

Back To Chiropractic CE Seminars

Labs Review~ 6 Hours

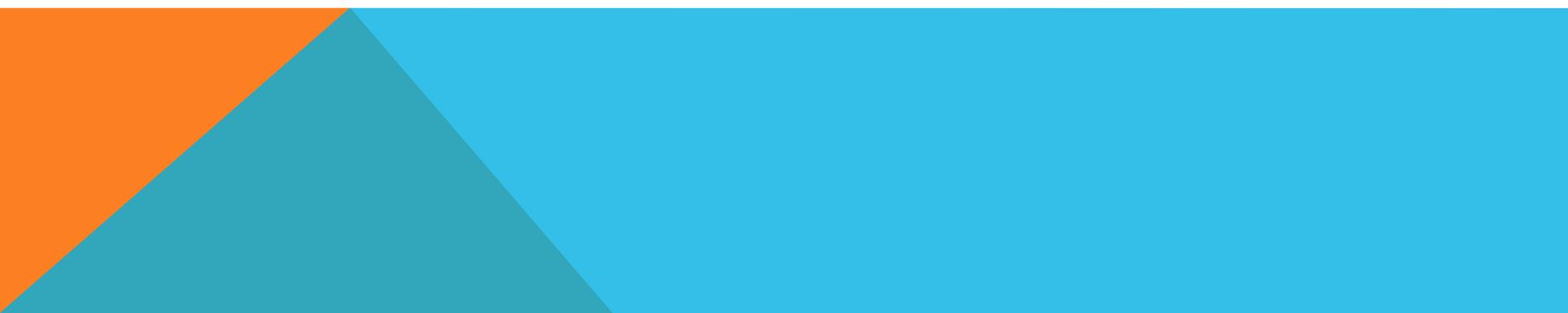
Welcome to Back To Chiropractic Online CE exams:

This course counts toward your California Board of Chiropractic Examiners CE. (also accepted in other states, check our website or with your Chiropractic State Board)

The California Board requires that you complete all of your CE hours BEFORE the end of your Birthday month. We recommend that you send your chiropractic license renewal form and fee in early to avoid any issues.

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I'm always a phone call away... 707.972.0047 or email: marcusstrutzdc@gmail.com

Marcus Strutz, DC

Back To Chiropractic CE Seminars

33000 North Highway 1

Ft Bragg CA 95437

BLOOD LABS REVIEW

A NUTRITIONAL PERSPECTIVE

Dr. Mark D. Emerson

DC, CCSP

- Millions of standard blood labs are ordered each year as a general screen for pathology.
- Generally, most of these labs do not show advanced pathology, but do offer valuable information as to the state of the health of the patient.
- Understanding how to read them, interpret them and utilize their valuable information will help you, the clinician, offer better conservative choices to help the patient improve their health naturally.
- I like to tell my patients; your blood does not lie!

Why Blood Lab Analysis?

- Accurate and Comprehensive
- Objective, Consistent and Reproducible
- The Gold Standard: Accepted Scientifically, Medically, Legally, Publicly
- Supports Your Treatment Plans

‘What you know about...You see”

~ Goethe

Once you start seeing the patterns of what the blood tests tell you, I hope you will have that “aha” moment.

Standard, regular, general lab tests are a powerful tool to use in everyday practice. Particularly if your goal is to help your patients in the prevention of disease.

- Lab results help clinicians (MD's) Rx & monitor medications. These same Labs help (DC's & ND's) to Rx & monitor Nutritional considerations.
- It takes 2 pts to determine a line; A-B.
- With a single point (blood or urine) you do not know if line is going up or down.
- However, looking at several consecutive labs you can help determine which direction the patient's health is going.

- As a general rule:
- Repeat test within 60-90 days is good idea.
- Look for tendencies over a history of past lab reports.
- The human body is constantly changing, minute to minute, day to day, week to week and is capable of remarkable healing at any time.

WHAT ARE WE EVALUATING WITH STANDARD BLOOD TEST?

- It's an **evaluation of the major organ function**. It evaluates:
 - Bone marrow
 - Kidney
 - Liver
 - Thyroid gland
 - Parathyroid gland
 - Pancreas
 - Arteries – Vascular system
 - Immune system

- If all the tests are looking good, then we know as clinicians, we are looking at a pretty healthy patient.
- However, if there are high/low/border line values on the results report, then we have a patient that may need assistance in improving their health.

- The absence of pathology on Blood tests does not indicate good health or well being.
- It is simply absent of advanced pathology.
- For every path positive test finding, that number was at one time, a slow moving “normal” number.
- “Normal” does not necessarily mean healthy!

ASSESSING LAB VALUES

Tests Ordered				
CMP12+LP+TP+TSH+7AC+CBC/D/P...;Homocyst(e)ine, Plasma;Vitamin D, 25-Hydroxy				
General Comments				
PID: 70204407				
TESTS	RESULT	FLAG	UNITS	REFERENCE INTERVAL
CMP12+LP+TP+TSH+7AC+CBC/D/P...				
Glucose, Serum	104	High	mg/dL	65-99
Hemoglobin Alc	5.8	High	%	4.8-5.6
<p>Increased risk for diabetes: 5.7 - 6.4</p> <p>Diabetes: >6.4</p> <p>Glycemic control for adults with diabetes: <7.0</p>				
Uric Acid, Serum	5.3		mg/dL	2.5-7.1
Therapeutic target for gout patients: <6.0				
BUN	15		mg/dL	6-24
Creatinine, Serum	0.78		mg/dL	0.57-1.00
eGFR If NonAfricn Am	84		mL/min/1.73	>59
eGFR If Africn Am	97		mL/min/1.73	>59
BUN/Creatinine Ratio	19			9-23
Sodium, Serum	140		mmol/L	134-144
Potassium, Serum	4.4		mmol/L	3.5-5.2
Chloride, Serum	104		mmol/L	97-108
Calcium, Serum	9.4		mg/dL	8.7-10.2
Phosphorus, Serum	3.5		mg/dL	2.5-4.5
Magnesium, Serum	2.1		mg/dL	1.6-2.6
Protein, Total, Serum	6.6		g/dL	6.0-8.5
Albumin, Serum	4.3		g/dL	3.5-5.5

Pt Values ↗

ABNORMAL ↘

Range of Normal Values ↖

Lower Limit ↘

Upper Limit ↙

- Do not make the mistake of having the lab determine your plan of care via “Red Flags” or “an absence of “Red Flags” for you.
- The patient’s lab results contain valuable information whether it be in the “Normal Range” or “Abnormal Range”.
- Blood values are established by taking an average of the blood draws across the U.S. These blood labs are from predominantly patients following the Standard American Diet (SAD). They are not draws from well conditioned healthy people.

- The lab will base results on “Normal Values” which are established by a reference set of values the “Normal” population falls within 95% of the time.
- Consider the source, remember: “Normal” does not necessarily mean healthy.
- Therefore, relaying on the lab to suggest the level of health of your patient via “Flags” nullifies your need to be part of the process.

- Conventional allopathic medicine's standard of care is to intervene when there is an advanced, abnormality present. In other words, crisis management.
- Conservative management standard of care is to keep the patient from progressing to abnormality.
- Example: If a patient has 5 consecutive yearly labs and the normal range is 0-10, the first lab in year one is a 2, second year = 4, third year = 7, fourth year = 9, and fifth year = 10. This patient is considered normal to laboratories and conventional medicine.

- However, this patient is clearly moving toward abnormal results.
- The patient has progressed toward pathology all the while being told he/she was “normal”.
- You will see this time and time again.

The Tests

- Complete Blood Count (CBC) – Hematology
- Comprehensive Metabolic Panel (CMP) – Blood Chemistry
- Renal Function
- Parathyroid
- Liver Function
- Thyroid
- Pancreas
- Inflammation
- Lipids

Hematology (CBC)

- Blood is a living tissue and there is a lot to learn by studying the blood.
- Reflects the health of the bone marrow via the Complete Blood Count (CBC).

