

THE 3RD LINE OF DEFENCE

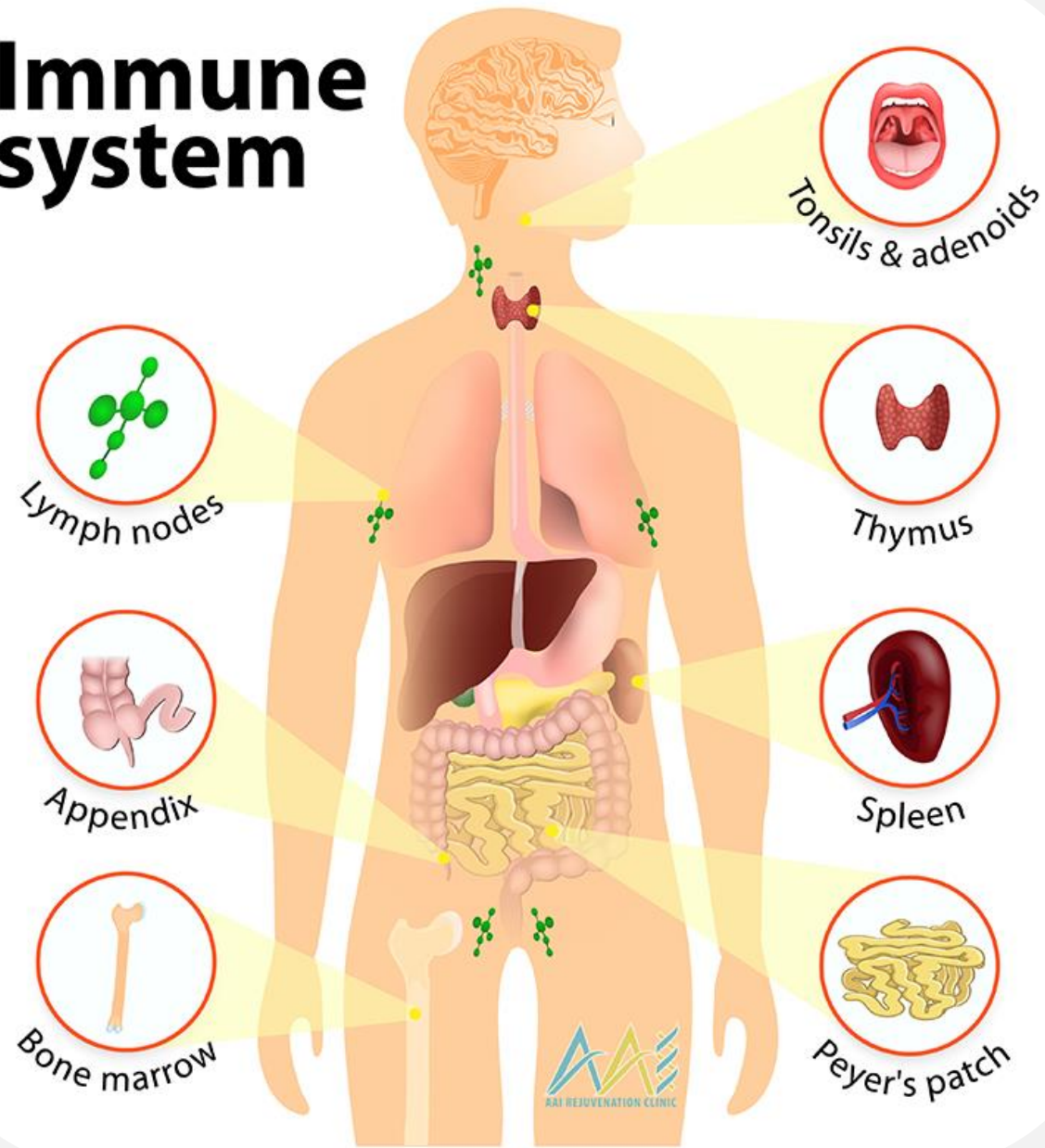
U5:L2

The immune system is the body's defense against infectious organisms and other invaders.

Through a series of steps called the immune response, the immune system attacks organisms and substances that invade body systems and cause disease.



