IMMUNOLOGY SHEET

DONE BY: RASHA RAKAN

LECTURE: INTRODUCTION TO MEDICAL IMMUNOLOGY
Plasma cells are b cells that produce antibodies, and express B-cell receptor (BCR)

Blood cells that has relation with immune system are:
1. Leukocytes (WBCs)
2. Platelets: it has a role in thrombosis

*We have 2 lines of defense:
-First line: Innate immune system (including mechanical barriers)
-Second line: Adaptive immune system

*In some textbooks:
3 lines of defense...considering mechanical barriers alone as the first line of defense followed by innate immune system then adaptive immune system
Innate immune system = “natural” = “native”
Mainly phagocytes (granules, agranules) and NK cells (doesn’t do phagocytosis, for intracellular microbes like viruses)
Native \[\rightarrow\] already existed

-Germline: prepared before exposure since synthesis it has fixed genetics, same DNA in life span

...the defense is direct or just needs some activation after exposure

-Mainly against microbes

-With repetition same microbe attacked twice ...the response is the same same velocity, same intensity, no adaptation

-Identify groups of related microbes...not distinguishing fine differences they have receptors but they are not specific

...limited diversity

Adaptive immune system = “acquired” = “specific”
T and B lymphocytes
Acquired: microbes + non-microbial material (foreign proteins)
Memory cells

• It adapts:\[\uparrow\] performance with repetitive exposure...the ability to remember same microbe means faster and stronger response

• High specificity... distinguishing fine differences...the specific target molecules = antigens (cause the synthesis of antibody) they bind to them by the receptors on their surfaces
• Large diversity... by **somatic recombination of gene segments**

*not germline, stem cells → 10 lymphocytes → undergo somatic recombination (DNA is cut and changed, so new proteins and functions) → 10 different lymphocytes*

**Immunoglobulins** *antibodies*... by B lymphocytes

**Mechanical barrier → Inflammation → Lymphocytes**

**Cells & organs/tissues**

**Primary lymphoid organs**

- Hematopoietic stem cells in Yolk sac & fetal liver/spleen (Prenatally)
- Bone marrow (Postnatally)

**Autoimmune response**

- Basophiles when the migrate to tissue

**Primary lymphoid organ**

**Blood**

- B lymphocytes
- APCs
- Monocytes
- Granulocytes
- T lymphocytes
- Recirculating lymphocytes

**Secondary lymphoid organs**

- Macrophages
- Monocytes of the tissue

**Tissues, including:**

- APCs & lymphocytes

**Innate immune system**

- Cytokines

**APCs: antigen presenting cells**
Thymus is a secondary factory that T-lymphocytes complete maturation in. Macrophages either go into:

1. Normal tissue and becomes the monocytes of it
2. Secondary lymphoid organs and become APCs

APCs + lymphocytes → inflammation

1ry VS 2ry lymphoid organs

• 1ry lymphoid organs:
  ...they are the organs or tissue in which lymphocytes are produced
  ...they are:
  - Bone marrow (postnatally) & yolk sac/fetal liver/fetal spleen (in embryo)
    ...where both B & T lymphocytes are produced
  - Thymus...where T lymphocytes development is completed

*Note: by puberty, most lymphopoiesis is of B type (in the marrow of flat bones) the thymus is atrophic (fat replacement as we talked about it in HLS) and we will have enough T-lymphocytes for the rest of our lives

• 2ry lymphoid organs:
  ...they are the organs or tissue where:
  Lymphocytes come into contact with foreign antigen, are clonally expanded & mature into effector cells
...they are: lymph nodes, spleen, mucosa-associated lymphoid tissues (MALT) & skin

Somatic recombination:
after lymphocytes was produced from stem cells, genetic material is changed before encountering antigen

Clonal expansion: after being expose to antigen in 2ry lymphoid organs, where the cell clones itself

Put your heart, mind, and soul into even your smallest acts. This is the secret of success.
Contact us if there is any mistakes.
GOOD LUCK 😊