

Bloodwork Results for: Doe, Jane (02/25/2018)

Lab Name	Optimal Range	Reference Range	Units	Result
C-Reactive Protein (CRP)	0 - 1.5	0 - 3		4 ↑
Eosinophils	0 - 3	0 - 4	%	7.8 ↑
LDL-cholesterol	0 - 120	0 - 99	mg/dL	106 ↑
Lymphocytes	30 - 35	20 - 45	%	11.7 ↓
Magnesium	2.2 - 2.6	1.5 - 2.5	mg/dL	15 ↑
MCH	28 - 32	27 - 33	pg	25.7 ↓
MCHC	32 - 35	31.5 - 35.7	%	30.2 ↓
Neutrophils	50 - 60	40 - 70	%	71.8 ↑
Phosphorus	3.4 - 3.8	2.5 - 4.5	mg/dL	75 ↑
Reverse T3	9.2 - 20	9.2 - 24.1	ng/dl	5 ↓
Uric acid	3.5 - 5.5	2.5 - 7.1	mg/dL	40 ↑
Albumin	4.3 - 4.7	3.6 - 4.8	g/dL	4.1 ↓
Albumin/Globulin Ratio	1.8 - 2	1.1 - 2.5		1.7 ↓
BUN/Creatinine Ratio	10 - 16	10 - 24		20.5 ↑
Calcium	9.4 - 9.8	8.6 - 10.2	mg/dL	8.9 ↓
Chloride	101 - 103	96 - 106	mmol/L	106 ↑
Ferritin	40 - 60	30 - 400	ng/mL	90 ↑
Free T3 (Tri-iodothyronine)	3.2 - 4.2	2 - 4.4	pg/mL	2.4 ↓
GGT (Gamma glutamyl transferase)	15 - 28	0 - 60	IU/L	50 ↑
HDL-cholesterol	55 - 80	35 - 150	mg/dL	48 ↓
Hematocrit	37 - 44	34 - 44	%	36.6 ↓
Hemoglobin	13.5 - 14.5	11.5 - 15	g/dL	11.7 ↓
Iron	80 - 100	38 - 169	ug/dL	125 ↑
LDH (Lactate dehydrogenase)	140 - 170	119 - 226	IU/L	125 ↓
Protein, total	7 - 7.4	6 - 8.5	g/dL	6.9 ↓
RDW	10 - 12	12.3 - 15.4	%	14.7 ↑
Sodium	138 - 141	133 - 144	mmol/L	142 ↑
Total Cholesterol/HDL Ratio	0 - 3	0 - 5	%	3.6 ↑
Total T3 (Tri-iodothyronine)	100 - 225	71 - 180	ng/dl	78 ↓
Total T4 (Thyroxine)	8 - 9	4.5 - 12	ug/dL	7 ↓
Total WBC	5.3 - 7.5	3.4 - 10.8	x10E3/uL	5.1 ↓
% Iron Saturation	20 - 35	16 - 60	%	30
Alkaline phosphatase	70 - 90	39 - 117	IU/L	76
ALT (SGPT)	15 - 28	0 - 32	IU/L	27
AST (SGOT)	15 - 28	0 - 40	IU/L	27
Bilirubin	0.6 - 0.9	0 - 1.2	mg/dL	0.6
Blood urea nitrogen (BUN)	12 - 17	3 - 27	mg/dL	16

Carbon Dioxide (CO2)	24 - 27	18 - 29	mmol/L	27
Creatinine	0.7 - 0.9	0.57 - 1	mg/dL	0.78
Free T4 (Thyroxine)	1.3 - 1.8	0.82 - 1.77	ng/dl	1.46
Globulin, total	2.3 - 2.7	1.5 - 4.5	g/dL	2.4
Glucose	85 - 95	65 - 99	mg/dL	86
MCV	82 - 90	79 - 97	fL	85.1
Monocytes	4 - 5	2 - 8	%	4.9
Platelets	200 - 250	150 - 379	x10E3/uL	205
Potassium	4.3 - 4.7	3.5 - 5.2	mmol/L	4.7
Red Blood Cells (RBC)	4.2 - 4.6	3.8 - 5.1	x10E6/uL	4.56
Reticulocyte count	0.05 - 1.5	0.5 - 2.6	%	1.5
Total Cholesterol	160 - 199	100 - 189	mg/dL	173
Triglycerides	70 - 100	0 - 114	mg/dL	86
TSH (Thyroid stimulating hormone)	1.5 - 2.5	0.45 - 4.5	uIU/ml	2.5

Lab

C-Reactive Protein (CRP)

Opt Range: **0 - 1.5**

Results: **4** ↑

Std Range: **0 - 3**

Description

C-reactive protein (CRP) is a substance produced by the liver in response to inflammation. A high level of CRP in the blood is a marker of inflammation. It can be caused by a wide variety of conditions, from infection to cancer

Out of Range Description

Increased CRP commonly is associated with systemic and/or arterial inflammation, bacterial infection, malignant disease and collagen vascular diseases. Viral infections do not commonly increase CRP.