Immune system



INNATE (NATURAL)



ACQUIRED (ADAPTIVE)



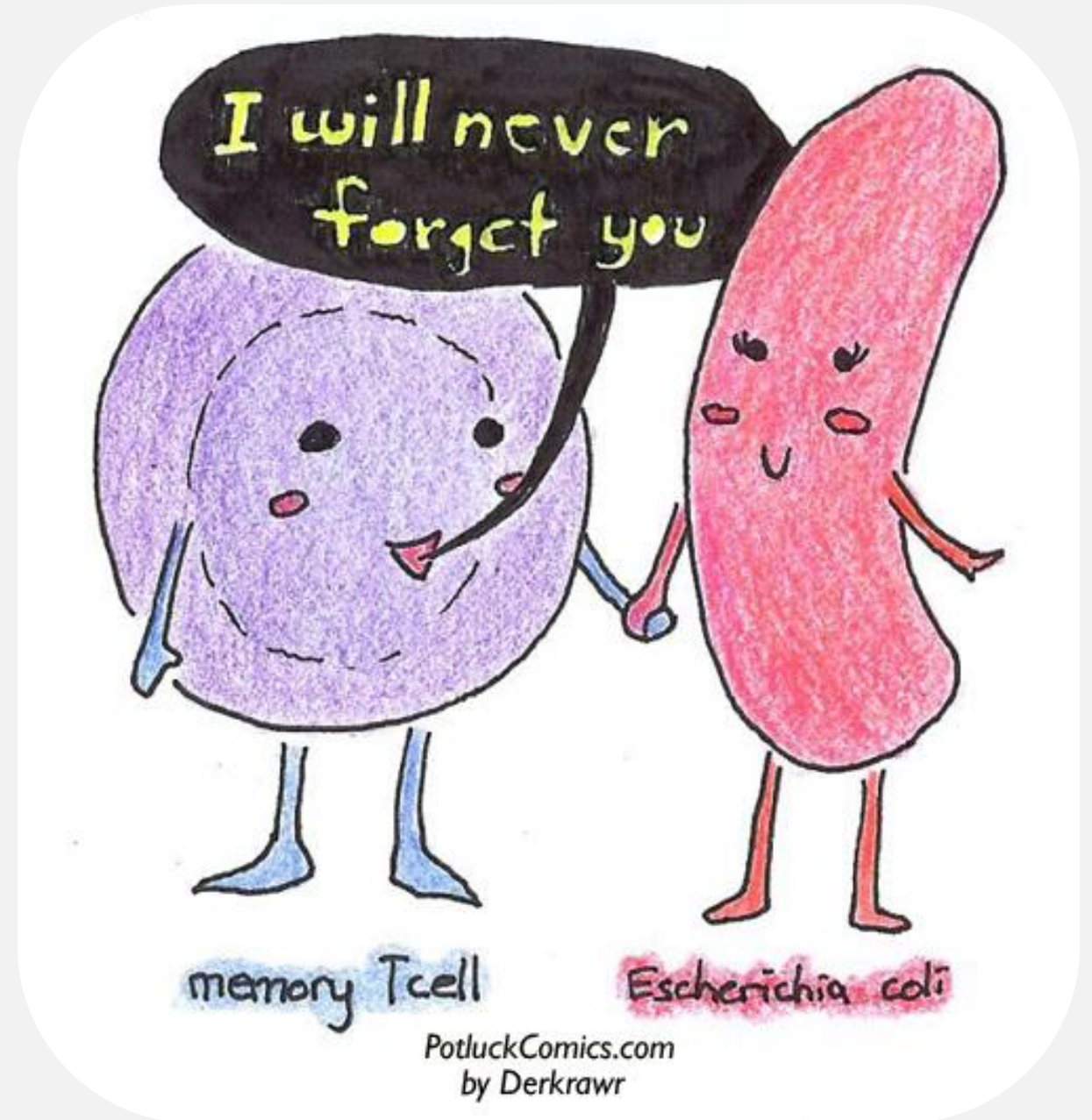
ACQUIRED / ADAPTIVE IMMUNITY

You develop an immune system once you're born in response to different exposures

- 2nd & 3rd line of defence
- Activated when something gets past your natural/innate immunity
- Takes 5-7 days to be activated & lasts for years
- Enhanced by exposure to antigens