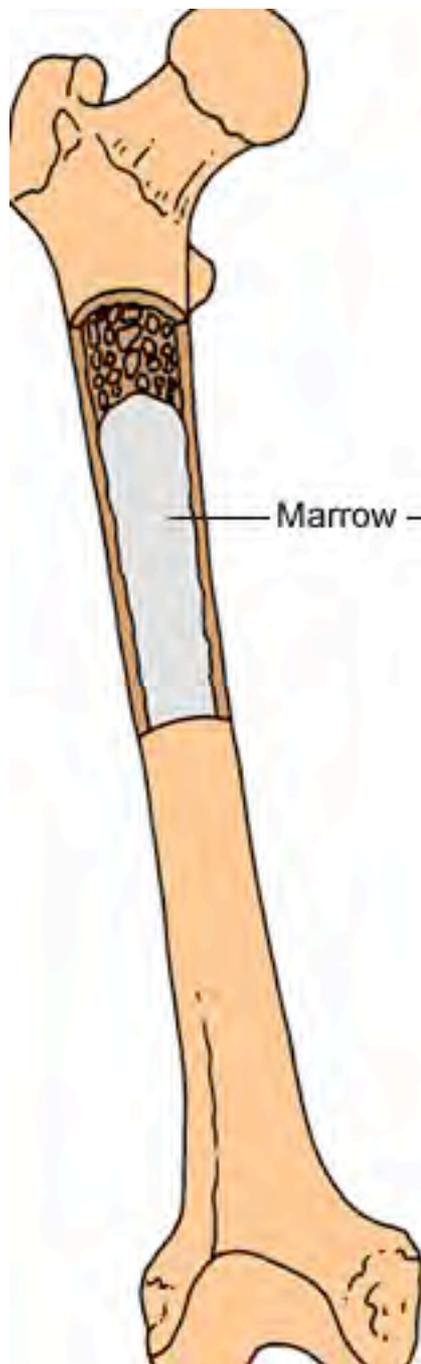
HEMATOLOGY

PID: 70204407

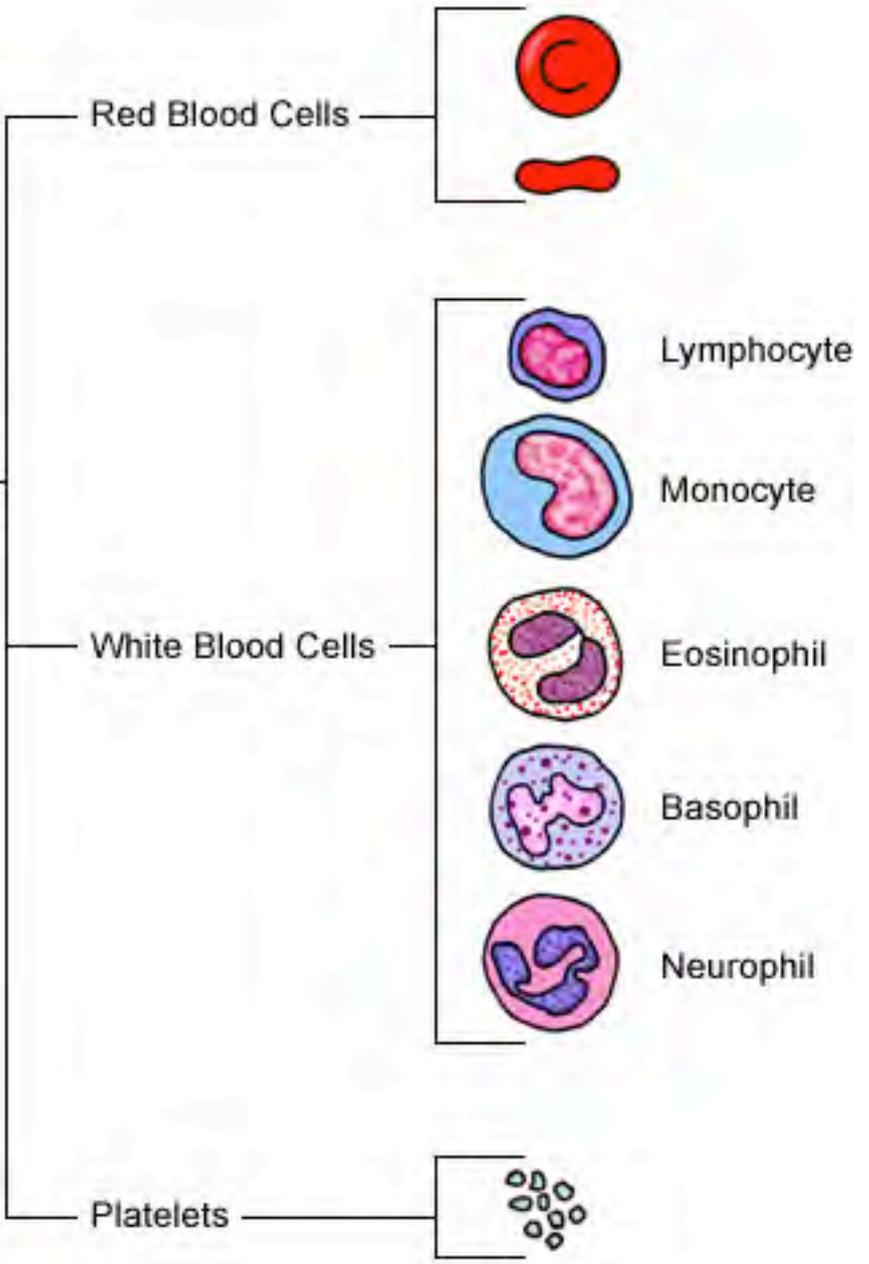
TESTS	RESULT	FLAG	UNITS	REFERENCE INTERVAL
Hemoglobin	13.2		g/dL	11.1-15.9
Hematocrit	40.3		%	34.0-46.6
MCV	94		fL	79-97
MCH	30.8		pg	26.6-33.0
MCHC	32.8		g/dL	31.5-35.7
RDW	13.2		%	12.3-15.4
Platelets	105		x10E3/uL	155-379
Neutrophils	58		%	40-74
Lymphs	33		%	14-46
Monocytes	6		%	4-12
Eos	2		%	0-5
Basos	1		%	0-3
Immature Cells				
Neutrophils (Absolute)	3.8		x10E3/uL	1.4-7.0
Lymphs (Absolute)	2.2		x10E3/uL	0.7-3.1
Monocytes (Absolute)	0.4		x10E3/uL	0.1-0.9
Eos (Absolute)	0.1		x10E3/uL	0.0-0.4
Baso (Absolute)	0.0		x10E3/uL	0.0-0.2
Immature Granulocytes	0		%	0-2
Immature Grans (Abs)	0.0		x10E3/uL	0.0-0.1
NRBC				
Hematology Comments:				
Sedimentation Rate-Westergren	5		mm/hr	0-40
Vitamin D, 25-Hydroxy				
Vitamin D, 25-Hydroxy	27.4	Low	ng/mL	30.0-100.0

Handwritten Annotations:

- Anemia:** Indicated by a bracket next to Hemoglobin and Hematocrit.
- RBC size + shape:** Indicated by a bracket next to MCV, MCH, and MCHC.
- Bone Marrow:** Indicated by a bracket next to MCH and MCHC.
- Clotting:** Indicated by an arrow pointing to Platelets.
- Immune Cells:** Indicated by a bracket next to Neutrophils, Lymphs, Monocytes, Eos, and Basos.



