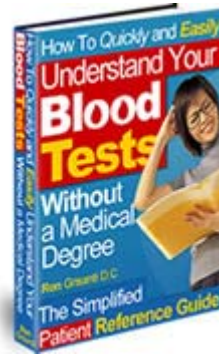


# How to Quickly and Easily Understand Your Blood Tests Without A Medical Degree



## The Simplified Patient Reference Guide

By Ronald J. Grisanti D.C.

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## About the Author



Dr. Ronald Grisanti is a practicing chiropractic physician since 1981. In addition to earning his doctorate in chiropractic medicine, Dr. Grisanti is a Board Certified Chiropractic Orthopedist and Board Certified Sports Physician. He is presently completing his Master's Degree in Nutrition from the University of Bridgeport.

In addition, Dr. Grisanti has had extensive training in Functional Diagnostic Medicine and frequently consults with patients suffering with difficult to diagnose health problems like fibromyalgia, chronic fatigue syndrome, diabetes, hypertension, depression, anxiety, acid reflux and other challenging health conditions.

His admirable success record has earned him the title, "Your Medical Detective."

Dr. Grisanti has discovered that many health problems can be successful treated once the underlying cause has been found.

He is known for his tenacity and strong will to find the root cause of a patient's health problem. In 2001, with his ever-growing love for research, Dr. Grisanti launched his weekly medical report titled, "The Grisanti Report" and has written over 400 articles on a host of medical conditions.

His weekly reports have gained worldwide attention and are now read in over 40 countries around the world. His list of subscribers has grown into the thousands.

Just recently, Dr. Grisanti launched his exclusive membership site called [YourMedicalDetective.com](http://YourMedicalDetective.com).

Dr. Grisanti invites you to take a tour of his new site. Go to [www.YourMedicalDetective.com](http://www.YourMedicalDetective.com)

This site gives you exclusive, in-depth information and tools to help you and your doctor track down the real cause of your health challenges and solve them.

Dr. Grisanti would like to thank you for purchasing his digital book titled “**How to Quickly and Easily Understand Your Blood Tests Without A Medical Degree.**”

I believe you will benefit from a book that finally makes sense out of your blood chemistry results.

Take care and enjoy the book.

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# Comprehensive Blood Test Guide

Don't you just hate when you get your blood test back and you have absolutely no idea what all those numbers mean on a standard chemistry profile? Well now you can use this book to help you understand your test a bit better.

## GLUCOSE

**Glucose:** This is the chief source of energy for all living organisms. A level greater than 105 in someone who has fasted for 12 hours suggests a diabetic tendency. If this level is elevated even in a non-fasting setting one must be concerned that there is a risk for developing diabetes. This is an incredibly powerful test and can predict diabetes ten years or more before one develops the strict definition of diabetes which is levels greater than 120.

**Common Causes of Glucose Increase:** Diabetes, poor carbohydrate utilization, syndrome X

**Less Common Causes of Glucose Increase:** Cerebral lesions, uremia, pregnancy, intracranial pressure, cushing's disease, hyperthyroidism, chronic nephritis, infections, first 24 hours after a severe burn, pancreatitis, cerebral lesions, uremia, early hyperpituitarism

**Common Causes of Glucose Decrease:** Fasting Hypoglycemia

**Clinical Note:** LDH will frequently be decreased or in the low normal with Fasting Hypoglycemia, however, LDH will almost ALWAYS be decreased with Reactive Hypoglycemia

**Less Common Causes of Glucose Decrease:** liver damage, pancreatic adenoma, addison's disease (adrenal insufficiency), starvation, late hypopituitarism Carcinoma of islet tissue

**Clinical Adult Range:** 70-115 mg/dL

**Optimal Adult Range:** 85-100 mg/dL

**Red Flag Range** <50 or >250 mg/dL

**Clinical Notes:** Order **Glycohemoglobin (HGB A1C)** with serum glucose values above 160 and to monitor diabetics under therapy

**Nutrition Tip:** **Thiamine Deficiency** has been linked to increase in glucose levels

# SODIUM

**Sodium:** This element plays an important role in salt and water balance in your body. A low level in the blood can be caused by too much water intake, heart failure, or kidney failure. A low level can also be caused by loss of sodium in diarrhea, fluid or vomiting. A high level can be caused by too much intake of salt or by not enough intake of water.

**Clinical Adult Range:** 135-145

**Optimal Adult Range:** 140-144

**Red Flag Range** <125 or >155 mmol/L

**Common Causes of Sodium Increase:** Nephritis (kidney problems), dehydration, hypercorticoadrenalism (increased adrenal function)

**Clinical Notes:** Water Softeners have been linked to cause an increase in sodium

**Common Causes of Sodium Decrease:** Reduced kidney filtration, diarrhea, Addison's disease, adrenal hypo-function

# POTASSIUM

**Potassium:** This element is found primarily inside the cells of the body. Low levels in the blood may indicate severe diarrhea, alcoholism, or excessive use of water pills. Low potassium levels can cause muscle weakness and heart problems.

**Clinical Adult Range:** 3.5-5.0

**Optimal Adult Range:** 4.0-4.6

**Red Flag Range** <3.0 or >6.0 mmol/L

**Common Causes of Potassium Increase:** Adrenal hypo-function, cortisol resistance, acidosis, ongoing tissue destruction

**Common Causes of Potassium Decrease:** Diarrhea, diuretic use, kidney problems, adrenal hyperfunction

**Less Common Causes of Potassium Decrease:** Anemia, overdosage of testosterone, hereditary periodic paralysis, hypertension

**Nutrition Tip:** Excessive licorice consumption has been linked to lower potassium levels

# MAGNESIUM

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

**Clinical Adult Range:** 1.7-2.4

**Optimal Adult Range:** 2.2-2.6

**Red Flag Range** <1.2 mg/dL

**Common Causes of Magnesium Increase:** Kidney problems

**Common Symptoms of Magnesium Deficiency:** Anxiety, aching muscles, disorientation, low body temperature, easily angered, hyperactivity, insomnia, muscle tremors, nervousness, rapid pulse, sensitivity to noise and loud sounds, epilepsy

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

**Clinical Note:** Patient suffering with fibromyalgia may have a low serum magnesium accompanied with a low CO<sub>2</sub> and an increased anion gap

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

**Clinical Note:** If your magnesium is less than 2.0, it is strongly recommended to have an erythrocyte magnesium test or a magnesium loading test

# CHLORIDE

**Chloride:** Is an electrolyte controlled by the kidneys and can sometimes be affected by diet. An electrolyte is involved in maintaining acid-base balance and helps to regulate blood volume and artery pressure. Elevated levels are related to acidosis as well as too much water crossing the cell membrane.

