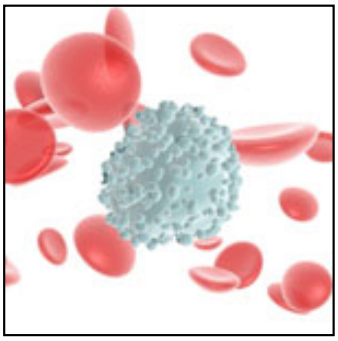
The Immune System: The War Over Disease



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If the body's immune system were to be compared to a known society it would have to be the Spartans of ancient Greece. The immune system is a warrior-like federation with all the sophistication of a modern military. Within its ranks is an intelligence seeking force, B cells; standing army, Killer T cells; database of past actions, Memory B and T cells; weapons experts, Granulocytes; and even a force that does a little of everything, Macrophages.

First Line Of Defense

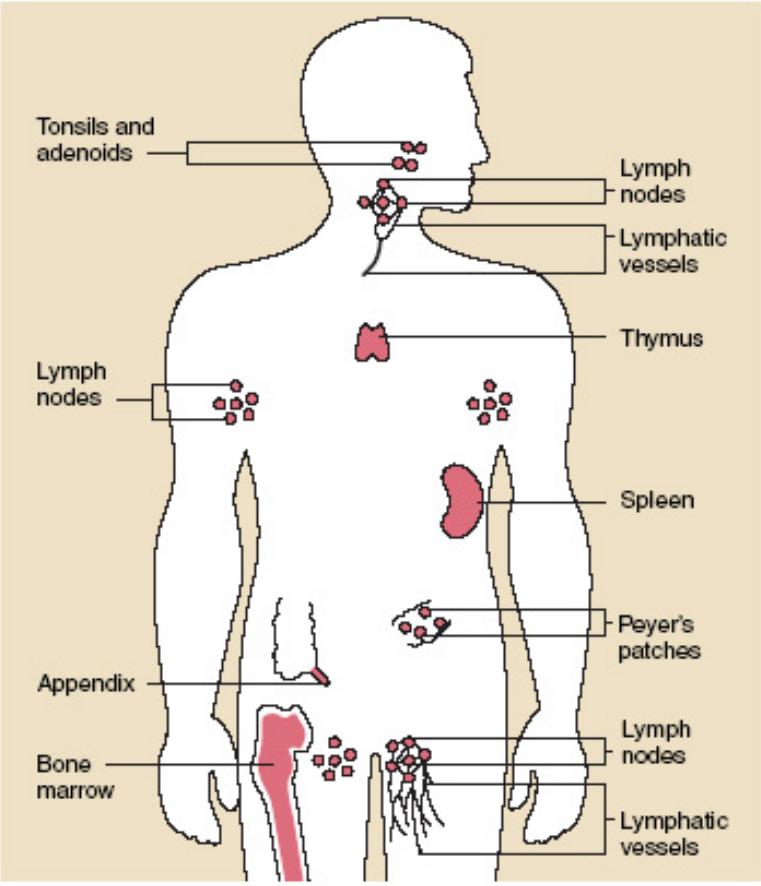
The immune system has forces within and without the body working in unison to keep the body disease free. The first line of defense is the hair, skin, tears and mucus of the mouth, nose and lungs. These, in and of themselves, possess powerful weapons. Both the skin and mucus carry chemicals which fight bacteria. The mucus has an added feature which traps invaders and through tentacle-like cilia moves them back up toward the body entrance, so they can be expelled.

If a bacteria, virus, parasite or fungi does penetrate the initial defense, be it through a cut in the skin, or a built-in opening like the nose, the immune system takes action.

The Lymphatic System: The Pentagon Of The Immune System

The immune system's defenses are controlled through the lymphatic system. The body's lymphatic system is made up of several major and minor organs. The major ones being the bone marrow and thymus. The spleen, lymph nodes, tonsils, adenoids, appendix, Peyer's patches and lymphatic vessels are considered the minor organs.

The purpose of the lymphatic system is to produce, train and help the various cells of the immune system to do their jobs. The work horses of the immune system are the white blood cells. White blood cells are made from stem cells in the bone marrow. Over a billion of these cells are created daily.