Marrow



Red Blood Cells

White Blood Cells

Platelets

Lymphocyte

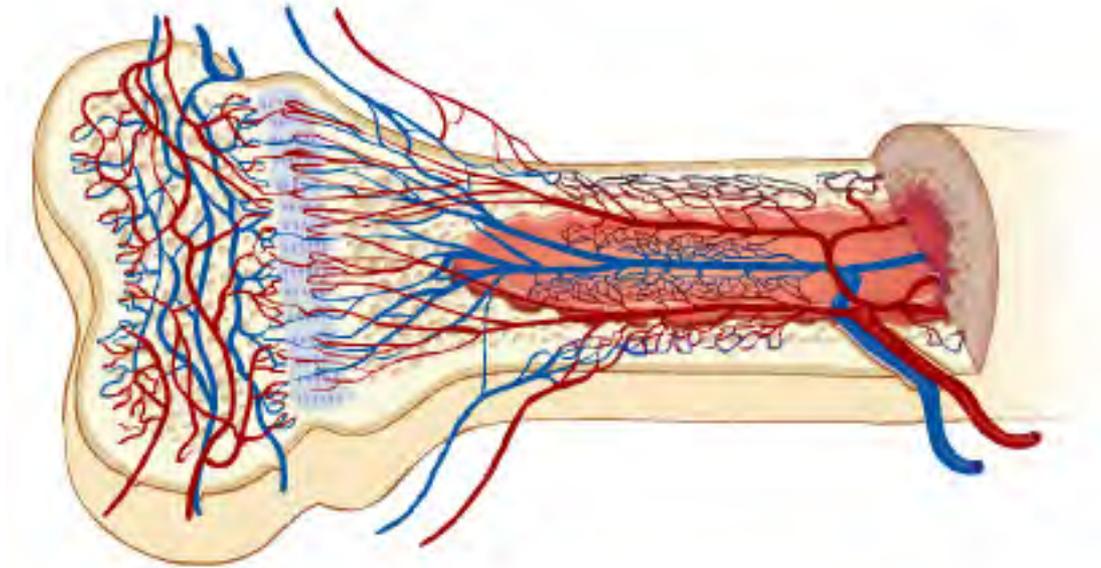
Monocyte

Eosinophil

Basophil

Neutrophil

- Bones have a rich blood supply. Vascular system picks up newly formed blood cells to travel thru the circulatory system.



WHAT DOES THE CBC TELL US?

- The health and the quantity of the:
- RBC's (Red Blood Cells)
- WBC's (White Blood Cells)
- Platelets

RED BLOOD CELLS (RBC's)

- RBC's, hemoglobin and hematocrit
- RBC count: measures how many “packets” of hemoglobin.
- RBC's are little envelopes of hemoglobin that carry oxygen and are made in the bone marrow.
- Normal count should be 3.8-5.3 mil

- Hemoglobin is the actual amount of pigment in a 100 mL of blood, should be about 12 gr of hemoglobin.
- Hemoglobin is a good measure of the blood's ability to carry oxygen throughout the body.
- Hematocrit is the number of solid RBC's when spun down in a centrifuge, compared to the liquid plasma. The volume of space rbc's take up in the blood.

WHAT DOES THE RBC, HEMOGLOBIN AND HEMATOCRIT TELL US?

Is there an anemia present???

- If RBC is below 3.8mil = Anemia
- If Hemoglobin is below 12gr = Anemia
- If Hematocrit is below 34% = Anemia

ANEMIA

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MCHC	32.8		g/dL	31.5-35.7
RDW	13.2		%	12.3-15.4
Platelets	305		x10E3/uL	155-379
Neutrophils	58		%	40-74
Lymphs	33		%	14-46
Monocytes	6		%	4-12
Eos	2		%	0-5
Basos	1		%	0-3
Immature Cells				
Neutrophils (Absolute)	3.8		x10E3/uL	1.4-7.0
Lymphs (Absolute)	2.2		x10E3/uL	0.7-3.1
Monocytes (Absolute)	0.4		x10E3/uL	0.1-0.9
Eos (Absolute)	0.1		x10E3/uL	0.0-0.4
Baso (Absolute)	0.0		x10E3/uL	0.0-0.2
Immature Granulocytes	0		%	0-2
Immature Grans (Abs)	0.0		x10E3/uL	0.0-0.1
NRBC				
Hematology Comments:				
Sedimentation Rate-Westergren	5		mm/hr	0-40
Vitamin D, 25-Hydroxy				

+ RBC] - Anemia

- Red Blood Cell Indices:
- Mean Corpuscular Volume (MCV) is RBC size (average volume) should be around 99fL.
- Decrease MCV = Iron deficiency.
- Increase MCV = B12 deficiency.
- Mean Corpuscular Hemoglobin (MCH) is how much hemoglobin is an average RBC.
- Mean Corpuscular Hemoglobin Concentration (MCHC) determines if RBC's are pigmented correctly.

- Red Cell Distribution Width (RDW): A mathematical equation: If all RBC's are similar in size = Healthy cells.
- If large width, some RBC's too big, some too small = Pathological condition ie: sickle cell anemia.
- Platelets = clotting. (aka Thrombocytes)
- Platelets are the smallest type of blood cells.
- Total platelet count should be 155-380uL. Too few platelets is problematic.
- Below 50uL = significant bruising or uncontrolled bleeding.

HEMATOLOGY

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- Bone Marrow:** Indicated by a bracket next to MCH and MCHC.
- Clotting:** Indicated by an arrow pointing to the Platelets result.
- Immune Cells:** Indicated by a large bracket encompassing the white blood cell differentials (Neutrophils, Lymphs, Monocytes, Eos, Basos, and Absolute counts).

WHITE BLOOD CELLS (WBC's)

THE IMMUNE SYSTEM CELLS

- 5 Different types of White Blood Cells
- Lymphocytes
- Monocytes
- Eosinophils
- Basophils
- Neutrophils
- WBC Count reflects the total count of all types of WBC's

HEMATOLOGY

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- Clotting** (written next to Platelets)
- Immune Cells** (bracketed next to Neutrophils, Lymphs, Monocytes, Eos, Basos, Immature Cells, Neutrophils (Absolute), Lymphs (Absolute), Monocytes (Absolute), Eos (Absolute), Baso (Absolute), Immature Granulocytes, Immature Grans (Abs))

- Neutrophils increase with bacterial infections (Pneumonia, tonsillitis, appendicitis) They increase to combat the bacteria.
- Lymphocytes increase with viral infections (mumps, measles, chicken pox) Small cells with big nucleus.
- Monocytes are the all purpose immune cells that increase with various immune reactions. Increase with the Epstein Barr virus = Mononucleosis
- Eosinophils take up a red dye called eosin and increase with parasites and allergies.
- Basophils pick up an intense blue dye and increase with allergies (Hay fever).

- Summary: The complete blood count tells us what is going on in the bone marrow with the Red Cells, White Cells and Platelets.
- It is an indicator of the health of the bone marrow and the immune cells.

Comprehensive Metabolic Profile (CMP)

- Blood Chemistry: Blood from a chemical point of view.
- A profile of 3 major organs:
 - Kidney
 - Liver
 - parathyroid

Therapeutic target for gout patients: <6.0

BUN	15	mg/dL	6-24
Creatinine, Serum	0.78	mg/dL	0.57-1.00
eGFR If NonAfricn Am	84	mL/min/1.73	>59
eGFR If Africn Am	97	mL/min/1.73	>59
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Calcium, Serum	9.4	mg/dL	8.7-10.2
Phosphorus, Serum	3.5	mg/dL	2.5-4.5
Magnesium, Serum	2.1	mg/dL	1.6-2.6
Protein, Total, Serum	6.6	g/dL	6.0-8.5
Albumin, Serum	4.3	g/dL	3.5-5.5
Globulin, Total	2.3	g/dL	1.5-4.5
A/G Ratio	1.9		1.1-2.5
Bilirubin, Total	0.8	mg/dL	0.0-1.2
Alkaline Phosphatase, S	94	IU/L	39-117
Creatine Kinase, Total, Serum	67	U/L	24-173
LDH	144	IU/L	0-214
AST (SGOT)	29	IU/L	0-40
ALT (SGPT)	40	IU/L	0-32
GGT	17	IU/L	0-60
Iron, Serum	103	ug/dL	35-155

- Kidney Function (CMP)

Parathyroid

Liver Function

High

XXXXXX

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FINAL REPORT

066-216-4465-0

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Renal Function (Kidney)

- Sodium
- Potassium
- Chloride
- BUN (Blood Urea Nitrogen)
- BUN/Creatinine Ratio
- Creatinine

- Blood comes in from the Renal artery:
- The blood is “dismantled”, waste products are eliminated via urine, the blood is “reassembled” and pushed thru the renal vein into circulation
- The Kidney’s job (one of many) is to maintain a balance of minerals with the blood stream using the electrolyte elements – Sodium, Potassium, Chloride, CO₂.