**Clinical Adult Range:** 96-110 mmol/L

**Optimal Adult Range:** 100-106 mmol/L

**Red Flag Range** <90 or >115 mmol/L

**Common Causes of Chloride Increase:** Renal (kidney) problems, metabolic acidosis

**Common Causes of Chloride Decrease:** Kidney problems, metabolic alkalosis, hypochlorhydria (too little acid in the stomach)

**Less Common Causes of Chloride Increase:** Hyperventilation, anemia, prostate problems, salicylate poisoning, excess intake of salt, dehydration

**Less Common Causes of Chloride Decrease:** Diabetes, pneumonia, intestinal obstruction, pyloric spasm. Adrenal hypo-function



**Clinical Note:** Suspect hypochlorhydria if chloride is below 100, the total globulin is less than 2.4 and serum phosphorus is less than 3.0

**Clinical Note:** Chloride is required for the production of HCL by the chief cells of the stomach

## BLOOD UREA NITROGEN

**BUN (Blood Urea Nitrogen):** BUN is a waste product derived from protein breakdown in the liver. Increases can be caused by excessive protein intake, kidney damage, certain drugs, low fluid intake, intestinal bleeding, exercise, heart failure or decreased digestive enzyme production by the pancreas. Decreased levels are most commonly due to inadequate protein intake, malabsorption, or liver damage.

**Clinical Adult Range:** 10-26 mg/dL

**Optimal Adult Range:** 13-18 mg/dL

**Red Flag Range** <5 or >50 mg/dL

**Common Causes of BUN Increase:** Renal disease, gout, drug diuretics

**Common Causes of BUN Decrease:** Pregnancy, protein malnutrition

**Less Common Causes of BUN Increase:** Metallic poisoning, pneumonia, ulcers, Addison's disease, increased protein catabolism, dysbiosis, congestive heart failure

**Less Common Causes of BUN Decrease:** Acute liver destruction, dysbiosis, celiac sprue

**Clinical Note:** Decreased BUN less than 8 with a decreased urinary specific gravity may indicate posterior pituitary dysfunction

**Clinical Note:** Increased BUN above 25 usually indicates kidney disease. However, if Creatinine is not above 1.1, then kidney disease may not be the problem. Instead consider anterior pituitary dysfunction, dehydration or hypochlorhydria.

**Nutrition Tip:** Increased BUN may indicate a Boron deficiency

# CREATININE

**Creatinine:** Creatinine is also a protein breakdown product. Its level is a reflection of the bodies muscle mass. Low levels are commonly seen in inadequate protein intake, liver disease, kidney damage or pregnancy. Elevated levels are generally reflective of kidney damage and need to be monitored very carefully.

**Clinical Adult Range:** 0.7-1.5 mg/dL

**Optimal Adult Range:** 0.7-1.0 mg/dL

**Red Flag Range** >1.6 mg/dL

**Common Causes of Creatinine Increase:** Kidney Problems, Gout

**Clinical Note:** If Creatinine is 1.2 or higher in a male over the age of 40, Prostate Hypertrophy MUST be ruled out

**Less Common Causes of Creatinine Increase:** Renal Hypertension, uncontrolled diabetes, congestive heart failure, urinary tract infection, dehydration

**Clinical Note:** Suspect early nephritis ( kidney disease) if creatinine is between 2-4 mg/dL. Suspect severe nephritis is creatinine is between 4-35 mg/dL

**Common Causes of Creatinine Decrease:** Amyotonia congenita

# BUN/CREATININE RATIO

**BUN/Creatinine Ratio:** increased values may indicate catabolic states, dehydration, circulatory failure leading to fall in renal blood flow, congestive heart failure, acute and chronic renal (kidney) failure, urinary tract obstruction, prostatic enlargement, high protein diet. Decreased values may indicate overhydration, low protein/high carbohydrate diet, pregnancy

**Clinical Adult Range:** 6-10

**Optimal Adult Range:** 10-16

**Red Flag Range** <5 or >30

**Common Causes of BUN/Creatinine Ratio Increase:** Kidney problems

**Less Common Causes of BUN/Creatinine Ratio Increase:** Catabolic states, prostatic hypertrophy, high protein diet, dehydration, shock

**Common Causes of BUN/Creatinine Ratio Decrease:** Low protein/high carbohydrate diet, pregnancy

## URIC ACID

**Uric Acid:** Uric acid is the end product purine metabolism. High levels are seen in gout, infections, high protein diets, and kidney disease. Low levels generally indicate protein and molybdenum (trace mineral) deficiency, liver damage or an overly acid kidney.

**Clinical Female Range:** 2.4-6.0 mg/dL

**Clinical Male Range:** 3.4-7.0 mg/dL

**Optimal Female Range:** 3.0-5.5 mg/dL

**Optimal Male Adult Range:** 3.5-5.9 mg/dL

**Red Flag Range** <2 mg/dL or >9.0 mg/dL

**Common Causes of Uric Acid Increase:** Gout, kidney problems, arteriosclerosis, arthritis  
**Less Common Causes of Uric Acid Increase:** Metallic poisoning (mercury, lead), intestinal obstruction, leukemia, polycythemia, malignant tumors, drug diuretics  
**Common Causes of Uric Acid Decrease:** Chronic B-12 or folate anemia, pregnancy

**Less Common Causes of Uric Acid Increase:** Salicylate and atrophine therapy

**Nutrition Tip:** If the uric acid is low with a normal MCV and MCH, a molybdenum deficiency may be present

## PHOSPHORUS

**Phosphorus:** Phosphorus is closely associated with calcium in bone development. Therefore most of the phosphate in the body is found in the bones. But the phosphorus level in the blood is very important for muscle and nerve function. Very low levels of phosphorus in the blood can be associated with starvation or malnutrition and this can lead to muscle weakness. High levels in the blood are usually associated with kidney disease. However the blood must be drawn carefully as improper handling may falsely increase the reading.

