Dr. Hussein Mahdi
Dr. wurood Ali Alduamy
Lecture . 2
Third stage

College of Technology & Health Sciences
Department of Medical Laboratory Technique

LYMPHOID CELLS, ORGANS AND TISSUES

Lymphoid tissue

A lymphoid tissue is simply a tissue in which lymphocytes are found. **Lymphoid tissues** range in organization from diffuse arrangements of individual cells to encapsulated organs (**Fig. 1**). **Lymphoid follicles** are organized cylindrical clusters of lymphocytes that, when gathered into groups, are called **lymphoid patches**. Lymphoid organs are usually groups of follicles that are surrounded, or encapsulated, by specialized supporting tissues and membranes.

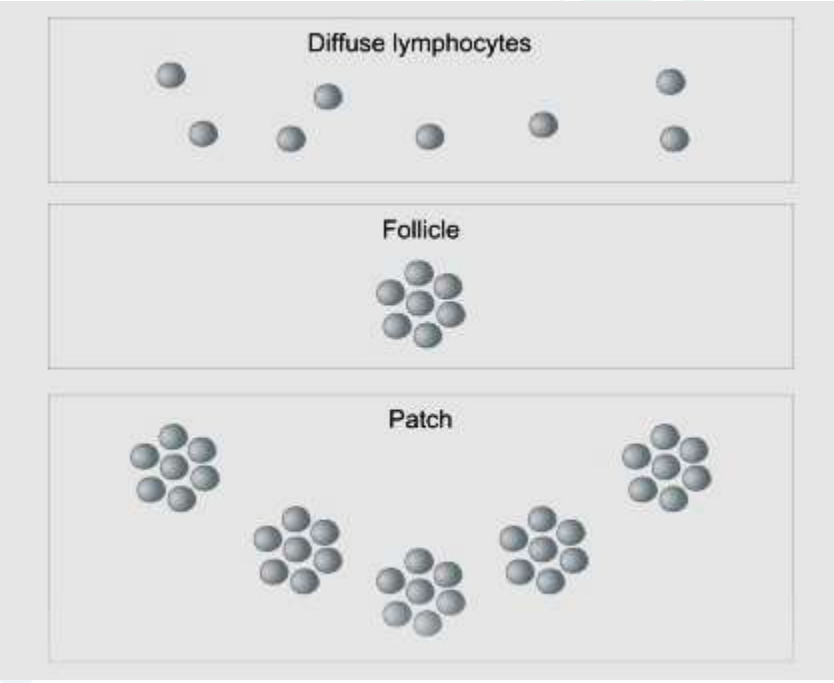

Figure-2: Lymphoid tissue

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Lymphocyte

Lymphocyte are the central cells of the immune system, responsible for adaptive immunity and the immunologic attributes of diversity, specificity, memory, and self/nonself recognition. The other types of white blood cells play important roles, **engulfing and destroying microorganisms, presenting antigens, and secreting cytokines**.

Lymphoid Cells:

Lymphocytes constitute 20%–40% of the body's white blood cells and 99% of the cells in the lymph. These lymphocytes continually circulate in the blood and lymph and are capable of migrating into the tissue spaces and lymphoid organs, thereby integrating the immune system to a high degree.

A:- The lymphocytes can be broadly subdivided into three populations:

B cells, T cells, **and natural killer cells**—on the basis of function and cell-membrane components.

Natural killer cells (NK cells) are large, granular lymphocytes that do not express the set of surface markers typical of B or T cells.

1-B cells

Derived it's letter designation from it's site of maturation, in the bursa of fabricius in bird; and in bone marrow where is it's major site of maturation in a number of mammalian species including humans and mice.

