **kinetic energy**, so they move faster. This increased movement of phospholipids and other components makes membranes leaky, which allows substances that would normally not do so to enter or leave the cell.

Organisms that live in very hot or very cols environments need differently adapted molecular components of their membranes, for example the cholesterol content, so that their membranes can perform the functions needed to maintain life.