**Clinical Adult Range:** 2.5-4.5

**Optimal Adult Range:** 3.2-3.9

**Red Flag Range** <2.0 mg/dL or >5.0 mg/dL

**Common Causes of Phosphorus Increase:** Parathyroid dysfunction, kidney dysfunction, excessive phosphoric acid in soft drinks.

**Important Fact:** Children will have an increase in Phosphorus due to normal bone growth. In addition, people with fractures will usually reveal an increase.

**Less Common Causes of Phosphorus Increase:** Bone tumors, edema, ovarian hyper-function, diabetes, excess intake of vitamin D

**Common Causes of Phosphorus Decrease:** Parathyroid Hyper-function, osteomalacia, rickets

**Less Common Causes of Phosphorus Decrease:** Diabetes, liver dysfunction, protein malnutrition, neurofibromatosis, myxedema

**Nutrition Tip:** Phosphorus is frequently decreased with diets high in refined sugars

**Clinical Note:** Suspect Vitamin D deficiency with low levels of calcium, phosphorus and increased levels of alkaline phosphorus

**Clinical Note:** Phosphorus is a general indicator of digestive function. Consider hypochlorhydria when phosphorus is below 3.0 and total serum globulin is greater than 3.0 or less than 2.4

## CALCIUM

**Calcium:** Calcium is the most abundant mineral in the body. It is involved in bone metabolism, protein absorption, fat transfer, muscular contraction, transmission of nerve impulses, blood clotting, and heart function. It is highly sensitive to elements such as magnesium, iron, and phosphorous as well as hormonal activity, vitamin D levels, CO<sub>2</sub> levels and many drugs. Diet, or even the presence of calcium in the diet has a lot to do with "calcium balance" - how much calcium you take in and how much you lose from your body.

**Clinical Adult Range:** 8.5-10.8

**Optimal Adult Range:** 9.7-10.1

**Red Flag Range** <7.0 mg/dL or >12.0 mg/dL

**Common Causes of Calcium Increase:** Hyperparathyroidism

**Less Common Causes of Calcium Increase:** Tumor of the thyroid, hypervitaminosis (excess Vitamin D), multiple myeloma, neurofibromatosis, osteoporosis, ovarian hypo-function, adrenal hypo-function

**Clinical Note:** Serum protein influences calcium levels. Calcium goes up with increased protein and goes down with decreased protein

**Common Causes of Calcium Decrease:** Hypoparathyroidism, pregnancy, hypochlorhydria, kidney dysfunction

**Less Common Causes of Calcium Decrease:** Vitamin D deficiency, diarrhea, celiac disease, protein malnutrition, chemical/heavy metal toxicity, HPA-axis dysfunction

**Clinical Fact:** Poor intestinal fat absorption may be suspected with low levels of calcium, bilirubin and phosphorus

**Nutrition Note:** Pancreatic enzyme deficiency may be suspected with low levels of calcium, triglycerides and increased levels of LDH

**Clinical Note:** Circadin rhythm abnormality should be a primary consideration with calcium levels either above or below normal

## ALBUMIN

**Albumin:** The most abundant protein in the blood, it is made in the liver and is an antioxidant that protects your tissues from free radicals. It binds waste products, toxins and dangerous drugs that might damage the body. It is also a major buffer in the body and plays a role in controlling the precise amount of water in our tissues. It serves to transport vitamins, minerals and hormones. Lower levels are seen in poor diets, diarrhea, fever, infections, liver disease, kidney disease, third-degree burns, edemas or hypocalcemia.

**Clinical Adult Range:** 3.0-5.5

**Optimal Adult Range:** 4.0-4.4

**Red Flag Range** <4.0 g/dL

**Common Causes of Albumin Increase:** Dehydration

**Less Common Causes of Albumin Increase:** Thyroid and adrenal hypofunction

**Common Causes of Albumin Decrease:** Liver Disease

**Less Common Causes of Albumin Decrease:** Acute Nephritis, malnutrition, acute cholecystitis (gall bladder), multiple sclerosis, vitamin B-12 or folic acid anemia

**Clinical Note:** Albumin 3.5 or below with a 1500 or less lymphocyte count is one of the four **OMINOUS** signs

**Nutrition Tip:** Decreased albumin with decreased serum phosphorus may indicate digestive inflammation

**Calcium/Albumin Ratio:** elevated in malnutrition or visceral protein loss.

Levels higher than 2.7 is one of the four **OMINOUS** signs

## GLOBULIN

**Globulin:** Globulins have many diverse functions such as, the carrier of some hormones, lipids, metals, and antibodies. High levels are found in chronic infections, liver disease, rheumatoid arthritis, myelomas and lupus. Lower levels may be seen in immune compromised patients, poor dietary habits, malabsorption, liver and kidney disease.

**Clinical Adult Range:** 2.0-4.0

**Optimal Adult Range:** 2.8-3.5

**Red Flag Range** <2.0 g/dL or >3.5 g/100ml

**Common Causes of Globulin Increase:** Hypochlorhydria, liver disease (infection)

**Less Common Causes of Globulin Increase:** liver parasites, multiple myeloma, rheumatoid arthritis, typhoid fever

**Common Causes of Globulin Decrease:** Anemia, hemorrhage

**Clinical Note:** Anytime the total globulin is less than 2.0 or greater than 3.5 a Serum Protein Electrophoresis

## A/G RATIO

**A/G Ratio:** is an important indicator of disease states. Low ratio suggests ulcerative colitis, burns, kidney disease, cirrhosis, multiple myeloma.

