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**SUBJECT: IMMUNOLOGY:**

**DEPARTMENT: MICROBIOLOGY:**

**4th SEMESTER:**

**INSTRUCTOR: SIR FAZLI ZAHIR MIAN:**

**DATE:14/04/2020**

**ANSWER:1**

**FILL IN THE BLANKS:**

1. **Infection.**
2. **Immunity.**
3. **Auto-immunity**
4. **Chemokines.**
5. **Cytokines.**
6. **Bone marrow and thymus.**
7. **Bursa of fabricius**
8. **Spleen**
9. **Macrophages.**

**SHORT NOTES:**

**NEUTROPHILS:**

* Neutrophils derived from a Latin word which means “neuter, neither and philien, highly phagocytic”. They are the type of white blood cells or granulocytes.
* Their job is to protect the human body from bacterial infections.
* Neutrophils are about 50 to 70 percent in our body and are the first cells to respond and reach the site where infection enters.
* Normally neutrophils are about 2500 to 7500 per microliter of blood. The count is high due to increased production in the bone marrow with leukemia.
* Or due to physical and emotional stress.it is not a good if the number decreases and may result in different diseases i-e (leukemia, vitamin B12defficiency, chemotherapy and many more.

**FUNCTIONS:**

* Neutrophils first responds and works as line of defense against infectious organisms.
* Primary granules contain peroxidase, lysozyme, defensins and various hydrolytic enzymes and other molecules that digest foreing material after it is phagocytosed.
* Mature neutrophils leave the bone marrow and circulate in blood so they can rapidly migrate to site of tissue damage and infection.
* It also helps in regulating the immune response.
* **STRUCTURE:**
* Can be seen easily under microscope.
* Neutrophils are in pink and purple stains.
* Have a short life span approximately (8 hours).

**BASOPHILS:**

* Derived from Greek word which means base loving.
* They are non-phagocytic.Our body produces different and many types of cells and basophils is one of them.
* Just like neutrophils basophils are also white blood cell’s type, and are produced in bone marrow
* Basophils level gets low due to allergic reactions
* Too many basophils can also lead to cancer.

**FUNCTIONS:**

* It prevents blood clots,with the help of naturally occurring substance which thins the blood known as hepanin.
* Basophils also releases histamine during allergic reactions
* It produces antibody called immunoglobulin(IE).

**STRUCTURE:**

* Basophils are pink and blue in colour.
* Can be seen under microscope.
* Arise from a different cellular lineage.
* **EOSINOPHILS:**
* They are a type of white blood cells.
* Eosinophils have two lobed nucleus connected by a slender thread of chromatin.
* There number in the bloodstream increases during allergic reactions.
* They defend against protozoa and helminth parasites.
* And are motile and phagocytic.

**FUNCTIONS:**

* They moves to inflamed areas
* Kills the cells,anti parasitic
* Participates in immediate allergic reactions.
* **STRUCTURE**:
* They contain large granules.
* And the nucleus exists as two non-segmented lobes.
* The stain of eisonophils is red which makes them easy to be distinguished.
* **MONOCYTES**:
* They are also a type of leukemia or white blood cells.
* They are kidney shaped nucleus or granules in the cytoplasm.
* They are produced in the bone marrow and enter the blood.
* Circule for about (8hours), enlarge and migrate into tissues.
* And mature in to dendritic cells.
* It also influence the process of adaptive immunity.
* **FUNCTIONS**:
* They fight against infections .
* Help the cells to remove dead cells from the body.
* The number of monocytes doesn’t cause any infection whether it’s high or low.
* **Structure:**
* Bean shaped nucleus.
* Circulate for 8 hours.
* Are blue in colour stains.
* **LYMPHOCYTES**:
* Lymphocytes derived from a latin word which means water cell.
* They are the major cells of adaptive immunity.
* Have further 3 types i-e T-cells,B-cells,N-K cells.
* **T-CELLS:**
* Helper CD4 and recognizes AG context
* **B-CELLS:**
* They secrete antibody produces plasma membrane.
* **N-K CELLS**:
* NK cells are the natural killer cells.
* The major function is to destroy malignant and stressed cells.
* And are part of innate immune response.
* **FUNCTIONS:**
* They are involved in the humoral and cellular aimmunity of the body.
* Humoral immunity do the production of antibodies(immunoglobulins).
* Cellular immunity includes delayed hypersensitivity reactions,defense against intracellular organisms.
* **STRUCTURE:**
* Cannot be distinguished morphologically.
* Made up of 20-40 percent of white blood cells.
* **ANSWER:3**
* **IMMUNITY:**

The term immunity derived from the Latin word immunize (free of burden).Refers to the ability of host to resist infection or disease. Immunology is the science focused on immune responses and how these responses are used to resist infection. It includes the distinction between self and non self and all the biological, chemical, physiological, metabolic and physical aspects of the immune response.

There are two fundamentally different yet complementary components of the mammalian immune response. The first component is common to all vertebrate animals, which have evolved unique features that inherently protect against invasion by foreign substances. The organs of immunity can be involved in generation ,maturation or activity.

**NATIVE AND ADAPTIVE IMMUNITY:**

**NATIVE IMMUNITY:**