Lecture 13

White blood cells

White blood cells, **or leukocytes** are cells of the immune system involved in defending the body against both infectious disease and foreign materials. Five different and diverse types of leukocytes exist, but they are all produced and derived from a multipotent cell in the bone marrow known as a hematopoietic stem cell. They live for about three to four days in the average human body. Leukocytes are found throughout the body, including the blood and lymphatic system.

The number of leukocytes in the blood is often an indicator of disease. There are normally approximately 7000 white blood cells per microliter of blood. They make up approximately 1% of the total blood volume in a healthy adult. An increase in the number of leukocytes over the upper limits is called leukocytosis, and a decrease below the lower limit is called leukopenia. The physical properties of leukocytes, such as volume, conductivity, and granularity, may change due to activation, the presence of immature cells, or the presence of malignant leukocytes in leukemia.

Types Of White Blood Cells :

There are several different types of white blood cells. They all have many things in common, but are all distinct in form and function. A major distinguishing feature of some leukocytes is the presence of granules; white blood cells are often characterized as granulocytes or a granulocytes:

A. **Granulocytes (polymorphonuclear leukocytes):** leukocytes characterized by the presence of differently staining granules in their cytoplasm when viewed under light microscopy. These granules are membrane-bound enzymes that act primarily in the digestion of endocytosed particles. There are three types of granulocytes: Neutrophils, Basophils, and Eosinophils, which are named according to their staining properties.

B. **Agranulocytes (mononuclear leukocytes):** leukocytes characterized by the apparent absence of granules in their cytoplasm. Although the name implies a lack of granules these cells do contain non-specific azurophilic granules, which are lysosomes .The cells include lymphocytes, monocytes, and macrophages .

Classification Of White Blood Cells :

1 - By the type of defense function :

A - Phagocytosis in the case of phagocytes .
e.g. : granulocytes and monocytes .

B - Antibody production and cellular immunity in case of immunocytes.

2 – By the shape of the nucleus :

Polymorphnuclear Or Mononuclear .

3 – By the site of origin :

Myeloid Or Lymphoid .

4 – By the presence or absence of specific staining granules :

Granulocytes Or A granulocytes ,

The granulocytes in turn are classified by the nature of their specific staining granules which are ; Neutrophillic, Eosinophillic, and Basophillic .