NORTHWESTERN HEALTH SCIENCES UNIVERSITY

BLT SYSTEM
BLOOD LAB TESTING
www.BLTSYSTEM.com

Pain & Fatigue - A Practical Application of Lab Testing and Nutritional Therapies

Presented by:
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All seminar materials, handouts, case studies can be found at this link: bltsystem.com/documents

A little about me.

When did I start doing lab testing?

- Graduated NWHSU in 1997
- Started in private practice promoting weight loss
- Started doing lab testing in my first year of practice
- Diplomate Degree in Clinical Nutrition
- Created the BLT System
- Continue to be in private practice + helping other providers easily incorporate functional lab testing into patient care + providing easy access to low-cost lab testing.

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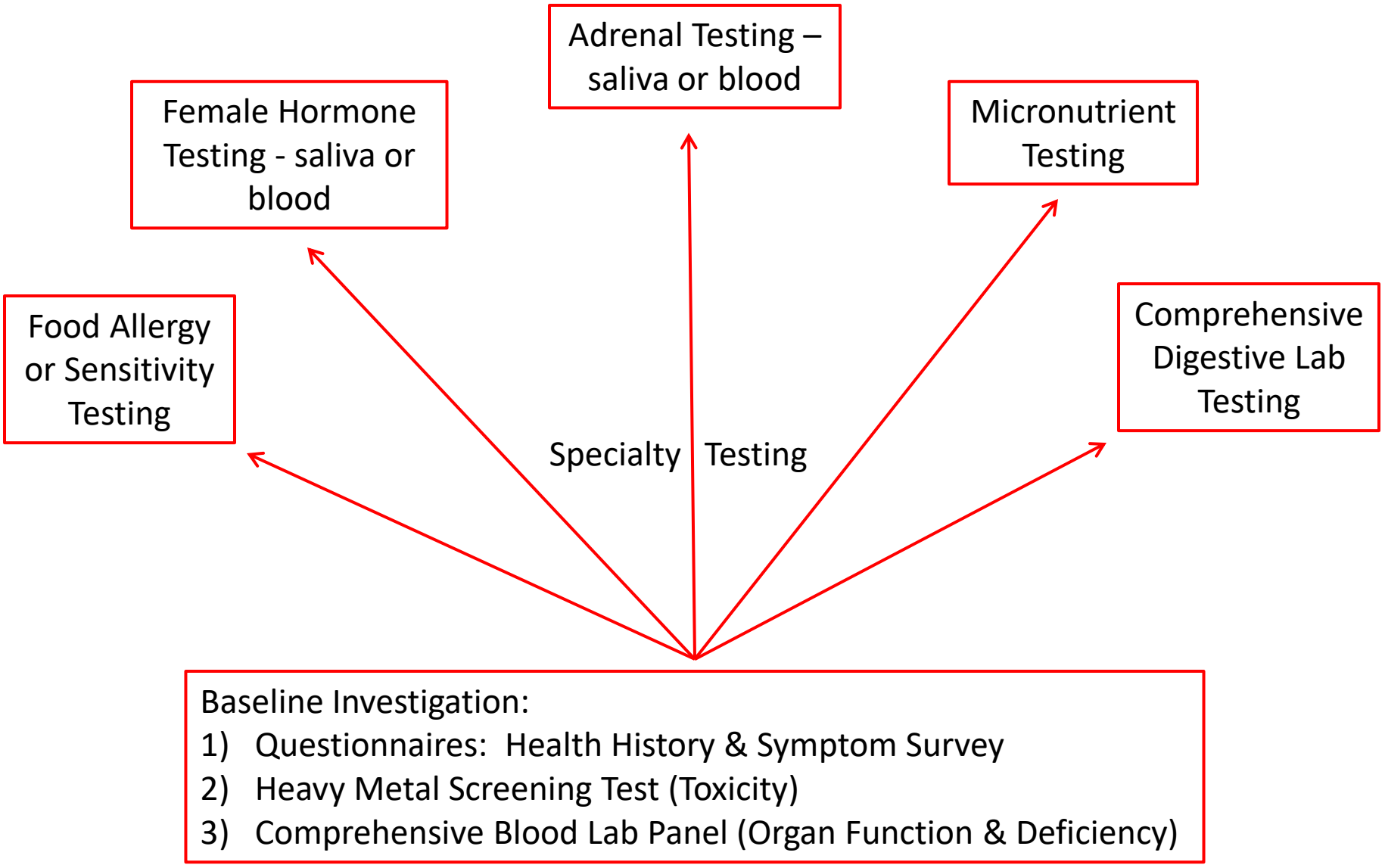
This is why your lab tests are "normal" but you still feel sick:

