Hemoglobin A1c

Hemoglobin A1c is a long term indicator of circulating glucose levels in the blood. Attachment of glucose to hemoglobin (glycosylation) is a normal process and normal fasting glucose levels (< 100 mg/dL) results in A1C levels in the range of 4 – 6 %. The A1c percent reflects average glucose levels over the last 8 weeks. The American Diabetes Association now endorses hemoglobin A1c as a screening test for diabetes. Levels greater than or equal to 6.5 % are considered diagnostic for diabetes. If an elevated A1c level is found, further testing such as a fasting glucose or a glucose tolerance test may be indicated.

Vitamin D

The level of 25-OH Vitamin D is the most accurate indicator of Vitamin D in the human body. Vitamin D is a fat soluble vitamin whose primary role is to maintain normal levels of calcium and phosphorus in our circulation. It also plays an important role in prevention of bone disease, maintaining muscle strength, immune system function, cancer prevention and decreasing cardiovascular risk.

The primary source of Vitamin D3 is direct exposure to sunlight. Dietary sources of Vitamin D include fish (salmon, mackerel, tuna), milk or other fortified foods. Limited sun exposure, sunscreens, malabsorption disease, pregnancy and melanin content in the skin can affect Vitamin D levels. At latitudes north of Texas, there is a risk of Vitamin D deficiency from October through March.

CBC (COMPLETE BLOOD COUNT):

- **WBC (WHITE BLOOD CELLS)** are also called leukocytes. Their function is to assist the body in overcoming infections. A white count of less than 3,000 (3.0×10^3) or greater than 12,000 (12.0×10^3) may be significant and should be reported to your doctor.
- **RBC (RED BLOOD CELLS)** or erythrocytes carry hemoglobin. The red blood cell count is an actual count of the number of red cells per cubic millimeter of blood.
- **HEMOGLOBIN** is the main constituent of red blood cells. It carries oxygen to every cell of the body and returns carbon dioxide to the lungs. Low hemoglobin may indicate anemia. High hemoglobin may also be significant and should be reported to your doctor.
- **HEMATOCRIT** is a number that tells the percent of red cells as compared to the volume of plasma in a milliliter of blood.
- **MCV, MCH, MCHC AND RDW-SD** are mathematical calculations of red cells that measure the volume of the red cells, the weight of hemoglobin in a red cell, the average hemoglobin concentration in red cells and the size distribution of the red cells.
- **PLATELETS** are tiny cells whose functions are to assist in blood clotting and to help maintain damaged blood vessels. A platelet count of less than 50,000 (50×10^3) or greater than 500,000 (500×10^3) should be reported to your doctor.
- **DIFFERENTIAL** is a numerical indicator of the type of white cells that are present in blood. There are usually more neutrophils than any other cell type.
  - Neutrophils assist the body in fighting bacterial infections.
  - Lymphocytes are the second most common type of white blood cell. They help the body make antibodies and fight viral infections.
  - Monocytes help the body produce antibodies. They also assist neutrophils and lymphocytes in carrying out their functions.
  - Eosinophils and Basophils are usually present in small number and are not clinically significant unless extremely elevated.

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PHYSICIANS LABORATORY SERVICES

Explanation of Blood Tests

Omaha & Lincoln Locations

This information is to help you understand your blood test results.
Values that are outside expected ranges are printed in the abnormal results column on your report form.
Abnormal values may be the result of several factors and do not always indicate the presence of any disease. Some of these factors are:

a) You may have eaten during the overnight fast
b) medications you are taking (if any) are interfering with the blood test
c) you are normally not within standard ranges, or
d) there was a delay in processing your sample.

CONSULT YOUR DOCTOR WITH ANY QUESTIONS ABOUT THE RESULTS OF ANY LAB TEST.

YOUR PHYSICIAN MAY WANT YOU TO SCHEDULE AN APPOINTMENT FOR FURTHER EVALUATION.

It is not possible to diagnose or treat any disease or problem with blood tests alone. These tests can help you learn more about your body and help detect potential problems in early stages when treatment or lifestyle changes can be most effective.

Non-prescription drugs (asprin, cold medication, vitamins), prescription drugs and alcohol intake often affect test results. Your doctor must have a complete and honest picture of your use of medications in order to effectively interpret the results of your blood tests. To save time and money, please inform your physician of these factors in the initial visit.

