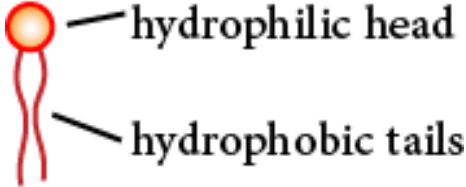
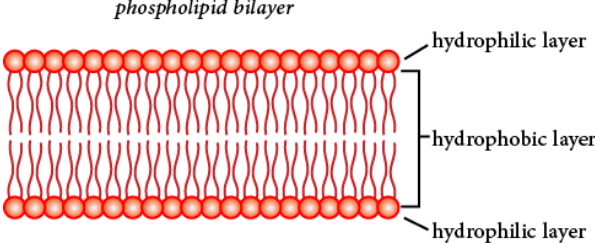
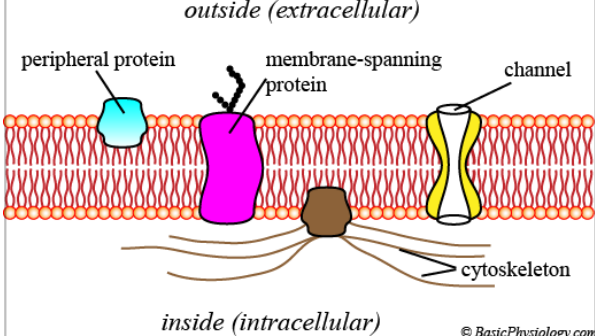
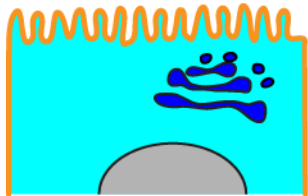
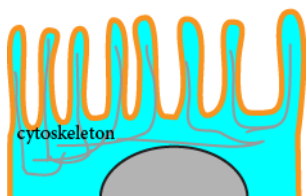


A2.2. The Plasma Membrane.

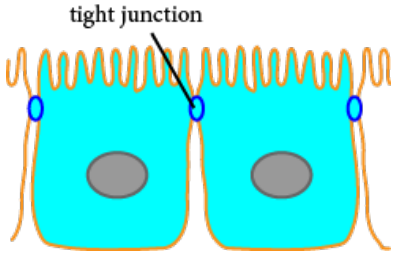
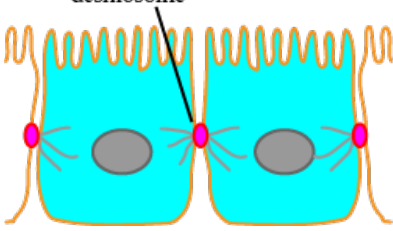
A. The Plasma Membrane

<p>1. The plasma membrane envelops all the cells in the body and separates the intracellular environment (=cytoplasm) from the extracellular environment.</p>	<p>2. It consists of two layers of phospholipids. Each phospholipid consists of a head, which is hydrophilic ('=likes water') and two hydrophobic ('=repels water') tails.</p>
	<p>3. If you place a lot of these phospholipid molecules together in water, they will tend to cluster in such a way that their heads are in contact with water and their tails are oriented inwards and away from the water.</p>
<p>4. Since both the intracellular and the extracellular fluid contain a lot of water, all the heads will point towards the intra- or the extracellular water while the tails will point away from the water and towards each other!</p>	
<p>5. In this way, a bi-layer (=two layers) are formed with the hydrophobic layers located inside this layer and two hydrophilic layers located outside and in contact with water.</p>	<p>6. However, in order for the cell to be able to communicate with the outside world, other molecules, in most cases proteins, are located in the plasma membrane. Since the phospholipids are not fixed, these protein molecules literally 'float' around in this plasma membrane.</p>
<p>7. There are many types of membrane-bound proteins such as channels, transporters, receptors, anchors for the cytoskeleton etc. The function of several of these transporters will be discussed in these two pages: A.2.3. Passive Transport Systems and A.2.4. Active Transport Systems.</p>	

B. Specialized Plasma Membranes

<p>1. In some cells, the shape of the plasma membrane is modified, by the cytoskeleton, into different shapes.</p>	<p>2. For example, in cells lining the intestines, the plasma membrane shows several folds (microvilli) extending into the intestinal lumen (space).</p>
<p style="text-align: center;">microvilli</p> 	<p style="text-align: center;">cilia</p> 
<p>3. These microvilli are useful because they increase the surface area of the plasma membrane for the absorption of nutrients from our ingested food.</p>	<p>4. In other cells, much longer finger-like projections occur from the plasma membrane. These are called cilia and are supported by the cytoskeleton. They occur for example in the respiratory tract (= the lungs).</p>

C. Plasma Junctions between cells

<p>1. In some tissues, there are also special connections between neighboring cells.</p>	<p>2. We will discuss here three types:</p> <ol style="list-style-type: none"> 1. tight junctions 2. desmosomes 3. gap junctions
<p>3. In tight junctions, adjacent plasma membranes are fused together, to avoid 'leakage' or transportation of molecules from one side of the extracellular space to the other. This is for example the case in epithelial cells, lining the lumen of a tube such as in the intestine.</p>	
<p>4. Desmosomes are even stronger connections between adjacent cells, when stronger forces are involved (in the stomach and the intestinal system for example).</p>	
<p>5. Gap junctions are very specialized structures that bridge the gap between cells. They consist of several channels (called 'connexons') through which ions and small molecules can flow from one cell to another. See: A.3.6. <i>The Electrical Synapse</i>.</p>	