- Sodium = water balancing
- Increase in Sodium = Dehydration. Decrease = too much water
- Chloride & CO₂ = element balancing
- If the body reduces Sodium, it will also reduce, Calcium, Chloride, Potassium as well
- Processed food and industrial salts/preservatives are high in sodium which lead to a loss of electrolytes putting a load on the kidneys.

- The kidney is constantly monitoring and adjusting the alkaline/acid balance of the blood PH to normal values.
- Note: “alkaline water” does not contribute to “proper” PH balance. The body will regulate proper PH balance regardless via kidney function. Similar to carbonated water, the body will neutralize the CO₂ and you are left with H₂O.

- Excretion of Waste:
- Blood Urea Nitrogen (BUN) is a waste product from protein metabolism. It is the ammonia off amino acids. (Example: Burning of amino acids during fasting removes the ammonia from amino acids and the kidneys must remove this toxic ammonia from the blood as urea)
- Urea = Ammonia + CO₂ to excrete
- BUN should be low. The lower the BUN better
- Increased BUN = Increased Kidney load = decreased kidney function.
- Bun/Creatinine Ration – 10-20 times BUN to Creatinine

Parathyroid

- The calcium level found on the CMP is NOT a calcium level of the body (bone).
- It is a parathyroid check!
- Calcium has hundreds of functions in the body, not just bone health. Without calcium, we cannot clot blood, contract muscles or have normal heart function.
- The body will always guard Calcium levels and the range is a very small window as to how much it will release or store.

- Too much calcium in the blood and the body will store it in the bones – Savings account
- Not enough calcium in the blood and the body will leech it from the bones. (caused by SAD and high intake of sodium) – withdraw of savings
- The Parathyroid gland is responsible for the deposit or withdraws of calcium from storage by making Parathormone which regulates the serum calcium levels
- Consistent increase of Calcium levels warrants a referral to an Endocrine specialist for a parathyroid workup.

Liver Function

- The liver is the Master Chemist with hundreds of thousands of chemical reactions.
- The CMP tests shows how well the liver is synthesizing and eliminating.
- If inflamed, the Liver enzymes increase in the blood.

- Liver tests:
- Albumin and Globulins – synthesizing functionality of the liver
- Bilirubin – Eliminating functionality
- SGOT and SGPT – liver enzymes
- Alkaline Phosphatase – liver enzymes that suggest inflammation

- Total Protein – Albumin + Globulin
- Albumin – osmotic balance, decreased in alcoholics
- Globulin – increase with cancer and infection
- Albumin/Globulin ratio – decrease albumin + increased globulin suggests pathology, cancer
- Bilirubin – waste product with yellow pigment. Increased values suggest liver congestion. If levels become too high, pt can present with jaundice.

- SGOT (AST) + SGPT (ALT) are enzymes that belong inside liver cells. They do not belong outside the liver.
- Elevated values suggest liver inflammation/injury that cause enzymes to spill into blood stream.
- Causes: Viral hepatitis, Trauma, Alcohol, Hydrocarbons, Tylenol, Statins, chronic systemic inflammation.

Thyroid Profile

- The thyroid gland makes and stores Thyroxine which is a hormone that determines the rate cells will burn energy – Metabolism (engine idle speed)
- Thyroxine (T4) – 4 atoms of iodine and is the storage form of iodine in the gland.
- When thyroxine is released into the blood stream it goes thru the liver and kidney where an iodine atom is pulled off making the active form Triiodothyronine (T3). (Thyroxin)
- T3 (active form) burns glucose (energy) and revs the engine.

- If there is a too much of Thyroxine (T4) released too often, it will increase the burn rate by making too much T3. These patients present with Hyperthyroid symptoms, rapid heart beat, sweating, higher body temp, etc. leading to systemic problems.
- If there is not enough T4 released then T3 is lacking and metabolism is sluggish. These patients present with hypothyroid symptoms, slow heart beat, cold, lethargic, retain fluid etc., also leading to systemic problems.

How does the body know how much Thyroxine to put out to avoid hyper/hypo thyroid function??

- The pituitary gland constantly measures thyroxine in the blood. If too little, the gland releases a small protein (8 amino acids long) called Thyroid Stimulating Hormone (TSH)
- TSH signals the thyroid to release thyroxine (T4) into the blood to produce T3 (via liver/kidneys)
- When the pituitary gland senses there is enough T4 it decreases thyroxine. (think thermostat)

What does TSH test reveal?

- Increase of TSH = Hypothyroid (body is saying more more more)
- Decrease of TSH = Hyperthyroid (too much thyroxine)
- If you had just one test relating to the thyroid, it should be TSH. It will tell the story for hyper/hypo conditions.

Pancreas

- Regulates Blood Sugar
- Glucose test: Under 100mg/dl reflects normal

Testing Lab: LabCorp of America

Specimen Number 066-216-4465-0	Patient ID 7020XXX	Control Number M680646303	Account Number 34511XXX	Account Phone Number XXX-XXX-XXXX	Account Delivery Route
Patient Last Name XXXXXXXXXX			Account Address Mark D. Emerson, D.C. 14375 Saratoga Ave Saratoga, CA 95070		
Patient First Name XXXXXX		Patient Middle Name			
Patient SS#	Patient Phone		Total Volume		
Age (Y/M/D) 58/2/0	Date of Birth 01/07/56	Sex F	Fasting Yes		
Patient Address Fort Myers, FL 33901			Additional Information		
Date and Time Collected 03/07/14 09:46	Date Entered 03/07/14	Date Entered 03/08/14 08:06	Physician Name M. Emerson	NPI	Physician ID
Tests Ordered CMP12+LP+TP+TSH+7AC+CBC/D/P...;Homocyst(e)ine, Plasma;Vitamin D, 25-Hydroxy					
General Comments PID: 70204407					

TESTS	RESULT	FLAG	UNITS	REFERENCE INTERVAL
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CMP12+LP+TP+TSH+7AC+CBC/D/P...				
Glucose, Serum	104	High	mg/dL	65-99
Hemoglobin Alc	5.8	High	%	4.8-5.6

Pancreas

Increased risk for diabetes: 5.7 - 6.4
 Diabetes: >6.4
 Glycemic control for adults with diabetes: <7.0

- A mildly high glucose could be a fasting error issue or possible carb load the night before fasting lab.
- Therefore having the hemoglobin A1c is important to confirm blood handling issues, pre-diabetes and diabetes.
- Hemoglobin A1c is the percentage of hemoglobin in the blood stream that is sticky with sugar. It is an average blood sugar over the previous 8-12 weeks.
- Over 7% confirms diabetes
- 5.7-6.4 = Pre diabetes
- Used to Dx diabetes and/or monitor diabetes patients

- The patient below: Glucose 104 - Hemoglobin A1c 5.8 = Pre Diabetic
- NOW is the time to help this patient with dietary changes Next years lab will most like

Testing Lab: LabCorp of America

Specimen Number 066-216-4465-0	Patient ID 7020XXX	Control Number M680646303	Account Number 34511XXX	Account Phone Number XXX-XXX-XXXX	Account Delivery Route
Patient Last Name XXXXXXXXXX			Account Address		
Patient First Name XXXXXX		Patient Middle Name		Mark D. Emerson, D.C. 14375 Saratoga Ave Saratoga, CA 95070	
Patient SS#	Patient Phone	Total Volume			
Age (Y/M/D) 58/2/0	Date of Birth 01/07/56	Sex F	Fasting Yes		
Patient Address Fort Myers, FL 33901			Additional Information		
Date and Time Collected 03/07/14 09:46	Date Entered 03/07/14	Date Entered 03/08/14 08:06	Physician Name M.Emerson	NPI	Physician ID
Tests Ordered CMP12+LP+TP+TSH+7AC+CBC/D/P...;Homocyst(e)ine, Plasma;Vitamin D, 25-Hydroxy					
General Comments PID: 70204407					
TESTS	RESULT	FLAG	UNITS	REFERENCE INTERVAL	

CMP12+LP+TP+TSH+7AC+CBC/D/P...