A/G ratio less than 1.0 is one of the four **OMINOUS** signs

**Clinical Adult Range:** 1.1-2.5

**Optimal Adult Range:** 1.2-1.5

**Red Flag Range** <1.0

**Nutrition Note:** Elevated A/G ratio, elevated protein and an elevated cholesterol may indicate too high protein consumption

## ALKALINE PHOSPHATASE

**Alkaline Phosphatase:** Alkaline phosphatase is an enzyme that is found in all body tissue, but the most important sites are bone, liver, bile ducts and the gut. A high level of alkaline phosphatase in your blood may indicate bone, liver or bile duct disease. Certain drugs may also cause high levels. Growing children, because of bone growth, normally have a higher level than adults do. Low levels indicate low functioning adrenal glands, protein deficiency, malnutrition or more commonly, a deficiency in zinc.

**Clinical Adult Range:** 30-115

**Optimal Adult Range:** 60-80

**Red Flag Range** <30U/L or >Laboratory range

**Common Causes of Alkaline Phosphatase Increase:** Primary bone lesion, invasive liver lesion, biliary duct (liver) obstruction, osteomalacia, paget's disease, rheumatoid arthritis

**Less Common Causes of Alkaline Phosphatase Increase:** Excess ingestion of Vitamin D, rickets, Cirrhosis of liver, adrenal hyper-function, shingles, hodgkin's disease, osteogenic sarcoma, alcoholism, multiple myeloma, jaundice

**Common Causes of Alkaline Phosphatase Decrease:** Anemia, Hypothyroidism, celiac disease

**Less Common Causes of Alkaline Phosphatase Decrease:** Adrenal hypo-function, vitamin C deficiency, progesterone deficiency

**Nutrition Note:** Alkaline Phosphatase levels below 70 U/L may indicate a Zinc Deficiency

**Clinical Note:** Any patient having a significant increase in Alkaline Phosphatase should have a ALP isoenzyme

**Clinical Note:** It is considered “NORMAL” for Alkaline Phosphatase to be elevated in children under 18 and people with bone fractures.

## SGPT/ALT & SGOT/AST

**Transaminases (SGTP/ALT) & (SGOT/AST):** These are enzymes that are primarily found in the liver. Drinking too much alcohol, certain drugs, liver disease and bile duct disease can cause high levels in the blood. Hepatitis is another problem that can raise these levels. Low levels of GGT may indicate a magnesium deficiency. Low levels of SGPT and SGOT may indicate deficiency of vitamin B6.

**Clinical Adult Range:** 0-41

**Optimal Adult Range:** 18-26

**Red Flag Range** >100 U/L

**SGOT/AST** is found in the heart, skeletal muscles, brain, liver and kidneys

**Clinical Note:** In acute congestive heart failure and/or myocardial infarction, the SGOT/AST will significant increase. However, these values will slowly return to normal. SGPT/ALT will also increase in these cardiac heart emergencies, however, SGOT/AST normally will not return to normal as quick as SGPT

**Common Causes of SGOT/AST Increase:** Myocardial Infarction, pulmonary embolism, congestive heart failure, myocarditis

**Other Common Causes of SGOT/AST Increase:** Hepatitis, liver cirrhosis, liver disease, pancreatitis

**Less Common Causes of SGOT/AST Increase:** liver neoplasm

**Nutrition Note:** Low levels of SGOT/AST and SGPT/ALT may indicate a B-6 deficiency

**SGPT/ALT** is found in the liver, kidneys, heart and skeletal muscles.

**Common Causes of SGPT/ALT Increase:** Acute hepatitis, cirrhosis of liver, mononucleosis

**Less Common Causes of SGPT/ALT Increase:** Pancreatitis, biliary dysfunction, diabetes

**Clinical Note:** SGPT values are greater than SGOT in liver obstruction, toxic hepatitis. SGOT values are greater than SGPT in cirrhosis of the liver, liver neoplasms and jaundice

## GGT

**Gamma-Glutamyl transerase (GGT):** Believed to be involved in the transport of amino acids into cells as well as glutathione metabolism. Found in the liver and will rise with alcohol use, liver disease, or excess magnesium.

**Clinical Adult Range:** 0-55U/L

**Optimal Adult Range:** 10-30U/L

**Red Flag Range** >90U/L

**Common Causes of GGT Increase:** Biliary obstruction, alcoholism, cholangitis/cholecystitis (bile duct and gall bladder inflammation)

**Clinical Note:** If GGT is greater than 150 U/L with a serum bilirubin of over 2.8 mg/dL, strongly suspect biliary obstruction. Seek immediate medical attention

**Clinical Note:** If GGT values are five times higher than the clinical range suspect pancreatitis

**Less Common Causes of GGT Increase:** Brucellosis, hepatitis, mononucleosis, bacterial and viral infection, malignancy, congestive heart failure biliary.

**Nutrition Note:** Low levels of GGT may indicate a B-6 deficiency.

**Additional Clinical Notes:** Food allergy/sensitivity is a very common finding with biliary dysfunction

## LDH

**Lactate Dehydrogenase (LDH):** LDH is an enzyme found in all tissues in the body. A high level in the blood can result from a number of different diseases such as hepatitis, anemia etc. Also, slightly elevated levels in the blood are common and usually do not indicate disease. The most common sources of LDH are the heart, liver, muscles, and red blood cells.

**Clinical Adult Range:** 60-225U/L

**Optimal Adult Range:** 140-200U/L

**Red Flag Range** >250U/L

**Common Causes of LDH Increase:** Liver/biliary dysfunction, pulmonary embolism, myocardial infarction, tissue inflammation, tissue destruction, malignancy anywhere in the body, several types of anemias

**Clinical Note:** LDH will frequently increase with low thyroid function

**Clinical Note:** LDH is frequently increased with birth control usage



**Nutrition Note:** Decrease LDH may indicate reactive hypoglycemia. (Check glucose)

## TOTAL PROTEIN

**Total Protein:** This is a measure of the total amount of protein in your blood. Total protein is the combination of albumin and total globulin and is affected by the albumin and total globulin. A low or high total protein does not indicate a specific disease, but it does indicate that some additional tests may be required to determine if there is a problem.