 The following medication may increase CRP: oral contraceptives

Lab

Eosinophils

Opt Range: **0 - 3**

Results: **7.8** ↑

Std Range: **0 - 4**

Description

These specialists produce peroxidase enzymes and proteins that are toxic to invading elements. Eosinophils are also capable of phagocytosis and are not involved with viral or bacterial infections.

Out of Range Description

Increases occur in response to parasites/fungal infections or some other toxin/gut allergens. May also increase with allergic reaction including food and environmental allergies or intolerances. If the eosinophils are >10-20% suspect roundworm infection. Hypereosinophila that causes organ damage is called hypereosinophilic syndrome. This syndrome tends to have an unknown cause or results from certain types of cancer, such as bone marrow or lymph node cancer.

<https://www.ncbi.nlm.nih.gov/pubmed/8492440>

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2769221/>

Lab

LDL-cholesterol

Opt Range: **0 - 120**

Std Range: **0 - 99**

Results: **106** ↑

Description

Out of Range Description

Increased values are seen hypercholesterolemia, diet-high in refined carbohydrates, atherosclerosis, Oxidative stress syndrome X and fatty liver.

Clinical Note: The American Heart Association now recognizes that LDL cholesterol is "bad" when it becomes oxidized. This is the primary reason to order advanced lipoprotein Testing and subfractionation. Recommend the CardioIQ test from Quest

The following medications may increase LDL cholesterol: aspirin, oral contraceptives, phenothiazines, steroids, thiazides, some beta blockers, sulfonamides, estrogens, progestins, androgens

Lab

Lymphocytes

Opt Range: **30 - 35**

Std Range: **20 - 45**

Results: **11.7** ↓

Description

Protective especially against virus and cancer, lymphocytes are derived from either bone marrow - B cells for humoral immunity/formation of specific antibodies; or the thymus - T cells for cellular immunity/direct contact with pathogens. T cells are mobilized by interleukin 2.

Out of Range Description

Low values are seen with low protein, compromised immune function and heightened cancer risk. A lymphocyte % <15% puts people at the highest risk of cancer or AIDS. It is considered one of the OMNIOUS signs of seriously compromised immune function. Other OMNIOUS signs include significant depression of cholesterol, albumin and albumin/globulin ratio

Lab

Magnesium

Opt Range: **2.2 - 2.6**

Std Range: **1.5 - 2.5**

Results: **15** ↑

Description

Magnesium measurements are used in the diagnosis and treatment of hypomagnesemia (abnormally low plasma levels of magnesium) and hypermagnesemia (abnormally high plasma levels of magnesium).

This important element is found in the arteries, heart, bone, muscles, nerves, teeth.

Clinical Note: Magnesium should be evaluated on all patients suffering with heart disease.

Out of Range Description

Magnesium is increased in acute or chronic renal failure and Addison's Disease.

Nutrition Tip: Excessive use of antacids containing magnesium may increase magnesium levels

Lab

MCH Opt Range: **28 - 32** Results: **25.7** ↓
Std Range: **27 - 33**

Description

Mean Corpuscular Hemoglobin. Represents the weight of hemoglobin in a single red blood cell. Since larger cells tend to have more hemoglobin, the values of MCH and MCV usually trend in similar directions.

Out of Range Description

Decreased values found in iron and B-6 anemia and internal bleeding.
There is a casual relationship between copper deficiency, toxic metal lead and decreased MCH levels.
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2887903/>

Lab

MCHC Opt Range: **32 - 35** Results: **30.2** ↓
Std Range: **31.5 - 35.7**

Description

Mean Corpuscular Hemoglobin Concentrate reflects the average concentration of hemoglobin in an RBC.