Glucose, Serum

Hemoglobin A1c

↑ Pancreas

104
5.8

High
High

mg/dL
%

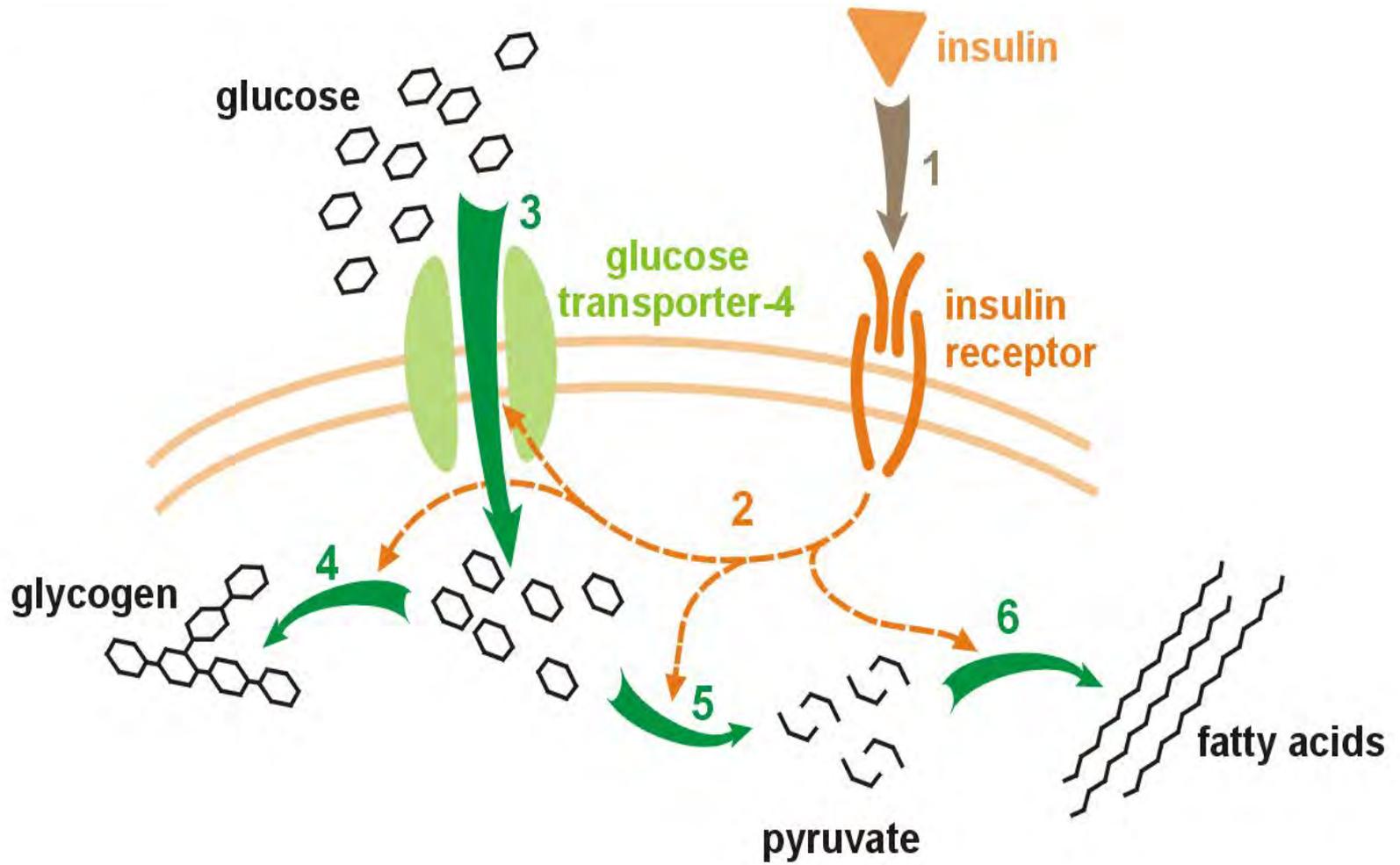
65-99
4.8-5.6

Increased risk for diabetes: 5.7 - 6.4

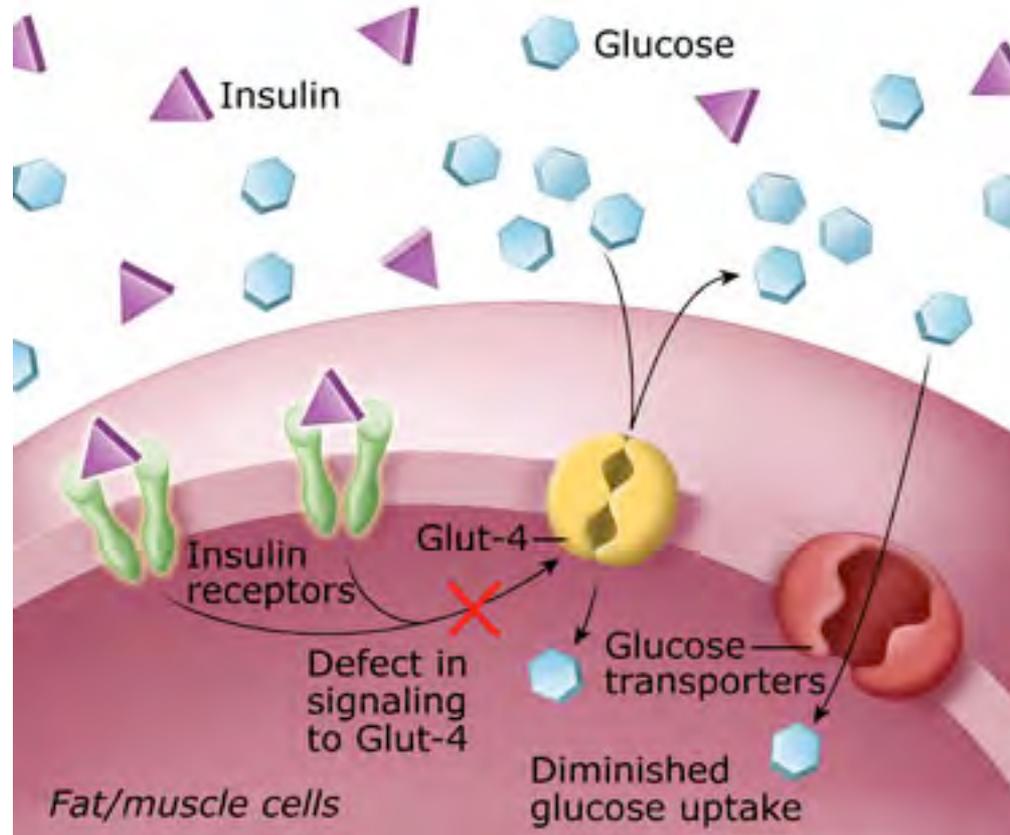
Diabetes: >6.4

Glycemic control for adults with diabetes: <7.0

- A word on Diabetes. It has long been a medical misconception that Diabetes type 2 (adult onset) was caused by high sugar intake. We now understand Diabetes type 2 is due to high dietary fats rather than high sugar intake issue. High refined sugar intake can aggravate blood glucose levels, but the insulin resistance is coming from fat accumulation inside the cell.
- In order for glucose to enter the cell and used as energy, the insulin receptor site on the cell membrane acts like a key to open the cell for the glucose to enter. In the diabetic 2 patient the insulin receptor sites of the cell membranes become impacted with fat that blocks the insulin key from opening the cell thus deflecting glucose back into the blood stream.
- High fat dietary intake as seen in the SAD, cause an excessive accumulation of intramyocellular lipids which block the cell key and result in insulin resistance contributing to diabetes 2, obesity and metabolic syndrome.
- Diabetes 2 is a dietary fat intake issue not a sugar intake issue.