In these areas you will find lab results that a doctor will say are "normal" but they are not!

Goals for this 2-Hour Presentation on Pain & Fatigue

- To review a list of the most common causes of Pain and Fatigue in your patient population from a Functional Medicine perspective.
- To go into more detail on a handful of these causes – specifically the ones you are more likely to see in your patient care.
- Learn how to approach or discuss these concerns with your patient or client in a practical way.
- What to say or recommend to your patient if you are not wanting to do lab testing so you can be a better resource to them for their health.
- Easy ways to order low-cost lab testing and easy interpretation . . . if you are looking to do that with your patient.
- What to do if you are getting out of your comfort zone.



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Baseline Investigation

- Questionnaires:
  - General Health
  - Symptom Survey – many good ones out there.
  - Toxicity/Detox Questionnaire – if you think you may be incorporating a detox process into your patient programs.
- Heavy Metal Screening Test (HMT)
  - Nissen Medica
  - 1-888-888-9145
  - info@nissenmedica.com
  - Clinic cost is @ $10 per kit for HMT1 (Item #110) and I sell for $29.95

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Blood Lab and Specialty Testing

- Comprehensive Lab Panel or other blood lab testing:
  - www.bltsystem.com – “Order Lab Testing”
- Specialty Lab Testing
  - Food Sensitivity Testing – ELISA/ACT Biotechnologies – I typically do the 166 food panel – cost is $410.
  - Female Saliva Hormone Testing – Diagnos-Techs or ZRT
  - Adrenal Testing – DHEA and Cortisol blood testing through the BLT System, or saliva testing (ASI) through Diagnos-Techs or ZRT Labs.
  - Micronutrient Testing - SpectraCell Micronutrient Test
  - Comprehensive Digestive Stool Analysis (CDSA) – Doctors Data as the CDSA with Parasitology x3.

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Why would you consider doing blood lab testing on your patient?