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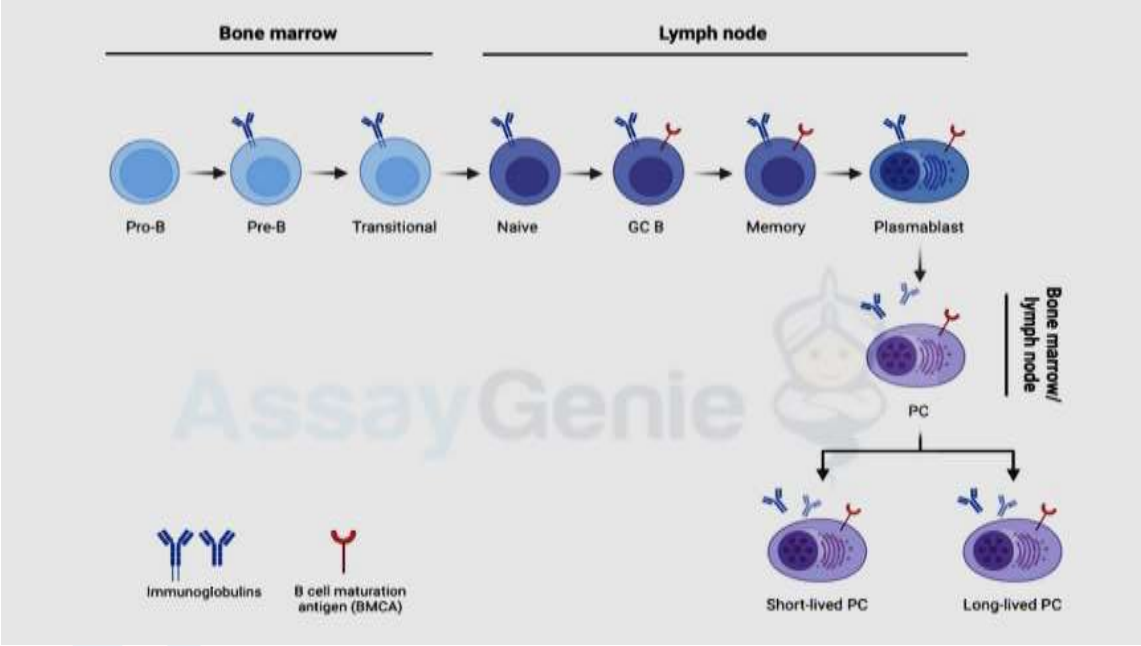
Mature B cells display of membrane-bound immunoglobulin (antibody) molecules, which serve as receptor for Ag (BCR) .

Types of B cells

Effector cells called Plasma cells ,which produce the Ab in a form that can be secreted and have little or no membrane-bound Ab. They are end-stage cells and do not divide.

Memory B cells, which have a longer life span than naïve cells, and they express the same membrane-bound Ab as their parent B cell.



2-T-Cells

It derive it litter designation from their site of maturation in the thymus. During its maturation within the thymus, the T cell comes to express on its membrane a unique Ag-

LYMPHOID CELLS, ORGANS AND TISSUES

binding molecule called the T-cell receptor. TCR recognize Ag that is bound to cell membrane proteins called major histocompaibility complex (MHC).

There are Three well-defined subpopulations of T cells:

1. T-helper (TH) cells.

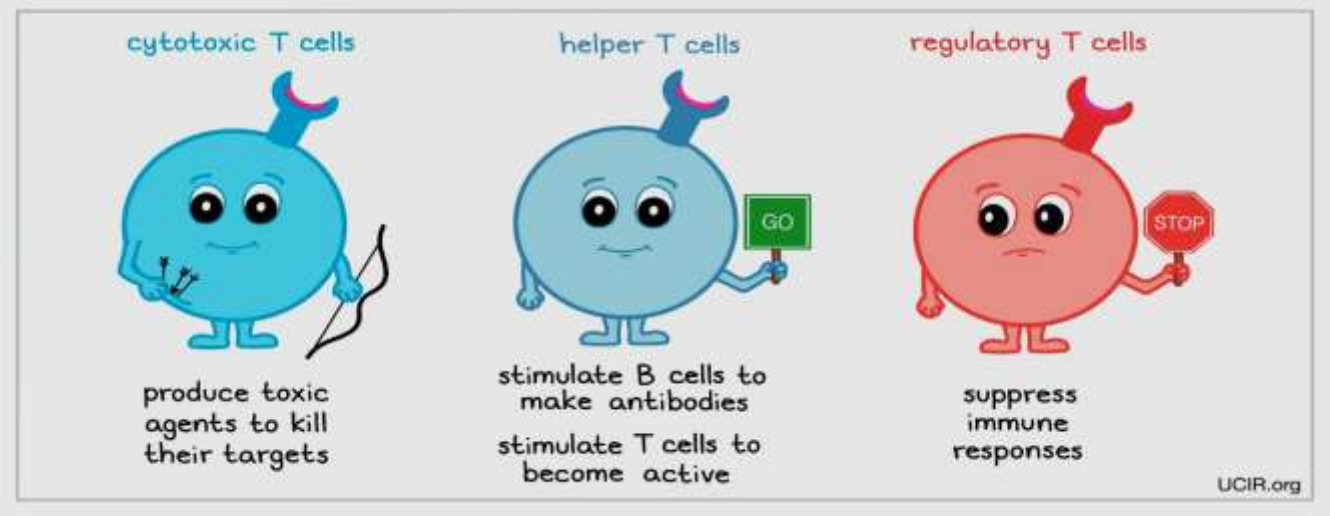
T helper cells characterize by the presence of CD4 membrane glycoproteins on their surfaces.

2. T-cytotoxic (TC) cells.

T cytotoxic cells express CD8 membrane glycoproteins on their surfaces.

3. T-regulatory (T-reg)cells .

The regulatory T cells formerly known as suppressor T cells, are a subpopulation of T cells that modulate the immune system, maintain tolerance to self-antigens, and prevent autoimmune disease.



