

***Title of Lecture: immunology***

***Date of Lecture : 26/9***

***Sheet no: 1***

***Refer to slide no. :1***

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-Immunology : response of the body (humans, mammals ) to any injury such as infections (by microbes, outside the body) or tumors ( cellular defect , inside the body ) or others.

Immune system :1- innate 2- adaptive-

-History of immunology:

Generation theory: it was believed that microorganisms created themselves from nothing .

-Slide 4 :

430 B.C: it was noticed that if someone survived a disease it is very unlikely for him to have it again.

In the 15th century: they didn't realize that they were transferring a died microorganism ( giving vaccine)

In the 17th century: it was the first time to prove that humans have immune system

-Slide5:

2: the virus that causes smallpox is called vaccinia , from here comes the word vaccination)

3: both cows and humans can be affected by vaccinia

 jenner noticed that if a healthy lady milks an infected cow she won't have smallpox , because she contacted with the cows' skin slowly and became immuned.
he proved that by taking crusts of an infected cow and injected it to an infected boy , the boy was cured.

-Slide7: elie metchinkoff : studied the mechanism of phagocytosis on the ameba .

-Slide 10: smallpox virus is now completely eradicated

 Diphtheria very low incidents but still exists

 But still there is a problem in finding vaccines to some viruses like HIV or corona.

-Slide 13 : 1.2 : everyday there is a new mutation in the cell , immune system is responsible for clearing these abnormalities, else autoimmune disease will result.

-innate system: nonspecific , no memory (can't differentiate between microorganisms)

-adaptive system : specific , has memory

-slide14.6: hypersensitivity and autoimmunity

hypersensitivity : sometimes the reaction of immune system with foreign bodies will cause a disease , a complex of the foreign body and the antibody or the reacting material will deposit somewhere in the body causing a disease.

 autoimmune diseases: 1.anemia: antibodies for RBCs distroing them

 2.type 1 diabetes: destruction of islet cells in

 Pancreas, no insulin.

\*immune system organs:

1- primary: A .thymus B. bone marrow

2-secondary: A. spleen B. lymph nodes:1. Capsulated 2.noncapsulated

bone marrow: \*

-slide 20: stem cells that are in the primary organs originally developed in the fetal liver .

B cells in the bone marrow move to other lymphatic organs during its maturation , it express different receptors on its surface at different stages, to specify its location we depend on the surface receptors ,BCR: B cell receptor, which are the immunoglobins on its surface.

BCR could be IgM or IgD

Function of the BCR: recognition of foreign substances.

 But they can be used in lymphoma cases to identify the level at which the error is happening by knowing which receptor is expressed at each level of maturation.

3 major BCRs: 1. CD79a 2. CD79b 3. HLA ( histo compatibility complex)

\*thymus:

Extremely important in the fetal development, after birth it can be safely removed, unlike bone marrow which is important at all stages of life.

Stem cells → fetal liver→ bone marrow → thymus (through lymphatic vessels , has no permeability , closed system)

Cells of the thymus: 1. Epithelial cells 2.phagocyes 3. Dentritic cells

-slide23: thymus cells will educate the new T lymphocytes coming from the BM (tell them what is self component and what is not)

If the produced T cell reacts with a self component it must die ( to prevent autoimmunity), that is why we end with a smaller number of cells .

Until now T cells have the same receptors

When they reach the medulla they will differentiate into :1 T4 2.T8

T4=CD4 T8=CD8 (CD= cluster of differentiation)

Then T cells will leave the thymus through blood vessels to the secondary organs

So: education →segregation→ T4 or T8

\*lymph nodes:

T and B cells come to different zones in secondary organs (slide 29)

-activation of the lymphocytes take place near the HEV.

\*tonsils : noncapsulated, especially important in the protection of upper respiratory tract.

\*spleen: filter of blood in the body.

 -Slide 50: monophages : free ,circulating ,found in fluids macrophages : fixed , example: kuppfer cells in the liver

-antigen presenting cells :1. Macrophages 2.dentritic cells 3. Interdigitating cells

-slide 63: MP = marcophages , present the microorganism to T or B cells