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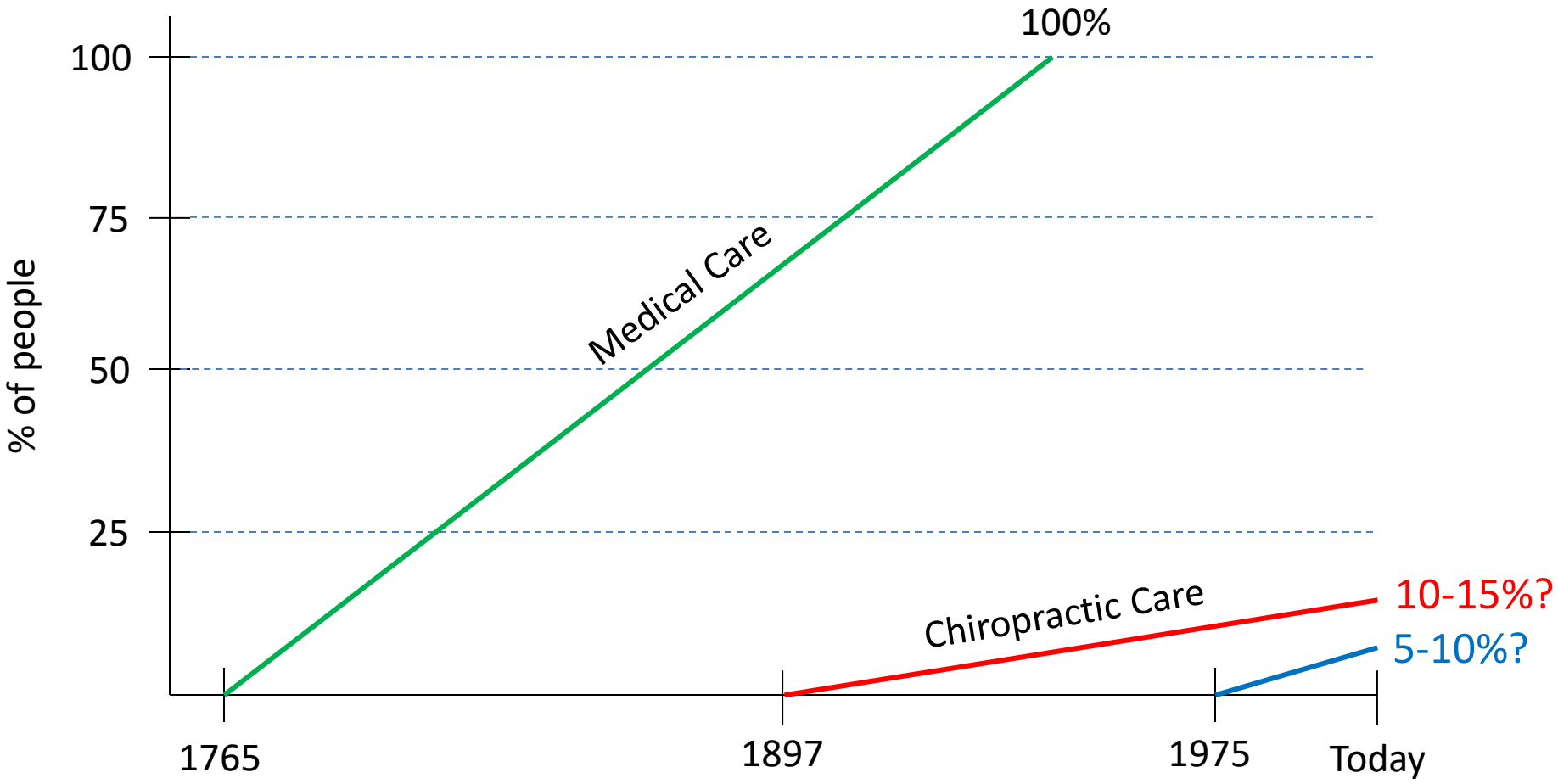
Let’s also look at this from another perspective!



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What are some of the health issue or imbalances that can lead to pain and/or fatigue?

Low Iron

Thyroid Issues

Blood Sugar Issues / Insulin Resistance

Neuropathy

Inflammation

Lyme Disease

Adrenal Issues

Infection

Toxicity

Digestive Issues

Poor Sleep / Sleep Apnea

Food Sensitivities

Mitochondrial Issues

Autoimmune Disease

↑ Uric Acid

Overweight / Obesity

Injury

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Overweight & Obesity

Let's start with the elephant in the room!

- The problem that is visually obvious, but no one is fixing it.
- Affecting hundreds of millions of Americans with estimates stating more than 2/3 of Americans are either overweight or obese, and it's also a worldwide problem.
- We all have patients, family, neighbors, friends, community that are either overweight or obese.
- Let's go beyond stating to the patient that is would be good for them to lose weight and provide them with an easy and effective starting point.

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Overweight & Obesity

How does this relate to Pain & Fatigue?

Mass vs Gravity

- The equation is simple. The greater the mass the greater the weight as gravity is pulling that larger mass to the center of the earth.
- While muscles can easily adapt to become stronger to support the extra weight, your joints and cartilage do not have that same ease of adaptation.
- The greater the weight the more pressure goes into joints = faster joint damage over time = Pain!
- The greater the weight = muscles working harder = more energy consumed = Fatigue!