4 MAIN CHARACTERISTICS:

- Specific
- Diverse
- Memory
- Recognizes self vs non-self

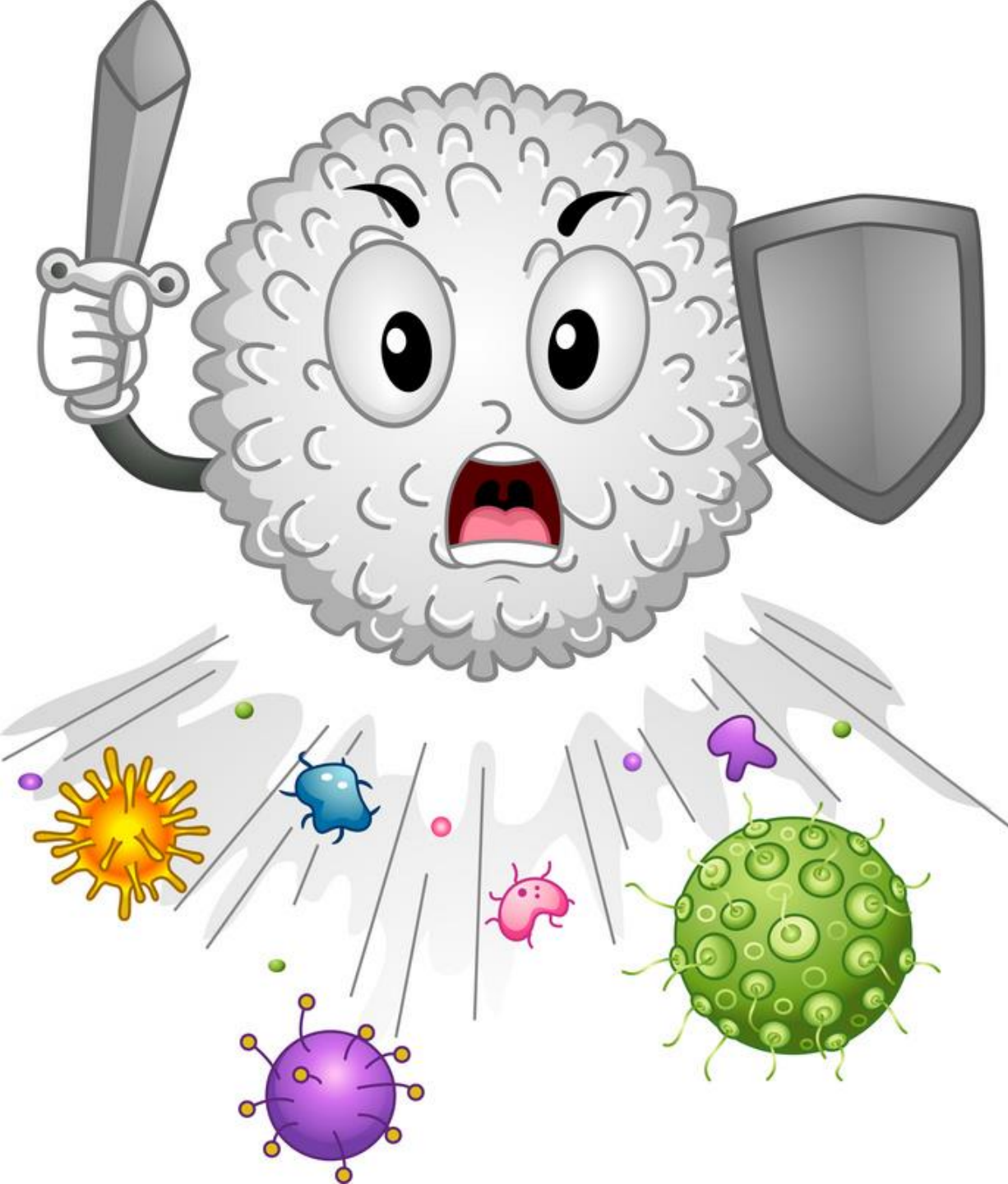


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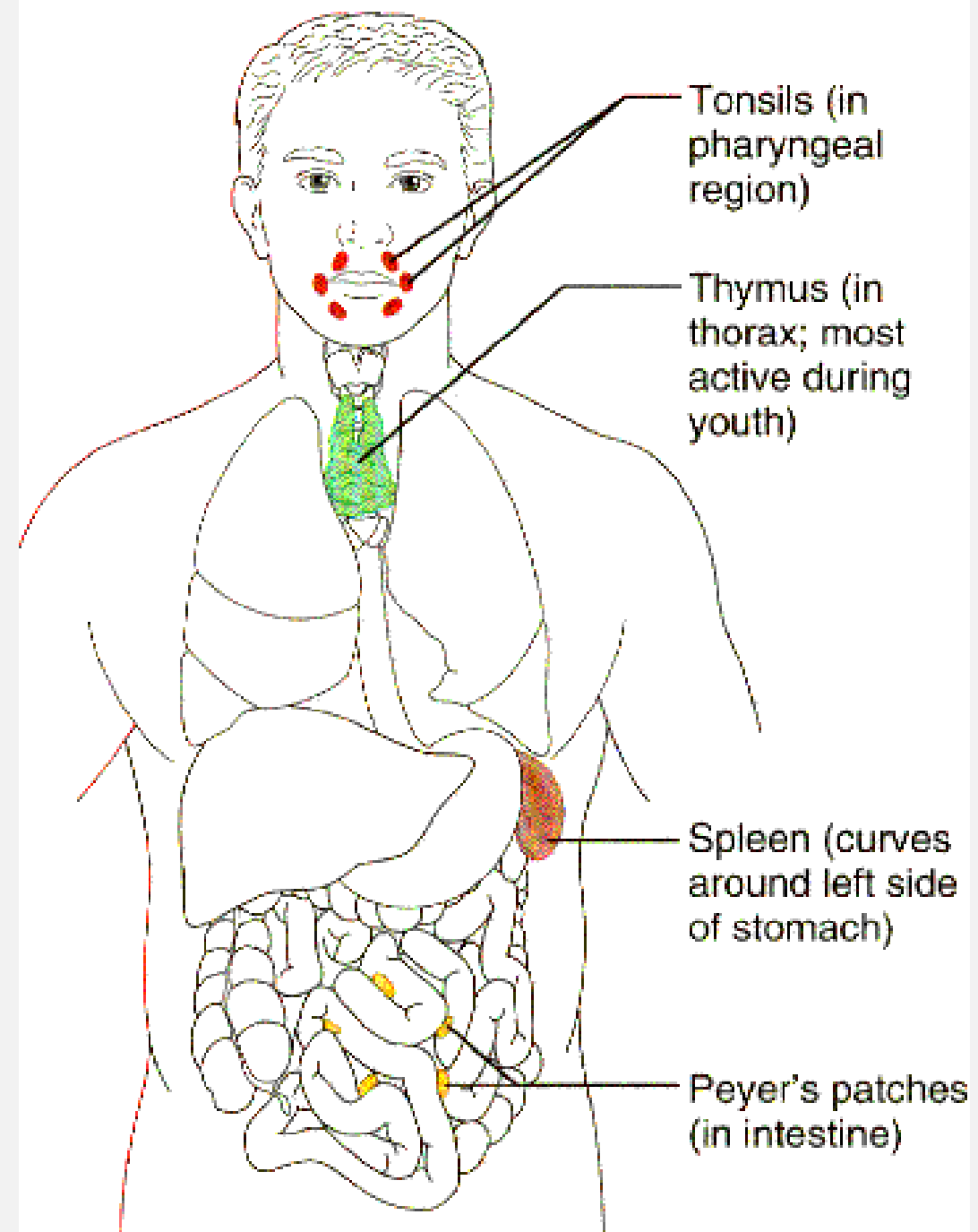
- If the invader makes it past the first two lines of defense, the immune system identifies the invader (pathogen) and prepares a specific response.
- This response is known as the immune response and is considered to be **SPECIFIC IMMUNITY**. This means that the response targets specific pathogens.



The immune system is made up of a network of cells, tissues, and organs that work together to protect the body.

One of the important cells involved are white blood cells, also called leukocytes, which come in two basic types that combine to seek out and destroy disease-causing organisms or substances.