Out of Range Description

Decreased values found in iron and B-6 anemia and internal bleeding.
There is a casual relationship between copper deficiency, toxic metal lead and decreased MCHC levels.
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2887903/>

Lab

Neutrophils Opt Range: **50 - 60** Results: **71.8** ↑
Std Range: **40 - 70**

Description

Polymorphoneuclear leucocytes, often referred to as neutrophils. The primary function is phagocytosis, the killing and digesting of bacteria.

Out of Range Description

Elevated neutrophils are found in acute and chronic bacterial infection and trauma. Extremely high levels of neutrophils should alert you to the possibility of malignant neoplasms, leukemia, etc.

Clinical Notes: Neutrophils tend to increase with chronic bacterial infections and decrease with chronic viral infections

Lab

Phosphorus Opt Range: **3.4 - 3.8** Results: **75** ↑
Std Range: **2.5 - 4.5**

Description

- Phosphorus exists mostly as phosphate in the body.
- Most phosphate is organically bound, but it is the circulating inorganic phosphorus that is measured in blood chemistry.
- Most inorganic phosphorus is combined with calcium to form bone and teeth, but 15% is circulating in the blood.
- Phosphorus compounds are the source of chemical energy in the body and it is therefore a tremendously important mineral.
- Its many functions include influencing pH balance and it is reflective of acidity in the gut where it is responsible for stabilization of sugars (Phosphoryllation) preparing them for transport to the liver.
- Important functions are in phospholipids, nucleic acids, membrane and energy production/ATP.
- Phosphorus and calcium must be in proper balance for optimum health – see formula under additional notes.
- The parathyroid helps regulate amounts in the blood and good kidney function is necessary.
- Phosphorus is efficiently absorbed in the small intestine and calcium metabolism, PTH, and renal excretion influence levels.

Out of Range Description

Increased values are seen in an alkaline gut/lack of hydrochloric acid. Also Paget’s disease, Addison’s disease, sarcoidosis, hypoparathyroidism, bone metastases, diabetic ketoacidosis, renal failure, healing fractures, hypocalcemia, advanced lymphoma or myeloma.

 Clinical Note: Laxatives and enemas containing sodium phosphate increase phosphorus levels.

Clinical Note: Elevated levels are commonly considered in normal bone growth in children.

Lab

Reverse T3

Opt Range: **9.2 - 20**

Results: **5** ↓

Std Range: **9.2 - 24.1**

Description

The Reverse T3 (RT3) test measures the inactive form of the hormone T3 or Triiodothyronine. Patients with high levels of Reverse T3 tend to have one or more of the following symptoms:
 Lower than normal metabolism.
 Constant weight gain without changing eating habits.
 Crushing fatigue.

In any situation where one’s body needs to conserve energy, such as illness, surgery or an accident, the thyroid will probably convert any excess T4 to the inactive reverse T-3 in order to lower one’s T-3 levels and to concentrate on the problem.

Sometimes once body makes far too much reverse T-3. For example, if your body has an adequate levels of iron, low or high levels of cortisol, and even low B12, your body will convert to excess reverse T-3.
 Symptoms of hypothyroidism.
 Chronic pain.
 Depression, anxiety and/or bipolar disorder.

Out of Range Description

n/a

Lab

Uric acid

Opt Range: **3.5 - 5.5**

Results: **40** ↑

Std Range: **2.5 - 7.1**

Description

- Principle end product of purine metabolism.
- Purine rich foods include organ meats, asparagus, spinach and mushrooms.
- Breakdown of nucleoproteins - Purine is a building block for DNA.
- Men tend to have slightly higher levels than women.
- Gouty arthritis may be linked in part to mycotoxin infestation.
- Uric acid is related to antioxidant defenses.

- It is considered a mucous substance formed by protein metabolism.
- Uric acid is related to antioxidant defenses.
- Uric acid becomes more saturated in acidic urine – the more alkaline the urine, the less crystallization and stone formation occurs.
- Lack of Vitamin E has been linked with an increase of uric acid.
- Avoid all alcohol. It increases the production of uric acid.
- Uric acid is increased in 80% of patients with high triglycerides.
- Stress is the most seen cause of high uric acid.

Out of Range Description

Increased values are seen in gout, kidney insufficiency and inflammation, diabetes, excessive exercise; high protein diets and excessive purine containing foods; excessive intake of PUFA's (polyunsaturated fatty acids), rheumatoid arthritis, malignancies and other conditions with tissue breakdown, oxidative stress and atherosclerosis. Stress. Hypothyroidism, hypoadrenalism, and parathyroid dysfunction may cause elevations.