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Overweight & Obesity

There isn't really a lab test that defines if a person is overweight or obese.

- While you can look at BMI, Waist to Hip Ratio, and other variables . . . most patients already know if they are overweight or obese.
- Lab testing can help you discover some of the causes or effects of being overweight or obese.
- As a provider you can basically see if a person carrying excess body weight.
- So let's jump right into the practical application of how we can approach this with our patients and how we can get them off to a good start.

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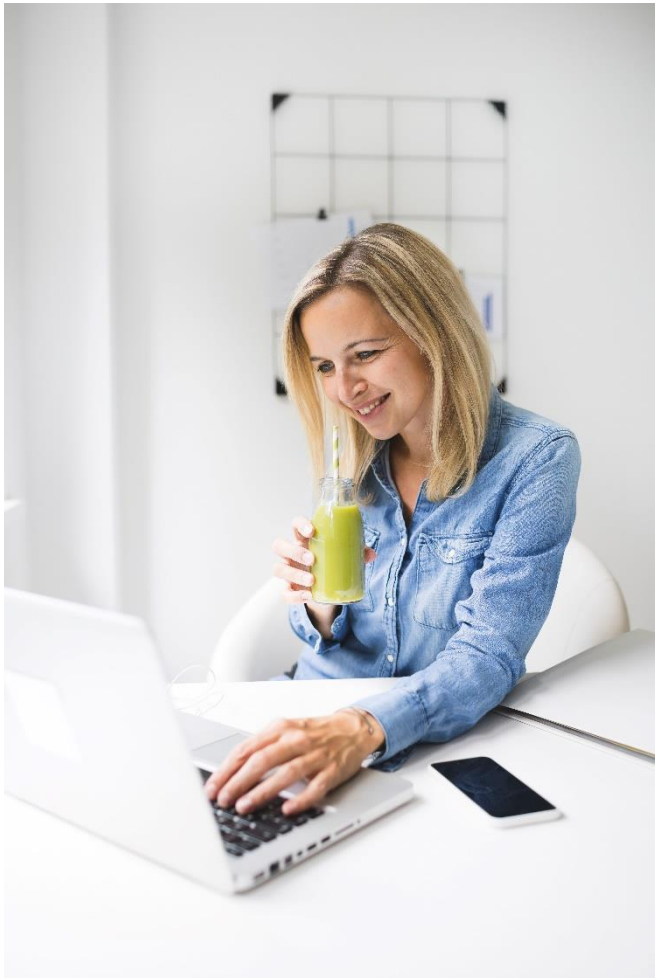
Overweight & Obesity

The 7 Day Detox



- We've all heard of or learned about detox programs from various nutrition companies . . . and maybe you've done them yourself.
- Before you dismiss this idea hear me out as you may not be seeing the full value of what you can learn about the patient and how you can help them using this strategy.
- Simple . . . . effective . . . and a great service you can provide to your patients and community.

