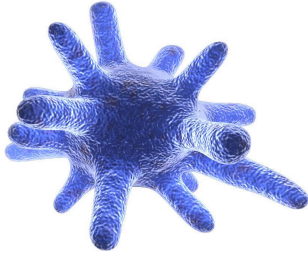
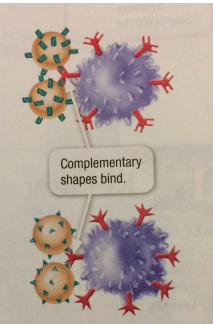


## Protecting Your Body: Antigen Formation

	Notes, Thoughts, and Ideas I Have
<p><b><u>Specific Immune Response</u></b></p> <p>Most pathogens are destroyed by the general, nonspecific defenses that have been looked at so far. But what happens if an invader gets past these responses? The third line of defense is the <b>specific immune response</b>, in which special white blood cells target a particular invader. <b>When a pathogen infects a cell, the body produces immune cells that specialize in detecting and destroying that specific pathogen.</b></p> <p><b><u>Antigen Display:</u></b></p> <p><b>Macrophages</b> are one type of white blood cell that destroys pathogens. Pathogens have unique proteins near their surfaces that help your body identify them as “nonself”. These proteins, called <b>antigens</b>, identify the cell as foreign and start an immune response. After a macrophage swallows up and destroys a pathogen, pieces of the pathogen that contain its antigens move to the surface of the macrophage. This “display” of antigens changes the cell surface markers on the macrophage, and alerts the immune system to an invader. The immune system then put cells into action.</p> <div style="text-align: center;">  </div> <p style="text-align: center;"><b>Figure 1:</b> A macrophage</p> <div style="display: flex; align-items: flex-start;"> <div style="margin-right: 20px;">  </div> <div> <p>Every <b>antigen</b> has its own <b>receptor</b>, which is located on the surface of an immune cell. The shape of antigen receptors allows the immune system to be specific to certain antigens. As <b>Figure 2</b> shows, antigen receptors bind to antigens that match their shape exactly, in the same way that two pieces of a puzzle fit together. The body produces a great variety of immune cells, each of which has receptors for a different antigen. This variety allows the immune system to respond to millions of different antigens.</p> </div> </div> <p><b>Figure 2:</b> Specific antigens (<i>green</i>) located on several foreign cells (<i>yellow</i>) bind to antigen receptors (<i>red</i>) that are located on immune system cells (<i>purple</i>).</p> <p><b><u>Two-Part Assault:</u></b></p> <p>When a displayed antigen binds to its antigen receptor on an immune system, another response is triggered → more immune cells are produced that have the same antigen receptor. These immune cells carry out two processes at the same time. One process destroys a person’s body cells that are no longer normal. These cells may be infected by pathogens or may be other altered body cells, such as cancer cells. The other process removes extracellular pathogens, or pathogens that have not yet entered body cells. Together, these two processes form an integrated response to an infection.</p>	