Lab

Albumin

Opt Range: **4.3 - 4.7**

Results: **4.1** ↓

Std Range: **3.6 - 4.8**

Description

- Albumin is formed in the liver and is a measure of liver function.
- It represents about 60% of the total protein.
- Albumin maintains colloidal osmotic pressure, is water soluble and is a carrier for protein hormones, enzymes, waste products, drugs and other substances.
- In liver disease hepatocytes lose the ability to synthesize albumin, causing levels to fall.
- Albumin's lifespan is 12-18 days and therefore a delay in lowering of values may occur.
- The liver may lose its ability to produce albumin, but the reticuloendothelial system is producing enough globulins to maintain Total Protein levels.
- Albumin is a much smaller molecule and can be selectively lost to the extravascular space as in Lupus Erythematosis.
- Chronic liver disease is associated with low albumin and normal globulin and total protein. A/G ratio reflects these changes – normally >1.
- Decreased albumin, <4 and lymphocytes <20 – possible neoplasm or other degenerative disease.
- Albumin may rise significantly in acute illness – lots of transport.

Out of Range Description

Decreased values are seen in edema, digestive inflammation, hyperthyroid, low calcium, neoplastic disease and free radical pathology. Also see Total Protein. Albumin may be decreased in some cases while globulins are normal or elevated to keep total protein levels up – chronic liver disease. Decreased albumin is considered one of the four OMNIOUS signs (Decreased albumin, decreased A/G ratio, decrease cholesterol, decreased lymphocytes and decreased cholesterol)

Albumin levels <3.5 in hospitalized patients indicate a 20% chance of dying within 3 weeks.

Albumin levels <2.5 in hospitalized patients indicate an 80% chance of dying within 3 weeks.

Lab

Albumin/Globulin Ratio

Opt Range: **1.8 - 2**

Results: **1.7** ↓

Std Range: **1.1 - 2.5**

Description

The ratio provides insight into liver and kidney function and also inflammation and dehydration. It will change depending on the body's needs at any given time.

Out of Range Description

Decreased values are seen in depletion of the body's defense mechanisms, inflammation and liver dysfunctions. One of the OMNIOUS signs. (Decreased A/G ratio <1.0, decreased albumin, decreased cholesterol <140 and decreased lymphocytes)

Clinical Note: blood maybe too thin (rule out chronic aspirin use, unnecessary blood thinners)

Lab

BUN/Creatinine Ratio

Opt Range: **10 - 16**

Results: **20.5** ↑

Std Range: **10 - 24**

Description

BUN/Creatinine is dependent on the BUN and Creatinine levels. This ratio is used to assess patients with chronic renal dysfunction and serves as a rough guide, due to the variability in BUN and Creatinine levels

Out of Range Description

Elevated BUN/Creatinine Ratio should alert you to a renal disease, however correlate with an elevated BUN and/or elevated creatinine.

In kidney disease, a rise in BUN commonly precedes a rise in creatinine.

The following medications may increase BUN/Creatinine Ratio: steroids, antibiotics

Lab

Calcium

Opt Range: **9.4 - 9.8**

Results: **8.9** ↓

Std Range: **8.6 - 10.2**

Description

- Calcium is the principle component of bone and teeth with 99% of the body's calcium is found in these structures.
- The other 1% is extremely important to many physiologic processes such as blood clotting, nerve and muscle transmission and enzyme activities.
- About half the total serum calcium is free ionized and the rest is bound to proteins, mostly albumin.
- PTH causes calcium to increase by causing more absorption in the gut, decreasing renal excretion and increasing bone resorption.
- Calcium is involved in fat and protein absorption and has functions in trauma, and infection.
- An excess of "free" calcium can be a substantially negative influence and this must be ascertained by viewing calcium and phosphorus together.

Out of Range Description

Decreased values are seen in hypoparathyroidism, Vitamin D deficiency, hypochlorhydria, magnesium deficiency, chronic renal failure, hyperphosphatemia secondary to renal failure alkalosis, pancreatitis, tetany, intestinal malabsorption, low albumin and total protein and diuretic use.