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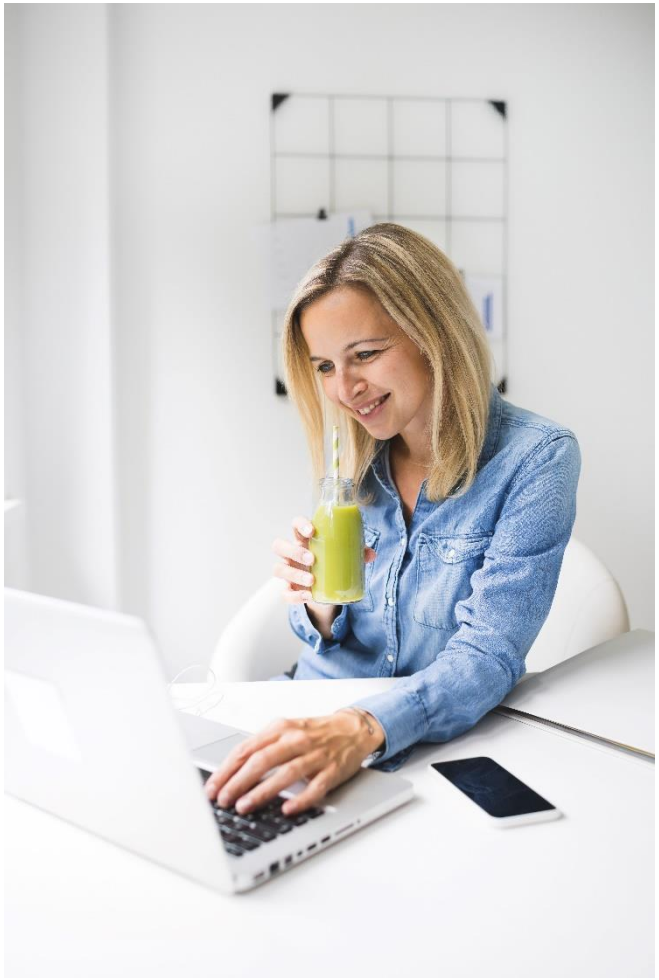
Overweight & Obesity

The 7 Day Detox



- Here is the plan:
  1. A detox shake for breakfast
  2. A detox shake for lunch
  3. A protein & vegetable meal in the evening.
  4. if needed a healthy snack during the day for help ease hunger.
  5. Lots of water.
  6. Exercise (cardio) for 1 hour each of the 7 days. Does not have to be all at one time.
  7. Get good rest.

- This can work with any detox / metabolic cleanse program from any nutrition company.

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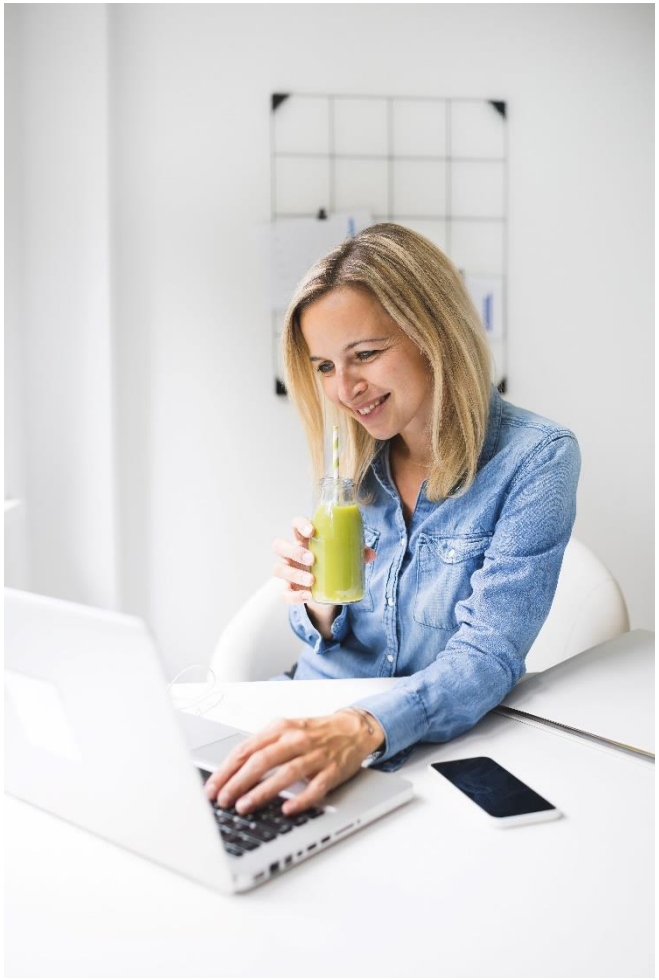
Overweight & Obesity

The 7 Day Detox



- Regardless if they lose weight or don't lose weight during the 7 Day detox we gain valuable information about their body.

- In the 7 Day Detox:
  1. They are eating fewer calories
  2. They are increasing activity to stimulate metabolism.
  3. They are support the detox pathway of the body.

