

This Report on Lab Results has been specially created for :  
**Ima Hungry**



***Lab Report Created By:***

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# Your Lab Testing Results - Quickview

**Patient Name :** Ima Hungry

**Date :** October 30, 2015

**Clinical Lab Ranges:** A Clinical High or Clinical Low lab result is indicating a more severe level of imbalance resulting in some type of disease or condition, and will often result in a clinical diagnosis. The clinical ranges may vary slightly when comparing one lab to another.

**Functional Lab Ranges:** A Functional High or Functional Low lab result is indicating an imbalance that is not yet severe enough to be given a clinical diagnosis, but the imbalance may change function enough to cause symptoms or health problems. **We will often want to address this functional imbalance before it becomes a more severe health problem.** The functional lab ranges are the commonly accepted ranges based on the experience of doctors who specialize in functional lab testing. These functional ranges may vary slightly from one specialist to another.

Lab Test	Current Lab Results on Oct 30, 2015	Clinical Low	Functional Low	Optimal	Functional High	Clinical High
Glucose, Serum	80	0 - 64	65 - 79	80 - 94	95 - 99	100 or higher
Hemoglobin A1c	5.0	0.0 - 4.7	4.8 - 5.1	5.2 - 5.6	5.7 - 5.9	6.0 or higher
Uric Acid, Serum	4.6	0.0 - 3.6	NA	3.7 - 5.7	5.8 - 8.6	8.7 or higher
BUN	10	0 - 5	6 - 9	10 - 20	21 - 24	25 or higher
Creatinine, Serum	0.65	0.00 - 0.56	0.57 - 0.74	0.75 - 0.95	0.96 - 1.00	1.01 or higher
eGFR	127	0 - 59	60 - 89	90 - 140	NA	NA
BUN/Creatinine Ratio	15	0 - 5	6 - 9	10 - 19	20 - 23	24 or higher
Sodium, Serum	137	0 - 133	134 - 135	136 - 141	142 - 144	145 or higher
Potassium, Serum	4.5	0.0 - 3.4	3.5 - 3.9	4.0 - 4.6	4.7 - 5.2	5.3 or higher
Chloride, Serum	99	0 - 96	97 - 99	100 - 105	106 - 108	109 or higher
Carbon Dioxide, Total	22	0 - 18	19 - 23	24 - 28	NA	29 or higher
Calcium, Serum	9.4	0.0 - 8.6	8.7 - 9.1	9.2 - 10.2	NA	10.3 or higher
Phosphorus, Serum	2.8	0.0 - 2.4	2.5 - 2.9	3.0 - 4.0	4.1 - 4.5	4.6 or higher
Magnesium, Serum	1.9	0.0 - 1.5	1.6 - 2.0	2.1 - 2.6	NA	2.7 or higher
Protein, Total, Serum	6.7	0.0 - 5.9	6.0 - 6.9	7.0 - 8.0	8.1 - 8.5	8.6 or higher
Albumin, Serum	4.5	0.0 - 3.4	3.5 - 3.9	4.0 - 5.0	5.1 - 5.5	5.6 or higher
Globulin, Total	2.2	0.0 - 1.4	1.5 - 2.2	2.3 - 3.2	3.3 - 4.5	4.6 or higher
A/G Ratio	2.0	0.0 - 1.0	1.1 - 1.4	1.5 - 2.0	2.1 - 2.5	2.6 or higher
Bilirubin, Total	0.3	NA	NA	0.0 - 1.2	NA	1.3 or higher
Alkaline Phosphatase	62	0 - 38	39 - 59	60 - 90	91 - 117	118 or higher
LDH	172	NA	0 - 119	120 - 180	181 - 214	215 or higher
AST (SGOT)	20	NA	0 - 14	15 - 30	31 - 40	41 or higher
ALT (SGPT)	19	NA	0 - 14	15 - 30	31 - 55	56 or higher

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GGT	22	NA	0 - 14	15 - 30	31 - 60	61 or higher
Iron Bind. Cap. (TIBC)	345	0 - 249	NA	250 - 350	351 - 450	451 or higher
UIBC	227	0 - 149	150 - 199	200 - 300	301 - 375	376 or higher
Iron, Serum	118	0 - 34	35 - 79	80 - 125	126 - 155	156 or higher
Iron Saturation	34	0 - 14	15 - 19	20 - 40	41 - 55	56 or higher
Ferritin, Serum	167	0 - 30	31 - 79	80 - 250	251 - 400	401 or higher
Cholesterol, Total	178	0 - 99	100 - 154	155 - 199	NA	200 or higher
Triglycerides	68	NA	0 - 74	75 - 100	101 - 149	150 or higher
HDL Cholesterol	62	0 - 39	40 - 59	60 - 80	81 - 99	100 or higher
VLDL Cholesterol	14	NA	NA	0 - 30	31 - 40	41 or higher
LDL Cholesterol	102	NA	NA	0 - 99	100 - 129	130 or higher
T. Chol/HDL Ratio	2.9	NA	NA	0.0 - 2.5	2.6 - 4.4	4.5 or higher
C-Reactive Protein, Cardiac	1.35	NA	NA	0.00 - 0.99	1.00 - 3.00	3.01 or higher
Homocysteine, Plasma	5.7	NA	NA	0.0 - 8.9	9.0 - 15.0	15.1 or higher
TSH	0.734	0.000 - 0.449	0.450 - 0.999	1.000 - 2.500	2.501 - 4.500	4.501 or higher
Thyroxine (Total T4)	6.5	0.0 - 4.4	4.5 - 5.9	6.0 - 12.0	NA	12.1 or higher
T3 Uptake	25	0 - 23	24 - 26	27 - 37	38 - 39	40 or higher
Free Thyroxine Index	1.6	0.0 - 1.1	NA	1.2 - 4.9	NA	5.0 or higher
Triiodothyronine (Total T3)	127	0 - 70	71 - 98	99 - 180	NA	181 or higher
Triiodothyronine, Free, Serum (Free T3)	3.3	0.0 - 1.9	2.0 - 2.9	3.0 - 3.8	3.9 - 4.4	4.5 or higher
Reverse T3, Serum	16.7	NA	NA	0.0 - 19.9	20.0 - 24.1	24.2 or higher
T4, Free (Direct)	1.08	0.00 - 0.81	0.82 - 1.02	1.03 - 1.56	1.57 - 1.77	1.78 or higher
Thyroid Peroxidase (TPO) Ab	5	NA	NA	0 - 19	20 - 34	35 or higher
Thyroglobulin Antibody (if <1.0 enter 0.9)	0.0	NA	NA	0.0 - 0.9	NA	1.0 or higher
Vitamin D, 25-Hydroxy	26.1	0.0 - 29.9	30.0 - 59.9	60.0 - 80.0	80.1 - 100.0	100.1 or higher
Fibrinogen Activity	346	0 - 192	NA	193 - 399	400 - 507	508 or higher
WBC	7.3	0.0 - 3.3	3.4 - 4.4	4.5 - 7.5	7.6 - 10.8	10.9 or higher
RBC	4.44	0.00 - 3.76	3.77 - 4.09	4.10 - 4.70	4.71 - 5.28	5.29 or higher
Hemoglobin	14.0	0.0 - 11.0	11.1 - 13.4	13.5 - 15.5	15.6 - 15.9	16.0 or higher
Hematocrit	42.6	0.0 - 33.9	34.0 - 36.9	37.0 - 46.6	NA	46.7 or higher

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MCV	96	0 - 78	79 - 83	84 - 92	93 - 97	98 or higher
MCH	31.5	0.0 - 26.5	26.6 - 27.9	28.0 - 32.0	32.1 - 33.0	33.1 or higher
MCHC	32.9	0.0 - 31.4	31.5 - 32.5	32.6 - 34.6	34.7 - 35.7	35.8 or higher
RDW	12.1	0.0 - 11.7	NA	11.8 - 13.0	13.1 - 15.4	15.5 or higher
Platelets	327	0 - 149	NA	150 - 379	NA	380 or higher
Neutrophils	63	0.0 - 39.9	40.0 - 49.9	50.0 - 60.9	61.0 - 74.9	75.0 or higher
Lymphs (Lymphocytes)	29	0.0 - 13.9	14.0 - 21.9	22.0 - 38.9	39.0 - 46.9	47.0 or higher
Monocytes	6	NA	NA	0.0 - 7.9	8.0 - 12.9	13.0 or higher
Eos (Eosinophils)	2	NA	NA	0.0 - 2.9	3.0 - 5.9	6.0 or higher
Neutrophils (Absolute)	4.7	0.0 - 1.3	1.4 - 2.8	2.9 - 5.6	5.7 - 7.0	7.1 or higher
Lymphs (Absolute)	2.1	0.0 - 0.6	0.7 - 1.3	1.4 - 2.5	2.6 - 3.1	3.2 or higher
Monocytes (Absolute)	0.5	NA	NA	0.0 - 0.6	0.7 - 0.9	1.0 or higher
Eos (Absolute)	0.1	NA	NA	0.0 - 0.4	NA	0.5 or higher
Basos (Absolute)	0.0	NA	NA	0.0 - 0.2	NA	0.3 or higher
Immature Grans (Abs)	0.0	NA	NA	0.0 - 0.1	NA	0.2 or higher
Urinalysis, Complete (1=Normal, 2=Abnormal)	2	NA	NA	0 - 1	NA	2 or higher

# Understanding Your Lab Results : A Patient Guide

This Patient Guide to your lab results has been created to give you more detailed information that a doctor or health provider may not have time to review with you in a typical office visit. Keep in mind that if you've been told by another doctor or health provider that your lab results are "normal" . . . they may have failed to offer you a more critical interpretation of your lab results. We offer you this more in-depth and critical interpretation to help you identify health problems before they become more serious. The explanations provided here will give you an expert analysis of your lab results.