Nutrition Note: Pancreatic enzyme deficiency may be suspected with low levels of calcium

The following medications may decrease serum calcium: acetazolamide, anticonvulsants, asparaginase, aspirin, calcitonin, cisplatin, corticosteroids, heparin, laxatives, loop diuretics, magnesium salts, thiazide diuretic, estrogens, albuterol, and oral contraceptives

Lab

Chloride

Opt Range: **101 - 103**

Results: **106** ↑

Std Range: **96 - 106**

Description

- Chloride is the major extracellular anion and along with the other electrolytes sodium and potassium, is essential for maintaining proper fluid balance and reflects the ability of cell membranes to exchange fluids.
- It is the opposite charge of the major cation sodium and therefore maintains relative electrical neutrality.
- Chloride is part of the buffering activity and functions as one of the controls for acid-base balance.
- Inside the cell as CO₂ and H⁺ increase, HCO₃ moves from intracellular to extracellular space causing CHLORIDE to SHIFT back into the cell to balance the electrical factor.
- It is a component of hydrochloric acid.
- Levels of chloride primarily provide information on the adrenals, stomach and kidney, but can also reflect insight to posterior pituitary function.

- High chloride and normal sodium usually means high stomach acid.
- Increased chloride with increased sodium indicates fluid retention.

Out of Range Description

Increased values are seen in dehydration, acid conditions and swelling of tissues because too much water infiltrates the cells. Renal tubule acidosis, Cushing syndrome, metabolic acidosis, anemia, and respiratory alkalosis. High chloride signs include lethargy, weakness and deep breathing. Lack of Vit. K protein handling, digestive issues.

The following medications may increase serum chloride: acetazolamide, ammonium chloride, androgens, chlorothiazide, cortisone preparations, estrogens, guanethidine, hydrochlorothiazide, methyl dopa, and nonsteroidal antiinflammatory drugs.

Lab

Ferritin Opt Range: **40 - 60** Results: **90** ↑
Std Range: **30 - 400**

Description

Ferritin is the main storage of iron in the body. It is the most sensitive test to identify iron deficiency.

Out of Range Description

Elevated levels are commonly associated with Hemochromatosis. The following should be considered with elevated ferritin: inflammation, liver dysfunction and oxidative stress.

Excess consumption of iron should not be discounted with elevated ferritin.

Lab

Free T3 (Tri-iodothyronine) Opt Range: **3.2 - 4.2** Results: **2.4** ↓
Std Range: **2 - 4.4**

Description

T3 is the most active thyroid hormone and is derived from the conversion of T4 to T3.

In order to get more T3, a healthy body will convert roughly 60% of the circulating T4 into T3. This process occurs most in the liver by an enzyme called iodothyronine 5' deiodinase. The remaining T4 is converted to T3 in a healthy GI tract. If you have a healthy liver and GI tract, you'll be optimally converting T4 into T3.

Common reason the liver may not be converting T4-T3

- Stress
- Alcohol
- Sugar
- Transfats
- Advanced glycation end products (AGES)
- High carbohydrate diet
- Leaky gut syndrome
- Mineral and vitamin deficiencies (selenium, zinc, iron, vitamin A, B-6, B12)
- Heavy metals (mercury, lead, etc..)
- Petrochemicals and other toxins
- Infections (Candida)
- Adrenal dysfunction
- Growth hormone deficiency
- Hemochromatosis
- Drugs (propylthiouracil, methimazole, dexamethasone, propranolol, amiodarone, birth control medication, estrogen, lithium)
- Postoperative state
- Physical trauma
- Fasting
- Anti-TPO antibodies

Alpha-Lipoic acid

Out of Range Description

Low T3 values are associated with primary hypothyroidism.

Nutritional Note: Low levels of T3 may indicate a selenium deficiency.

<https://www.ncbi.nlm.nih.gov/pubmed/7604216>

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5307254/>

Lab

GGT (Gamma glutamyl transferease)

Opt Range: **15 - 28**

Results: **50** ↑

Std Range: **0 - 60**

Description

- Gamma-glutamyltransferase is an enzyme found primarily in the liver and is used to transfer amino acids and peptides including albumin and globulins across the cell membrane.
- It reflects liver function and the status of the bile duct and is involved in glutathione metabolism.
- Highest concentrations are in the liver and biliary tract with lesser amounts found in the kidney, spleen, heart, intestines, brain and prostate.
- Primary use is in assessment of liver function and is quite sensitive to any stasis in bile flow.
- It is the best indicator of cholestasis, biliary obstruction and liver cell dysfunction.
- GGT elevation usually parallels alkaline phosphatase, but GGT is a more sensitive test of liver function.
- GGT not increased in bone disease.
- Normal GGT and elevated alkaline phosphatase probably means bone implication but may be related to other alkaline phosphatase isozymes.
- Concurrent GGT and alkaline phosphatase elevations imply hepatobiliary problems. GGT is elevated in about 75% of chronic alcohol users and is therefore a useful tool in monitoring alcohol use and abuse.

