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UNDERSTANDING YOUR OPTI-CHEM BLOOD REPORT

Each element in the Opti-Chem report has an impact on your health. The chemistry portion measures a variety of things in the blood and these include proteins, fats, minerals, electrolytes, enzymes and by-products of metabolism. A brief explanation of what each test means along with some reasons and conditions that may cause increases and decreases are provided for you. Blood chemistry is very complex and there is much more to it than what is mentioned here, including the effects of various drugs. Your Healthcare Professional can guide and assist you in balancing your chemistry for optimal health, but your participation and compliance is necessary for success. In some cases you may be referred to another physician for further consultation. Overviews of the blood cell counts, urinalysis and thyroid tests are also provided. Congratulations on your decision to take charge of your body and your health.

Chemistry Analysis

Glucose is sugar that is used by the cells to provide energy. It is the only type of fuel that can be used by the brain and nervous system, whereas other tissues can also burn fats for energy. Glucose comes from the digestion of carbohydrates and may also be stored as glycogen for later use. It is primarily kept in balance by 2 hormones made in the pancreas – insulin and glucagon, although the liver, adrenal and thyroid glands are also involved. Increased values are related to diabetes, stress, Syndrome X and diet. Decreased values can reflect hypoglycemia and result from overproduction of insulin, alcoholism and liver disorders.

Uric Acid is an end product of a protein digestion, mainly a type of protein called purine. Some foods that are high in purine are organ meats, spinach, mushrooms, yeast and asparagus. It also comes from the breakdown of purine proteins in the nucleus of cells. Increases occur when the kidneys can't eliminate properly or with gouty arthritis, alcoholism and high protein diets. Decreases are primarily associated with low protein diet or malabsorption.

BUN (Blood Urea Nitrogen) is an end product of protein breakdown. It's produced mainly in the liver and is eliminated by the kidneys. Increases can be caused by excessive protein consumption, inadequate water consumption and kidney disorders. Decreases are related to poor diet, liver problems, excessive water consumption and malabsorption.

Creatinine is a waste product of muscle activity and levels are related to a person's muscle mass and how much exercise and strenuous activity they perform. Increases can also be related to inadequate kidney function. Deceases may be due to lack of muscle mass or degeneration.

Sodium is an electrolyte related to fluid balance, the kidneys, the heart and nerve conduction. Sodium is present mainly in the fluids surrounding the cells. Increases are seen in hypertension, fluid retention, excessive dietary consumption, dehydration and kidney and heart disorders. Decreases are seen in diuretic use, excessive sweating, excessive water intake and diarrhea.

Potassium is an electrolyte related to fluid balance and is used mainly inside the body's cells. It is necessary for proper function of the heart and muscles. Increases are seen with excessive destruction of cells, underactive adrenal glands and kidney disease. Decreases

are mainly seen in diarrhea, diuretic use, nutritional deficiency and overactive adrenal glands.

Chloride is another electrolyte involved in maintaining proper fluid balance and pH balance. It is also part of the stomach's hydrochloric acid that digests protein and levels are also influenced by kidney function. Increases are seen when too much acid is in the system, in dehydration, and with swelling caused by too much fluid inside the cells. Decreases are seen in excessive sweating, stomach acid deficiency and edema.

Carbon Dioxide (CO2) is actually the total of bicarbonate and carbon dioxide. These two substances are in a dynamic equilibrium and help maintain the balance of acid and base in the body. The test also reflects the ability of the lungs to exchange oxygen for the carbon dioxide gas. Increases indicate more alkaline blood condition and in the extreme, metabolic alkalosis. Decreases show more acidity in the blood and in the extreme, metabolic acidosis.

Calcium is a principle component of the bones and teeth with 99% of the body's calcium found in these structures. The other 1% is very important to processes like blood clotting, nerve and muscle function, and various enzyme activities. Increases are seen in disorders involving the parathyroid and thyroid glands, excess intake of vitamin D, and in conditions related to too much acid in the body. Decreases are seen in parathyroid dysfunction, vitamin D deficiency, magnesium deficiency and numerous other conditions.