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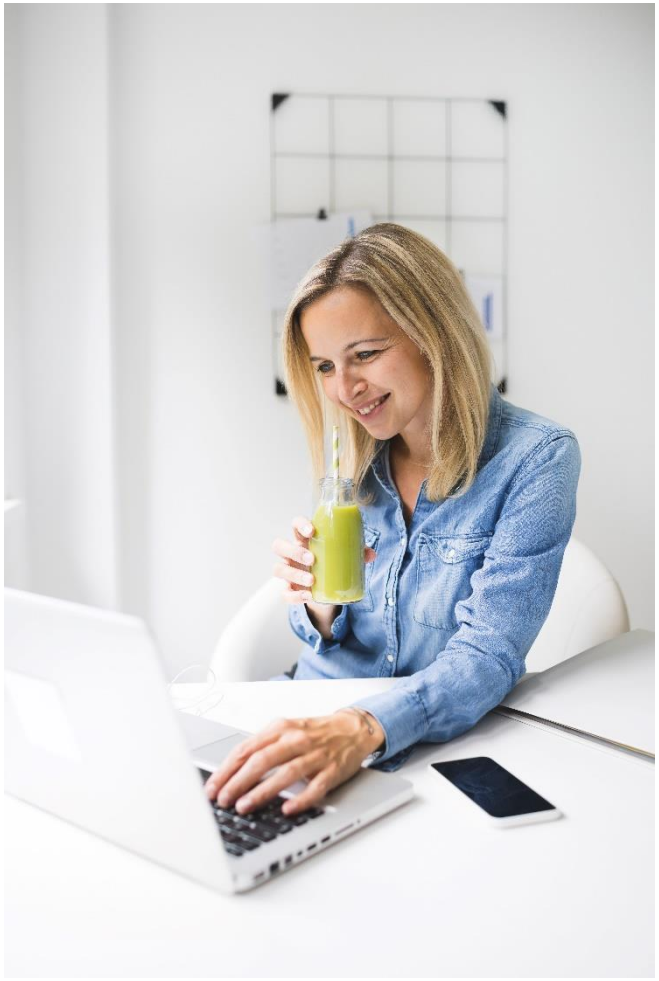
Overweight & Obesity

The 7 Day Detox



SUCCESS!!

- If they see a decent weight loss (@5 or more pounds) then it means:
  1. They are likely eating more calories than they realize.
  2. They are not active enough to properly stimulate their metabolism.
  3. They have a build-up of toxins in their body that is limiting their ability to lose weight.
  4. Or some combination of the above 3.
  5. Congratulate them and tell to focus on maintaining their weight loss for a few weeks and then do the 7 Day Detox again.

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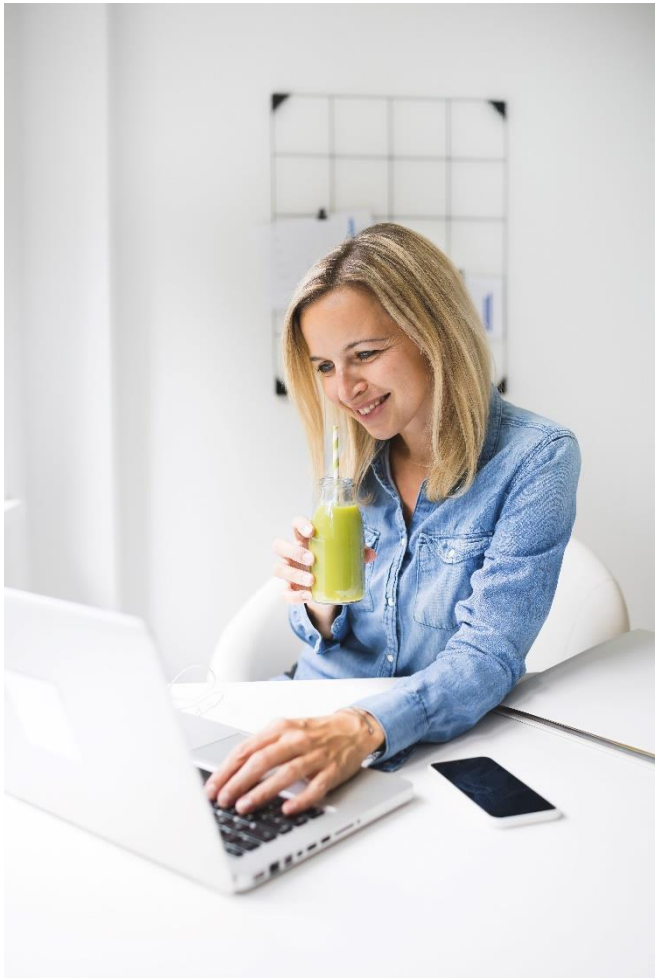
Overweight & Obesity

