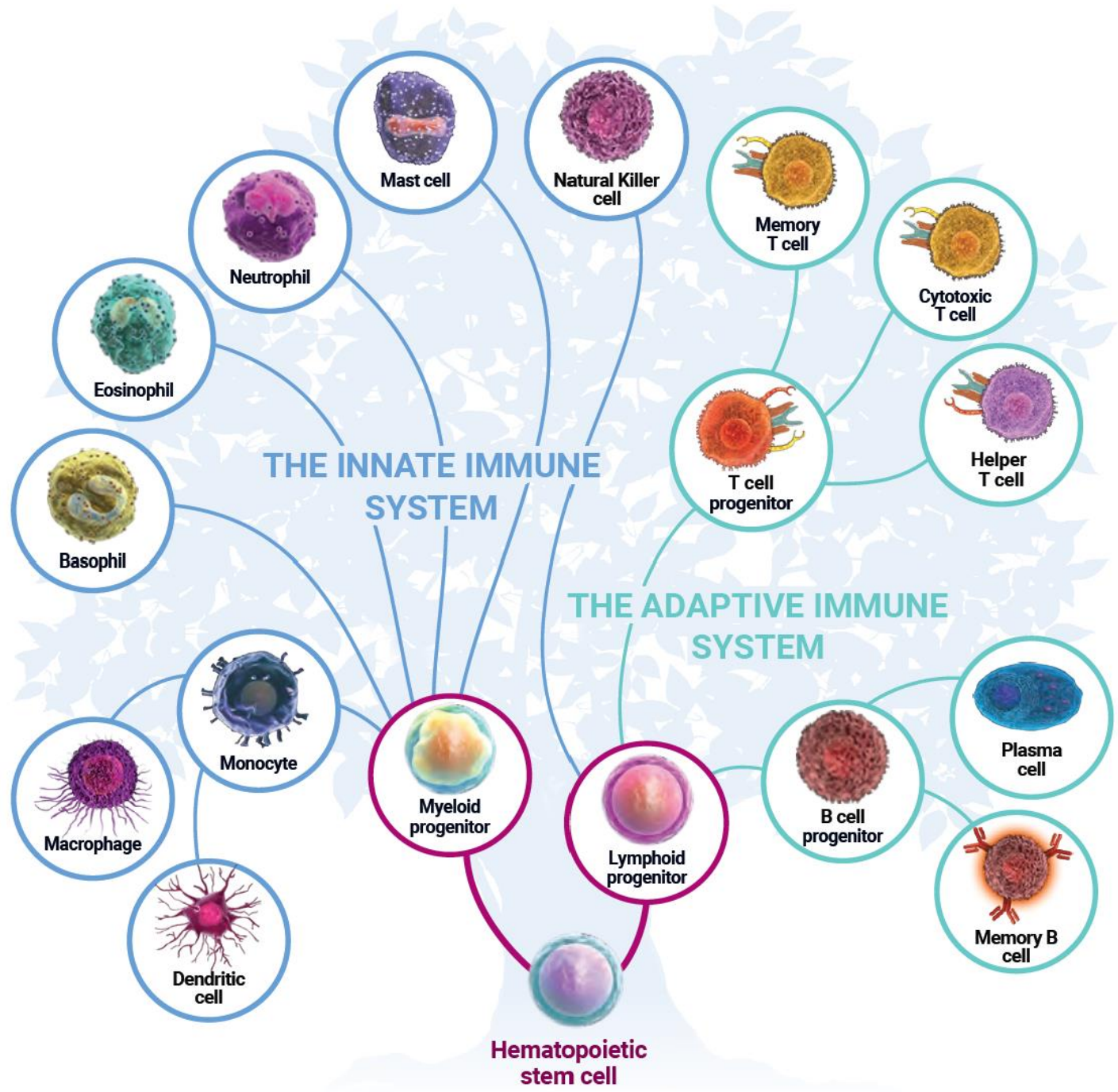




Antibodies

An antibody is a protein component of the immune system that circulates in the blood, recognizes foreign substances like bacteria and viruses, and neutralizes them. After exposure to a foreign substance, called an antigen, antibodies continue to circulate in the blood, providing protection against future exposures to that antigen.