## **Glucose, Serum**

Your result for this lab test is in the OPTIMAL range. Serum Glucose is a measurement to see how well your body is controlling your blood sugar levels over a shorter period of time - about the past 12 - 24 hours. Glucose is the preferred source of fuel for all the cells in your body. It is also the most important source of fuel for your brain and nervous system which has the greatest need for healthy Glucose levels because it alone consumes about 50% of the glucose in your body. Your Glucose can vary quite a bit . . . even within the same day based on what you are eating and drinking. The most reliable method for testing Serum Glucose is after doing a 12 hour fasting . . . meaning there is no eating or drinking (except water) . . . for 12 hours prior to your blood draw.

## **Hemoglobin A1c**

Your result for this lab test is in the FUNCTIONAL LOW range. Hemoglobin A1c is a measurement to see how well your body is controlling your blood sugar levels (or glucose) over a longer period of time - about the past 2 to 3 months. As glucose circulates in the blood, some of it binds to hemoglobin. Hemoglobin is part of your red blood cells and it is responsible for transporting oxygen throughout your body. Once glucose binds to hemoglobin it will remain there for the life of the red blood cell - which is about 120 days. This makes it a good measurement of what's been happening with your blood sugar levels over a longer period of time . . . in this case the past 2 to 3 months.

We are less concerned about a Hemoglobin A1c in the Functional Low range if Serum Glucose is testing in the Optimal range. When Hemoglobin A1c is in the Functional Low range - and in conjunction with a lower than optimal Serum Glucose - we become much more concerned about hypoglycemia (low blood sugar). Symptoms of hypoglycemia can include fatigue, weakness, headaches and even shakiness of the hands or body until food is eaten to feel better again. Low blood sugar can also contribute to feelings of anxiety or panic attacks. People with lower than optimal blood sugars and hypoglycemia often have "insulin resistance" . . . meaning the cells in your body have become resistant to the effect of insulin. Insulin is a hormone produced by your pancreas which helps to transport sugar from the blood and bring it into your cells to be used as energy. If your cells become resistant to the effect of insulin, then blood sugar levels will usually go higher before the body will correct this and bring these glucose levels back down . . . but the result can be bringing your levels down too fast resulting in low blood sugar or hypoglycemia. These ups and down of blood sugar, and the tendency for insulin resistance and hypoglycemia, can be the beginning of what turns into diabetes later in life.

## **Uric Acid, Serum**

Your result for this lab test is in the OPTIMAL range. Uric Acid is created in the body as a by-product of protein metabolism, or increased destruction of cells within your body. Uric Acid is removed from the body mostly by your kidneys, and this makes Uric Acid an indicator of how your kidneys are functioning. High Uric Acid can also be a strong indicator of possible inflammation within your body.

## **BUN**

Your result for this lab test is in the OPTIMAL range. BUN (or Blood Urea Nitrogen) is one of the tests to measure kidney function. As proteins are broken down in your digestive system from your diet, your liver will process and utilize these proteins and produce a waste product called Urea. This waste product (Urea) is then removed from your blood by the kidneys. BUN is a lab test that should first be correlated with other kidney function tests such as GRF and Creatinine in order to determine if there are any concerns about kidney function.

### **Creatinine, Serum**

Your result for this lab test is in the FUNCTIONAL LOW range. Creatinine is found within muscle tissue and is released into the blood stream during muscle contraction or breakdown of muscle tissue. Since almost all Creatinine is removed by the kidneys . . . testing blood levels of Creatinine is a good measure of how well the kidneys are working. Creatinine is also relative to the amount of muscle on the body, so a person with higher muscle mass will have slightly higher Creatinine levels and a person with low muscle mass will have slightly lower levels. Creatinine is derived from Creatine which is used as a source of energy in muscle contraction and is produced mostly within in the liver. Remembering the difference between Creatinine and Creatine can be confusing because the words are so similar, so it helps to understand the sequence of events leading up to Creatinine getting released into the blood. First - Creatine is made in the liver and then transported to the muscle tissue to be used as an energy source for muscle contraction. Second - Creatinine then gets released into the blood due to muscle contraction or other conditions that result in muscle tissue breakdown.

When Serum Creatinine is in the Functional Low range we must first consider if this is due to low muscle mass, such as in the elderly or in a small-framed individual. This could also be due to very low protein intake in the diet, or some type of disease or condition resulting in low muscle mass. Since Creatinine is derived from Creatine (which is produce by the liver) a low Creatinine can also indicate poor liver function and should be correlated with other liver function tests to determine a problem or disease process within the liver.

### **eGFR (Glomerular Filtration Rate)**

Your result for this lab test is in the OPTIMAL range. GFR (Glomerular Filtration Rate) is a measure of your kidney function, and the concern is when the GFR number drops too low. Within your kidneys are small clusters of blood vessels called Glomeruli which act like tiny filters in the kidneys that remove waste products out of your blood, while still keeping the good things we need to remain in your blood - like protein and red blood cells. The GFR refers to the amount of blood that is filtered by the Glomeruli per minute. As kidney function declines due to disease or damage, the rate at which your blood gets filtered by your kidneys also decreases and waste products begin to build-up in your blood.

This lab test combines your level of Creatinine with a formula that factors in your age, sex and race to determine your eGFR (estimated Glomerular Filtration Rate). Low GFR along with a high BUN (Blood Urea Nitrogen) and high Creatinine will create the greatest concern for altered kidney function and may require further evaluation with a specialist to determine the cause of abnormal kidney function or confirm the presence of kidney disease.

### **BUN/Creatinine Ratio**

Your result for this lab test is in the OPTIMAL range. The BUN/Creatinine Ratio is a measure of kidney function that compares the ratio between BUN and Creatinine. This lab test is primarily useful for those that have already been diagnosed with some type of chronic kidney dysfunction or disease. This lab test needs to be viewed in relation to other kidney function tests. Because many things can change the results for BUN and Creatinine as individual tests . . . a slightly altered BUN/Creatinine Ratio is of little

concern when other kidney function tests are normal.

### **Sodium, Serum**

Your result for this lab test is in the OPTIMAL range. Sodium is an electrolyte that helps your cells to function normally and helps to regulate the amount of fluid in your body. Sodium is regulated by your kidneys and certain hormones . . . and is strongly influenced by adrenal hormone function. We get sodium in our body through our diet. Your body will use what it needs, and the kidneys will get rid of the rest in your urine to maintain sodium levels in a very narrow range within your blood. It is more common to see sodium levels too low in blood testing versus too high.

### **Potassium, Serum**

Your result for this lab test is in the OPTIMAL range. Potassium is an electrolyte that is critical to cell metabolism and muscle function . . . including the proper function of your heart muscle. Potassium also helps to regulate the amount of fluid in your body, and helps in maintaining an acid-alkaline balance within your body. Most of the potassium in your body is located inside of your cells, but we still measure potassium levels outside of your cells (in the serum) because even small changes in serum potassium can have big consequences to how your cells are functioning. Potassium is mostly regulated in your body by your kidneys and can serve as another indicator of kidney function, but potassium is also strongly influenced by adrenal hormone function and certain medications - such as diuretics.

### **Chloride, Serum**

Your result for this lab test is in the FUNCTIONAL LOW range. Chloride is an electrolyte which helps to regulate the fluid in the body and to maintain the acid-alkaline balance in your body. Most chloride in your body is consumed through food and table salt (sodium chloride). Chloride levels will most often change in the same direction as sodium due to the relationship between the two. Chloride can also exert an effect on blood pressure, with some research indicating that higher chloride levels contribute to higher blood pressure. Chloride is also drawn from the blood and used in the production of stomach acid (hydrochloric acid) which is important for proper digestion of foods.

When Chloride levels are in the Functional Low range we become more concerned about how this is affecting the production of stomach acid and overall digestion. Chloride in the blood is one of the main elements needed for your stomach to produce hydrochloric acid. A low Chloride level could also be due to: 1) a body chemistry that is too alkaline, 2) underactive or hypo-adrenal function, and 3) the effect of some medications.