Type 2 Diabetes: Insulin Resistance



- Diabetes 2 is preventable and reversible with proper dietary protocols and monitoring.
- By utilizing the Blood Glucose and Hemoglobin A1c tests you can help manage and in most cases prevent your patients from progressing to diabetes.
- Diabetes 2 is a diet induced condition
- Fortunately, the proper dietary protocols can reverse and resolve diabetes 2

Tissue Damage Tests

- Looking for cellular turnover and tissue damage markers.
Uric Acid and LDH Levels:
- Uric Acid: is from the chemical breakdown of the purine bases that form DNA and RNA. As cells die they release their DNA from their chromosomes, purines are converted into uric acid. High levels of uric acid suggests large amounts of tissue death and the kidneys are having a hard time excreting the amount of uric acid. High levels can cause uric acid crystal formation leading to **gout**.
- Lactic Acid Dehydrogenase (LDH): is released into the blood stream with tissue destruction i.e.: abscess, cancer, mm damage, myocardial infarction. When LDH levels are elevated, there is something seriously wrong with the patient.
- The lower the levels of Uric Acid and LDH, the better!

Inflammation:

CRP, Cardiac CRP & SED RATE

- C-Reactive Protein (CRP): blood test that measures the amount of a protein called C-reactive protein in the blood.
- C-reactive protein measures general levels of inflammation in the body. High levels of CRP are caused by infections and many chronic diseases.
- A CRP test does not show the exact location of the inflammation or the exact cause, however, it does serve as a good inflammatory marker in conjunction with the other tests included in the standard lab orders.
- High Sensitivity C-Reactive Protein: (cardiac CRP) is more specific for CVD. It picks up a protein that leaks off the surface of damaged blood vessels.
- A good test for high risk patients and/or patients with significant family history of CVD. Not a routine test, CRP and Cardiac CRP - a value close to zero is ideal.

- Sedimentation Rate (Sed Rate): Long standing inflammatory marker. The sed rate is determined by measuring the time blood cells fall and “Sediment” on the bottom of a test tube.
- How fast they fall is the Sedimentation Rate. Normal cells fall at 10-30 mm/hour (20 male, 30 female)
- If inflammation is present in the body ie: RA, colitis, migraines, there will be a change in blood chemistry and the sed rate increases. Similar to most inflammatory markers, the lower the test value the better.

Special Chemistry Values

- B-12: I don't order serum B-12 tests much any more as many patients are taking fortified blue green algae, sea veggies and fortified foods that can create inaccurate high levels due to these fortified B-12 analogs.
- A Homocysteine Test is better: Homocysteine is an antioxidant by-product from the breakdown of Methionine (essential amino acid). Too high of Homocysteine damages arteries.
- B-12 helps to metabolize Homocysteine, therefore the Homocysteine level is a good index of B-12 levels. If there is an elevated Homocysteine level, most likely a B-12 deficiency is present. Elevated Homocysteine levels also suggest inflammation and increased cardiovascular risk.
- 1000mcg of B-12 per day for 3 months plus increased dietary greens for folate and B-6 will help also reduce Homocysteine levels and increase healthy methyl donors.
- If there is an elevated Homocysteine + decreased serum Vitamin D then B-12 and Vitamin D should both be supplemented.

- Vitamin D: once thought to be only important for calcium utilization and the prevention of rickets, it is now understood that Vitamin D has hundreds of reactions in the body.
- It stabilizes membranes, has anti-cancer properties, Alzheimer's protection and supports immune function. There are many reasons to keep Vit D levels up.
- 25-hydroxy Vitamin D test is most accurate assessment
- Vitamin D levels below 30 is considered deficient
- Ideal levels should be 50-80 ng/mL
- Vitamin D is easy to supplement and too important to overlook.

Lipids

- Cholesterol: is an essential molecule in the body where it is used as a building block material for important substances such as hormone production, estrogen, testosterone, cortisol etc.
- Cholesterol is not an evil substance. The body needs it, the liver makes it and therefore it is important, however, if cholesterol levels become too high and then oxidize from free radicals associated with poor eating and lifestyle habits then it can become a sticky substance that contributes to plaque buildup. Too much means too many “sticky” opportunities.

Lipid Panels

CMP12+LP+TF+TSH+TAC+CBC/D/P...; HOMOCYSTEINE, Plasma, vitamin D, 25-OH
 General Comments
 PID: 70204407

TESTS	RESULT	FLAG	UNITS	REFERENCE INTERVAL
Ferritin, Serum	161	High	ng/mL	15-150
Cholesterol, Total	178		mg/dL	100-199
Triglycerides	75		mg/dL	0-149
HDL Cholesterol	54		mg/dL	>39
According to ATP-III Guidelines HDL-C >59 mg/dL is considered a negative risk factor for CHD.				
VLDL Cholesterol Cal	15		mg/dL	5-40
LDL Cholesterol Calc	109	High	mg/dL	0-99
Comment:				
T. Chol/HDL Ratio	3.3		ratio units	0.0-4.4
Estimated CHD Risk	< 0.5		times avg.	0.0-1.0

Lipids

T. Chol/HDL Ratio

	Men	Women
1/2 Avg.Risk	3.4	3.3
Avg.Risk	5.0	4.4
2X Avg.Risk	9.6	7.1
3X Avg.Risk	23.4	11.0

The CHD Risk is based on the T. Chol/HDL ratio. Other factors affect CHD Risk such as hypertension, smoking, diabetes, severe obesity, and family history of premature CHD.

TSH	3.820		uIU/mL	0.450-4.500
	6.8		ng/dL	4.5-12.0

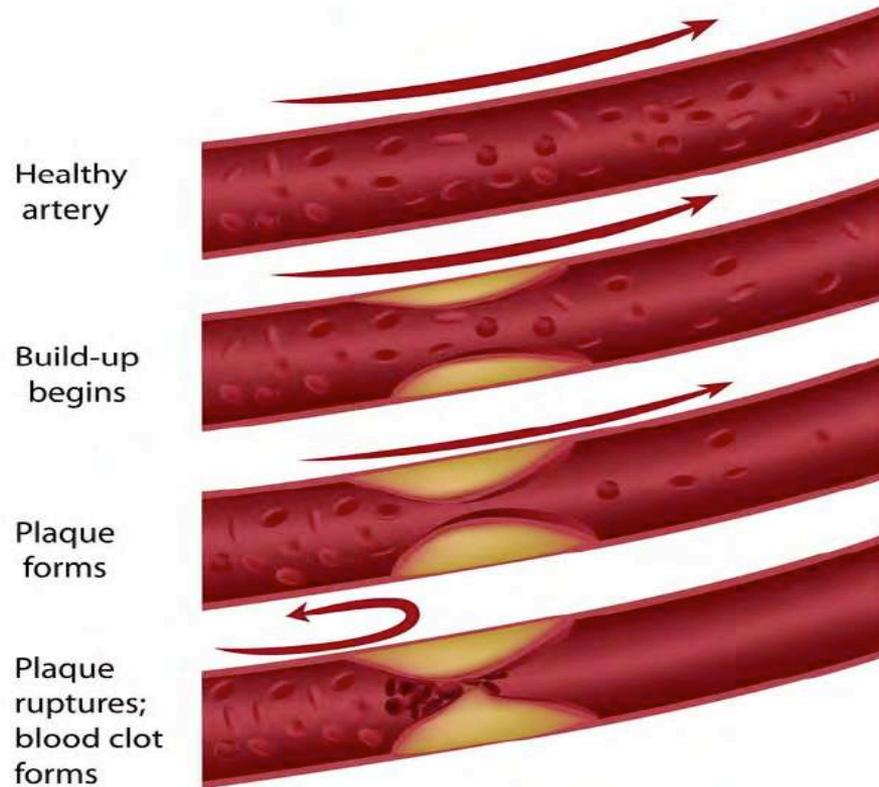
- High Density Lipoproteins (HDL): The protective good cholesterol.
- Pulls cholesterol out of the plaques and arteries. Known as the “garbage truck” that removes garbage away from the arteries.
- Higher the better for patients who eat the SAD
- Ideally Over 49 mg/dl
- Low Density Lipoprotein (LDL) & Very Low Density Lipoprotein (VLDL): these are the bad cholesterol which oxidize and contribute to plaque build up within arteries.
- The lower the better for LDL & VLDL