**Clinical Adult Range:** 6.0-8.5g/dL

**Optimal Adult Range:** 7.1-7.6g/dL

**Red Flag Range** <5.9g/dL or > 8.5g/dL

**Common Causes of Protein Increase:** Dehydration, "early" carcinoma, multiple myeloma (should be correlated with serum protein electrophoresis)

**Less Common Causes of Protein Increase:** malignancy, diabetes, rheumatoid arthritis

**Common Causes of Protein Decrease:** Protein malnutrition, digestive inflammation (colitis, gastritis)

**Less Common Causes of Protein Decrease:** hypothyroidism, leukemia, adrenal hyper-function, congestive heart failure

**Nutrition Note:** If protein and calcium are found to be on the low side of the optimal range suspect poor protein absorption.

**Additional Nutrition Notes:** Decreased protein, cholesterol and SGPT may indicate fatty liver congestion

## IRON

**Iron:** The body must have iron to make hemoglobin and to help transfer oxygen to the muscle. If the body is low in iron, all body cells, particularly muscles in adults and brain cells in children, do not function up to par. If this test is low you should consider getting a Ferritin test, especially if you are a female who still has menstrual cycles.

**Clinical Adult Range:** 40-150ug/ml

**Optimal Adult Range:** 50-100ug/ml

**Red Flag Range** <25ug/ml or >200ug/ml

**Common Causes of Iron Increase:** Hemochromatosis, liver dysfunction, iron therapy, pernicious and hemolytic anemia

**Less Common Causes of Iron Increase:** cooking with iron utensils

**Common Causes of Iron Decrease:** Pathologic bleeding (especially in geriatric population), iron deficiency anemia

**Less Common Causes of Protein Decrease:** chronic infections, kidney and liver problems

**Nutrition Note:** Increased iron with decreased hemocrit (HCT) suggests intrinsic factor deficiency

**Clinical Notes:** An iron evaluation is not complete without ordering Ferritin (see below)

## FERRITIN

**Ferritin:** This test is considered the "gold standard" in documenting iron deficiency anemia. Low levels below 25 indicate a need for iron. High levels may indicate an inflammatory disorder, infections, rheumatoid arthritis, chronic kidney disease

**Clinical Male Adult Range:** 33-236ng/mL

**Clinical Female Adult Range (before menopause):** 11-122ng/mL

**Clinical Female Adult Range (after menopause):** 12-263ng/mL

**Optimal Male Adult Range:** 20-200ng/mL

**Optimal Female Adult Range (before menopause):** 10-110ng/mL

**Optimal Female Adult Range(after menopause):** 20-200ng/mL

**Red Flag Range** <8ng/mL or >500ng/mL

**Common Causes of Ferritin Increase:** Iron overload, hemochromatosis

**Less Common Causes of Ferritin Increase:** inflammation, liver disease, rheumatoid arthritis

**Common Causes of Ferritin Decrease:** Iron deficiency anemia

**Less Common Causes of Ferritin Decrease:** Free radical pathology

**Clinical Notes:** Serum ferritin greater than 1000 suspect hemochromatosis

**Clinical Notes:** Iron overload and/or hemochromatosis are silent and can result in cirrhosis of the liver, bacterial infections, dementia, arteriosclerosis, diabetes and stroke

**Nutrition Note:** Doctors specializing in chelation have found a correlation with increased iron and arteriosclerosis.

## TRIGLYCERIDES

**Triglycerides:** These are fats used as fuel by the body, and as an energy source for metabolism. Increased levels are almost always a sign of too much carbohydrate intake and hyperlipidism. Decreased levels are seen in hyperthyroidism, malnutrition and malabsorption.

**Clinical Adult Range:** 50-150mg/dL  
**Optimal Adult Range:** 70-110mg/dL  
**Red Flag Range** <35mg/dL or >350mg/dL

**Common Causes of Triglycerides Increase:** Hyperlipidism, diabetes, alcoholism

**Less Common Causes of Triglycerides Increase:** Hypothyroidism, early stages of fatty liver

**Common Causes of Triglycerides Decrease:** chemical/heavy metal overload, liver dysfunction, hyper thyroid function

**Clinical Notes:** Resistive exercise training has been found to be effective in lowering elevated triglycerides

## CHOLESTEROL

**Cholesterol:** Group of fats vital to cell membranes, nerve fibers and bile salts, and a necessary precursor for the sex hormones. High levels indicate diet high in carbohydrates/sugars. Low levels indicate low fat diet, malabsorption, anemia, liver disorders, carbohydrate sensitivity. Cholesterol values below 140 are considered one of the four OMINOUS signs.

**Clinical Adult Range:** 120-200mg/dL  
**Optimal Adult Range:** 150-180mg/dL  
**Red Flag Range** <50mg/dL or >400mg/dL

**Common Causes of Cholesterol Increase:** Early stages of diabetes, fatty liver, arteriosclerosis, hypothyroidism

**Less Common Causes of Cholesterol Increase:** biliary obstruction, multiple sclerosis, pregnancy

**Common Causes of Cholesterol Decrease:** Liver dysfunction, chemical/heavy metal overload, hyperthyroidism, viral hepatitis, free radical pathology

**Nutrition Note:** Increased cholesterol levels have been found to be lowered by the amino acid methionine

**Clinical Notes:** Cholesterol level below 130 is considered an Ominous sign

**Clinical Notes:** If cholesterol is above 220 with a SGPT below 10 suspect liver congestion/fatty liver

## LDL CHOLESTEROL

**LDL Cholesterol:** LDL is the cholesterol rich remnants of the lipid transport vehicle VLDL (very-low density lipoproteins) there have been many studies to correlate the association between high levels of LDL and arterial arteriosclerosis.