Unlike the blood system which has the heart to keep the blood moving throughout the body, the lymphatic system relies on muscle contractions to keep the lymph moving through the lymph vessels. Clogging can accrue in a lymph system which has not been properly stimulated with movement. The Photon-Genie has been specifically designed to clear lymph vessel clogging and promote a healthier lymphatic system.

As the immune cells pour from the bone marrow they go to various organs like the Thymus where they are trained to become one of the varied members of the T cell population. The B cell, also made in the bone marrow, realize their full potential in the lymph nodes and spleen.

And The Battle Begins

An antigen is a foreign substance that invades the body triggering an immune response. The antigen is easily recognized as being alien to the body by the lack of the self-marker each cell of the body carries. It's a bit like a uniform. Viruses somewhat evade this identification method by taking over a cell, so to replicate themselves and hide from the immune warriors. No one kind of immune cell is responsible for sounding the intruder alert alarm. Instead any immune cell given the ability to produce cytokines can sound the initial warning. Cytokines are like Paul Revere. Racing through the body they forewarn the various immune cells of the danger encountered, and instruct them as to how they can help.

Once the alarm has been sounded the needed forces of the immune system swing into action. T cells, B cells, Macrophages and Granulocytes are the immune system's main armed forces.

The War Of The T Cells

T cells are responsible for numerous immune responses, depending on the type of T cell. The Helper T cells are the communication officers of the immune system. Helper T cells secrete interleukin which activates other T cells into action. Along with this the Helper T cells prompt the B cells to produce the antibody needed to identify the antigen.

Killer T cells attack the antigen. They are the main muscle of the immune system. Killer T cells can also identify a virus hiding in another cell. Launching an attack they will kill both the cell and virus. There are two other kinds of T cells. The Memory T cell persists after the antigen has been conquered. If the same antigen returns Memory T cells will move quickly to mobilize T cells to fight the new threat.

Regulatory T cells act as the military police in the fight. Once the antigen has been destroyed the Regulatory T cell suppresses the fighting forces, so they don't get out of control and begin attacking the bodies own cells. An autoimmune disease is the result of an immune system that attacks the body. Rheumatoid Arthritis, Lupus and Multiple Sclerosis are just a few of the possible autoimmune diseases.

B Cells The Antibody Factory

There are two main kinds of B cells, the Memory B cell which has a similar job as the Memory T cell and Plasma B cell. Once instructed by Helper T cells, B cells become Plasma B cells and begin the task of creating the antibody associated with that particular antigen. The Plasma B cell becomes a factory secreting up to 30,000 needed antibodies per second. These antibodies then attach themselves to one of the antigen cells. This action marks the antigen for destruction by the fighting forces. In this way antibodies are a lot like the handcuffs used to immobilize the suspect. Once the antibody has locked the antigen down they may begin the process of destruction by punching holes into the antigen's membrane, or just wait for stronger forces to do the dismantling.

There are four basic kinds of antibodies, each with its own purpose:

IgG – coat antigens, which speeds up their confrontation time with other immune cells.
IgM – are stationed around the entrances of the bodies natural openings, like the mouth.
IgE – causes allergic responses and protect against parasites.
IgD – used by the B cells in early response against antigens.

Macrophages: The Blob With The Really Big Mouth

Macrophages look like a blob with tentacles which are used to grab antigens and other foreign objects. Their mouth possess the elasticity of a snakes. They often swallow things larger than themselves, or at least attempt to. Being the jack-of-all-trades the macrophage has duties that last from the beginning to the end of the immune response. Not only do macrophage destroy invaders, but they also patrol, send for help and after the battle scavenge around and remove the remaining debris.

Granulocytes Contain Killer Chemicals

There are three kinds of granulocytes; basophilis, eosinophils and neutrophils. They destroy the antigen by releasing granules filled with destructive chemicals into the antigen. A couple of the chemicals released are hydrogen peroxide and nitric oxide.

After The Battle

Once the antigen has been defeated Regulatory T cells keep the other fighting force from finding an unnecessary battle to fight in. The macrophage cleans up the battlefield of antigen parts and killed immune cells. After all is over the Memory T and B cells patrol the body for years watching out for the same antigen to once again intrude upon the body.

Article written by Cat Pippin Lowe for Promolife, Inc.