

# Characters of WBCs

- ❑ Leukocytes are found throughout the body, including the blood and lymphatic system.
- ❑ The name "White Blood Cell" derives from the fact that after centrifugation of a blood sample, the white cells are found in the Buffy coat, a thin layer of nucleated cells between the sedimented red blood cells and the blood plasma, which is typically white in color. The scientific term *leukocyte* directly reflects this description, derived from Greek *leuko* - white, and *cyte* - cell.

# Formation of White blood cells (WBC)

- Leukocytes are formed in the red marrow of many bones.
- They can also be formed in lymphatic tissue.
- They live for about 13-20 days.

# White blood cells (WBC)

- ❑ Five Types
- ❑ Classified according to the presence or absence of granules and the staining characteristics of their cytoplasm.
- ❑ Leukocytes appear brightly colored in stained preparations, they have a nuclei and are generally larger in size than RBC's.

- The leukocytes, or white blood cells, constitute only 1% of the total blood volume.
- They originate in the bone marrow and circulate throughout the lymphoid tissues of the body.
- There they function in the inflammatory and immune processes.
- They include:
  - the granulocytes
    - Neutrophils – 55-65%
    - Eosinophils – 1-4%
    - Basophils – 0-1%
  - the lymphocytes – 20-40%
  - the monocytes – 3-8%

# WBC Anatomy and Types

- All WBCs (leukocytes) have a nucleus and no hemoglobin
- Granular or agranular classification based on presence of cytoplasmic granules made visible by staining
  - granulocytes are neutrophils, eosinophils or basophils
  - agranulocytes are monocytes or lymphocytes

1. Granulocytes—have large granules in their cytoplasm
  - ✓ Neutrophils
  - ✓ Eosinophils
  - ✓ Basophils
  
2. Agranulocytes—do not have granules in their cytoplasm
  - ✓ Lymphocytes
  - ✓ Monocytes

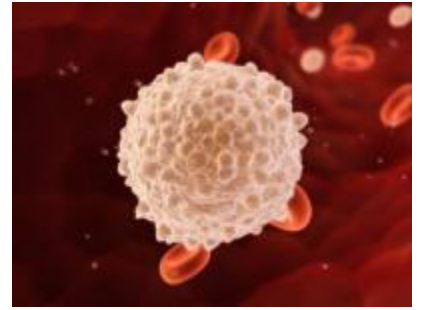
# WBC Numbers

- An increase in the number of white blood cells is leukocytosis. If number goes up there is some kind of infection and surgery might be needed.
- A decrease in the number of white blood cells is leukopenia

*WHITE BLOOD  
CELL COUNT*



# LEUKOCYTES:



- In per microliter of blood:4000 to 11,000 leukocytes
- White blood cells originate from the primitive stem cells in the bone marrow.

# Functions of WBC:

**a. Mainly functions to protect against disease.**

**b. Works mainly outside the the blood stream**

**c. Diapedesis - squeezing through bld. vessels.**

## **Leukocytosis:**(WBC above 10,000/mm<sup>3</sup>)

- ✓ Infection
- ✓ acute appendicitis.
- ✓ Leukemia.
- ✓ Pregnancy.
- ✓ Hemolytic disease of new born.
- ✓ Following exercise.
- ✓ Emotional stress.
- ✓ Food intake.

