Membrane Structure

- The cell membrane (or plasma membrane) surrounds all living cells and is the cell's most important organelle.
- Controls how substances can move in and out of the cell
- The membrane that surrounds the nucleus and other organelles are almost identical to the cell membrane.
- Membranes are composed of phospholipids, proteins, carbohydrates and cholesterol.
- Phospholipids form a thin, flexible sheet; the proteins 'float' in the phospholipid sheet like icebergs and the carbohydrates extend out from the proteins.
- Animal cell membranes also contain cholesterol linking the fatty acids together – stabilising and strengthening the membrane. This structure is called a fluid mosaic – all the components can move around (fluid) and the many different components all fit together.
- The phospholipids are arrange in a bilayer (double layer) with their polar, hydrophilic phosphate heads facing out towards water, and their non-polar hydrophobic fatty acid tails facing each other in the middle of the bilayer.
- The hydrophobic layer acts as a barrier to most molecules, effectively isolating the two sides of the membrane.
- Different kinds of membranes can contain phospholipids with different fatty acids, affecting the strength and flexibility of the membrane.
- The proteins usually span from on side of the phospholipid bilayer to the other (integral proteins) but can also sit on one of the surfaces (peripheral proteins). They can slide around the membrane very quickly and collide with each other.
- Proteins have hydrophilic amino acids in contact with water on the outside of membranes, and hydrophobic amino acids in contact with the fatty chains inside the membrane.
- Proteins comprise about 50% of the mass of membranes and are responsible for most of the membrane's properties.
- Carbohydrates are found on the outer surface of all eukaryotic cell membranes – attached to the membrane proteins or sometimes to the phospholipids.
- Proteins with carbohydrates attached are called glycoproteins, while phospholipids with carbohydrates attached are called glycolipids.