Out of Range Description

Increased values are seen in bile duct obstruction (cholestasis), liver damage, alcohol use especially chronic, mononucleosis, pancreatitis, hyperthyroidism, environmental toxic load, hepatotoxic drugs and possibly overuse of supplements, hepatitis, cirrhosis tumor or metastases in liver, jaundice, MI, pancreatic cancer, EBV, cytomegalovirus, and Reye syndrome.

Clinical Note: SGPT (ALT) will be elevated while SGOT (AST) will be normal or high normal if the elevated GGT is due to cholestasis.

The following medications may increase GGT: alcohol, phenytoin (Dilantin), and phenobarbital

Lab

HDL-cholesterol

Opt Range: **55 - 80**

Results: **48** ↓

Std Range: **35 - 150**

Description

HDL, or High Density Lipoprotein, is composed mainly of phospholipids and apoproteins. It functions to transport cholesterol from the peripheral tissues and vessel walls back to the liver for processing and metabolism into bile salts.

Out of Range Description

Low levels of HDL are associated with an increased risk of developing atherosclerosis. The following are also associated with a depressed HDL: diet high in refined carbs, syndrome X and fatty liver. Some people simply have a genetic predisposition to low HDL.

The following medications may decrease HDL: thiazide diuretics, antihypertensive medications, beta blockers without sympathomimetic activity, sympatholytic agents

Lab

Hematocrit

Opt Range: **37 - 44**

Results: **36.6** ↓

Std Range: **34 - 44**

Description

The percentage of whole blood volume occupied by red blood cells.

Out of Range Description

Low readings are associated with fatigue, anaerobic metabolism and anemia, particularly microcytic, and blood loss. Also consider cirrhosis of the liver, renal disease and collagen vascular diseases with low hematocrit.

The following should be suspected when you have "chronically" decreased hematocrit: lymphoma, multiple myeloma, leukemia and Hodgkin disease

Clinical Notes: Consider ordering a ferritin test with a decrease hematocrit.

The following medications may decrease hematocrit: chloramphenicol and penicillin

Lab

Hemoglobin

Opt Range: **13.5 - 14.5**

Results: **11.7** ↓

Std Range: **11.5 - 15**

Description

An iron bearing protein that is the primary carrier of oxygen. 90% of red blood cells is hemoglobin.

Out of Range Description

Low readings reflect fatigue, anaerobic metabolism and anemia, chronic inflammation or low protein. Internal bleeding should be considered with significant depression of hemoglobin.

There is a casual relationship between low hemoglobin and inflammatory bowel disease.

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4540708/>

Nutrition Tip: Low levels of hemoglobin may indicate a deficiency of B-12, folic acid and thiamine.

The following medications may decrease hemoglobin: antibiotics, antineoplastic drugs, aspirin, indomethacin, rifampin and sulfonamides

Lab

Iron

Opt Range: **80 - 100**

Results: **125** ↑

Std Range: **38 - 169**

Description

- Iron is essential for the formation of myoglobin, cytochrome and hemoglobin and is bound to a glycoprotein in the blood called transferrin.
- Stomach acid converts ferric iron to an absorbable ferrous iron.
- Iron is essential for oxygen transport and when deficient, oxygenation is less than optimal.
- The test is used to evaluate iron deficiency and overload conditions and relates primarily to spleen and liver function.
- Total Iron Binding Capacity (TIBC), Ferritin, hemoglobin and RBCs are used to differentiate various iron problems and related states of inflammation.
- Protein bound iron is healthy while free iron promotes oxidative stress.
- 70% of iron is found in the hemoglobin of RBCs. The other 30% is stored as Ferritin and hemosiderin.
- Iron deficiency anemia may be caused by insufficient intake, inadequate gut absorption and blood loss through menstruation, bleeding ulcer, colon neoplasm or extreme inflammation of the colon.
- Iron deficiency results in decreased production of hemoglobin, followed by microcytic, hypochromic RBCs.

- Iron deficiency anemia is characterized by low serum iron, elevated TIBC, and low transferrin saturation (TS).
- Iron is the primary pro-oxidant catalyst.
- Iron overload, hemochromatosis and hemosiderosis all involve excess iron.
- Excess iron is usually deposited in the brain, liver, gonad and heart and may cause severe damage and dysfunction.