Phosphorus is the other principle component of bones and teeth and much like calcium, it has an important role to play in physiology. It helps form compounds for energy production, it is related to pH balance, and is necessary for transporting foods from the stomach for processing elsewhere in the body. Phosphorus and calcium must be in balance with each other for good health. Increases are seen when the stomach is too alkaline, with healing fractures and certain kidney problems. Decreases are found when the stomach is too acidic causing digestive problems and with the use of aluminum containing antacids.

Magnesium is necessary for good function of nerves and muscles. It allows muscles to relax after a contraction, calms the nervous system, functions in many enzyme systems and is necessary for regulation of the heartbeat. It is the second most prevalent mineral inside the cells (potassium is first) where it assists with the integrity of DNA and its counterparts. Increases are mainly found in kidney disorders, use of certain antacids and regular use of magnesium sulfate type enemas. Decreases are seen in cardiac arrhythmia, muscle spasm and cramps, and some viral disorders.

Total Protein is a measure of available building blocks for many compounds in the body. Proteins are used to form enzymes, hormones, antibodies and many structural components like muscle tissue. The main proteins in the blood are albumin and globulin. Increases are seen in liver disorders, alcoholism, and chronic infections and inflammation. Decreases are noted in malabsorption, colitis, and poor nutrition.

Albumin is a primary protein in the blood and is made from amino acids in the liver and is also available from the diet, especially from eggs. It helps with the immune system, maintains proper fluid balance in the tissues and plays a role in nutrient transport and waste removal. Increases are seen in kidney disorders and dehydration. Decreases are noted in decreased immune function and edema.

Globulin is the other primary protein and has important functions in immune response. Among its other jobs are carrying hormones and lipids. Compounds known as immunoglobulins, like IgA, IgG and IgE are highly important for various immune issues like allergies and infections in the mucus linings of the body. Increases are seen in chronic infection and during recovery from acute infections, as well as in rheumatoid arthritis, lupus, and in some cases when stomach acids are deficient. Decreases are primarily found in patients with compromised immunity and in cases of poor nutrition or malabsorption.

Bilirubin (Total Bilirubin) comes from the normal breakdown of red blood cells. This breakdown is done by the spleen, which produces indirect bilirubin, and the liver, which produces direct bilirubin. The combination of these two forms is called total bilirubin. Increases are seen in liver and spleen dysfunction. Decreases are found in iron deficiency anemia and also a type of spleen dysfunction.

Alkaline Phosphatase is an enzyme produced primarily in the bone, liver and intestinal tract. It reflects growth or activity in these areas of the body and is often used as a tumor marker. Through its highly alkaline nature, it functions as one of the pH controls in the blood. Increases are seen in some types of tumors, bone injury, pregnancy, gall bladder duct obstruction and skeletal growth. Decreases are seen in low adrenal function and zinc deficiency.

LDH (Lactic Dehydrogenase) is an enzyme formed in all cells of the body from the use of sugar. It is a general indicator of pancreas function due to its relationship with sugar metabolism. Different types of this enzyme can be used to find which of the body's structures are producing it, such as the heart, lung, liver and skeletal muscle. Increases are seen in heart attack, diabetes, pancreatitis, muscle damage and cancer. Decreases are seen in cases of low blood sugar and poor carbohydrate metabolism.

SGOT (also called AST) is an enzyme found mainly in the liver, heart, muscle and gonads. It functions in conversion of cholesterol to hormones and in the synthesis of several acids formed from the breakdown of proteins and fats. Increases are seen in congestive heart disease, heart attack, liver disease and alcoholism. Decreases are seen in gonadal dysfunction and vitamin B-6 deficiency.

SGPT (also called ALT) is an enzyme found primarily in the liver where it is produced when fatty membranes release stored food substances. It is released when cells die and is used to measure liver damage and other cellular damage. Increases are seen in liver disorders, alcoholism, vitamin A deficiency and heart attack. Decreases are seen in congested liver with poor release of stored nutrients.

GGT is another enzyme found primarily in the liver that is responsible for transporting amino acids and proteins into cells. Increases are seen in obstruction of the bile duct, liver damage and alcohol use, especially chronic. Decreases are seen when the liver is congested and in hypothyroid conditions.