### **Carbon Dioxide, Total**

Your result for this lab test is in the FUNCTIONAL LOW range. The Total Carbon Dioxide is actually a measure of a bicarbonate molecule, and not a measure of the CO<sub>2</sub> gas in the blood since carbon dioxide occurs mostly in the form of a bicarbonate molecule. Bicarbonate in the blood is controlled primarily by the kidneys, and it helps to neutralize metabolic acids within the body and is important in maintaining the acid-alkaline balance of your body chemistry. Bicarbonate (or Total CO<sub>2</sub>) is usually ordered as part of an electrolyte panel to help understand if a person is suffering from an electrolyte imbalance and is a good general measure of the acid - alkaline balance of your body chemistry. When the Total Carbon Dioxide measurement is outside the optimal range we must first consider if this is due to a respiratory (lung) problem or a metabolic (body chemistry) problem.

When Total Carbon Dioxide is in the Functional Low range it's indicating the body chemistry is becoming more acidic. This could be due to many factors including: 1) overconsumption of acidic foods and

beverages, 2) a problem affecting the kidneys, 3) underactive or hypo-adrenal function, 4) blood sugar issues - remember that excess sugar is acidic in the body, 5) a respiratory problem that results in excess loss of CO<sub>2</sub> through the lungs, and 6) the effect of some medications.

## **Calcium, Serum**

Your result for this lab test is in the OPTIMAL range. Calcium is the most abundant mineral in the body, and the majority of the calcium in your body is stored in your bone tissue. Therefore, most people will associate calcium with bone density and preventing osteoporosis. However, calcium is involved in many other important functions of the body including muscle function, nervous system function, heart function, your immune system, blood clotting and the repair of damaged tissues, and more. Your ability to absorb calcium is highly dependent on having enough stomach acid (HCL) available during digestion, so low stomach acid can equal poor calcium absorption. Calcium levels in your blood are most greatly controlled by your parathyroid gland . . . which is a group of 4 small glands that sit on the backside of the thyroid gland (two on each side). Calcium levels are also strongly influenced by Vitamin D which helps improve the absorption of calcium from the intestines into the blood. Calcium travels in the blood in both a freely available ionized form, and in a non-available form that is bound to other proteins - most commonly albumin. This makes it important to also look at Serum Albumin levels when interpreting Serum Calcium levels. Please note that a low Serum Calcium does not automatically mean you are in need of additional calcium or that you are at risk for lower bone density, and is not a good method for tracking osteoporosis. Other factors should also be considered when interpreting Serum Calcium, such as magnesium levels, Vitamin D levels and how different hormones will influence calcium levels.

When Serum Calcium levels are HIGHER than optimal we must consider if a person is taking too much Vitamin D in supplement form. Sometimes those people on thyroid medications can have slightly elevated calcium levels. Calcium levels in the blood are very carefully controlled by the body, so if blood testing reveals Serum Calcium to be at very high levels then this indicates some other problem in the body - possible with the parathyroid gland - and this person will likely need to go to a specialist for more testing. When Serum Calcium levels are LOWER than optimal we know that this could be due to several factors, but it is safe to conclude that the body may be in need of more calcium.

## **Phosphorus, Serum**

Your result for this lab test is in the FUNCTIONAL LOW range. Phosphorus - sometimes referred to as phosphate - is vital for energy (ATP) production, muscle and nerve function, bone tissue, and in helping to maintain the acid-alkaline balance of your body chemistry. The majority of Phosphorus in your body is stored in bone tissue, and it is regulate by the parathyroid gland via parathyroid hormone. Phosphorus levels are closely connected to Calcium levels with an inverse relationship between the two . . . meaning that as Calcium levels increase Phosphorus levels will decrease and vice versa. An excess of one will cause the kidneys to excrete the other. Phosphorus is also general indicator of digestive function with lower phosphorus levels indicating low stomach acid (HCL). Phosphorus levels are normally higher in children compared to adults because their bones are actively growing.

When Serum Phosphorus is in the Functional Low range there are several factors that we must consider including: 1) Vitamin D deficiency, 2) low stomach acid, 3) other hormone imbalance, 4) diabetes or a high intake of sugars and carbohydrates, and 6) a possible a liver problem.

## **Magnesium, Serum**

Your result for this lab test is in the FUNCTIONAL LOW range. Magnesium is involved in hundreds of chemical and enzyme reactions within the body, and it's one of the most common mineral deficiencies. Magnesium is needed for many functions in the body to include: energy production, sugar metabolism,



hormone balance, balance of brain chemistry, memory, heart function, and most notably for proper muscle function. About half of your magnesium is found within the soft tissues and muscles of your body, and the rest is in bone tissue. Your body needs enough magnesium for your muscles to relax properly. People who suffer with chronic muscle tightness, or even muscle cramps – such as “charlie horses” in the foot or calf muscles waking a person up from their sleep at night – are often symptoms of a magnesium deficiency.

Magnesium not only affects the function of the skeletal muscles (the muscles that allow you to move your body), but it also affects the muscles that control your blood vessels. You have small muscles in your blood vessels that control how dilated (open) or contracted (closed) your blood vessels are. A magnesium deficiency could lead to tighter muscles in your blood vessels and result in them being more contracted (closed) and therefore higher blood pressure. Considering how common magnesium deficiency in our society is, this is likely to be one of many factors that contribute to High Blood Pressure. Taking magnesium may result in a decrease of chronically High Blood Pressure.

When Serum Magnesium is in the Functional Low range we must first consider an actual Magnesium deficiency and the body is in need of more Magnesium. Other reasons for low magnesium could include: 1) a problem with the kidneys, 2) overactive or hyper-thyroid function, 3) other hormone imbalance, 4) a liver problem, 5) poor absorption of magnesium due to a digestive problem, and 6) the effect of some medications.

### **Total Protein, Serum**

Your result for this lab test is in the FUNCTIONAL LOW range. Protein is an important building block for all the cells and tissues in your body. Protein is needed for the growth and repair of tissue, and makes up an important part of the structure of your organs, enzymes and hormones within your body. Total Protein is a measure of the two classes of proteins found within the blood called Albumin and Globulin. Albumin makes up about 60% of the Total protein, and Globulin makes up about 40%. It is important to consider the individual lab tests for Albumin and Globulin when evaluating Total Protein levels. Total Protein can be a good general indicator for liver function, kidney function and digestive problems.

When Total Protein is in a Functional Low range we must first consider if a person is not eating enough protein. Other factors that may contribute to low Total Protein include: 1) low stomach acid or low digestive enzymes, 2) digestive inflammation or other digestive problem resulting in poor absorption, 3) a liver/gall bladder problem, 4) overactive or hyper-adrenal function, 5) a problem affecting the kidneys, or 6) other hormone problem.

### **Albumin, Serum**

Your result for this lab test is in the OPTIMAL range. Albumin is a major protein found in the blood, and it is produced almost entirely within the liver. This makes Albumin a good indicator of liver function. You can think of Albumin as a “carrier protein” that helps to transport and deliver nutrients, hormones and other resources to the cells of your body so your cells can function at their best. When Albumin levels drop too low this is an indicator of poor health and possibly serious disease, because the cells of your body are no longer getting a good delivery of the important resources they need to function well due to the low Albumin levels.

### **Globulin, Total**

Your result for this lab test is in the FUNCTIONAL LOW range. Globulin is a term for all proteins in the blood that are not Albumin. Globulins are another type of “carrier protein” involved in the transport of some resources to your cells to help them function at their best. There are 4 fractions (or types) of

Globulins in the blood that make up your number for Total Globulin. These 4 fractions are called: Alpha 1, Alpha 2, Beta and Gamma. Globulins are also an important part of your immune system and are critical in the formation of antibodies - also called immunoglobulins such as IgA, IgE, IgG and IgM - which are manufactured from the gamma fraction. The gamma fraction usually makes up the largest portion of the Total Globulin, so an abnormal Total Globulin would have us first thinking about some type of acute or chronic challenge to the immune system . . . but may be due to other factors as well. When Total Globulin is close to or within the Clinical High or Clinical Low ranges, an additional test called a serum protein electrophoresis should be considered to determine which fraction(s) are involved to allow for a better diagnosis.

When Total Globulin is in the Functional Low range we must first consider an immune system that has been worn down due to some type of chronic infection or other immune challenge. Other factors that may contribute to a low Total Globulin include: 1) an inflammatory problem, 2) a liver problem, or 3) anemia.

### **A/G Ratio**

Your result for this lab test is in the OPTIMAL range. The A/G Ratio compares the level of Albumin to the level of Globulin. Factors that affect Albumin and Globulin will then affect the A/G Ratio. An A/G Ratio in the Clinical High or Clinical Low ranges will create a much greater concern for a developing or ongoing disease process within the body.