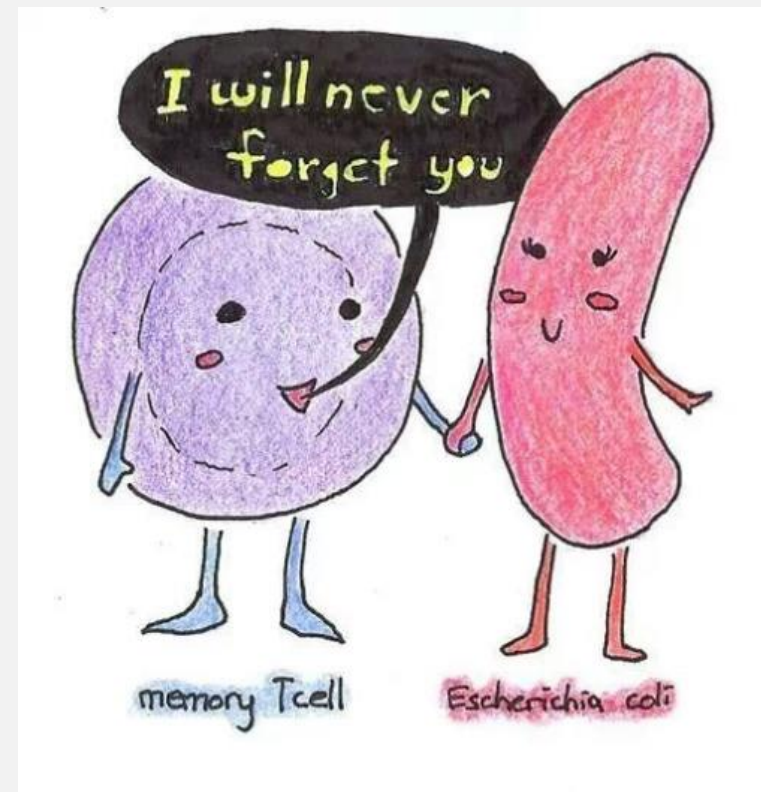
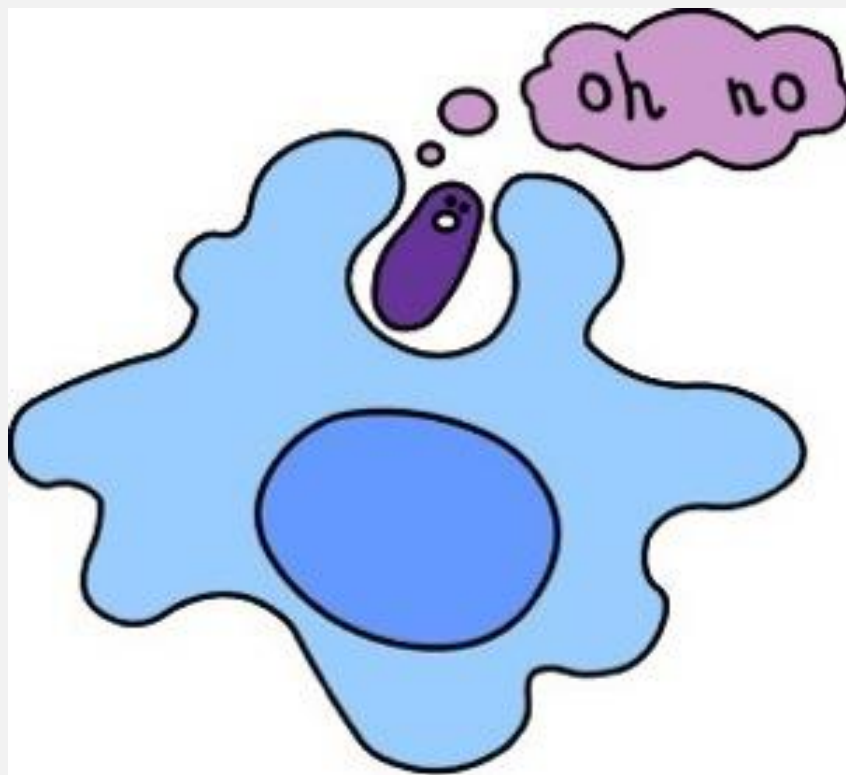
Leukocytes are produced or stored in many locations in the body, including the thymus, spleen, and bone marrow. For this reason, they're called the lymphoid organs. There are also clumps of lymphoid tissue throughout the body, primarily as lymph nodes, that house the leukocytes.



The two basic types of leukocytes are:

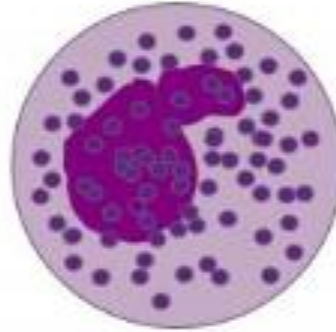
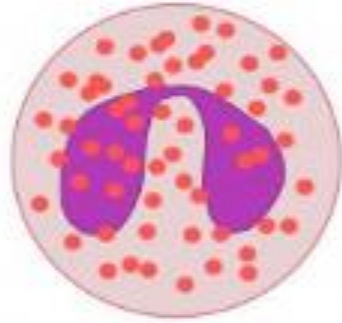
1. **phagocytes**, cells that chew up invading organisms

2. **lymphocytes**, cells that allow the body to remember and recognize previous invaders and help the body destroy them





A number of different cells are considered phagocytes.
The most common type is the **neutrophil**,
which primarily fights bacteria.



