The White blood cell (WBC) count Dr. Haneen Abdelsalam Ali WBCs (Leukocytes) are round shaped, nucleated cells. They are found throughout the body including the blood and lymphatic system. ● The normal level of WBCs under basal condition of complete physical and mental rest is 4500–11000 cell/mm3. A condition with WBCs level more than 11000 mm3 is called leukocytosis. The opposite condition, leukopenia, is an abnormally low WBCs count. ● WBCs make up approximately 1% of the blood volume in a healthy adult. ● The lifespan of WBCs varies from few days to few weeks. ● Acting together, WBCs provide our body with powerful defenses against tumor and viral, fungal, bacterial, and parasitic infections ● The name "White Blood Cell" derives from the fact that after centrifugation of a blood sample, the WBCs are found in the Buffy coat, a thin layer of nucleated cells between the sedimented RBCs 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. ● Leucopoiesis is the process of WBCs/leucocytes production. Aims of WBC Count Experiment ● WBCs count is part of the complete blood count (CBC) test that is used to evaluate the overall health and detect a wide range of disorders such as anemia, infection and leukemia ● To know whether or not subjects/patients are suffering from Leukocytosis (the increase in the no. of WBCs to more than 11000/mm3) or Leucopenia (the decrease in the no. of WBCs to less than 4000 or 1500 /mm3) ● To learn how to use the manual method in the lab to get the number of white blood cells. ● White blood cell count is the total number of leukocytes in a volume of blood, expressed as thousands/□l ● Methods 1. Manual method 2. Electronic cell counter ● Manual differential white cell count material and instruments 1. Anticoagulated whole blood (using EDTA or heparin as an anticoagulant) or capillary blood can be used. 2. Turk's solution (diluting fluid) composed of: ●Glacial acetic acid 2.00 ml ● Gentian Violet (1% w/v) 1.00 gm ● Distilled water 97.00 m 3. pipette 4. Haemocytometer / "Neubauer" chamber is the counting chamber with a coverslip. 5. Microscope 6. Lancet, Alcohol 70%, and Cotton ● Procedure: ● Obtain a drop of blood in the same manner as in RBC count. ● Remove blood from outside of the pipette with a clean gauze. ● Aspirate diluting fluid, The dilution is 1:20. ● Gently rotate the pipette horizontally with your hand to ensure a proper amount of mixing for 3 minutes. ● After mixing discard the first four drops of the mixture. ● Fill the counting chamber with diluted blood(10 um)by holding the pipette at 45o 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 WBCs using the low power 10 x objectives. ● Calculation: ● 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: ● 1 x 1 x 1/10 x 4 = 4/10 mm3 ● Where 1 mm is the sideline of the large square, 1/10 mm is the depth of the counting ● chamber between coverslip and the ruling, 4 is the number of large squares used to count. ● Therefore the total numbers of cells in 1 mm3 ● are = N x 10/4 (diluted sample). ● The actual total number of cells before dilution should be: ● N x 10/4 x 20 = N x 50 Some Medical Consideration: Leukocytosis ● A total WBCs count above 11.000 cells/mm3 is referred to as leukocytosis. ● Leukocytosis generally indicates that a: ● Bacterial infection such as appendicitis, tonsillitis, ulcers and urinary tract infection ● Hemolytic disease of newborn ● Leukemia ● Pregnancy ● Cigarette smoking Some Medical Consideration: Leukopenia ● Leukopenia is a condition characterized by a decreased number of white cells in the blood, which is usually due to: ● Some bacterial infections

such as typhoid fever, brucellosis, and typhus fever ● Rheumatoid arthritis ● Viral disease such as measles and infectious hepatitis ● Systemic Lupus Erythematosis ● Certain drugs such as such as corticosteroids, radio therapy and chemotherapy. leukemia ● In leukemia, this rapid, out of–control growth of abnormal cells takes place in the ● Leukemia is a cancer of the blood and bone marrow. In simple terms, cancer is defined as the uncontrolled growth of abnormal cells.