- **Clinical pearl:** It is not uncommon for vegans/vegetarians who follow a healthy low fat diet to score low in all types of cholesterol. Low levels of HDL's are not of a clinical concern as the entire cholesterol profile is low.
- If the diet is clean and the arteries are clean the need for the HDL's (garbage trucks) goes down. No garbage = no garbage trucks.
- Low HDL's + low LDL's are not a risk factor!
- Food for thought: High HDL's are an artifact of the SAD. They are a protective response from the body. The truth is; ALL levels should be low since there should not be much cholesterol to remove from the arteries if the patient is eating a cleaner more healthy diet.
- Statins lower cholesterol by impairing cholesterol production in the liver. In other words, makes the liver sick.

- Clinical Thought:
- The Question is NOT how “high” is your Cholesterol?
- The true question is: How Clean are your arteries???
- If the arteries are clear, cholesterol levels are not that important.

Clean Arteries?

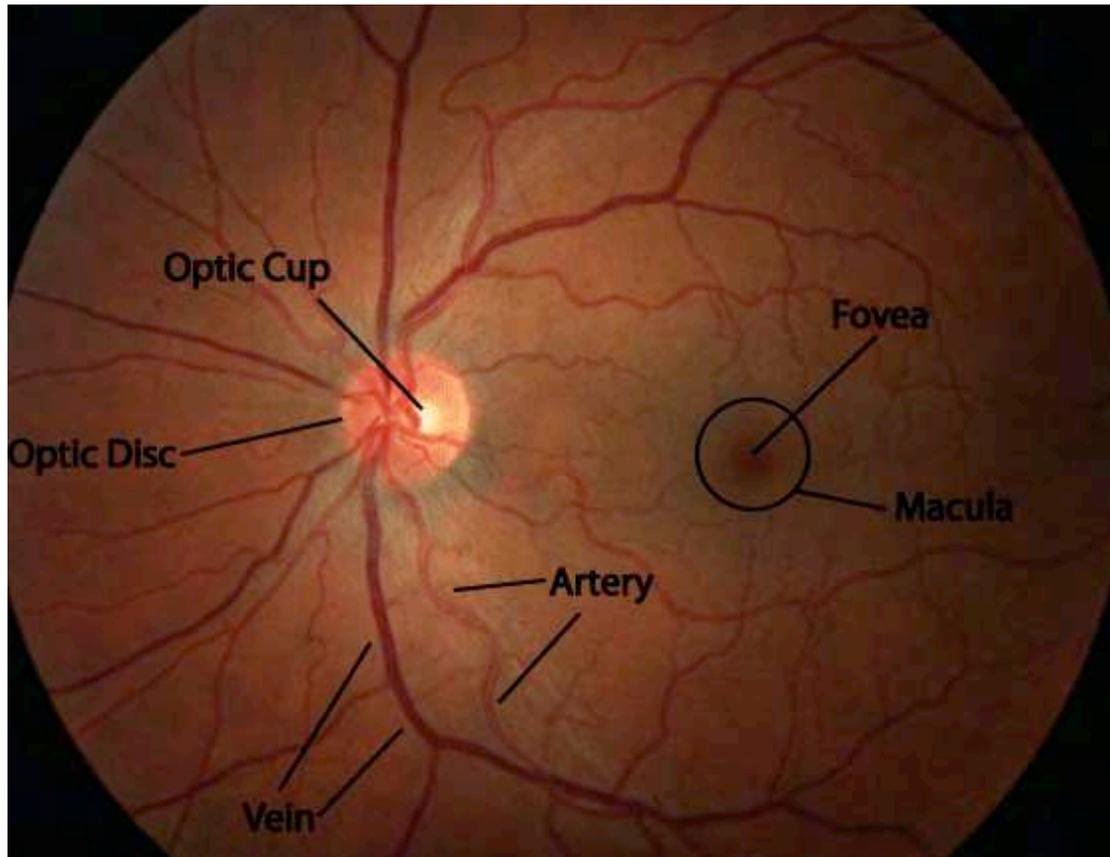
STAGES OF ATHEROSCLEROSIS



How do we tell how clean the arteries are??

- Non invasive procedures:
- Ophthalmoscope Exam, Ultrasound Scan and Carotid Intima Media Thickness (CIMT)
- Ophthalmoscope exam: The eye is where we can look at the arteries directly!
- Check the arteries in the retina. They should look healthy.
- It is possible to see cholesterol plaques within the arteries of the retina.