Iron is an important part of hemoglobin (the red blood cells), carrying oxygen to all cells of the body. It also provides information on how the liver and spleen are functioning. Increases are indicative of some types of anemia where adequate co-factors are deficient leaving unbound iron that can cause free radicals. Decreases are seen in iron deficiency anemia, fatigue and bleeding in the G.I. tract.

Triglycerides are circulating fats that are made in the liver. Like glucose, they can be a source of energy and their amount increases when glucose cannot be used properly. Increases are seen in diabetes, atherosclerosis, hypothyroid conditions, high fat diet and alcoholism. Decreases are seen in hyperthyroidism, autoimmune disorders, vegetarian diet and deficiency of stomach acid.

Cholesterol is derived from the diet, formed in the liver and found in all cells of the body. It is used to form hormones, antibodies and bile salts and also protects cell membranes. It is also used to evaluate risk for atherosclerosis. HDL cholesterol is called the "good" cholesterol and LDL is the "bad" fraction that sticks to the linings of arteries. Increases are seen in atherosclerosis, hypothyroidism, and stomach problems affecting digestion of fats and in high fat diets. Decreases are seen some liver disorders, hyperthyroidism and severely fat restricted diets.

Blood Cell Counts

White Blood Cells (WBC) represent the body's immune system and the various kinds of white cells have specialized functions. Lymphocytes are mainly for defense against virus and cancer cells, while Polys are primarily defending against bacteria. Monocytes are the second line of defense and finish the job started by the lymphocytes and polys. They are seen in higher numbers when there is infection or inflammation. Basophils primarily function as clean up for allergy reactions and Eosinophils perform a service when toxins, allergens and parasites attack.

Red Blood Cells are the oxygen carrying cells using Hemoglobin to hold the oxygen until it is exchanged for carbon dioxide. Hematocrit is a measure of the volume of whole blood taken up by the red blood cells and expressed as a percent. MCV, MHC, MCV and RDW all reflect the size, shape and contents of red cells.

Platelets are special cells in the blood that help form clots when repair is necessary.

Urinalysis

The urine is analyzed to determine a number of things including how concentrated it is through Specific Gravity, which tells us how "heavy" it is compared to water. The pH is very important because it is a good measure of how acidic or alkaline the tissues of the body are. WBC Esterase tells us whether there are white blood cells in the urine and Occult Blood indicates the presence of blood (may be due to menstruation). Nitrite is a sign of infection, while Glucose in the urine may indicate diabetes. Ketones can also indicate diabetes, but may be due to a low carbohydrate diet or fasting. Protein may "leak" through the kidney and show a possible weakness in that organ. Bilirubin is normally eliminated through the bile and its presence in the urine may be an early sign of liver problems. Urobilinogen is a by-product of intestinal activity and may suggest a lack of proper bowel flora.

A microscopic examination is used, if indicated, to confirm suspicious findings of the basic urinalysis.

Thyroid Tests

T-4 or Thyroxine is a very important hormone because it is responsible for maintaining the body temperature, regulating the heart rate and stimulating metabolic activity in general through its involvement in using nutrients. Increases in T-4 can cause nervousness, palpitations, sweating, sleep disorders and weight loss. Decreases in T-4 may cause intolerance to cold, dry skin, fatigue and weight gain.

T-3 Uptake provides an estimate of how many of the available binding sites for this related thyroid hormone are used up. This test should be viewed in the context of the other thyroid tests, but in general, lower values are seen in hypothyroidism and higher values in hyperthyroidism.

FTI or Free Thyroxine Index provides an estimate of how much T-4 is in the free or active state. It is a useful index of hormonal levels and again low values are often associated with hypothyroid tendencies and high values with hyperthyroid tendencies.

TSH or Thyroid Stimulating Hormone is produced by the pituitary gland and sends a signal to the thyroid gland to produce more T-4 and T-3. This reflects how well the thyroid is responding to the orders of the pituitary and also how well the pituitary is working. It is part of the feedback mechanism that ensures a proper metabolic rate.