Out of Range Description

Increased values are seen in hemosiderosis, hemochromatosis, hemolytic anemia, hepatitis, congestive heart failure, gonadal atrophy, liver disorders, lead toxicity, iron poisoning. Excess free iron is associated with heart, liver and gonadal damage. Increased iron levels should also prompt you to rule out patient using products that would increase iron such as water, iron cookware and iron containing supplements.

Lab

LDH (Lactate dehydrogenase) Opt Range: **140 - 170** Results: **125** ↓
Std Range: **119 - 226**

Description

- Lactic Dehydrogenase is found in all cells as well as the blood.
- It is involved in carbohydrate/glucose metabolism, specifically the activity of lactic and pyruvic acids in the Krebs Cycle.
- Because it is in all cells, LDH is also a non-specific marker for cellular damage and is used specifically in heart attack to assess damage to the heart muscle.
- Isoenzymes or fractions of LDH can be used to identify which tissues are affected.
- Primary sites include heart, liver, RBCs, kidneys, muscles, brain and lungs.
- When injury or disease affects cells containing LDH, the cells are lysed and the LDH spills into the bloodstream causing an increase total LDH.
- There are 5 isoenzymes that allow the affected tissue type to be identified.
- Strenuous exercise can also cause an elevation.
- Provides an approximation of lactic acid.

Out of Range Description

Decreased values are seen in zinc deficiency, adrenal exhaustion and poor carbohydrate utilization (Hypoglycemia).

The following supplements may decrease LDH: ascorbic acid

Lab

Protein, total Opt Range: **7 - 7.4** Results: **6.9** ↓
Std Range: **6 - 8.5**

Description

- Total protein reflects the combined albumin and globulins in the serum.
- It is the available protein of the body, the primary building block and serves as the front line defense against toxins.
- It reflects pancreatic function, pH balance, muscle metabolism and to some degree, dietary intake.
- The anterior pituitary and thyroid, parotids (through proper chewing of food), adrenal, liver and pancreas are all involved with Total Protein, albumin and globulin metabolism.
- Proteins are constituents of muscle and other tissue structures, binding proteins, muscle mass, connective tissue, antibodies, enzymes, hormones and hemoglobin.
- Important in maintaining osmotic pressure in the vascular space, albumin and globulins constitute most of the protein in the blood and together represent the Total Protein.

Out of Range Description

Decreased values are seen in malnutrition, surgery and burns, Crohn's disease, ulcerative colitis, heavy metal toxicity, low protein diet, cirrhosis of the liver, alcoholism, malnutrition and malabsorption, hypochlorhydria, wasting diseases, kidney disorders and hyperthyroidism.

The following medications may decrease total protein: ammonium ions, estrogens, hepatotoxic drugs, and oral contraceptives

Lab

RDW Opt Range: **10 - 12** Results: **14.7** ↑
Std Range: **12.3 - 15.4**

Description

Red Cell Distribution Width is a calculation used to assess the variation in size of RBCs.

Out of Range Description

A high RDW is commonly associated with microcytic anemia. Increased RDW is also associated with B-12, folate or iron anemias and oxidative stress

Lab

Sodium Opt Range: **138 - 141** Results: **142** ↑
Std Range: **133 - 144**

Description

- Sodium is most the abundant cation in extra-cellular fluid (outside the cells) and reflects fluid balance, kidney function, as well as heart and adrenal function.
- Balance is achieved between intake and kidney elimination. Aldosterone, ADH, ACTH and Natriuretic factor are all involved in sodium balance.
- Aldosterone decreases renal losses, Natriuretic (3rd factor) increases renal losses and ADH controls resorption of water in kidney affecting balance of sodium.
- Sodium is the acidifying mineral that opposes potassium.
- Na pumps water and nutrients into the cell and is controlled by the adrenal cortex through aldosterone, which inhibits excretion and promotes resorption.
- Na is needed for nerve transmission, pH balance and electrical control of the heartbeat.
- Sodium assists in aggregating toxins for transport to the renal tubules.
- Adrenal, kidney and pituitary function can affect levels of this electrolyte.
- Steroidal hormones, progesterone and estrogen, under anterior pituitary control can affect sodium levels causing water retention.

Out of Range Description

Increased values are seen in renal dysfunction, dehydration, hyperadrenalism, congestive heart failure, Cushing's disease, toxic exposure, edema/water retention, hypertension and excessive dietary consumption. Hyponatremia – dry mucous membranes, thirst, restlessness, agitation and in the extreme, convulsions.