neutrophil

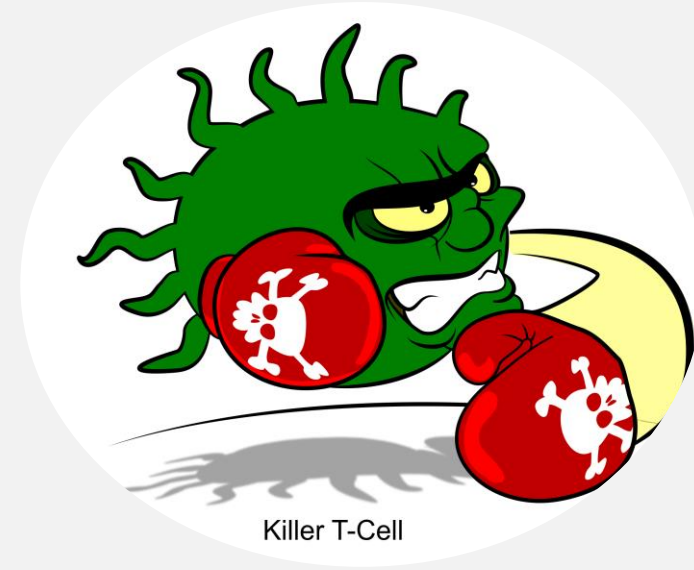
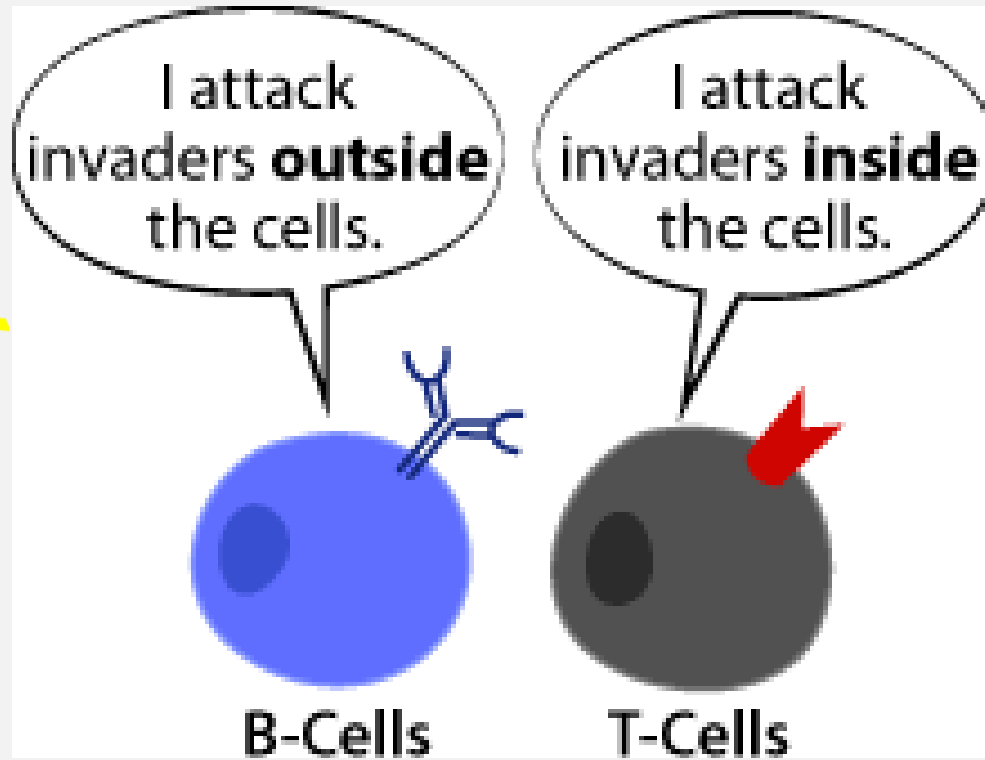
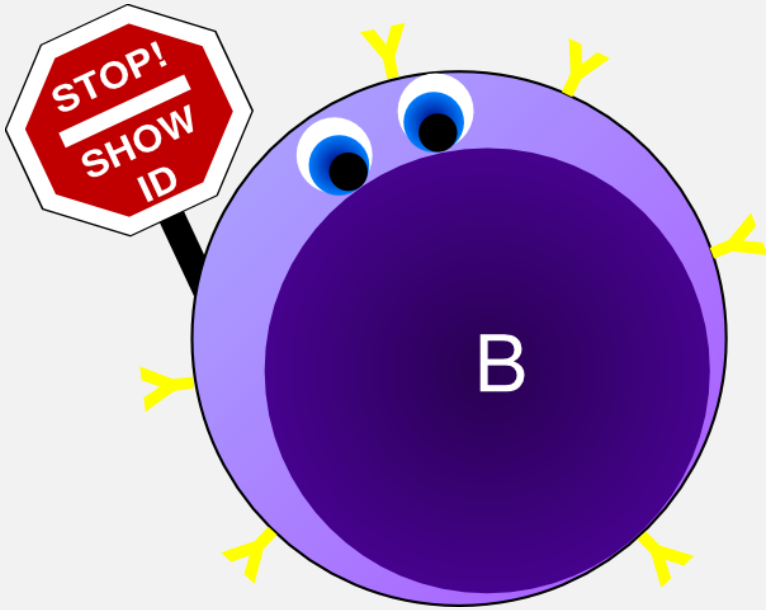
eosinophil

basophil

monocyte

lymphocyte

The two kinds of lymphocytes are **B lymphocytes** and **T lymphocytes**. Lymphocytes start out in the bone marrow and either stay there and mature into B cells, or they leave for the thymus gland, where they mature into T cells.