Cells of the immune system

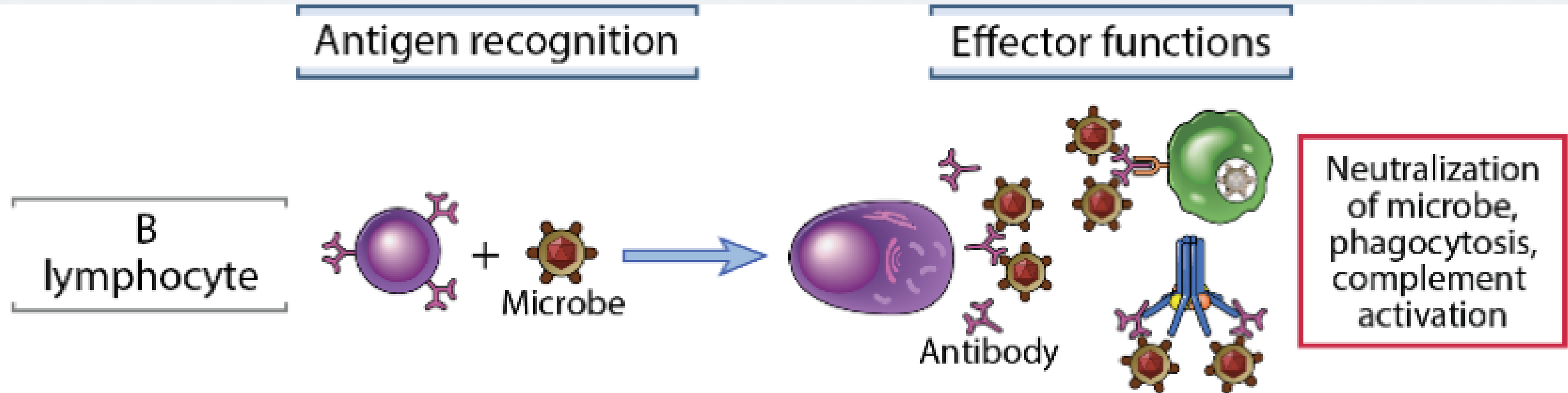


What is Antibodies

- **Antibody:** also called **immunoglobulin**, a protective protein produced by the immune system in response to the presence of a foreign substance, called an antigen.
- **Antigen:** An antigen is anything that is foreign to the human body. It can be a virus, it can be a bacteria, and in some cases your own body will appear as foreign.
- A wide range of substances are regarded by the body as antigens, including disease-causing organisms and toxic materials such as insect venom
- When an alien substance enters the body, the immune system is able to recognize it as foreign because molecules on the surface of the antigen differ from those found in the body.
- Antibodies recognize and latch onto antigens in order to remove them from the body

