Tikrit University
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Wbc count

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WBC Count

Definition:

White blood cells or leukocytes are cells of the immune system which defend the body against both infectous disease and foreign materials.

The white blood cells have a rather short life cycle, living from afew days to a few weeks.

- A white blood cell (WBC) count is a test that measures the number of white blood cells in your body.

- This test is often included with a complete blood count (CBC).

- There are several types of white blood cell and your blood usually contains a percentage of each type. Sometime, however your white blood cell count can fall or rise out of the healthy range.

Purpose Of The Test

1- To differentiate between acute and chronic infection WBCs count is increased above normal (leukocytosis) e.g in bacterial infection and physiological leukocytosis(during exercise and excitement).(leucopenia decreased WBCs number)

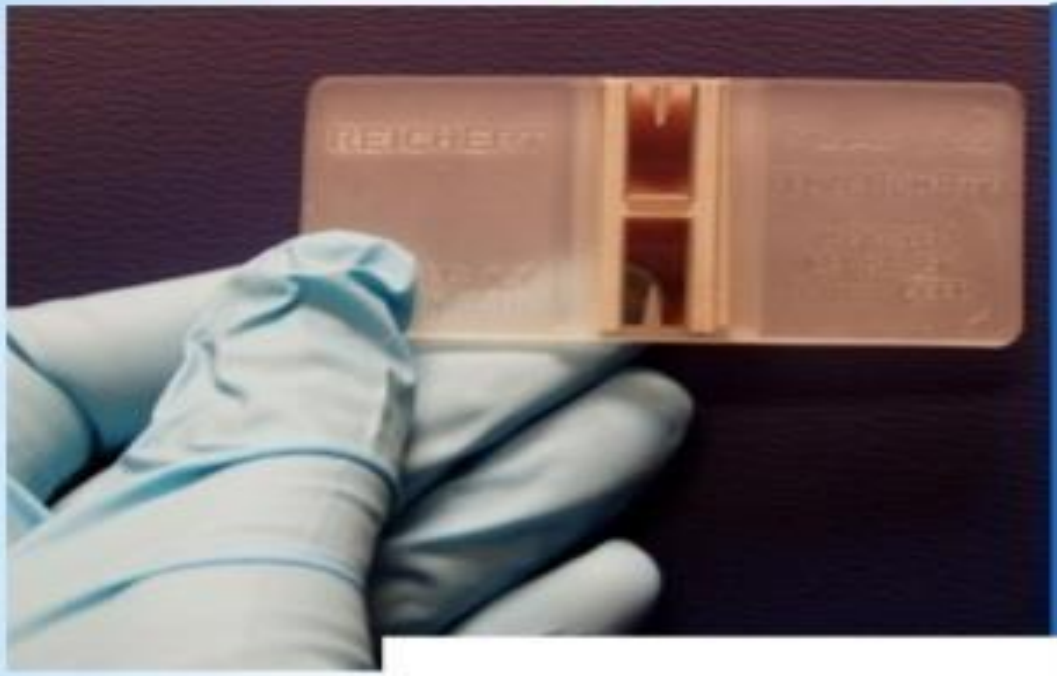
2- To determine the normal values of WBCs count (4000-9000 cell /mm3) in human.

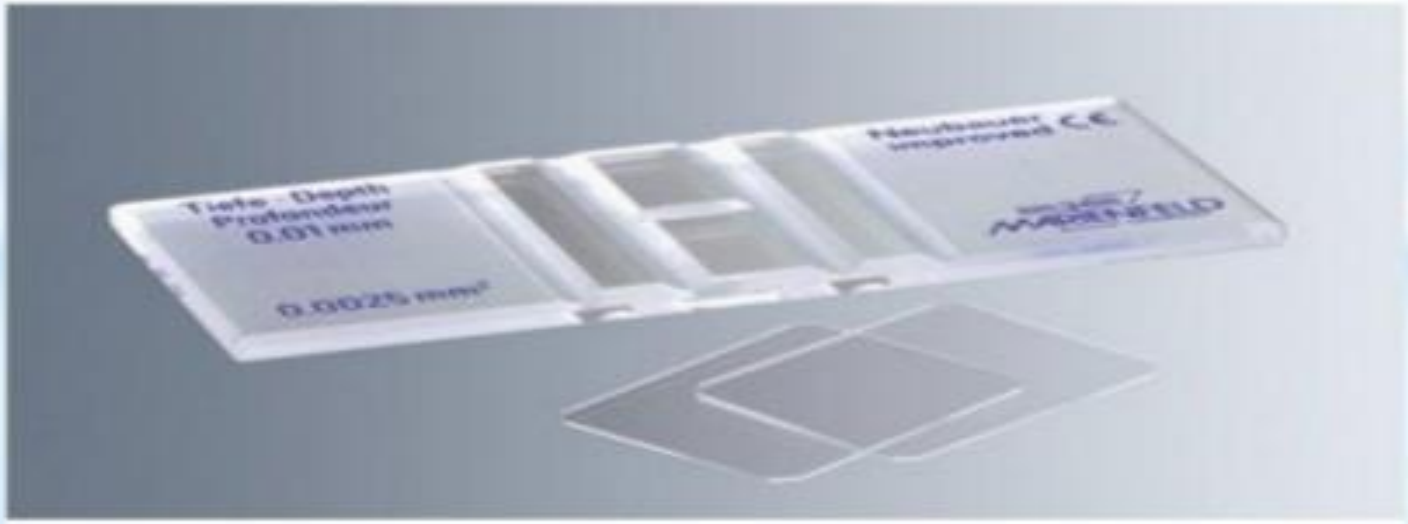
3- To follow the patient with chemotherapy also the effect of drugs.

