

**Faculty of Pharmacy, Nursing, and Health professions**

**Department of Nutrition and Dietetics**

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Questions:

1. **What does it mean when the MVC is high or low?**

* There is a significant difference between a high MVC and a low one, it can tell so much about the individual’s health. To start off, the normal MVC measure is about 80fl-100fl. Having a high MVC means that the red blood cells are larger than usual indicating the presence of macrocytic anemia which happens in people that have a MVC higher than 100fl. This is caused by folate deficiency, vitamin B12 deficiency, or liver disease. Whereas low MVC means that red blood cells are smaller than usual indicating the presence of microcytic anemia which happens in people that have MVC lower than 80fl. This may be caused by iron deficiency, which can be caused by poor dietary intake of iron, menstrual bleeding, or gastrointestinal bleeding.

1. **What are the 5 types of white blood cells?**

* ***Monocytes:***  Remove any dead cells. They're the immune system's garbage trucks. Monocytes make up from 5% to 12% of the white blood cells in your bloodstream. Their primary purpose is to remove dead cells from the body. Monocytosis, or a high amount of monocytes, indicates that your body is battling something. The following are some of the factors that can induce an increase in monocytes in your blood: Infectious mononucleosis, mumps, and measles are examples of viral illnesses. infections caused by parasites. Color (Blue-Grey)
* ***Lymphocytes:*** B and T cells are immune cells that defend the body against specific invaders. are also necessary for the immune system to function properly. They are divided into two types: B cells and T cells. B and T cells, unlike other white blood cells that produce non-specific immunity, have specialized functions. Humoral immunity, or the immune response involving antibodies, is controlled by B lymphocytes (B cells). Antibodies that "remember" an infection are produced by B cells. They are prepared in the event that your body is exposed to the infection again. T cells are responsible for recognizing and destroying certain foreign invaders. After an infection, "memory" T cells remember the invader and respond fast if it is seen again***.*** Many modern vaccinations rely on B lymphocytes for their effectiveness. T cells are the major participants in some circumstances, such as tuberculosis and pertussis vaccines. Your body is dealing with an infection or another inflammatory illness if your lymphocyte blood levels are high. A momentarily elevated lymphocyte count is usually a natural side effect of your immune system at action. Lymphocyte levels can sometimes be raised as a result of a major illness, such as leukemia. Color (Pale blue)
* ***Neutrophils:*** Immune cells that are the first to respond. These cells make up around half of the white blood cell population. They are the first line of defense for the immune system against germs and viruses. They also send out signals to alert other immune system cells to arrive as initial responders on the site. Neutrophils are the most common cells found in pus. After being liberated from the bone marrow, these cells barely live for about eight hours. Your body produces roughly 100 billion of these cells every day. Infections, traumas, and other sources of stress cause neutrophil blood levels to rise naturally. They may become less responsive in the face of severe or chronic infections, pharmacological treatments, or hereditary disorders. Color (Pink)
* ***Basophils:*** release histamine to mount a nonspecific immune response (blue) Only about 1% of white blood cells are made up of these cells. The role of these cells in asthma is likely the most well-known. They are, however, critical in mounting a non-specific immune response to pathogens, or disease-causing organisms. These cells emit histamine and other substances when activated. Inflammation and constriction of the airways can occur as a result of this. Infections, severe allergies, or an overactive thyroid gland can all cause it. Basophilia is a condition in which a person's basophil count is excessively high. It could be an indication of your body's persistent inflammation. It could also mean that your bone marrow is producing too many white blood cells as a result of a disorder. Color (Deep purplish to dark purple red)
* ***Eosinophils:*** The color (pink orange) is antibacterial and parasitic, but it also causes allergic symptoms. It aids in the battle against germs. They are also crucial in the fight against parasitic illnesses (such as worms). They're probably most known for their function in allergy symptoms. Eosinophils can overreact when developing an immune response to something that isn't harmful. Pollen, for example, is mistaken for a foreign intruder by eosinophils. Eosinophils make up less than 5% of the white blood cells in your blood. The digestive tract, on the other hand, has a large concentration of eosinophils. High quantities of eosinophils can be found in your blood (blood eosinophilia) or in tissues at the site of an infection or inflammation (tissue eosinophilia) (tissue eosinophilia)

1. **How to calculate PVC +HB?**

* The PCV or Packed Cell Volume Test, often known as the hematocrit test, is a test used to diagnose polycythemia, dehydration, or anemia in some patients. It's usually part of a full blood count test that's used to figure out if you'll need blood transfusions and how well you're responding to treatment. The packed spun volume of whole blood made up of RBCs, stated as a percentage of total blood volume, is known as hematocrit. Hct = (RBC MCV)/10 can be measured or estimated. Hb (g/dL) = (0.3 PCV) + 3 is a simple relationship that may provide a better estimate of Hb concentration from the PCV. *PVC=RBC/(RBC+ Plasma+ Platelets)x100*

1. **How do we know different blood types? Explain.**

* The presence or absence of specific antigens — chemicals that can provoke an immune response if they are foreign to the body – determines blood type. Safe blood transfusions rely on rigorous blood type and cross-matching since some antigens can cause a patient's immune system to attack the transfused blood. A molecule that is part of an object that is foreign to the body is called an antigen. Antibodies against A antigen would attack blood cells containing A antigen. Antigens A and B are found on red blood cells, however anti-A and anti-B antibodies are not found in plasma. Type AB blood recipients can receive any ABO blood type. If blood cells stay together, it suggests one of the antibodies in the blood has responded. Blood that is known to be type A and type B is combined with the liquid part of your blood (serum) that is devoid of cells. Antibodies against type B are present in people with type A blood. Anti-A antibodies are present in people with type B blood. Any RhD positive antigens that may have entered the mother's blood during pregnancy are neutralized by the anti-D immunoglobulin. The mother's blood will not create antibodies if the antigens have been neutralized.

1. **How should blood films look like? Why?**

* White blood cells (WBCs, leucocytes), red blood cells (RBCs, erythrocytes), and platelets can all be seen on a blood film (thrombocytes). The bone marrow produces and matures these cells, which are then released into the bloodstream as needed. The blood smear should not be too thin or thick, and the smear's tail should be smooth. Three parameters influence the optimum quality smear: speed, angle, and drop size. The smudge will be thinner. The slide will become shorter and thicker as it is moved slowly. When your blood has a sufficient amount of cells and the cells have a normal appearance, a blood smear is called normal. When the size, shape, color, or amount of cells in your blood smear are abnormal, it's termed abnormal.