CHEMISTRY TESTS

GLUCOSE is a measure of sugar levels in the blood. High values may be due to recent food intake or diabetes. If your value is over 200, even if you had recently eaten, consult your doctor. If you know you have diabetes it is important to report an elevated sugar level to your doctor.

BUN (BLOOD UREA NITROGEN) is a waste product produced in the liver and excreted by the kidneys. High values may mean that kidney function is decreased. BUN is also affected by high protein diets and/or strenuous exercise, which raise levels and by pregnancy, which lowers it.

CREATININE is a waste product not affected by the protein you eat. It is a very good indicator of kidney function. High values, especially with high BUN levels, require medical evaluation. Low levels are not significant.

GFR is a calculation based on creatinine, patient's age and gender. It stands for Glomerular Filtration Rate and reflects kidney function.

URIC ACID is normally excreted in urine. High values should be evaluated by your doctor and are associated with gout, arthritis, kidney problems and use of some diuretics. Low values are probably not significant.

BILIRUBIN is a pigment produced as a result of the normal breakdown and recycling of red blood cells and is removed from the blood by the liver. Low values are of no concern. If levels are elevated above the expected ranges, but all enzymes (LD, AST, ALT) are within expected ranges, it is probably not significant.

ALKALINE PHOSPHATASE is an enzyme found primarily in bones and the liver. Expected values are high for those who are growing (children and pregnant women) or when damage to bones or liver has occurred. Low values are probably not significant.

LD is an enzyme present in all cells in the body. Anything that damages cells, including blood drawing itself, will raise levels in the blood. If your blood sample is not processed promptly and properly, high levels may occur. If all values except LD are within expected ranges, it is probably a specimen handling variation and does not require further evaluation.

AST AND ALT are abbreviations for proteins called enzymes that help control chemical activities within cells. They are found in muscle cells, liver cells and heart muscle cells. Any injury to these cells causes the release of these enzymes into the blood. Damage from alcohol and a number of diseases cause high values and should be evaluated by your doctor. Low values are not significant.

CALCIUM AND PHOSPHORUS levels are controlled by the parathyroid glands and the kidneys. These minerals are found mostly in bone but are also important for proper blood clotting, nerve and cell activity. Your doctor should evaluate any elevated calcium or low phosphorus.

ELECTROLYTES are elements found in the body. The electrolytes include SODIUM, POTASSIUM, and CHLORIDE. The kidneys control potassium levels very carefully. It is important for proper functioning of nerves and muscles, particularly the heart. Values outside the expected ranges, high or low, generally require medical evaluation. This is especially important if you are taking a diuretic (water pill) or heart pill (Digoxin, Lanoxin, Crystodigen).

ALBUMIN AND GLOBULIN measure the amount and type of protein in your blood. They are a general index of overall health and nutrition. Globulin is the "antibody" protein important for fighting disease. If one of these results is high, but all other values are within expected ranges, it is probably not significant.

CHOLESTEROL AND TRYGLYCERIDES are two of the fats in the blood that have been associated with heart disease in some people. Tryglyceride values are significantly affected by recent ingestion of food. However, even if you just ate and your cholesterol is over 330 or your tryglyceride result is higher than 500, consult your doctor. Low values for these fats are not important in the screening situation. The American Heart Association recommends cholesterol levels be below 200 for individuals of all ages.

HDL AND LDL are abbreviations for lipoproteins. These lipoproteins help predict the risk of developing coronary heart disease (CHD). High levels of HDL may be protective against CHD.

TSH (THYROID STIMULATING HORMONE) stimulates the thyroid gland to synthesize and secrete thyroid hormones, T3 and T4. In primary hyperthyroidism the TSH will be low. In primary hypothyroidism TSH will be elevated.

PSA (PROSTATE SPECIFIC ANTIGEN) is a glycoprotein produced by the prostate gland, the lining of the urethra, and the bulbourethral gland. Normally very little PSA is secreted into the blood. Increases in glandular size and tissue damage caused by benign prostatic hypertrophy, prostatitis, and/or prostate cancer may increase circulating PSA levels.

HS-CRP

Fatty plaques lining the surface of our arteries are a consequence of high fat diets which cause elevated levels of oxidized LDL cholesterol, which sticks to the surface of our arteries. This is termed atherosclerosis and these fatty plaques can be observed in individuals in their teen years. When these plaques become inflamed, they are at increased risk for rupture which can result in heart attacks or strokes.
High sensitivity (hs)CRP is the most reliable inflammatory marker available and the higher the hsCRP value, the higher the risk that plaque rupture may occur.