### **Total Bilirubin**

Your result for this lab test is in the OPTIMAL range. Bilirubin is found in the blood as a result of Hemoglobin breakdown. Hemoglobin is part of your Red Blood Cells and has the important job of transporting oxygen to all the cells of your body. Bilirubin is found in the blood in two forms. One form is on its way to the liver to be processed so the body can remove it (also called Indirect or Unconjugated Bilirubin), and the other form has completed processing in the liver (also called Direct or Conjugated Bilirubin) and is on its way out of the body within the bile that is created by the liver and stored in the gall bladder. This makes Bilirubin a good indicator if there is a problem or blockage within the liver or gall bladder.

### **Alkaline Phosphatase**

Your result for this lab test is in the OPTIMAL range. Alkaline Phosphatase is a group of enzymes that originate from several tissues in the body to include: bone, liver, intestines and placenta. The highest concentrations are found within the bone and liver. Therefore it can be used as an indicator of a problem with these areas when Alkaline Phosphatase is higher than optimal. It is common to see Alkaline Phosphatase elevated in bone fractures that are healing and in teens when their bones are growing . . . this is considered normal due to the increase in bone activity.

### **LDH**

Your result for this lab test is in the OPTIMAL range. LDH refers to an enzyme called Lactate Dehydrogenase which is found in nearly all cells of the body with only a small amount normally found in the blood. LDH gets released into the blood when cells are damaged or destroyed. This makes LDH a good general indicator of damage to cells and tissues within the body. Measuring the total amount of LDH is actually a measurement of 5 fractions of this enzyme combined together - called isoenzymes.

### **AST (SGOT)**

Your result for this lab test is in the OPTIMAL range. AST refers to an enzyme called Aspartate Aminotransferase, and this test is commonly called a liver enzyme test. In reality AST is found in many organs and tissues of the body that are considered to be highly metabolic, or simply more active on a daily basis to include: liver, skeletal muscles, heart muscle, brain, kidney, pancreas and lungs . . . but this enzyme is found in the greatest quantity within the liver and heart. AST is an enzyme that will show up in the blood when there is damage or destruction of cells in these more metabolically active tissues. You may know of someone who needed to periodically get their “liver checked” while begin on a medication - such as a cholesterol medication. They were most likely getting these two main liver enzymes tested (AST and ALT) as a common screening test for liver function in blood testing.

Your liver has many important functions in the body including: removing chemicals and toxins from the body, it's involved in blood sugar control, it activates the majority of thyroid hormone into its more bioactive form (T3) to improve energy and metabolism, and much more. Your liver is a very resilient organ, as you can have as little as 20% of good liver function and still have these liver enzymes test in the normal range. This means that when the AST begins to test outside the optimal range we want to take action more quickly to help improve function before any more damage happens to the liver or other affected tissues.

### **ALT (SGPT)**

Your result for this lab test is in the OPTIMAL range. ALT refers to an enzyme called Alanine Aminotransferase, and this test is commonly called a liver enzyme test. In reality ALT is found in several organs and tissues to include: liver, skeletal muscles, heart muscle, and kidney . . . but this enzyme is found in the greatest quantity within the liver. ALT is an enzyme that will show up in the blood when there is damage or destruction of cells in these tissues. You may know of someone who needed to periodically get their “liver checked” while begin on a medication - such as a cholesterol medication. They were most likely getting these two main liver enzymes tested (AST and ALT) as a common screening test for liver function in blood testing.

Your liver has many important functions in the body including: removing chemicals and toxins from the body, it's involved in blood sugar control, it activates the majority of thyroid hormone into its more bioactive form (T3) to improve energy and metabolism, and much more. Your liver is a very resilient organ, as you can have as little as 20% of good liver function and still have these liver enzymes test in the normal range. This means that when the ALT begins to test outside the optimal range we want to take action more quickly to help improve function before any more damage happens to the liver or other affected tissues.

### **GGT**

Your result for this lab test is in the OPTIMAL range. GGT refers to an enzyme called Gamma Glutamyl Transferase (sometimes abbreviated as GGTP), and this is an enzyme test most commonly associated with damage to the liver or obstruction of the bile ducts outside the liver. In reality GGT is found in several organs and tissues to include: liver, the biliary tract (which carries bile from the liver to the small intestine), your kidneys, pancreas and prostate . . . but this enzyme is found in the greatest quantity within the liver. GGT is usually the first enzyme to elevate when the bile ducts become obstructed, and this makes it the most sensitive of the different liver enzyme tests to detect bile duct problems.

Your liver has many important functions in the body including: removing chemicals and toxins from the body, it's involved in blood sugar control, it activates the majority of thyroid hormone into its more bioactive form (T3) to improve energy and metabolism, and much more. Your liver is a very resilient organ, as you can have as little as 20% of good liver function and still have these liver enzymes test in the normal range. This means that when the GGT begins to test outside the optimal range we want to take

action more quickly to help improve function before any more damage happens to the liver or other affected tissues.

### **Iron Bind. Cap. (TIBC)**

Your result for this lab test is in the OPTIMAL range. Iron Binding Capacity (sometimes referred to as Total Iron Binding Capacity or TIBC) is a lab test to measure how much iron can bind to a protein that is responsible for transporting iron throughout the body (the protein is called transferrin). To state this more simply . . . if there is not enough iron bound to this transport protein (called transferrin) then there is a higher capacity or ability for more iron to bind and the Iron Binding Capacity will measure at a higher level. This would indicate that there may not be enough iron in the body. Conversely, if most of this transport protein is already bound to iron . . . then there is a lower capacity or ability to bind more iron and the Iron Binding Capacity will measure at a lower level. This would indicate that there may be too much iron in the body. The measurement for Iron Binding Capacity will usually travel opposite of iron levels in the body. If iron levels in the body are low, then the Iron Binding Capacity will go higher. If iron levels in the body are high, then Iron Binding Capacity will go lower.

### **UIBC**

Your result for this lab test is in the OPTIMAL range. UIBC refers to the Unsaturated Iron Binding Capacity, and this lab test measures the portion of the transport protein for iron (called transferrin) that has not been saturated with iron. It is essentially a duplicate measurement of Iron Binding Capacity or TIBC, and tells us the same information in a different format. To state this more simply . . . if there is not enough iron bound to this transport protein (called transferrin) then this protein is poorly saturated with iron and the UIBC (the unsaturated portion) will measure at a higher level. This would indicate that there may not be enough iron in the body. Conversely, if most of this transport protein is highly saturated with iron . . . then the UIBC (the unsaturated portion) will be at a much lower level. This would indicate that there may be too much iron in the body. The measurement for UIBC will usually travel opposite of iron levels in the body. If iron levels in the body are low, then the UIBC will go higher. If iron levels in the body are high, then the UIBC will go lower.

### **Iron, Serum**

Your result for this lab test is in the OPTIMAL range. Serum Iron is the most basic measure of iron status in your body, and like the name implies it measures the amount of iron that is currently available in your blood. Iron is transported in your blood with the help of a carrier protein called Transferrin. Serum Iron is specifically measuring the amount of Iron circulating in your blood while it is bound to Transferrin.

Iron is absorbed into the body from the foods we eat, and requires good digestion. The carrier protein - called Transferrin - is produced by the Liver, so good iron levels can depend on good liver function. Iron is also an important component of Hemoglobin which is found in your Red Blood Cells, and Hemoglobin has the important job of transporting oxygen to all the cells of your body to keep your cells healthy and functioning their best. About 70% of iron in your body is incorporated into Hemoglobin inside your Red Blood Cells. The remainder is found in tissues in its storage form called Ferritin.

### **Iron Saturation**

Your result for this lab test is in the OPTIMAL range. Iron Saturation is a measure of how much Transferrin is saturated with iron, and this is measured as a percentage. Transferrin is a carrier protein that helps to transport iron throughout the body. In a healthy individual the Iron Saturation ranges from about 20% - 40% . . . with an average around 33%. If there is not enough iron bound to this transport protein (called transferrin) then this protein is poorly saturated with iron and the Iron Saturation will be a

lower percentage. This would indicate that there may not be enough iron in the body. Conversely, if this transport protein is highly saturated with iron . . . then the Iron Saturation will be at a higher percentage. This would indicate that there may be too much iron in the body. The measurement for Iron Saturation will usually travel in the same direction of iron levels in the body. If iron levels in the body are low, then the Iron Saturation will be a lower percentage. If iron levels in the body are high, then the Iron Saturation will be a higher percentage.

## **Ferritin, Serum**

Your result for this lab test is in the OPTIMAL range. Serum Ferritin is a measure of the storage form of iron. About 70% of iron in your body is incorporated into Hemoglobin inside your Red Blood Cells. The remaining 30% is found in tissues in its storage form called Ferritin. Your body will store away reserves of iron in the form of Ferritin in case of injury or blood loss resulting in loss of iron in the blood. Your body will then draw upon this storage of iron (Ferritin) to try and bring iron levels in the blood back up to a healthy level.

