

CELLS OF THE IMMUNE SYSTEM

The cells of the immune system are located in different tissues and serve different roles in host defense (Fig. 1-8).

- **Lymphocytes**

circulate through lymphoid organs and nonlymphoid tissues. They recognize foreign antigens and initiate adaptive immune responses.

- **Cells resident in tissues**

detect the presence of microbes and react against them. These cells include

1. macrophages, whose function is to ingest and destroy foreign substances.
2. dendritic cells, which capture microbes and display them to lymphocytes to initiate immune responses, and are therefore called **antigen-presenting cells**.
3. mast cells, which help to recruit other leukocytes to destroy microbes

- **Phagocytes**

Normally circulate in the blood, including **neutrophils** and **monocytes**, are rapidly recruited to sites of infection in the process called inflammation. These leukocytes (white blood cells) ingest and destroy microbes and then start the process of repairing damaged tissues. Because these phagocytes, as well as some **T lymphocytes**, are responsible for the effect of the immune response, which is to destroy microbes, they are sometimes called **effector cells**.

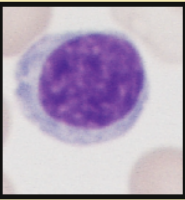
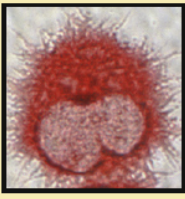
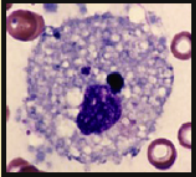
Cell type	Principal function(s)
<p>Lymphocytes: B lymphocytes; T lymphocytes</p>  <p><i>Blood lymphocyte</i></p>	<p>Specific recognition of antigens</p> <ul style="list-style-type: none"> • B lymphocytes: mediators of humoral immunity • T lymphocytes: mediators of cell-mediated immunity
<p>Antigen-presenting cells: dendritic cells; macrophages; B cells; follicular dendritic cells</p>  <p><i>Dendritic cell</i></p>	<p>Capture of antigens for display to lymphocytes:</p> <ul style="list-style-type: none"> • Dendritic cells: initiation of T cell responses • Macrophages: effector phase of cell-mediated immunity • Follicular dendritic cells: display of antigens to B lymphocytes in humoral immune responses
<p>Effector cells: T lymphocytes; macrophages; granulocytes</p>  <p><i>Macrophage</i></p>	<p>Elimination of antigens:</p> <ul style="list-style-type: none"> • T lymphocytes: activation of phagocytes, killing infected cells • Macrophages: phagocytosis and killing of microbes • Granulocytes: killing microbes

FIGURE 1-8 Principal cells of the immune system. The major cell types involved in immune responses and the key functions of these cells. Micrographs illustrate the morphology of some cells of each type.