Total WBC count

WBC or White Blood Cells are cells of immune system that are formed from the bone marrow. White blood cells are also known as Leukocytes. The main functions of White blood cells are to protect the body from infectious organism and foreign particles. White blood cells can be of five different types. The names are neutrophils, eosinophils, basophils, lymphocytes and monocytes.

A White blood cell count is a blood test used to determine the concentration of white blood cells in a patient’s blood. There are two types of white blood cell count tests. They are

* TLC or Total Leukocyte Count: TLC is used to measure the total number of white blood cells in a patient’s blood.
* DLC or Differential Leukocyte Count: The differential leukocyte count is used to measure the percentage of each of the five types of white blood cells i.e., lymphocytes, neutrophils, basophils, monocytes and eosinophils.

Total WBC count methods

1. Visual haemacytometer method.

2. Electronic method.

* Visual haemacytometer method

1- Thoma method

Principle:-

This is counting of WBCs in a calibrated chamber

By dilution of blood to 1:20 dilution with diluents which causes lysis of RBCs and staining of WBCs.

Dilution fluid Turks fluid is used which has the following composition:-

Glacial acetic acid: - 3.0 ml

1% aqueous gential violet: 2.0 ml

Distilled water: - 195 m

Procedure:-

1- Taken anticoagulated blood or blood from finger prick upto mark 0.5 in WBC pipette.

2- Wipe tip and outside of the pipette .

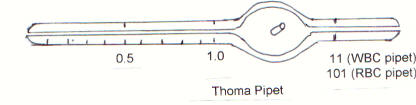
3- Draw diluting fluid upto mark 11 in the WBC pipette.

4- Mix well by rotating the pipette for 2 -3 minutes.

5- Charge the neubauers chamber after discarding 1 -2 drop of the mixture from the WBC pipette.

6- Allow the cells to settle down for 2 minutes.

7- Count the WBC under low power (10 x) in 4 large corner squares.



2- Second method by using micropipette

1- Pipette 0.38 ml of WBC diluting fluid and transfer to test tube.

2- Pipette 0.02 ml of blood by micropipette into the test tube which contains the dilution fluid.

3- Mix the suspension (tube) for at least 2 minutes, then charge the chamber by using pasture pipette.

4- Leave the cell to settle for 1-2 minutes.

5- Count the cells in the 4 corner squares using low power 10X objective lens.

Calculation:-

Area of one square = 1 mm × 1 mm =1 mm2

Area of 4 squares = 1× 4 = 4mm2

Number of cells counted =N

Depth of the chamber = 1/10

Dilution of the blood = 0.5/10 = 1/20

N × dilution factor × depth factor

Are of counted mm2

Total WBC / ml =

N × 20 × 10

4

= N × 50 cells /ml

Normal values

4,500 to 11,000 cells / cubic millimeter (cmm)

Leukocytosis is a condition characterized by an elevated number of white cells in the blood, which is usually due to:

1- Bacterial infection such as appendicitis, tonsillitis, ulcers and urinary tract infection

2- Leukemia.

3- Pregnancy.

4- Hemolytic disease of new born.

5- Following exercise.

6- Emotional stress.

7- Food intake.

Leukopenia is a condition characterized by a decreased number of white cells in the blood, which is usually due to:

1. Viral disease such as measles and infectious hepatitis.
2. Some bacterial infections such as typhoid fever, brucellosis, and typhus fever.
3. Rheumatoid arthritis.
4. Systemic Lupus Erythematosis.
5. Certain drugs such as radio therapy and chemotherapy.