In the situation of an iron deficiency your body will first deplete your storage of iron (Ferritin) in an effort to keep Serum Iron at a healthy level. This makes a low Serum Ferritin the earliest and most sensitive indicator of an iron deficiency. You may see all other lab tests related to iron in the normal range, but with the Ferritin lower than optimal this would be enough to indicate they are approaching a low iron status.

## **Cholesterol, Total**

Your result for this lab test is in the OPTIMAL range. This test measures the total level of Cholesterol in your body. Cholesterol circulates in your blood in different fractions or particles called lipoproteins, and these particles are usually referred to as HDL, LDL and VLDL. The sum total of HDL, LDL, and VLDL will equal your Total Cholesterol. Cholesterol is often communicated as a bad thing, and we are given the impression that we always need to get Cholesterol to a lower number to be healthy. The reality is that Cholesterol is needed to be healthy and it is essential for life. What many people don't know is that in the original research on Cholesterol completed decades ago the researchers found that not only does high Cholesterol have a negative impact on health . . . mainly to your heart and cardiovascular system, but they also found that having low Cholesterol levels has its own unique set of consequences. Specifically, those people with low Cholesterol levels have an increased risk of developing cancer or other serious health problems over time.

It will help you to understand some of the functions of cholesterol within your body. Cholesterol is part of the cell membrane (the outer layer of the cell) for all the cells in your body, so Cholesterol is necessary for healthy cells. About 60% of your brain is made up of fat and Cholesterol, so having enough Cholesterol is needed for a healthy brain and nervous system. Cholesterol is a precursor of what gets converted into many of the different hormones in your body . . . including the male and female hormones and adrenal hormones, so Cholesterol is needed for healthy hormone levels. Cholesterol is even a pretty good antioxidant . . . which means that it has the ability to protect your cells from getting damaged, and when your cells do get damaged Cholesterol can come to the rescue and help repair that cell damage.

About 70% - 80% of the Cholesterol in your body is manufactured from within your own body . . . mostly by your liver. The remaining Cholesterol comes from your diet. So if Cholesterol is high it's less likely due to dietary intake, and more likely because your liver is producing more Cholesterol because the body is sensing it needs more to improve the health of your cells, nervous system and hormones, or your body is in need of more antioxidants so your liver produces more Cholesterol for the antioxidant benefit it offers. It also means that if Cholesterol is too low it could indicate a person has an underactive or hypo-liver function since the liver produces the majority of cholesterol found in the body. The most reliable method for testing Cholesterol is after doing a 12 hour fasting . . . meaning there is no eating or drinking

(except water) . . . for 12 hours prior to your blood draw. If the Cholesterol is high and a person did NOT do a proper 12 hour fasting . . . then this lab result is invalid and this should be re-tested if there are concerns about Cholesterol values.

## **Triglycerides**

Your result for this lab test is in the FUNCTIONAL LOW range. This test measures the total level of Triglycerides in your body. A Triglyceride is a substance that has sugar and fat combined together. The sugar and fatty acid portions of a Triglyceride are part of what your cells use as a fuel source for the energy they need to function. Triglycerides also get incorporated into your fat cells and become part of your storage of body fat. Abnormal Triglyceride levels will often reflect dietary intake of fat and carbohydrates, as well as poor blood sugar control, and can have a significant impact on cardiovascular health. The most reliable method for testing Triglycerides is after doing a 12 hour fasting . . . meaning there is no eating or drinking (except water) . . . for 12 hours prior to your blood draw. If Triglycerides are high and a person did NOT do a proper 12 hour fasting . . . then this lab result is invalid and this should be re-tested if there are concerns about Triglyceride levels.

When Triglycerides are in the Functional Low range there are several factors to consider including: 1) underactive or hypo-liver function or other problem affecting the liver, 2) overactive or hyper-thyroid function or a thyroid medication dose that is too high, 3) poor nutrition and/or very low fat intake, 4) vegetarian or vegan diet, 5) poor absorption due to a digestive problem, 6) overactive or hyper-adrenal function, 7) a possible autoimmune condition - especially when seen with a high HDL at >80, and 8) the effect of some medications.

## **HDL Cholesterol**

Your result for this lab test is in the OPTIMAL range. HDL refers to a form of cholesterol called High Density Lipoprotein. In order for Cholesterol to travel through your bloodstream it needs to be carried and transported by a particle called a lipoprotein, and HDL is one of these lipoprotein particles. You will often hear of this as the “good cholesterol”, because these HDL particles have the ability to clean out deposits that can build-up in your arteries and HDL may prevent the build-up of plaque that can damage your blood vessels. Having your HDL levels high enough will help to protect and improve the health of your blood vessels and can be a positive factor in preventing cardiovascular problems including heart attack and stroke. The best ways we know of to naturally improve or maintain healthy levels of HDL is through regular exercise, consuming enough Omega 3 Essential Fatty Acids (EFA), maintaining healthy blood sugar levels, and keeping your body at a healthy weight.

## **VLDL Cholesterol**

Your result for this lab test is in the OPTIMAL range. VLDL refers to Very Low Density Lipoprotein. Because fat and water would normally want to separate from each other . . . we need a method of transporting fats through the water of our blood. A lipoprotein is a particle that helps to transport fats such as cholesterol and triglycerides through your bloodstream. VLDL carries mostly triglycerides in your bloodstream, and then gets converted to LDL after losing its triglyceride. If LDL is the “bad cholesterol”, then VLDL is considered the worst of the bad cholesterol. Many of the same things that affect LDL levels will also affect VLDL levels. The consequences of higher levels of VLDL are similar to having higher levels of LDL, and are associated with an increased risk for hardening of the arteries, and cardiovascular problems including heart attack and stroke.

## **LDL Cholesterol**

Your result for this lab test is in the FUNCTIONAL HIGH range. LDL refers to Low Density Lipoprotein.

Because fat and water would normally want to separate from each other . . . we need a method of transporting fats through the water of our blood. A lipoprotein is a particle that helps to transport fats such as cholesterol and triglycerides through your bloodstream. LDL carries mostly cholesterol in your bloodstream bringing it to your cells and tissues because it is needed for many important functions. LDL is often called the “bad cholesterol” because excess amounts can result in cholesterol getting deposited in the walls of your blood vessels leading to hardening of the arteries and cardiovascular problems including heart attack and stroke. LDL (the bad cholesterol) has an inverse relationship with HDL (the good cholesterol) . . . meaning that as LDL increases HDL will often decrease. Many of the same things that will raise the good cholesterol (HDL) will also lower the bad cholesterol (LDL).

When LDL Cholesterol is in the Functional High range there are many factors to consider to include: 1) Omega 3 EFA deficiency, 2) blood sugar issues or insulin resistance, 3) a problem affecting the liver, 4) a diet that is too high in sugar, carbohydrates, and saturated fats 5) underactive or hypo-thyroid function, 6) a lifestyle that is too sedentary / too little exercise, and 7) the effect of some medications.

## **T. Cholesterol/HDL Ratio**

Your result for this lab test is in the FUNCTIONAL HIGH range. The Total Cholesterol/HDL Ratio simply compares the amount of Cholesterol to the amount of HDL (good cholesterol) and gives you a ratio or number. This ratio is a common way to determine your future risk of cardiovascular problems based on Cholesterol (or lipid) values. A higher ratio or number can mean an increased risk for cardiovascular problems, and a lower number can mean that you have a lower risk of cardiovascular problems.

## **C-Reactive Protein, Cardiac**

Your result for this lab test is in the FUNCTIONAL HIGH range. C-Reactive Protein is produced by the liver and it is released into the bloodstream with inflammation, infection and injury of tissues. It is most often used as a measure of inflammation within the body that tends to be more recent or more acute. The “Cardiac” portion of this lab test name refers the High Sensitivity version of this lab test. This means we are trying to detect smaller levels of this protein due to inflammation which has also been shown to be a risk factor for cardiovascular problems, and its ability to predict the risk of a future cardiovascular event such as heart attack and stroke. However, the inflammation may be located anywhere in the body and is not specific to only the cardiovascular system.

Inflammation has the nickname of the “silent killer” because inflammation often precedes many of the chronic diseases that people suffer with when they get older. Identifying inflammation now and getting it under control could very well help to prevent a health problem later in life, or at the very least help to reduce the severity of a future health problem.

When C-Reactive Protein is in the Functional High range we will assume that there is inflammation in the body . . . although we will not yet know the cause of the inflammation or where it is located. We will need to compare this lab result with other lab testing to see if there may be an infection or stress within some organ systems that may account for this inflammation. Sometimes we cannot easily determine the cause of inflammation, but we will want to monitor this and possibly take some action to reduce the inflammation since research shows that increased levels of C-Reactive Protein is a strong predictor of a future heart attack or stroke.