## ✓ **Leukopenia:**(WBC below 5,000/mm<sup>3</sup>.)

- ✓ Flu
- ✓ AIDS,
- ✓ typhoid fever

# WBC Count (Cont.):

1. Fresh blood
2. Anticoagulated blood
  - EDTA
  - Double Oxalate
  - Citrate
  - Heparin

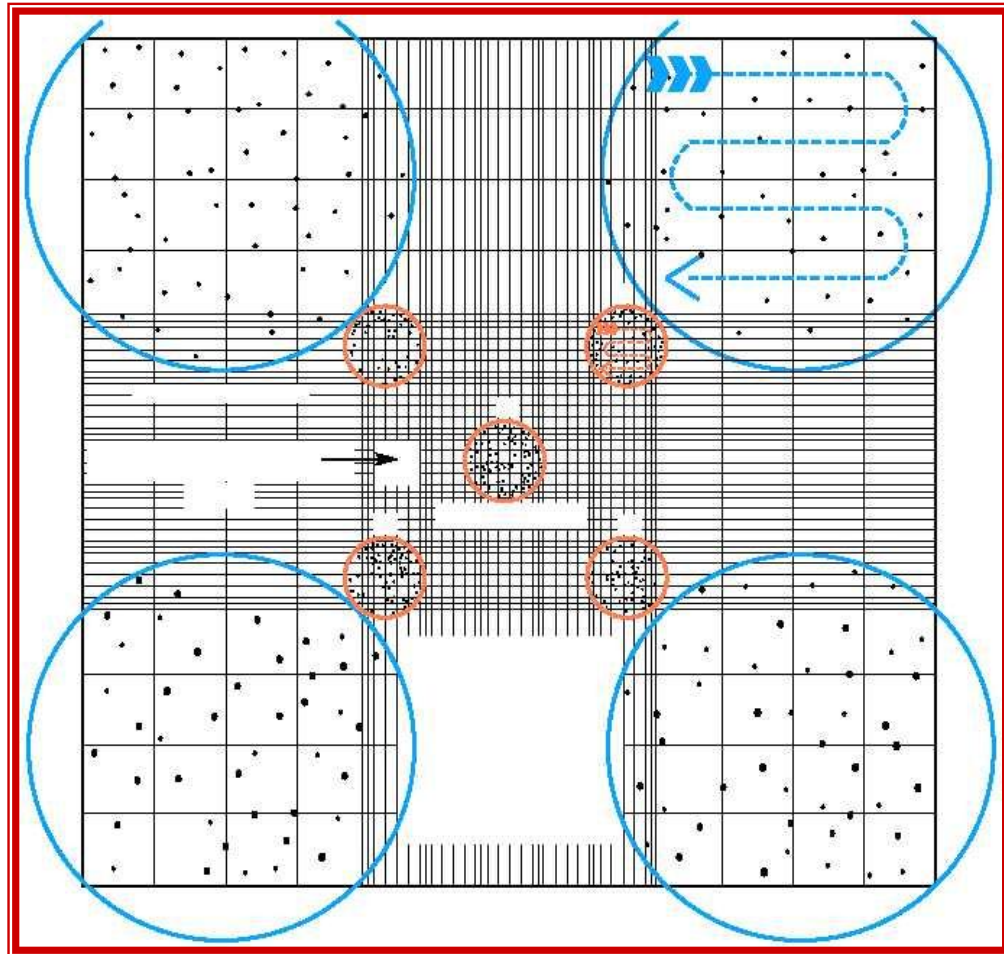
# WBC diluting fluids:

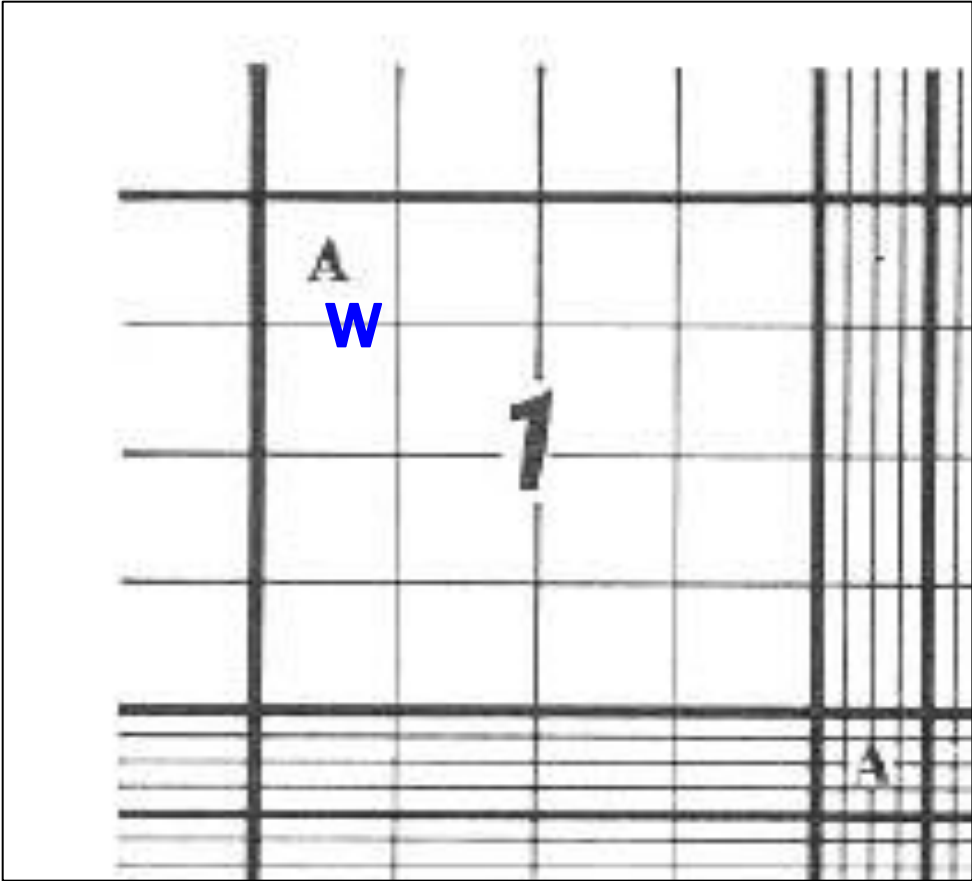
## Marcano:

Acid aetic → lysis RBC

Metilen blue → colouring WBC

# WBC count:





← 1 mm →

↑ 1 mm ↓

High 0.1 mm.

# Calculation:

- White cell count = number of cells counted (N)
- volume factor (=10)
- dilution factor (=20)
- $= N \times 200/4$