**Clinical Adult Range:** <130mg/dL

**Optimal Adult Range:** <120mg/dL

**Red Flag Range** >180mg/dL

**Common Causes of Cholesterol LDL Increase:** Arteriosclerosis, diabetes, Syndrome X

**Nutrition Note:** Increased cholesterol levels have been found to be lowered by the amino acid methionine

## HDL

**HDL (High Density Lipoprotein):** HDL or High-density lipoprotein is the cholesterol carried by the alpha lipoproteins. A high level of HDL is an indication of a healthy metabolic system if there is no sign of liver disease or intoxication. The two mechanisms that explain how HDL offers protection against chronic heart disease are that HDL inhibits cellular uptake of LDL and serves as a carrier that removes cholesterol from the peripheral tissues and transports it back to the liver for **catabolism**.

**Clinical Adult Males Range:** >50mg/dL

**Clinical Adult Female Range:** >55mg/dL

**Optimal Adult Male Range:** >55mg/dL

**Optimal Adult Male Range:** >60mg/dL

**Red Flag Range** <35mg/dL

**Common Causes of HDL Cholesterol Decrease:** Arteriosclerosis, diabetes, Syndrome X

**Less Common Causes of HDL Cholesterol Decrease:** Cigarette smoking, steroids, beta-blockers

**Nutrition Note:** Diets high in refined carbohydrates, lack of exercise and genetic predisposition have been found to lower HDL

**Clinical Notes:** If HDL is decreased, triglycerides are greater than 50% of the cholesterol value, LDL is increased and uric acid is increased rule out arteriosclerosis

## CHOLESTEROL/HDL RATIO

**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.

## CO2

**CO2:** The CO2 level is related to the respiratory exchange of carbon dioxide in the lungs and is part of the body's buffering system. Generally, when used with the other electrolytes, carbon dioxide levels indicate pH or acid/alkaline balance

in the tissues. This is one of the most important tests that we measure. Most people have too much acid in their body. If you garden you will know that it is very difficult to grow plants in soil where the pH is incorrect. Our blood is similar to soil in many respects and it will be difficult to be healthy if our body's pH is not well balanced.

**Clinical Adult Range:** 24-32mmol/L

**Optimal Adult Range:** 26-30mmol/L

**Red Flag Range** <18mmol/L or >38mmol/L

**Common Causes of CO<sub>2</sub> Increase:** Alkalosis, hypochlorhydria

**Less Common Causes of CO<sub>2</sub> Increase:** acute vomiting, fever, adrenal hyperfunction, emphysema (respiratory distress)

**Common Causes of CO<sub>2</sub> Decrease:** Acidosis

**Less Common Causes of CO<sub>2</sub> Decrease:** Diabetes, sleep apnea, severe diarrhea

**Nutrition Note:** Low levels of CO<sub>2</sub> may indicate a need for thiamine (a B-vitamin)

**Clinical Notes:** If CO<sub>2</sub> is above 32mmol/L, a Pulmonary Function Test should be warranted

## WHITE BLOOD CELLS

**White Blood Cell (WBC):** White blood count measures the total number of white blood cells in a given volume of blood. Since WBCs kill bacteria, this count is a measure of the body's response to infection.

**Clinical Adult Range:** 4,500-11,000cu.mm

**Optimal Adult Range:** 5,000-8,000cu.mm

**Red Flag Range** <3,000cu.mm or >13,000cu.mm

**Common Causes of WBC Increase:** Active Infections, Leukemia, Childhood diseases (measles, mumps, chicken-pox, rubella, etc.)

**Less Common Causes of WBC Increase:** asthma, emphysema, adrenal dysfunction, intestinal parasites, severe emotional stress

**Common Causes of WBC Decrease:** Chronic Viral or Bacterial Infections, Lupus (SLE)

**Less Common Causes of WBC Decrease:** Hepatitis, Immune dysfunction, Chemical/Heavy metal toxicity

**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 in conjunction with a lymphocyte count below 20 and serum albumin below 4.0 is a pattern frequently seen in a developing neoplasm (tumor)

## NEUTROPHILS

**Neutrophils:** elevated in acute infection

**Clinical Adult Range:** 35-65 percent of total WBC

**Optimal Adult Range:** 40-60 percent of total WBC

**Red Flag Range** <30 percent of total WBC or >80 percent of total WBC

**Common Causes of Neutrophils Increase:** see WBC

**Common Causes of WBC Decrease:** see WBC

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

## MONOCYTES

**Monocytes:** elevated in bacterial infections, protozoal infections

**Clinical Adult Range:** 0-10 percent of total WBC

**Optimal Adult Range:** <7 percent of total WBC

**Red Flag Range** >15 percent of total WBC

**Common Causes of Monocytes Increase:** Bacterial Infections, parasitic infections

**Common Causes of WBC Decrease:** high doses of corticosteroids will depress monocytes

**Clinical Notes:** Increased monocytes are frequently present with prostate hypertrophy, ovarian and uterine dysfunction

**Clinical Notes:** An increase in monocytes with an increase in the basophils (>1.0) and a mild increase of eosinophils (>3.0) may indicate intestinal parasites

## LYMPHOCYTES

**Lymphocytes:** elevated in acute and chronic infections. Decreased in viral infection and immune deficiency

**Clinical Adult Range:** 20-40 percent of total WBC

**Optimal Adult Range:** 25-40 percent of total WBC

**Red Flag Range** <20 percent of total WBC or >55 percent of total WBC

**Common Causes of Lymphocytes Increase:** Chronic viral or bacterial infection, Childhood diseases (measles, mumps, chicken-pox, rubella, etc.), HIV, Hepatitis

**Less Common Causes of Lymphocytes Increase:** Chemical/heavy metal toxicity

**Common Causes of Lymphocytes Decrease:** Active infections

**Clinical Notes:** Suspect a viral infections when the lymphocytes increase to a point that either equal or exceeds the neutrophil level