The following medications may increase sodium: anabolic steroids, antibiotics, clonidine, corticosteroids, cough medicines, laxatives, methyldopa, carbenicillin, estrogens, oral contraceptives, NSAIDS, aspirin, anti-hypertensives, laxatives

Lab

Total Cholesterol/HDL Ratio Opt Range: **0 - 3** Results: **3.6** ↑
Std Range: **0 - 5**

Description

Cholesterol/HDL ratio: this ratio is an important marker for cardiovascular health. A ratio <4.0 is considered adequate. A ratio <3.1 is ideal.

Out of Range Description

A high ratio is related to an increase heart attack risk.

Lab

Total T3 (Tri-iodothyronine) Opt Range: **100 - 225** Results: **78** ↓
Std Range: **71 - 180**

Description

T3 is the most active thyroid hormone and is derived the the conversion of T4 to T3. In order to get more T3, a healthy body will convert roughly 60% of the circulating T4 into T3. This process occurs most in the liver by an enzyme called iodothyronine 5' deiodinase. The remaining T4 is converted to T3 in a healthy GI tract. If you have a healthy liver and GI tract, you'll be optimally converting T4 into T3.

Common reason the liver may not be converting T4-T3

Stress
Alcohol
Sugar
Transfats
Advanced glycation end products (AGES)
High carbohydrate diet
Leaky gut syndrome
Mineral and vitamin deficiencies (selenium, zinc, iron, vitamin A, B-6, B12)
Heavy metals (mercury, lead, etc..)
Petrochemicals and other toxins
Infections (Candida)
Adrenal dysfunction
Growth hormone deficiency
Hemochromatosis
Drugs (propylthiouracil, methimazole, dexamethasone, propranolol, amiodarone, birth control medication, estrogen, lithium)
Postoperative state
Physical trauma
Fasting
Anti-TPO antibodies
Alpha-Lipoic acid

Out of Range Description

Low T3 values are associated with primary hypothyroidism

Nutritional Note: Low levels of T3 may indicate a selenium deficiency.

<https://www.ncbi.nlm.nih.gov/pubmed/7604216>

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5307254/>

Lab

Total T4 (Thyroxine) Opt Range: **8 - 9** Results: **7** ↓
Std Range: **4.5 - 12**

Description

T-4 is the major hormone secreted by the thyroid gland and is the primary regulator of metabolic activity. It is called T-4 because of the 4 iodine ions in its structure. T-4 and its more active product T-3 serve to stimulate metabolic activity, maintain body temperature, regulate heart rate and utilize nutrient carbohydrates, fats and proteins. Low T-4 indicates the pervasive condition, hypothyroidism. Some of the indications of low thyroid include fatigue, lethargy, dry skin, intolerance of cold, constipation and weight gain.

An ancillary test, the Barnes Basal Temperature Test, may be performed to corroborate findings: the patient takes his/her axial temperature before arising in the morning while lying quietly in bed. Temp should be between 97.8 and 98.2 with readings below 97.8 indicating a hypo condition and above 98.2, a hyper tendency. This should be done at least 4 mornings to get a baseline and ovulation time should be avoided.

Out of Range Description

Low T4 values are associated with hypothyroidism. Rule out iodine deficiency. Order the following test:

<https://www.doctorsdata.com/urine-iodine-pre-post-load/>

The following medications may decrease total T4: anabolic steroids, androgens, antithyroid drugs (e.g., propylthiouracil), lithium, phenytoin, and propranolol

Lab

Total WBC

Opt Range: **5.3 - 7.5**

Results: **5.1** ↓

Std Range: **3.4 - 10.8**

Description

Measures the total number of white blood cells or leucocytes. The main function of the white cells is to defend against foreign invaders and infection. This is mainly accomplished by production and transport of antibodies and by phagocytosis. Several types of cells contribute to this total count.

Out of Range Description

Decreases signal bone marrow disorders, massive infections (viral or bacterial), autoimmune disorders and general immune system weakness.

Nutrition Note: Decreased WBC may indicate a need for Vitamin B-12, B-6 and folic acid.

Clinical Notes: An increase or decrease in total WBC together with a lymphocyte count below 20 and serum albumin below 4.0 is a pattern commonly seen in a developing neoplasm (tumor).

The following medications may decrease WBCs: antibiotics, anticonvulsants, antihistamines, antimetabolites, antithyroid drugs, arsenicals, barbituates, chemotherapeutic agents, diuretics, and sulfonamides

Sample