**Immunology**

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**Question no:1 Fill in the blanks**

**Answer:**

1. Infection
2. Immunity
3. Autoimmunity
4. Chemokines
5. Cytokines
6. Bone marrow and thymus
7. Bursa of fabricius
8. Spleen
9. Macrophages or dentritic cells.

**Question no:2**

**Answer: Short notes on:**

**Neutrophils:**

Neutrophils are type of WBC or granulocyte that protect us from infections, also perform other functions.

* Excessive WBC in the body
* Main effector cells in innate immune system
* Released from bone marrow,maturation takes 10-15 days
* Circulate in blood and move quickly to site of infection
* 50-70% of WBC
* Cellular component of pus
* They can kill bacteria and other pathogens by phagocytosis
* Named based on staining property of granules
* Granules stain lightly blue to pink
* Life span 2-5 days

**Basophils:**

* Present small amount in blood about 1% in all WBC
* Life span 12-15 days
* Cell size 10-14micrometer
* Non –phagocytic
* Response in allergic reaction
* Release histamine and heparin
* IgE receptor

**Eosinophil:**

* Make 1-6% of WBC
* 12-17 micrometer in size
* 2-5 days life span but may be longer upto 14 days
* Acid-loving that appear brick-red on staining with eosin
* Found in medulla and the junction of cortex and medulla of the thymus and in the lower GI tract,ovary,spleen and uterus but not in the lung skin etc in normal condition
* Motile and phagocytic
* Killing antibodies

**Monocytes:**

* Have one nucleus (mononuclear)
* Cell size 12-20micrometer
* Formed in bone marrow and store in spleen
* Life spam is 1 day and macrophages tissue live for several months or years
* Destroy bacteria and other by phagocytosis
* Activate other immune funtions
* Monocytes mature into macrophages or dentritic cells when enter into tissue

**Lymphocytes:**

* Small WBC with one nucleus occur mostly occur in lymphatic system.
* 20-40% of WBC
* Found in blood ,spleen,lymph nodes and tonsil
* Arise from pluripotential haemopoietic stem cells.
* Important in both humoral and mediated immunity.
* 3 types:B lymphocytes,T lymphocytes and NK cell(natural killer cells)

**Question no :3**

**Answer:**

**Immunity:**

The natural system in our body which plays a great role in fighting against foreign particles like bacteria ,viruses etc.

When bacteria or other pathogen cause any infection or disease they fight against them and kill those pathogens.

**Types of immunity:**

* Innate immunity
* Adaptive immunity
* **Innate immunity:**
* Resistance to infection which a person possesses by its birth.Immunty by birth.

**Types of innate immunity:**

* **Specific immunity**: specific innate immunity include Species,racial and individual
* **Non-specific immunity**:Non-specific include species,racial and individual.

**Species immunty**:resistance shown by all member of particular specie.

Eg:antracis infect insects but not chicken.

**Racial immunity:**different race in same species may show sensitivity to infections

 Eg:genetic resistance plasmodium falciparum

Malaria in Africa.

**Individual immunity:**

When resistance to infection varies between individual

Eg:homozygous twins show similar resistance to leprosy and TB while heterozygous twins donot show resistance

* **Factor affecting innate immunity:**
* **Age:**new born(immature immune system) and old person(gradual fall off immune system) are highly sensitive to infection.

**Eg:**polio infection and chicken pox(severe in adults then children

* **Hormones:**increase sensitivity to infection

**Eg:**diabetes militus,Adrenal dysfunction,hypothyroidism in adults

* **Nutrition:**

Immune response reduced in malnutrition(lack of nutrition by not having enough food or not eating right things)

Eg:In kwashikor cell mediated immune response reduced.

* **Mechanism of innate immunity:**
* **Anatomical barrier(first line of defence):**

**Skin:**stop the entry of pathogens

Acidic environment pH 3-5,stop the microbial growth because microbes cannot grow in acidic environment.

**Mucous membrane:**mucous stop the entry of pathogens

**Urine:** some microbes from urethra flush out in urine

**Sperm :**have antibacterial property

* **Physiological barrier(non-specific defence)**

**Temperature:**body temperature inhibits some pathogen growth

 **Fever :**rise in body temperature is natural defense

**Low pH:**stomach pH 2 kills most pathogens

* **Phagocytic barrier:**

**Neutrophils, macrophages and Nk cells:**

These cells kill pathogen by phagocytosis and endocytosis:.

* **Inflammatory barriers:**

Vascular fluid contain there is protein which have antibacterial property that kill bacteria.

* **Acquired immunity:**

The immunity develop by a body or host after exposure to antigens or transfer of WBC from immune donor.

* **Classification:**

**Antigenic specificity**: antigens are specific to its antibody.

**Diversity**:immune system is capable to generate large number of antibodies by making diversity in its recognition molecules.

**Immunologic memory**:immune system induce memory for one antigen when they first time attack to produce quick action when the same antigen second time attack.

**Self/non self recognition**:immune system recognize body’s own cells they do not react to those cells but they show response to foreign particles.

* **Types of acquired immunity:**
* **Active immunity**:develop when there is natural exposure to pathogen or by vaccination
* Induced by infection
* Effective only for lag period
* Used to increase body resistance
* **Active immunity types:**

**Naturally acquired active immunity**:when a person get exposed to live pathogen and develop a disease and become immune as a primary response

eg: person recover from chicken pox and measles develop natural active immunity

**Artificialy acquired active immunity**:when a person is vaccinated which contain antigens and that antigens immunize a person as a primary response without causing symptoms of disease.

Eg:vaccines like BCG for TB,oral polio vaccines

* **Passive immunity:**when there is transfer of immune products such as antibody or sterilized T-cell from immune person to non immune.
* Less affective
* Used for treatment of acute infection.

**Types:**

**Naturally acquired passive immunity:**occur in pregnancy when some antibodies passed from mother to fetus through blood stream**.**

**Eg:** antibodies transfer through planceta from mother to fetus

**Artificially acquired passive immunity:**when antibodies is injected to aperson from outside like from immune person to non immune.

**Eg:**agents like pooled human gamma globulin

Convalescent sera etc.