## EOSINOPHILS

**Eosinophils:** Elevated in allergic conditions, skin diseases, parasitic diseases

**Clinical Adult Range:** 0-7 percent of total WBC

**Optimal Adult Range:** 0-3 percent of total WBC

**Red Flag Range** <20 percent of total WBC or >55 percent of total WBC

**Common Causes of Eosinophils Increase:** Allergic condition (asthma), food sensitivities, parasitic infection

**Less Common Causes of Eosinophils Increase:** Chemical/heavy metal toxicity, Hodgkin's disease, ovarian and bone tumors

## BASOPHILS

**Basophils:** Elevated in Infections

**Clinical Adult Range:** 0-2 percent of total WBC

**Optimal Adult Range:** 0-1 percent of total WBC

**Red Flag Range** <5 percent of total WBC

**Common Causes of Basophils Increase:** Inflammation, Childhood diseases (measles, mumps, chicken-pox, rubella, etc.), acute trauma and parasites

**Less Common Causes of Basophils Increase:** Chemical/heavy metal toxicity

**Clinical Notes:** Symptoms of inflammation in the absence of trauma may indicate a need to order C-Reactive Protein and/or a Sed rate

**Clinical Notes:** Consider ordering a comprehensive stool and digestive test to rule out intestinal parasites if the basophils are increased with no sign of inflammation

## RED BLOOD CELLS

**RBC (Red Blood Cells):** made in the spleen. Reveals the oxygen carrying ability of the blood.

**Clinical Adult Male Range:** 4.60-6.0 million cu/mm

**Clinical Adult Female Range:** 3.90-5.50 million cu/mm

**Optimal Adult Male Range:** 4.20-4.90 million cu/mm

**Optimal Adult Female Range:** 3.90-4.50 million cu/mm

**Red Flag Range for Men** <3.90 or >6.00 million cu/mm

**Red Flag Range for Women** <3.50 or >5.00 million cu/mm

**Common Causes of RBC Increase:** Polycythemia, dehydration, Respiratory Distress (asthma, emphysema)

**Less Common Causes of RBC Increase:** acute poisoning, cystic fibrosis, adrenal hyperfunction

**Common Causes of RBC Decrease:** Iron deficiency anemia, internal bleeding

**Less Common Causes of RBC Decrease:** Excessive exercise, salicylate toxicity, lead poisoning

**Nutrition Tip:** Low levels of RBC may indicate a need for B-12, B-6 and folic acid

**Clinical Notes:** Consider checking iron and ferritin levels with low levels of RBC

## HEMOGLOBIN

**Hemoglobin:** Hemoglobin provides the main transport of oxygen and carbon in the blood. It is composed of "globin", a group of amino acids that form a protein and "heme", which contains iron. It is an important determinant of anemia (decreased hemoglobin) or poor diet/nutrition or malabsorption.

**Clinical Adult Male Range:** 13.5-18.0g/dL

**Clinical Adult Female Range:** 12.5-16.0g/dL

**Optimal Adult Male Range:** 14.0-15.0g/dL

**Optimal Adult Female Range:** 13.5-14.5g/dL

**Red Flag Range** <10.0 or >17g/dL

**Common Causes of Hemoglobin Increase:** Polycythemia, dehydration, emphysema, asthma

**Common Causes of Hemoglobin Decrease:** Anemia, internal bleeding, digestive inflammation

**Nutrition Tip:** Low levels of Hemoglobin may indicate a need for B-12, folic acid and thiamine



**Clinical Notes:** Consider checking iron and ferritin levels with low levels of Hemoglobin

## HEMATOCRIT

**Hematocrit:** Hematocrit is the measurement of the percentage of red blood cells in whole blood. It is an important determinant of anemia (decreased), dehydration (elevated) or possible overhydration (decreased).

**Clinical Adult Male Range:** 40.0-52.0 percent

**Clinical Adult Female Range:** 36.0-47.0 percent

**Optimal Adult Male Range:** 40.0-48.0 percent

**Optimal Adult Female Range:** 37.0-44.0 percent

**Red Flag Range** <32.0 or >55 percent

**Common Causes of Hematocrit Increase:** same as hemoglobin

**Common Causes of Hematocrit Decrease:** same as hemoglobin

**Clinical Notes:**

- Suspect Iron anemia if serum iron, hemoglobin and hemocrit are all low
- Suspect B-6 anemia if MCT, hemocrit and iron are low (also look for a low SGOT)
- Suspect B12/folic acid anemia if you have a low hemocrit with a high MCH, MCV and iron

**Clinical Notes:** Consider getting a ferritin test

## PLATELETS

**Platelets:** Platelets are concerned with the clotting of the blood.

**Clinical Adult Range:** 150,000-450,000cu.mm

**Optimal Adult Range:** 200,000-300,000cu.mm

**Red Flag Range** <50,000 or >600,000cu.mm

**Common Causes of Platelets Increase:** Polycythemia, inflammatory arthritis, several types of anemia, arteriosclerosis, acute blood loss

**Common Causes of Platelets Decrease:** Leukemia, liver dysfunction

**Less Common Causes of Platelets Decrease:** Chemical/heavy metal toxicity

**Nutrition Tip:** Low levels of Platelets may indicate a B12, folic, selenium and iron deficiency

**Clinical Notes:** The following drugs have been found to lower Platelets: quinidine, heparin, gold salts, sulfas, digitoxin

## RETICULOCYTE COUNT

**Reticulocyte Count** This is an excellent test to confirm chronic microscopic bleeding

**Clinical Adult Range:** 0.5-1.5%

**Optimal Adult Range:** same as clinical range

**Red Flag Range** >2.0%

**Common Causes of Reticulocyte Count Increase:** Internal bleeding

**Common Causes of Reticulocyte Count Decrease:** Vitamin b-12, B-6 and folic acid anemia

## MCV

**Mean Corpuscular Volume (MCV)** The MCV indicates the volume occupied by the average red blood cell

**Clinical Adult Range:** 81.0-99.0cu.microns

**Optimal Adult Range:** 82.0-89.9cu.microns

**Red Flag Range** <78.0 or >95.0cu.microns

**Common Causes of MCV Count Increase:** Vitamin B-12/Folic Acid Anemia

**Common Causes of MCV Count Decrease:** Iron anemia, internal bleeding

**Clinical Notes:** If the MCV is >89.9 and the MCH is >31.9, suspect Vitamin B-12 or folic anemia. This should be confirmed with a serum or urinary methylmalonic (vitamin B-12) and a serum or urinary homocysteine (folic acid and vitamin B-6)