## **Homocysteine, Plasma**

Your result for this lab test is in the OPTIMAL range. Homocysteine is an amino acid that is usually found in only very small amounts in your cells and blood, because it will normally be quickly converted into other substances. Vitamins B6, B12 and Folic acid are needed for the conversion of Homocysteine into other

products, so elevated Homocysteine levels are usually associated with a deficiency of one or more of these B Vitamins. It is thought that elevated Homocysteine levels may be an important cause of inflammation in your arteries and can contribute to heart disease and other cardiovascular diseases. One may want to consider a strategy which includes therapeutic doses of Vitamins B6, B12 and Folic Acid to lower high Homocysteine levels . . . especially if other cardiovascular-related lab tests show a concern.

## **TSH**

Your result for this lab test is in the FUNCTIONAL LOW range. TSH refers to Thyroid Stimulating Hormone and it is with this hormone that the brain (or more specifically a part of the brain called the pituitary) is able to control the thyroid gland and the production of thyroid hormone. Thyroid hormone plays a major role in controlling your metabolism and energy production. If the brain senses too little thyroid hormone in the body then TSH will increase to tell the thyroid to produce more hormone. If the brain senses there is too much thyroid hormone in the body then TSH will decrease as a way of telling the thyroid to produce less hormone. TSH is the most common lab test performed by doctors to measure thyroid function. However, too many health providers rely on this test as the only measure of thyroid function, and this can be very misleading. The TSH lab result can be in the labs normal range and a person can still have altered thyroid function as determined by other thyroid lab tests. This overreliance on TSH as a primary indicator of thyroid function has resulted in millions of people not getting properly diagnosed with a real thyroid problem. A more comprehensive testing of thyroid function should be performed to have greater confidence that the thyroid gland is truly working at an optimal level . . . especially when a person is struggling with several symptoms of poor thyroid function.

The thyroid has the nickname of the “great mimicker” because poor thyroid function can cause many symptoms and mimic many other health conditions. Some people go from one doctor to another trying to find out what is causing their symptoms . . . only to find out that their poor thyroid function is playing a major role in their health problems. Symptoms of underactive or hypo-thyroid function can include: fatigue, weight gain, soreness in muscles and joints, headaches, depression, constipation, slow metabolism, hair falling out, dry skin, intolerance to cold, menstrual changes in women, and more. Symptoms of overactive or hyper-thyroid function can include: sudden weight loss, anxiety and nervousness, rapid heartbeat, hands and fingers trembling, increased sweating, enlarged thyroid gland / swelling of the neck, difficulty sleeping, and more. Because poor thyroid function can affect many metabolic functions within the body, and can alter many lab results (not just the ones testing thyroid directly) . . . improving thyroid function becomes a higher priority when it’s discovered that it’s not functioning at an optimal level.

When the TSH is in the Functional Low range this will indicate a pre-hyperthyroid condition. Meaning that it does not meet the clinical definition of hyperthyroidism, but a person may still be experiencing symptoms and the effects of overactive thyroid function. Instead of waiting for the problem to get worse . . . which could take many years and a slow decline of health over those years . . . It would be much more beneficial to take action now to bring thyroid function back to optimal. It will always help to compare this with other thyroid lab tests to confirm changes in thyroid function. Factors that can contribute to TSH in the Functional Low range may include: 1) a pituitary problem as the pituitary produces TSH to control the thyroid gland, 2) a hypothalamus problem as the hypothalamus controls the pituitary and this is really the beginning of the hormonal communication within the body, 3) chemicals or toxic heavy metals in the body disrupting thyroid function, or 4) the effect of some medications - including taking a thyroid medication dose that is a little too high for your body if on thyroid medication.

## **Thyroxine (Total T4)**

Your result for this lab test is in the OPTIMAL range. Thyroxine (also called T4) exists in your body in either the active form called Free T4, or in the inactive form where T4 is bound to a protein. This test



measures the total amount of T4 in your body in both the active and inactive forms. When stimulated your thyroid produces thyroid hormone mostly in the form of T4 which has little biological activity or effect on your cells. It's not until T4 gets converted to T3 in other areas of the body that your thyroid hormone will have its primary effect on the metabolism and function of your cells.

### **T3 Uptake**

Your result for this lab test is in the FUNCTIONAL LOW range. T3 Uptake measures the number of binding sites that are available on proteins that would bind to Thyroxine (T4). It is usually measured as a percentage, and this number is needed to determine the result of another lab test called the Free Thyroxine Index. This lab test is normally done with other thyroid lab tests as it provides limited information on its own. It is used as a way to rule out an error in the labs reporting of increased T4 levels. If T4 and T3 Uptake are both increased . . . then it helps to confirm a true increase in T4 levels.

When T3 Uptake is in the Functional Low range there are many factors to consider including: 1) underactive or hypo-thyroid function, 2) a pituitary problem, 3) a nutrient deficiency in iodine or selenium, 4) elevated estrogen levels in the body, 4) a liver problem, 5) the effect of some medications.

### **Free Thyroxine Index**

Your result for this lab test is in the OPTIMAL range. The Free Thyroxine Index (FTI) is a measurement created by multiplying the Total T4 and T3 Uptake together, and is an indirect way to determine Free T4 levels by using this calculation. This calculation has been found to be a less reliable way to measure Free T4 compared to simply testing Free T4 directly in blood testing.

### **Triiodothyronine (Total T3)**

Your result for this lab test is in the OPTIMAL range. Triiodothyronine (also called Total T3) exists in your body in either the active form called Free T3, or in the inactive form where T3 is bound to a protein. This test measures the total amount of T3 in your body in both the active and inactive forms. When stimulated your thyroid produces thyroid hormone mostly in the form of T4 which has little biological activity or effect on your cells. It's not until T4 gets converted to T3 in other areas of the body that your thyroid hormone will have its primary effect on the metabolism and function of your cells.

### **Triiodothyronine, Free (Free T3)**

Your result for this lab test is in the OPTIMAL range. Triiodothyronine, Free (also called Free T3) measures ONLY the free form of the T3 hormone. In your body T3 exists in both a free or active form, and in an inactive form which is bound to a protein. In the free form it is ready to actively communicate to your cells to affect the function and metabolism of your cells. In the bound form it is inactive and not available until it becomes free. The majority T3 in circulation is in the inactive form with less than 1% in the active or Free T3 form. When stimulated your thyroid produces mostly T4. It's not until T4 gets converted into T3 in other areas of the body that your thyroid hormone will have its primary effect on the metabolism and function of your cells. This conversion of T4 into T3 takes place mostly within the liver, but to a lesser amount in other tissues as well.

### **Reverse T3, Serum**

Your result for this lab test is in the OPTIMAL range. Reverse T3 is created in the body from T4 as a way to help remove excess amounts T4 out of the body. This conversion of T4 into Reverse T3 takes place mostly within the liver, and Reverse T3 is believed to be biologically inactive. The concern with Reverse T3 is that it has a blocking effect on Free T3. Free T3 is the form of thyroid hormone that is most actively

involved in communicating with your cells to improve their metabolism which then determines the metabolism of your entire body. Reverse T3 will prevent Free T3 from communicating with your cells by attaching to and occupying the same locations of the cell that Free T3 would normally bind to (called a receptor site on the cell). This essentially blocks Free T3 from connecting to your cells, and makes the thyroid hormone in your body function less effectively. The end result is that a person can still be suffering with symptoms of low thyroid function, even when TSH, T4 and T3 are within optimal ranges, due to the high levels of Reverse T3. A situation referred to as Reverse T3 Dominance. The two reasons we know of that causes high levels of Reverse T3 are elevated cortisol levels in response to some type of stress, or a deficiency of the mineral Selenium.

#### **T4, Free (Direct)**

Your result for this lab test is in the OPTIMAL range. Thyroxine (also called T4) exists in your body in either the active form called Free T4, or in the inactive form where T4 is bound to a protein. This test measures the total amount of Free T4 in your body in only the active or free form of the hormone. When stimulated your thyroid produces thyroid hormone mostly in the form of T4 which has little biological activity or effect on your cells. It's not until T4 gets converted to T3 in other areas of the body that your thyroid hormone will have its primary effect on the metabolism and function of your cells.

#### **Thyroid Peroxidase (TPO) Ab**

Your result for this lab test is in the OPTIMAL range. Thyroid Peroxidase (TPO) is an enzyme that helps to bring iodine into the cells of the thyroid which is then used to make the thyroid hormones we refer to as T3 and T4. This lab test is measuring the antibody levels that have been created by your immune system to attack and destroy this Thyroid Peroxidase enzyme. This is an abnormal immune system reaction, and is usually referred to as an auto-immune reaction. The TPO antibody test is one way to measure if a person's abnormal thyroid function is (in part) due to an auto-immune condition.

#### **Thyroglobulin Antibody**

Your result for this lab test is in the OPTIMAL range. Thyroglobulin is a protein produced and used within the thyroid gland, and it is used in the creation of the thyroid hormones T3 and T4. This lab test is measuring the antibody levels that have been created by your immune system to attack and destroy this protein called Thyroglobulin. This is an abnormal immune system reaction, and is usually referred to as an auto-immune reaction. The Thyroglobulin Antibody test is one way to measure if a person's abnormal thyroid function is (in part) due to an auto-immune condition.

