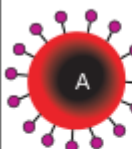
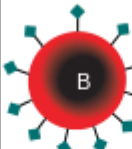
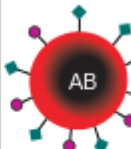









2.3.1

Blood Antigens and Antibodies

Red blood cells possess many glycoprotein cell membrane molecules known as **antigens**. Antigens are essentially “recognition” proteins that allow the body’s immune system to recognize and decipher between good cells (those that are part of the body already) from bad cells (ie., bacteria). In other words, all cells in the body as well as bacterial cells have antigens on their surface. The immune system often uses plasma proteins known as **antibodies** to help recognize and bind to the bad antigens. For the most part, each antibody binds to only one specific type of antigen. When an antibody binds to an antigen on a cell it can cause all the cells with antibodies bound to clump together, a process known as agglutination. In the case of bad or intruding cells, this clumping makes the cells easy to find and destroy. Hopefully, from this brief description, you could guess that making antibodies against your own cells would cause a catastrophic problem (some types of autoimmune diseases are caused by the immune system making antibodies against your own body). Thus, antibodies are only made against intruding or foreign cells. Typically, your body cells have their own unique types of antigens on them. This explains the difficulty in transplanting an organ from someone else who has a different type of antigen. However, in the case of blood cells (erythrocytes) certain people can have the exact same type of antigen as someone else. Conversely, they can also have very different antigens on their blood cells than someone else. Placing blood into someone with the same antigen can be life-saving, whereas placing blood into someone with a different antigen can cause antibody production, agglutination and lethal consequences.

Membrane antigens on red blood cells can be organized into categories known as **blood groups**. Note: there are probably more than 30 human blood group systems recognized by science, however, the two most important ones are the ABO and RhD blood groups.

	Group A	Group B	Group AB	Group O
Red blood cell type				
Antibodies in Plasma	 Anti-B	 Anti-A	None	 Anti-A and Anti-B
Antigens in Red Blood Cell	 A antigen	 B antigen	 A and B antigens	None

ABO Blood Type Chart.

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This figure above shows an ABO blood grouping chart. This chart shows the possible antigens that a red blood cell could contain in the ABO grouping. This chart also shows the antibodies that would be expected in the plasma of a person with a particular blood type. This chart does NOT show the RhD blood grouping. Keep in mind that each blood type in this chart could be Rh (-) or Rh (+).



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