**Clinical Notes:** If iron, ferritin are normal and MCV, MCH, Hemoglobin and Hematocrit are all decreased, suspect a toxic metal body burden

## MCH

**Mean Corpuscular Hemoglobin (MCH)** The MCV indicates the volume occupied by the average red blood cell

**Clinical Adult Range:** 26.0-33.0micro-micro grams

**Optimal Adult Range:** 27.0-31.9micro-micro grams

**Red Flag Range** <24.0 or >34.0micro-micro grams

**Common Causes of MCV Count Increase:** Vitamin B-12/Folic Acid Anemia

**Common Causes of MCV Count Decrease:** Iron anemia, internal bleeding

**Clinical Notes:** If the MCV is >89.9 and the MCH is >31.9, suspect Vitamin B-12 or folic anemia. This should be confirmed with a serum or urinary methylmalonic (vitamin B-12) and a serum or urinary homocysteine (folic acid and vitamin B-6)

**Clinical Notes:** If iron, ferritin are normal and MCV, MCH, Hemoglobin and Hematocrit are all decreased, suspect a toxic metal body burden

## T3

**T3 (Tri-Iodothyronine):** T-3 is a thyroid hormone produced mainly from the peripheral conversion of thyroxine (T-4)

**Clinical Adult Range:** 22-33%

**Optimal Adult Range:** 26-30%

**Common Causes of T3 Increase:** Hyperthyroidism

**Common Causes of T3 Decrease:** Hypothyroidism

## T4

**T-4 (Tetra-Iodothyronine):** T-4 is the major hormone secreted by the thyroid gland.

**Clinical Adult Range:** 4.0-12.0mcg/dL

**Optimal Adult Range:** 7.0-8.5mcg/dL

**Common Causes of T4 Increase:** Hyperthyroidism

**Common Causes of T3 Decrease:** Hypothyroidism, anterior pituitary hypofunction

## T7

**T7 (FTI-Free Thyroxine Index)** FTI is an estimate, calculated from T-4 and T-3 uptake.

**Clinical Adult Range:** 4.0-12.0mcg/dL

**Optimal Adult Range:** 7.0-8.5mcg/dL

**Common Causes of T7 Increase:** See T-3 uptake

**Common Causes of T3 Decrease:** See T-3 uptake

## T-3 UPTAKE

**T-3 Uptake** T-3 uptake measures the unsaturated binding sites on the thyroid binding proteins

**Clinical Adult Range:** 22-36%

**Optimal Adult Range:** 27-37%

**Red Flag Range** <20 percent of uptake or >39 percent of uptake

**Common Causes of T-3 Uptake Increase:** Thyroid hyperfunction

**Less Common Causes of T-3 Uptake Increase:** Kidney dysfunction, salicylates toxicity and protein malnutrition

**Common Causes of T3 Decrease:** Thyroid hypo-function

## TSH

**TSH (Thyroid Stimulating Hormone):** is used to confirm or rule out suspected hypothyroidism when T3, T4, T7 are essentially normal and clinical signs suggest hypothyroidism

**Clinical Adult Range:** 0.4-4.4mIU/L

**Optimal Adult Range:** 2.0-4.0mIU/L

**Red Flag Range** <0.3mIU/L or >10.0mIU/L

**Common Causes of TSH Increase:** Thyroid hypofunction

**Less Common Causes of TSH Increase:** liver dysfunction

**Common Causes of TSH Decrease:** Thyroid hyper-function, anterior hypo-function

**Clinical Notes:** The axillary temperature (underarm) will frequently be <97.8 with thyroid hypo-function. The axillary temperature should be taken for 10 minutes before leaving bed and ideally should be taken for five days in a row and averaged. Reduced axillary temperature is common with adrenal stress, thiamine deficiency, diets low in essential fatty acids and protein malnutrition

**Clinical Notes:** Difficulty losing weight, fatigue, lack of motivation, sensitivity to cold, dry or scaly skin, ringing in ears, low blood pressure, impaired hearing, constipation, difficulty working under pressure and headaches that start in the morning but improve during the day.

## ESR

**ESR (Erythrocyte Sedimentation Rate):** documents if organic disease is truly present in patients with vague symptoms. Monitors the course of chronic inflammatory conditions. Elevated in patients with breakdown of tissue

**Clinical Adult Male <50 Range:** 0-15mm/hour

**Clinical Adult Male >50 Range:** 0-20mm/hour

**Clinical Adult Male <50 Range:** 0-25mm/hour

**Clinical Adult Female >50 Range:** 0-30mm/hour

**Optimal Adult Male Range:** <5mm/hour

**Optimal Adult Female Range:** <10mm/hour

**Red Flag Range** >45 mm/hour

**Common Causes of ESR Increase:** Tissue Inflammation

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## Information for purchaser of this manual

I hope you have found value in “**How to Quickly and Easily Understand Your Blood Tests Without A Medical Degree.**”

This digital book will be periodically updated providing you the owner of the manual the opportunity to continue to learn about your blood tests.

If you have enjoyed this book, I would encourage you to take a look at my website [www.YourMedicalDetective.com](http://www.YourMedicalDetective.com)

**YourMedicalDetective.com** is a private, members-only, resource for those serious about knowing all their healthcare options.

Within the private, members-only area, you'll find a comprehensive source of in-depth "peer-reviewed" alternative medical solutions on most health conditions including back pain, depression, weight loss, anxiety, heart disease, fibromyalgia, diabetes and much more.

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If you are looking for real answers on your health problem, then I am happy to say that you will be excited about my site.

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Take care,

Dr. Grisanti