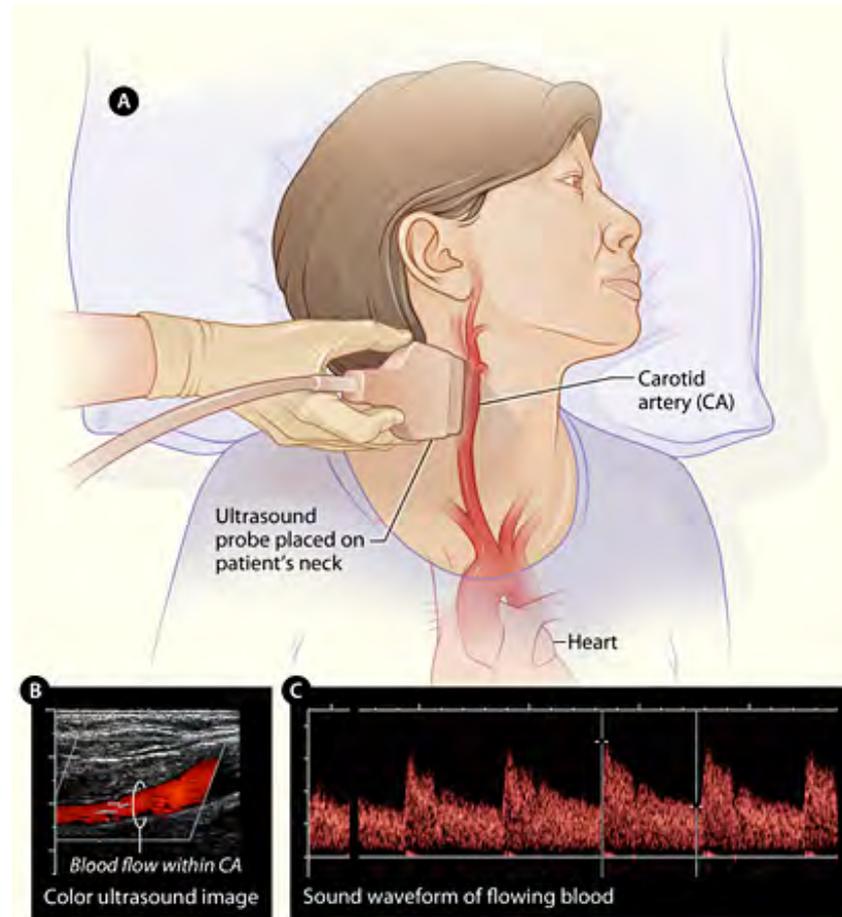
Healthy Retinal Arteries



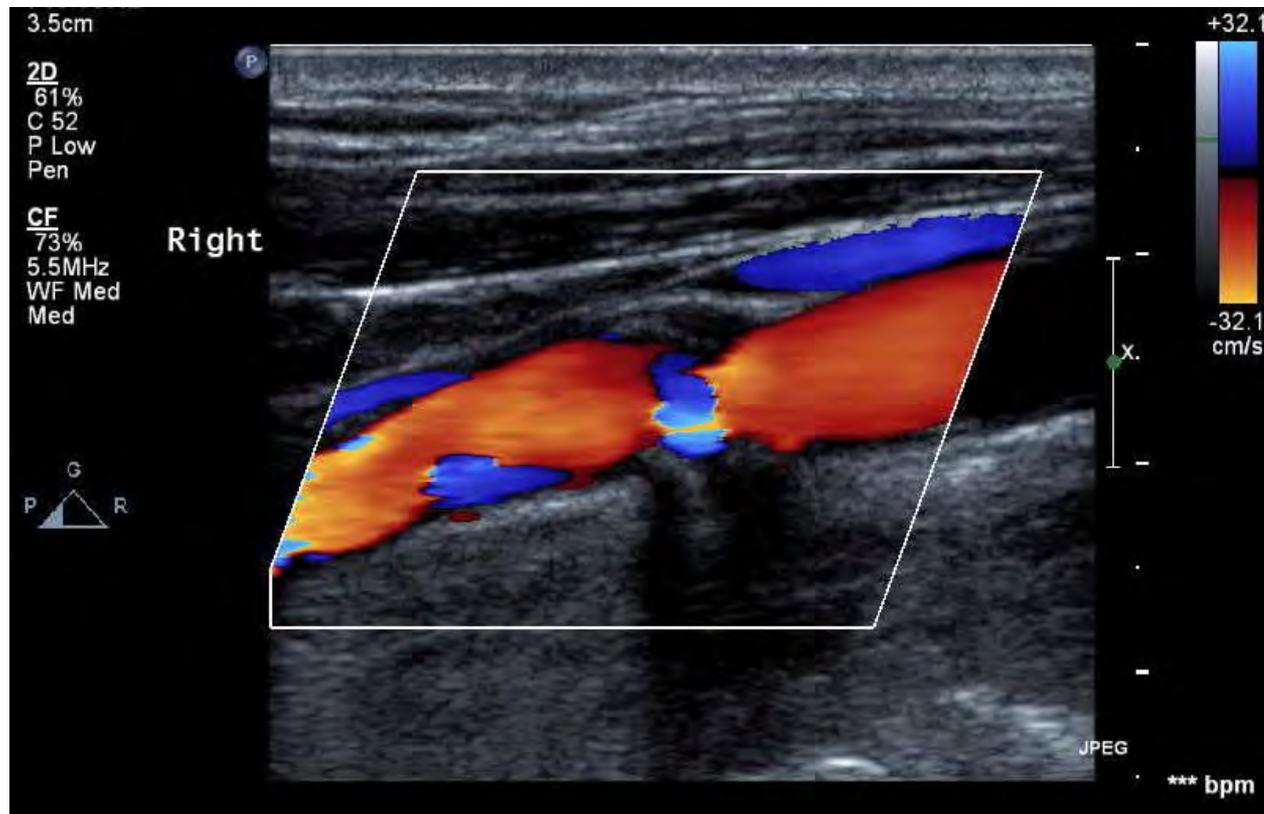
Cholesterol Plaques



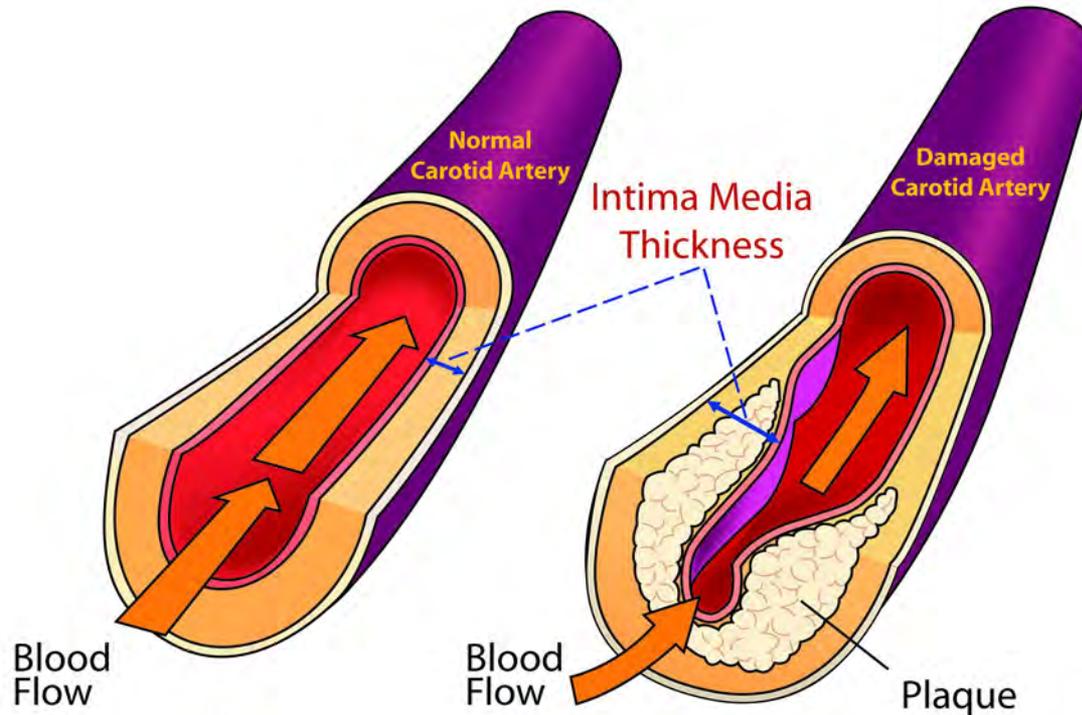
- The Ultrasound Scan of the Carotid or Abdominal Aorta



- The Ultrasound is a helpful study you (check your state scope rules) or an MD can order. Helps determine carotid plaque build up, swirls, eddies, ulcerating plaques for clot, stroke risk.



Carotid Intima Media Thickness: Measurement of the artery wall. Increased thickness =
Incr



- Remember, most everything our patients present with; High lipids, inflammation, reduced liver function, increased cardiac risk; they accumulated day by day, bite by bite through their poor dietary and lifestyle choices.
- Chronic progressive disease REQUIRES chronic progressive bad lifestyle choices.
- However, these elevated signs of damage and disease are reversible with the proper diet and the blood test results will improve as the patient's health improves.
- The arteries, organs and systems will repair and heal with proper dietary changes.

Lab & Nutrient Corollaries

- The lab results are full of helpful information which if viewed with an additional nutrient point of view, can be used to help your patients make better decisions about their health and long term wellbeing.
- As I hope you can see, many of the problems we encounter daily are due to a lack of appropriate nutrient intake or uptake and the dangers of the Standard American Diet (SAD).
- They are not caused by a drug deficiency. Yet the standard of care is to prescribe drugs to combat the symptoms of poor nutrient intake and systemic breakdown that manifest on lab reports as “abnormal”.
- Lets look at a few common lab results and how they correspond to nutrient issues:

Common Lab Findings

- Decreased Hemoglobin – Iron deficiency
- Decreased Hematocrit – B12, Folic Acid deficiency
- Decreased MCV – B6, Iron deficiency
- Increased MCV – B-12, Folic Acid deficiency
- Increased/decreased MCH – Iron, B-12, Folic Acid def.
- Increased/decreased MCHC – Iron, B-12, Folic Acid def.
- Decreased WBC – B-12, Folic Acid deficiency
- Do you see the common denominator?
- Lack of dietary nutrients! Particularly the methyl donors; B-12, B-6 and Folate.

- Anemia and Dietary methyl donor deficiency is common in patients who eat the Standard American Diet (SAD)
- If Clinicians focused on nutrient insufficiency/deficiency in more detail, then managing a patient's well being is far more achievable.
- The nutrient correlation should not be overlooked to improve the health of our patients and many patients are looking for nutritional guidance.
- you have an understanding of the valuable information standard blood labs provide and how in the absence of advanced pathology, the routine lab is an excellent tool for the Natural based healthcare professional to provide nutritional insight.
- Take Nutritional Labs Part 2 for additional clinical insight to utilize labs in your practice.

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