Materials & instrument

1-Anticoagulated whole blood or capillary blood can be used.
2-Turk's diluting fluid
3- WBC pipette, which is composed of a stem, mixing chamber, white bead inside the mixing chamber, aspiration tube (rubber sucking tube)
4- Haemocytometer (Neubauer's counting chamber) with a cover slip.
5- Microscope
6- Lancet
8 -Cotton

Neubauer counting chamber or hematocytometer





Requirements

White blood cells count diluting fluid

Thoma white pipette

Hemacytometer and coverslip

Alcohol pads

Microscope

Turkey's Solution

Turkey's Solution: WBC diluting fluid is used for performing the WBC(leukocyte) count.

Composition:

1- (glacial acetic acid) 2%
2-methylene blue or gentian violet (2-3) drop
3- distal water (98 ml)

What is the purpose of using Turk's solution or WBS fluid ?

The solution destroys the RBCs within a blood sample and stains the nuclei od the white blood cells and making them easier to see count.

Methods

- Microdilution method
- Bulk dilution method

Procedure

- Draw blood up to the mark 0.5 using WBC pipette.
- Remove blood from outside of the pipette with clean gauze.
- Aspirate diluting fluid up to mark 11. the dilution is 1:20.
- Gently rotate the pipette horizontally with your hand to ensure aproper amount of mixing for 3 minutes.

- After mixing discard the first four drops of the mixture.
- Fill the counting chamber with diluted blood by holding thepipette at 45 with the slide and allow the mixture to seep under the cover slip, the filled chamber should be allowed to stand for a minute prior to counting.
- Count the WBC using the low power 10x objectives.