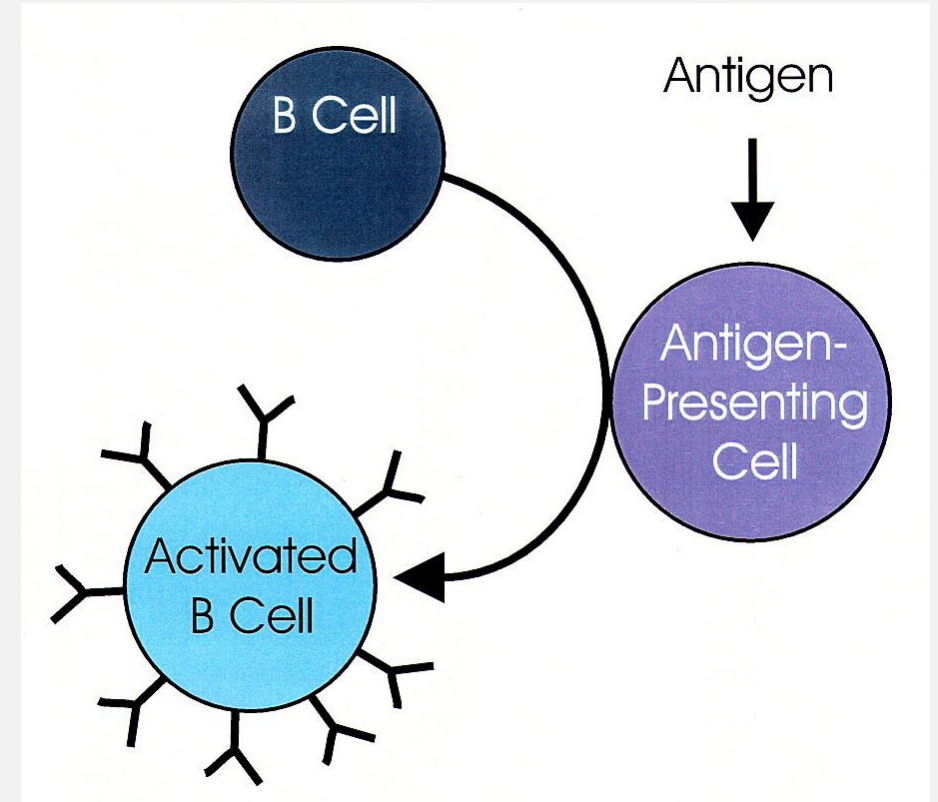


B lymphocytes and T lymphocytes have separate functions:
B lymphocytes are like the body's military intelligence system, seeking out their targets and sending defenses to lock onto them.
T cells are like the soldiers, destroying the invaders that the intelligence system has identified

B Cells – produce antibodies that bind to a specific antigen so that it can be removed from the body.

- This is called an ANTIBODY MEDIATED RESPONSE.

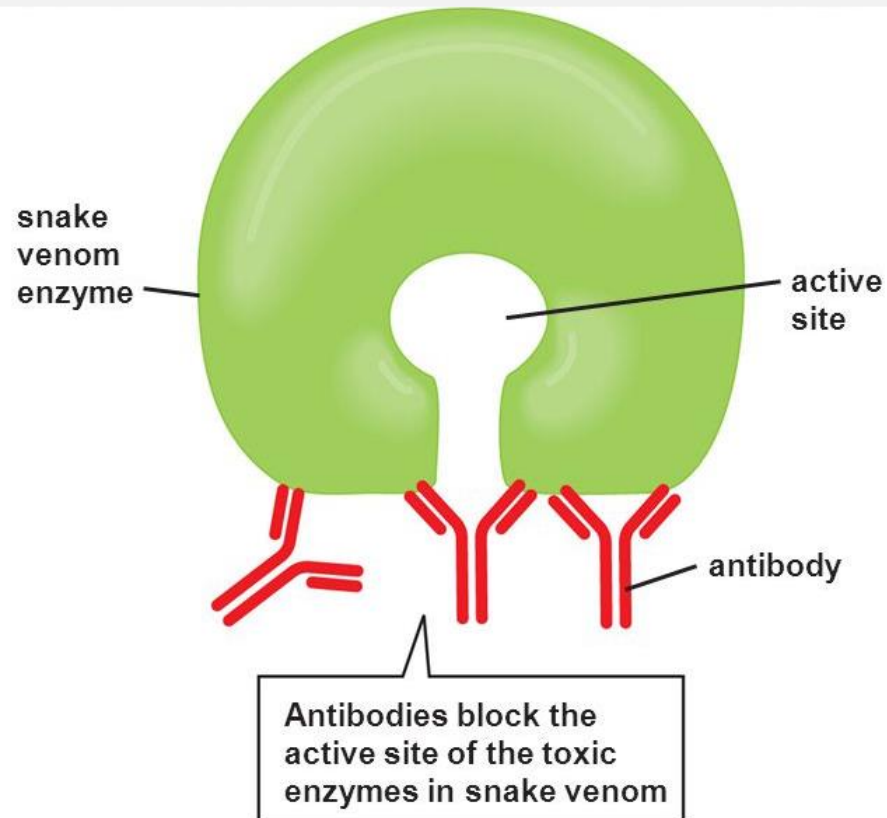
- The antibody and antigen fit together like a lock and key. This means that the antibody produced to fight the antigen, will bind to that specific antigen only.