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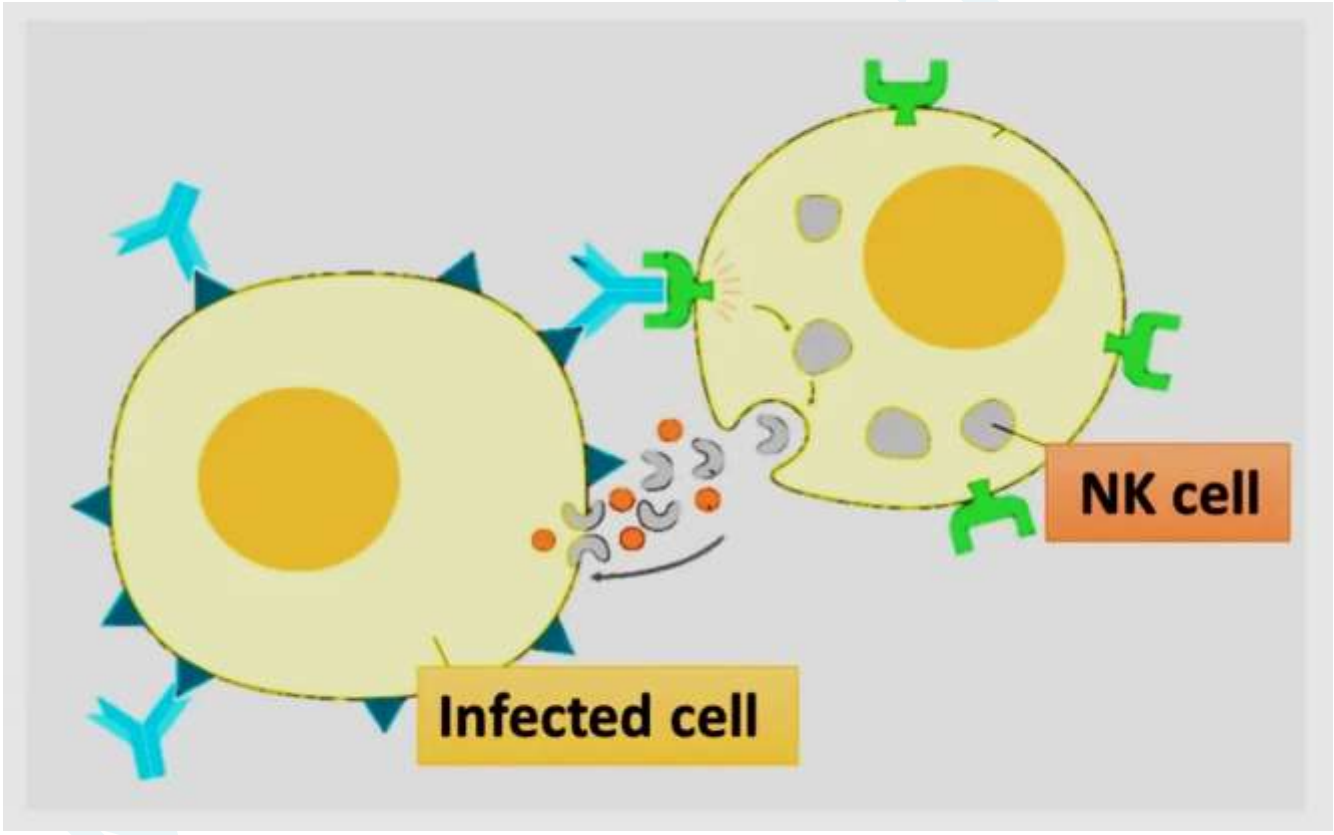
3-NATURAL KILLER CELLS

It is lymphocytes that display cytotoxic activity against a wide range of tumor cells in the absence of any previous immunization with the tumor. NK cells were subsequently shown to play an important role in host defense both against tumor cells and against cells infected with some, though not all, viruses.



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B. Monocytes:

They are the main phagocytic cells. They are either circulating or resident in different organs and tissues . In blood they are either macrophages or monocytes.

The main functions of the macrophages are:

Phagocytosis.

Antigen presentation to B and T-cells.

Cytokines secretion

C. The granulocytes:

There are three types of granulocytes which are:

- **Neutrophils.**
- **Eosinophils.**
- **Basophils.**

(Mast cells)

The neutrophils:

The neutrophils has lobulated nucleous with 3to 5 lobes. Their cytoplasmic granules are neutrally reacted with pink color. They are active phagocytic cells. They are active against bacterial infection. they are the first cells migrate to the site of infection with a life span of few days.

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Eosinophils:

They have also lobulated nucleous. Their cytoplasm contains granules with acidic reaction . they are stained orange in color.They are active against parasitic infection . They secrete toxic materials from their cytoplasmic granules which kill the parasites. They are also present in case of allergic reaction.

Basophils:

They have also lobulated nucleous. Their cytoplasm contains granules with basic reaction . they are stained violate in color.They are active in allergic reaction . They secrete histamine from their cytoplasmic granules which cause inflammatory and allergic reaction.