#### **Vitamin D, 25-Hydroxy**

Your result for this lab test is in the CLINICAL LOW range. Vitamin D is one of the most heavily researched of all the individual vitamins and minerals for many years. Although it is referred to as a vitamin . . . the active form of Vitamin D functions in many ways like a hormone in the way it communicates and controls the function of your cells. The benefits of Vitamin D include: 1) improving blood sugar control because your pancreas needs Vitamin D in the manufacture of insulin, 2) improving the balance of brain chemistry, 3) improving the balance of female and male hormones, 4) improving energy levels - some people have noticed an increase in energy after taking the proper therapeutic dose of Vitamin D3 based on the results of lab testing, 5) improved immune function - fewer colds and flu, 6) improving bone density by helping to bring digested calcium into the blood so it can then be incorporated into bone tissue, and 7) the ability to reduce an auto-immune reaction within the body.

One of the most important benefits of Vitamin D is the cancer-protective effect it has on your cells. Vitamin D helps to prevent the proliferation (or abnormal growth) of cells within your body . . . and this is

really what most cancers are . . . cells that are growing in an abnormal and uncontrolled way. The effect of Vitamin D to help suppress the growth of abnormal cells is powerful enough to make this an important consideration in cancer prevention, and in making your cells healthy again once cancer has become establish within the body.

Vitamin D3 is the active or bioavailable form of Vitamin D, and is the preferred form when taken as a supplement. This is the form of Vitamin D your body produces when your skin is exposed to sunlight. Care should be taken to let lab testing guide your daily dose of Vitamin D3 when taking it by supplement. Taking too much Vitamin D can become harmful if taken in excess for a longer period of time, and taking too small of a dose may have little to no benefit. Also, some people seem to improve and retain their Vitamin D levels better than others, so a recommended dose of Vitamin D3 can vary quite a bit from one person to another and should be determined based on the results of lab testing for Vitamin D.

When Vitamin D is in the Clinical Low range this usually means that a person is not receiving enough sunlight exposure to their skin, or they are not getting enough through foods that are fortified with Vitamin D. Since the cancer protective and many other health benefits of Vitamin D are realized when it is in the Optimal range . . . taking Vitamin D3 in supplement form would be appropriate to increase your levels. Follow-up lab testing of Vitamin D is recommended to make sure levels have improved, and to make sure your Vitamin D levels have not gone too high.

### **Fibrinogen Activity**

Your result for this lab test is in the OPTIMAL range. Fibrinogen is a protein produced by your liver that is involved in a complex series of reactions to help you form a blood clot when you are bleeding - called a coagulation cascade. Fibrinogen also affects the thickness or viscosity of your blood, and is a key factor in the formation of plaque in your arteries. The Fibrinogen Activity test does NOT measure the amount of Fibrinogen in your blood. Instead it measures the activity or function of Fibrinogen and its ability to help you form a blood clot. High Fibrinogen levels can mean that blood clots are forming too easily. This can result in cardiovascular problems if these blood clots are forming in blood vessels interfering with blood flow, and can contribute to a blockage of blood vessels leading to heart attack and stroke. Low Fibrinogen levels can mean that you may have difficulty forming clots normally when needed to effectively stop bleeding.

### **WBC**

Your result for this lab test is in the OPTIMAL range. This test is measuring the total number of White Blood Cells (WBC) circulating in your blood. White Blood Cells are important part of your immune system, and help to protect your body against invading organisms such as bacteria, viruses, parasites and fungal issues. White Blood Cells are also involved in inflammation, auto-immune conditions, how your body responds to allergies, and as part of your body's defense against cancer.

Your bone marrow will produce additional White Blood Cells and release them into your blood stream when there is an infection or inflammatory process within your body. We typically associate a high WBC count with a more recent or acute infection or process within the body, and a low WBC count with a more chronic or long-term infection or process. The WBC count can also falsely appear to be normal as an infection process is transitioning from an acute to chronic phase, or when a chronic infection is aggravated and reactivated back to a more severe or acute situation.

The total WBC count should be reviewed in relation to the different types of White Blood Cells which are Neutrophils, Lymphocytes, Monocytes, Eosinophils and Basophils as part of a WBC differential test to locate the source of an increased or decreased WBC count. Although less common . . . the production of White Blood Cells and the WBC count can also be affected by immune system disorders, cancers, and

other conditions that affect the function of bone marrow.

## **RBC**

Your result for this lab test is in the OPTIMAL range. This test is measuring the total number of Red Blood Cells (RBC) within a certain area or amount of blood during microscopic examination. Your Red Blood Cells are primarily responsible for picking up oxygen in your lungs, and transporting that oxygen to all the tissues of your body (with the help of hemoglobin located within the RBC). Your Red Blood Cells also have the important task of removing some carbon dioxide as a waste product of cell function, and transporting carbon dioxide back to the lungs so it can be removed from your body when you exhale during breathing.

Red Blood Cells are produced in your bone marrow, and the average lifespan of a Red Blood Cell is about 120 days. This means that as old Red Blood Cells are removed from your body they need to be continually replaced with new ones. If your bone marrow is not able to produce enough Red Blood Cells due to some type of deficiency or disease process or if a person is losing blood (bleeding) causing a decrease in the number of Red Blood Cells within the body . . . this is called "Anemia". Seeing only the RBC count at levels that are too low would likely result in a clinical diagnosis of Anemia, but this should still be correlated with other lab tests to measure the health and function of your Red Blood Cells to help determine the possible cause of Anemia. These other lab tests would include: Hemoglobin, Hematocrit, MCV, MCH, MCHC, RDW, and measurements of iron levels in the body.

## **Hemoglobin**

Your result for this lab test is in the OPTIMAL range. This test measures the amount of hemoglobin in a blood sample. Hemoglobin is a protein that contains iron, and this is what gives your blood its red color. Hemoglobin is an important part of your Red Blood Cells that allows you to pick-up oxygen from your lungs and transports that oxygen to all the cells of your body. It also helps transport carbon dioxide from your cells back to the lungs to be removed from your body when you exhale during breathing.

## **Hematocrit**

Your result for this lab test is in the OPTIMAL range. Hematocrit is simply measuring the percentage of your blood that is only Red Blood Cells, and reflects both the number of Red Blood Cells and the size or volume of the Red Blood Cells - with the size or volume measured as MCV (mean corpuscular volume) in blood testing. Understand that your blood is made up of both liquid and solid particles. The liquid is referred to as plasma, and the solid particles are things like Red Blood Cells, White Blood Cells, Platelets, and more. Hematocrit is telling us what percentage of a blood sample is purely Red Blood Cells. Hematocrit will usually travel in the same direction of the RBC count, unless the individual Red Blood Cells are smaller or larger than normal in size or volume.

## **MCV**

Your result for this lab test is in the FUNCTIONAL HIGH range. MCV refers to the Mean Corpuscular Volume, or the average size or volume of the Red Blood Cells. When anemia is present the MCV, along with other measurements on the health of your Red Blood Cells, may help to determine the type of anemia.

When MCV is in the Functional High range it may indicate an anemic tendency, but it alone would not meet the clinical definition of anemia and should be compared to other Red Blood Cells measurements. If other lab tests are confirming some type of anemia than the elevated MCV would be indicating an anemia due to folic Acid or Vitamin B12 deficiency, and both of these B vitamins can be tested for directly in

standard blood lab testing. Additional testing to confirm if the anemia is due to a Vitamin B12 deficiency can be done by doing a lab test for Methylmalonic Acid . . . with elevated levels of Methylmalonic Acid being a sensitive indicator of a Vitamin B12 deficiency. Another consideration when looking at Vitamin B12 deficiency is if there is enough Intrinsic Factor - a special protein produced by the stomach that allows you to properly absorb Vitamin B12 in the small intestine. This type of anemia in which there is too little Intrinsic Factor is called Pernicious Anemia, and can happen when the stomach is not producing enough Intrinsic Factor or with an auto-immune condition in which the immune system is attacking and destroying the Intrinsic Factor.

Other reasons for a higher than optimal MCV can include: 1) Poor health or function of the stomach or small intestine or low stomach acid production, 2) a liver problem, 3) underactive or hypo-thyroid function, 4) a Vitamin C deficiency, 5) recent blood loss which will have the bone marrow increase production of new Red Blood Cells which are usually larger in size when first released into your blood, or 6) the effect of some medications.

## **MCH**

Your result for this lab test is in the OPTIMAL range. MCH refers to the Mean Corpuscular Hemoglobin, or the average weight or mass of hemoglobin inside a Red Blood Cell. This measurement is calculated by taking the total mass of hemoglobin and dividing this by the number of Red Blood Cells in a volume of blood. When a person has anemia . . . the MCH can be useful for determining the type of anemia.