Once produced, these antibodies stay in a person's body, so that if his or her immune system encounters that antigen again, the antibodies are already there to do their job. So if someone gets sick with a certain disease, like chickenpox, that person usually won't get sick from it again.

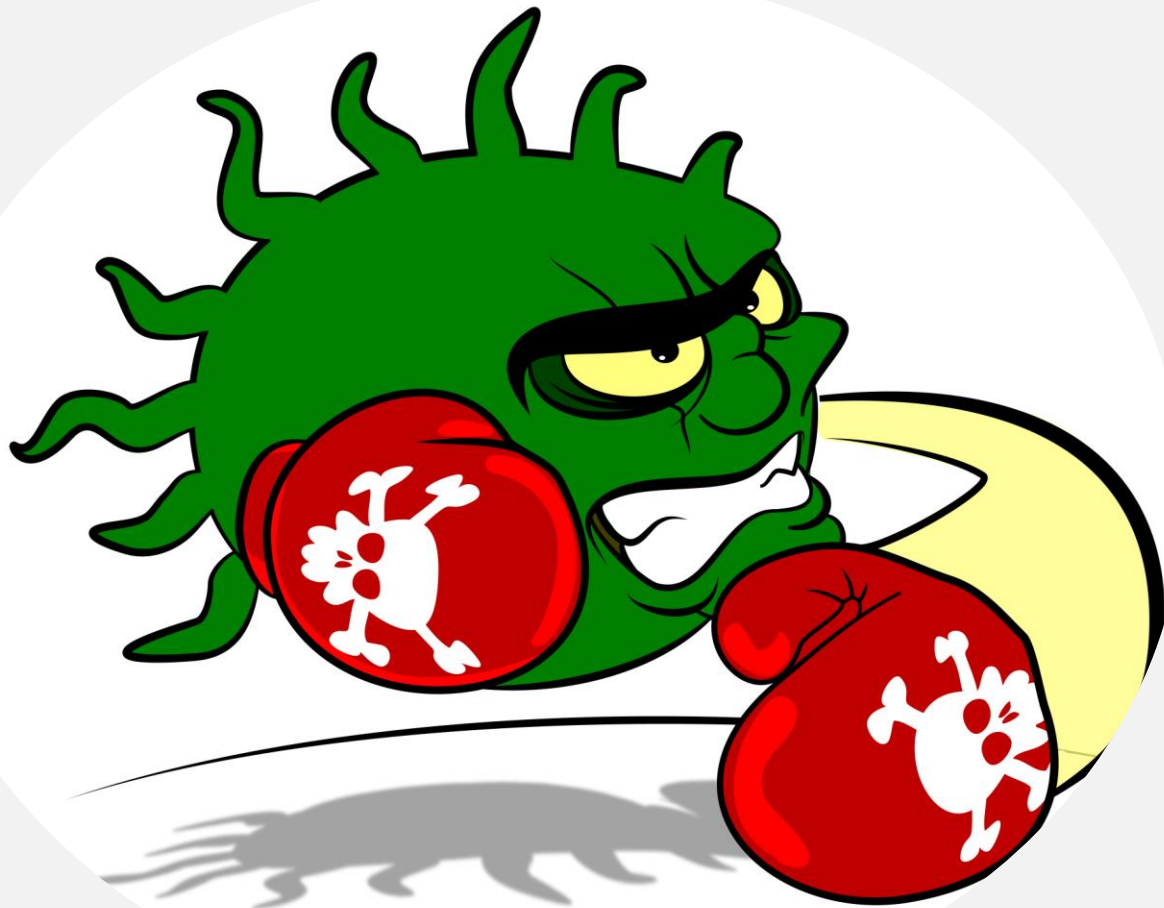
Antibodies also can neutralize toxins (poisonous or damaging substances) produced by different organisms.



Although antibodies can recognize an antigen and lock onto it, they are not capable of destroying it without help.

That's the job of the T cells, which are part of the system that destroys antigens that have been tagged by antibodies or cells that have been infected or somehow changed. (Some T cells are actually called "killer cells.")

T cells also are involved in helping signal other cells (like phagocytes) to do their jobs.



Killer T-Cell

- T Cells – do not produce antibodies. They attack cells directly.
- This is called a CELL MEDIATED RESPONSE.
 - When the T cell binds to antigens on the infected cell, it causes it to burst.