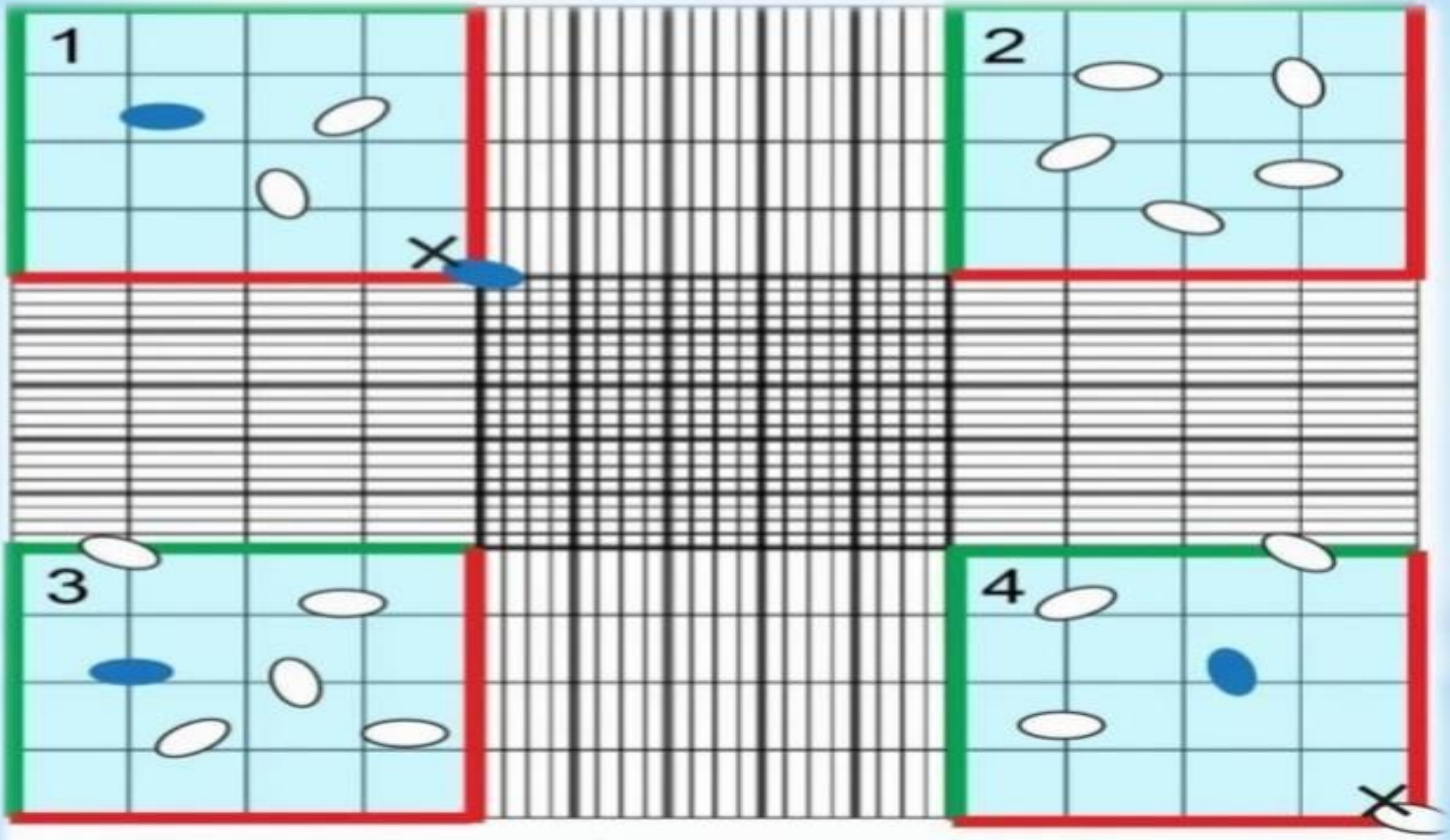
Count all WBCs in four large corner squares and add the result together to obtain the total number of cells counted.

In counting the cells that touch the outside lines

of the large square, count only those that touch the left and upper outside margin.

Procedure for bulk dilution method

- Mix 380µl of diluting fluid and 20µl of blood in a clean test tube
- Other steps same as above


1
2
3
4

Count the number (N) of cells in 4 large squares located at the four corners of the chamber.
The size 4 large squares in which"N" numbers of cells are found is:1x1x1/10x4=4/10 mm3

Where 1mm:- is the sideline of the large square

1/10 - is the depth of the counting chamber between cover slip and the ruling

4:- is the number of large squares used to count

The total numbers of cells in 1mm3 =Nx10/4 (after dilution of the sample)

The actual total numbers of cells before dilution should be=Nx10/4x20=Nx50

Medical consideration

Leucocytosis is the increased number of WBCs, this condition occurs in infection.

Leucocytosis could also be physiological. People who have had their spleenremoved (spleenctomy) will always have a slightly higher number of WBCs

Eating, physical activity and stress can cause an increased WBC count.

Pregnancy in the final month and labor may be associated with incraesed in WBC level.

• The WBC count tend to be lower in the morning and higher in the late afternoon.

•WBC count are age related. On average, normal newborns and infant have higher WBC countsthan adults.

Clinical significance

Leukocytosis

- Leukaemia
- Myeloproliferative disorder
- Infection
- Physiological: age, muscular exercise etc

Leucopenia

- Typhoid
- Aplastic anemia
- Dengue
- Influenza
- Malaria

TOTAL LEUCOCYTE COUNT

- Number of white blood cells in 1 µl or 1 cubic mm of blood
- Normal range

Age group	Cells / cu.mm
Adults	4000-11,000
At Birth	18,000 ± 8000
1 yr	6,000 - 15000
2 – 6 yr	5,000 - 15000
6-12yr	5000-13,000
Pregnancy	Upto 15,000

LEUCOCYTOSIS

TLC > 11,000/MM^3

Physiological

- At birth
- Pregnancy
- High temperature
- Severe pain
- Muscular exercise

Pathological

- Infections
- Malignancy like leukemia
- Severe haemorrhage


thank
you.