## **MCHC**

Your result for this lab test is in the OPTIMAL range. MCHC refers to Mean Corpuscular Hemoglobin Concentration, or how much of the Red Blood Cell is occupied by Hemoglobin. This measurement is most helpful to evaluate if a person's treatment for anemia is working and their anemia is improving.

## **RDW**

Your result for this lab test is in the OPTIMAL range. RDW refers to Red Blood Cell Distribution Width, and this test measures if there is an abnormal variation in the size or width of your Red Blood Cells in a blood sample. Your Red Blood Cells are normally a little larger in size when they are first created in the bone marrow and released into your blood stream. As these cells mature they decrease slightly in size and remain that way for the life of that cell - which is about 120 days. This means that your bone marrow should be constantly producing new Red Blood Cells to replace the ones that die and are removed from your blood. Therefore, in the same blood sample we expect to see a certain variation in the width of your Red Blood Cells as new ones are replacing old ones.

If something is affecting the health of your Red Blood Cells and hemoglobin, and your body is sensing that not enough oxygen is getting transported to all the cells of your body, your bone marrow will then produce and release more new Red Blood Cells into your blood as a way to get more oxygen transported to your cells. This increases the ratio of the slightly larger new Red Blood Cells versus the slightly smaller more mature Red Blood Cells. This change in the variation of Red Blood Cells size is seen as an increase in the RDW, and is most often seen with some type of anemia. The RDW is only a relevant test for those people that have anemia, and is not a helpful measurement for those that do not have anemia.

## **Platelets**

Your result for this lab test is in the OPTIMAL range. Platelets are essential for normal blood clotting, and this test for Platelet Count is to determine the number of Platelets in your blood sample. Platelets help to stop bleeding by adhering to the location of blood vessel damage, by clumping together to form a "platelet

plug”, and by releasing chemicals that help to stimulate more Platelets to clump together. Platelets are part of a complex series of events in the body that leads to proper clotting when a person is bleeding - called a coagulation cascade. Platelets are formed in the bone marrow and have a life-span of 8 - 10 days, so the bone marrow must be constantly creating new platelets to replace the old ones and to replace ones that are lost due to bleeding.

## **Neutrophils**

Your result for this lab test is in the FUNCTIONAL HIGH range. Neutrophils are one type of White Blood Cell, and they usually make-up the greatest percentage of the different kinds of White Blood Cells in a normal functioning immune system that is not fighting off an infection. This test is to determine what percentage of total White Blood Cells are specifically Neutrophils. Neutrophils are primarily involved in fighting off bacterial infections. A common pattern to see in a more active or acute bacterial infection is the Neutrophils increased and the Lymphocytes decreased.

When Neutrophils are in the Functional High range we will need to consider many sources to include: 1) very early stage of a more recent or acute bacterial infection or a lowering of Neutrophils from higher levels as an infection is becoming chronic, 2) an inflammatory process in the body, 4) adrenal problems, or 5) respiratory problems from asthma or emphysema.

## **Lymphs**

Your result for this lab test is in the OPTIMAL range. Lymphs - more commonly referred to as Lymphocytes - are one type of White Blood Cell. This test is to determine what percentage of total White Blood Cells are specifically Lymphocytes. There are several kinds of Lymphocytes such as T-cells, B-cells and Natural Killer Cells, and these Lymphocytes make up the second most common type of White Blood Cell in a normal functioning immune system that is not fighting off an infection. Lymphocytes are created in the bone marrow, and then travel to other tissues such as the thymus gland and spleen to mature into their active immune cell. Lymphocytes are primarily involved in fighting off viral infections, and they often become activated with inflammation. A common pattern to see with a viral infection is the Lymphocytes increased and the Neutrophils decreased.

## **Monocytes**

Your result for this lab test is in the OPTIMAL range. Monocytes are one type of White Blood Cell, and they can increase in response to a bacterial, viral or parasite infection. This test is to determine what percentage of total White Blood Cells are specifically Monocytes. Monocytes are produced in the bone marrow and then travel to tissues that are infected where they turn into a macrophage - a type of cell that consumes and removes infecting organisms, the fragments of damaged cells, and any other material left behind from an infection. It is typical to see Monocytes elevated in the final stages of an infection when the body is recovering from the infection.

## **Eos**

Your result for this lab test is in the OPTIMAL range. Eos - more commonly referred to as Eosinophils - are one type of White Blood Cell. This test is to determine what percentage of total White Blood Cells are specifically Eosinophils. Eosinophils are more often involved in parasite infections and environmental or food allergies and sensitivities. They have the ability to consume and remove broken-down particles of protein - to include the remains of invading organisms after an immune system attack and antibody complexes that get created from an allergic reaction - both of which have different kinds of proteins that make up their structure.

## **Neutrophils (Absolute)**

Your result for this lab test is in the OPTIMAL range. Neutrophils are one type of White Blood Cell, and they usually make-up the greatest percentage of the different kinds of White Blood Cells in a normal functioning immune system that is not fighting off an infection. This lab test is a calculation to determine the actual or absolute number of Neutrophils within a blood sample. When the total White Blood Cell count is elevated or decreased . . . looking at the absolute count of Neutrophils can be helpful in determining what type infection or challenge to the immune system is taking place. Neutrophils are primarily involved in fighting off bacterial infections. A common pattern to see in a more active or acute bacterial infection is the Neutrophils increased and the Lymphocytes decreased.

## **Lymphs (Absolute)**

Your result for this lab test is in the OPTIMAL range. Lymphs - more commonly referred to as Lymphocytes - are one type of White Blood Cell. This lab test is a calculation to determine the actual or absolute number of Lymphocytes within a blood sample. When the total White Blood Cell count is elevated or decreased . . . looking at the absolute count of Lymphocytes can be helpful in determining what type infection or challenge to the immune system is taking place. There are several kinds of Lymphocytes such as T-cells, B-cells and Natural Killer Cells, and these Lymphocytes make up the second most common type of White Blood Cell in a normal functioning immune system that is not fighting off an infection. Lymphocytes are created in the bone marrow, and then travel to other tissues such as the thymus gland and spleen to mature into their active immune cell. Lymphocytes are primarily involved in fighting off viral infections, and they often become activated with inflammation. A common pattern to see with a viral infection is the Lymphocytes increased and the Neutrophils decreased.

## **Monocytes (Absolute)**

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## **Eos (Absolute)**

Your result for this lab test is in the OPTIMAL range. Eos - more commonly referred to as Eosinophils - are one type of White Blood Cell. This lab test is a calculation to determine the actual or absolute number of Eosinophils within a blood sample. When the total White Blood Cell count is elevated or decreased . . . looking at the absolute count of Eosinophils can be helpful in determining what type infection or challenge to the immune system is taking place. Eosinophils are more often involved in parasite infections and environmental or food allergies and sensitivities. They have the ability to consume and remove broken-down particles of protein - to include the remains of invading organisms after an immune system attack and antibody complexes that get created from an allergic reaction - both of which have different kinds of proteins that make up their structure.

## **Basos (Absolute)**

Your result for this lab test is in the OPTIMAL range. Basos - more commonly referred to as Basophils -

are one type of White Blood Cell. This lab test is a calculation to determine the actual or absolute number of Basophils within a blood sample. When the total White Blood Cell count is elevated or decreased . . . looking at the absolute count of Basophils can be helpful in determining what type infection or challenge to the immune system is taking place. Once Basophils enter the tissue they are then referred to as a Mast cell. Both Basophils and Mast cells contain small pockets of powerful chemicals like histamine, serotonin and heparin which alter blood supply to tissues, help prevent clotting in inflamed tissue, and help mobilize the body's immune system. Basophils can be elevated in nearly any type of inflammatory condition or immune system reaction.

### **Immature Grans (Abs)**

Your result for this lab test is in the OPTIMAL range. A Granulocyte is a different type of White Blood Cell that you would normally NOT see in a healthy person's blood. Granulocytes are given their name because they contain many granules - which are microscopic pockets filled with enzymes and chemicals to digest invading organisms. Neutrophils, Eosinophils and Basophils are all types of Granulocytes. The presence of Immature Granulocytes in the blood simply means that the bone marrow is releasing these granulocytes at a faster rate before some of them have had a chance to fully mature. This could happen with a severe infection or some type of disease process within the bone marrow. This lab test is a calculation to determine the actual or absolute number of Immature Granulocytes within a blood sample. When the total White Blood Cell count is elevated or decreased . . . looking at the absolute count of Immature Granulocytes can be helpful in determining what type infection or challenge to the immune system is taking place.



# Therapeutic Nutrition Schedule

**Patient Name :** Ima Hungry

**Date :** October 30, 2015

Product Name	Morning on Wake-up	AM with Breakfast	Mid Morning Dose	Noon with Lunch	Mid Afternoon Dose	PM with Evening Meal	Before Bed

These therapeutic nutrition recommendations expire on : January 13, 2019

A re-test of lab testing is recommended on : January 13, 2019

Additional Notes / Special Instructions: