Tikrit University
College of Veterinary Medicine

Lect. 3-Immunology

Subject name: Cells and tissues of immune system part 2
Subject year:2024-2023
Lecturer name: Dr. Muthanna Ali Sultan and Assist.Prof.Dr. Agharid Ali Hussein
Academic Email:
agharidalrasheed@tu.edu.iq
muthanna.sultan@tu.edu.iq

SCAN ME
Lecturers link

IMMUNOLOGY

Lecture 3 **Dr. Muthanna Sultan**
Assist.Prof.Dr.Agharid Ali Hussein
Junior students **Academic Year 2023-2024**

Cells and tissues of immune system

Lymphoid lineage

-Lymphocytes

The lymphocytes considered the unique cells of adaptive immunity and they are the only cells that are expressed the antigenic receptor on their surfaces and these lymphocytes playing a major role by mediating the adaptive immunity .

The total number of lymphocytes in healthy adults 5×10^{11}

Of these, ~2% are in the blood, ~ 4% in the skin, ~10% in the bone marrow, ~15% in the mucosal lymphoid tissues of the gastrointestinal and respiratory tracts, and ~65% in lymphoid organs (mainly the spleen and lymph nodes).

B lymphocytes are the producers of antibody, were so called because in **birds** they were found to mature in an organ called the **bursa of Fabricius**.

In mammals, no anatomic equivalent of the bursa exists, and the early stages of B cell maturation occur in the **bone marrow**

Each of T cells as well as B cells have specific subsets (types) and each of these subsets characterized by specific phenotypes and functions based on their locations .

B cells subsets :

1-Follicular B cells

2-Mrginal zone B cells

3- B-1 cells

The names of these 3 types of B cells has been given based on their locations in the lymphoid organs.

T lymphocytes, the mediators of cellular immunity, arise in the bone marrow, and migrate to and mature in the **thymus**; T lymphocytes refer to thymus-derived lymphocyte.

There are three types of T lymphocytes

1- Naïve T lymphocyte
2- Effector T lymphocyte
3- Memory T lymphocyte

Important terms for T and B lymphocytes:

Naive and memory lymphocytes are both called **resting lymphocytes** because they are not actively dividing, nor are they performing effector functions

The size and diameter of lymphocytes may be changing to become bigger after the activation

The diameter of naïve lymphocytes is ≤10 um with less cytoplasm, organelles and RNA.

The diameter of activated lymphocytes is 10-12 um with more cytoplasm ,organelles and RNA

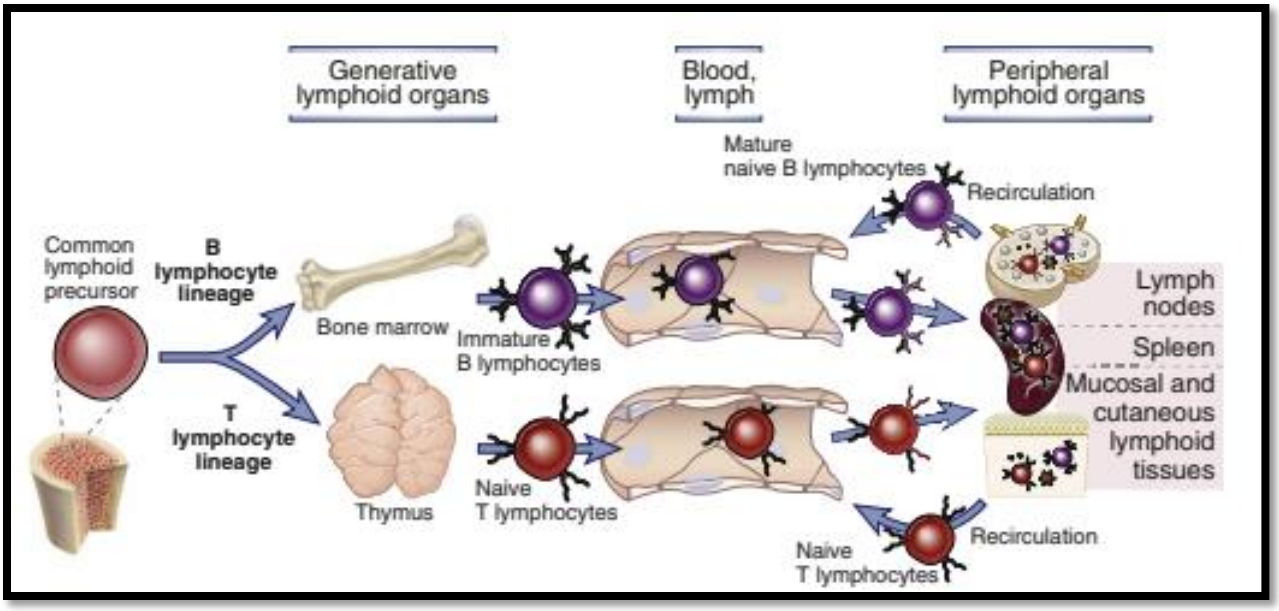
Lymphoid tissues are classified as generative organs, also called **primary or central lymphoid organs** (Bone marrow), where lymphocytes first express antigen receptors and attain phenotypic and functional maturity

Peripheral organs, also called secondary lymphoid (**spleen and lymph node**) organs, where lymphocyte responses to foreign antigens are initiated and develop.

Bone marrow is considered the responsible site for **maturation of some B cells**

Thymus is considered the responsible site for **maturation of T cells**

Memory cells may survive in a functionally quiescent or slowly cycling state for months or years without a need for stimulation by antigen and presumably after the antigen is eliminated. They can be identified by their expression of surface proteins that distinguish them from naïve



Maturation of lymphocytes. Lymphocytes develop from bone marrow stem cells, mature in the generative lymphoid organs (bone marrow and thymus for B and T cells, respectively), and then circulate through the blood to secondary lymphoid organs (lymph nodes, spleen, regional lymphoid tissues such as mucosa-associated lymphoid tissues). Fully mature T cells leave the thymus, but immature B cells leave the bone marrow and complete their maturation in secondary lymphoid organs.

STAY STRONG

GOOD LUCK