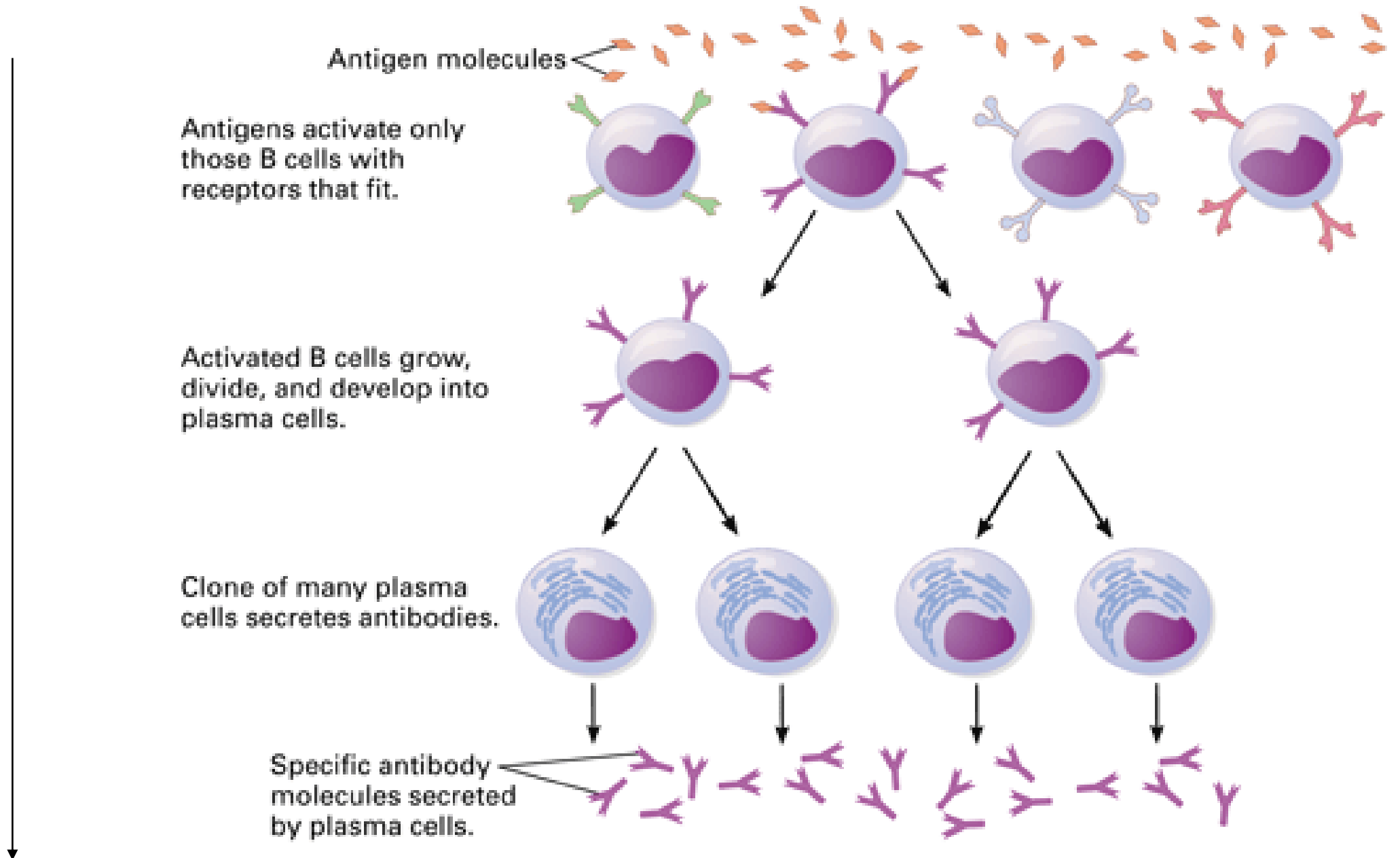
- To eliminate the invader, the immune system calls on a number of mechanisms, including one of the most important—antibody production.
- Antibodies are produced by specialized white blood cells called B lymphocytes (or B cells).
- When an antigen binds to the B-cell surface, it stimulates the B cell to divide and mature into a group of identical cells called a clone.
- The mature B cells, called plasma cells, secrete millions of antibodies into the bloodstream and lymphatic system.

Production of antibodies against an antigen



- B lymphocyte recognizes the antigenic part of the microbes(virus/bacteria) and start producing antibodies against them.
- These antibodies will neutralize the antigens or will activate the complement system to overcome the infection.

- **Activation of B cells to produce specific antibodies**



Function of antibodies

- As antibodies circulate, they attack and neutralize antigens that are identical to the one that triggered the immune response
- Antibodies attack antigens by binding to them. The binding of an antibody to a toxin, for example, can neutralize the poison simply by changing its chemical composition; such antibodies are called antitoxins.
- By attaching themselves to some invading microbes, other antibodies can render such microorganisms immobile or prevent them from penetrating body cells.
- In other cases the antibody-coated antigen is subject to a chemical chain reaction with complement, which is a series of proteins found in the blood.
- The complement reaction either can trigger the lysis (bursting) of the invading microbe or can attract microbe-killing scavenger cells that ingest, or phagocytose, the invader.
- Once begun, antibody production continues for several days until all antigen molecules are removed. Antibodies remain in circulation for several months, providing extended immunity against that particular antigen.

Basic Structure of antibody

- The structure of the antibody consists of two light chains and two heavy chains.
- At the very tip of the antibody is a hypervariable region.
- This hypervariable region allows the antibody to make different types of antibodies that will respond to all of the antigens encountered by the body.
- The region that has a constant structure is called the **constant region**.

Structure of antibody