The 7 Day Detox



NO SUCCESS!!

- If they see little to no weight loss then it means their difficulty with losing weight is less likely due to:
  1. Calorie intake.
  2. Activity level.
  3. Toxicity of the body.

- We now need to educate the patient that their inability to lose weight is more likely due to some other issue or imbalance of body chemistry ;
  - Thyroid or other hormone issue
  - Blood Sugar / Insulin Resistance
  - Inflammation
  - Digestive Issues
  - Food Sensitivities
  - … and more!

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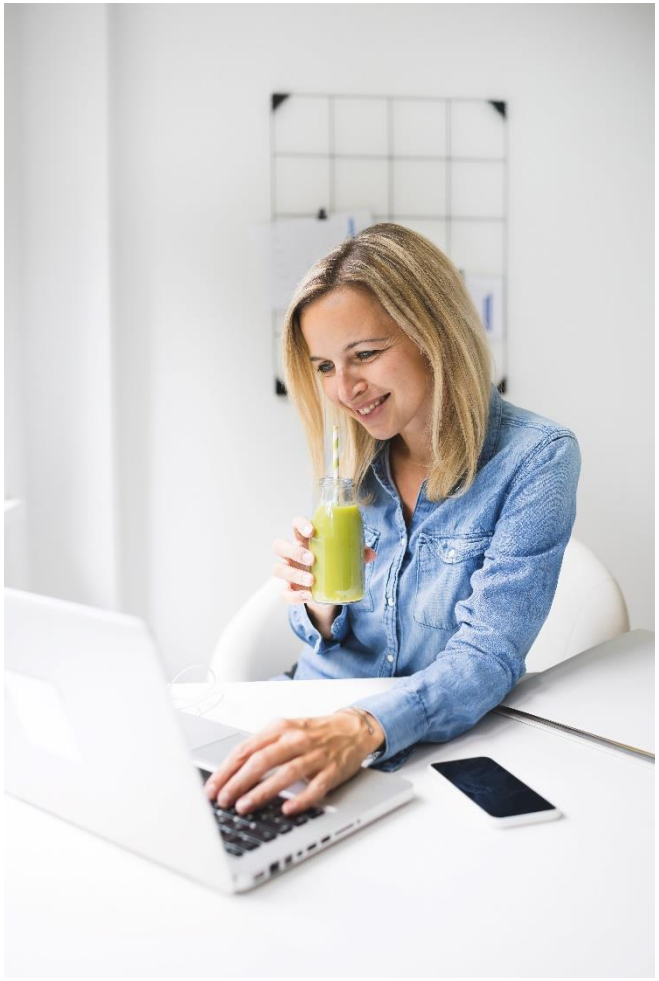
Overweight & Obesity

The 7 Day Detox



Even if they don't lose weight people often report better energy, better sleep better digestive function, and more . . . so it is still a win!

Regardless if they do or don't lose weight you have gained valuable information and you are now one step closer to solving the puzzle

A 7-Day Detox Flyer and "Dr. Larson's tips for Success" are available for you to download and use for free at: www.bltsystem.com/documents

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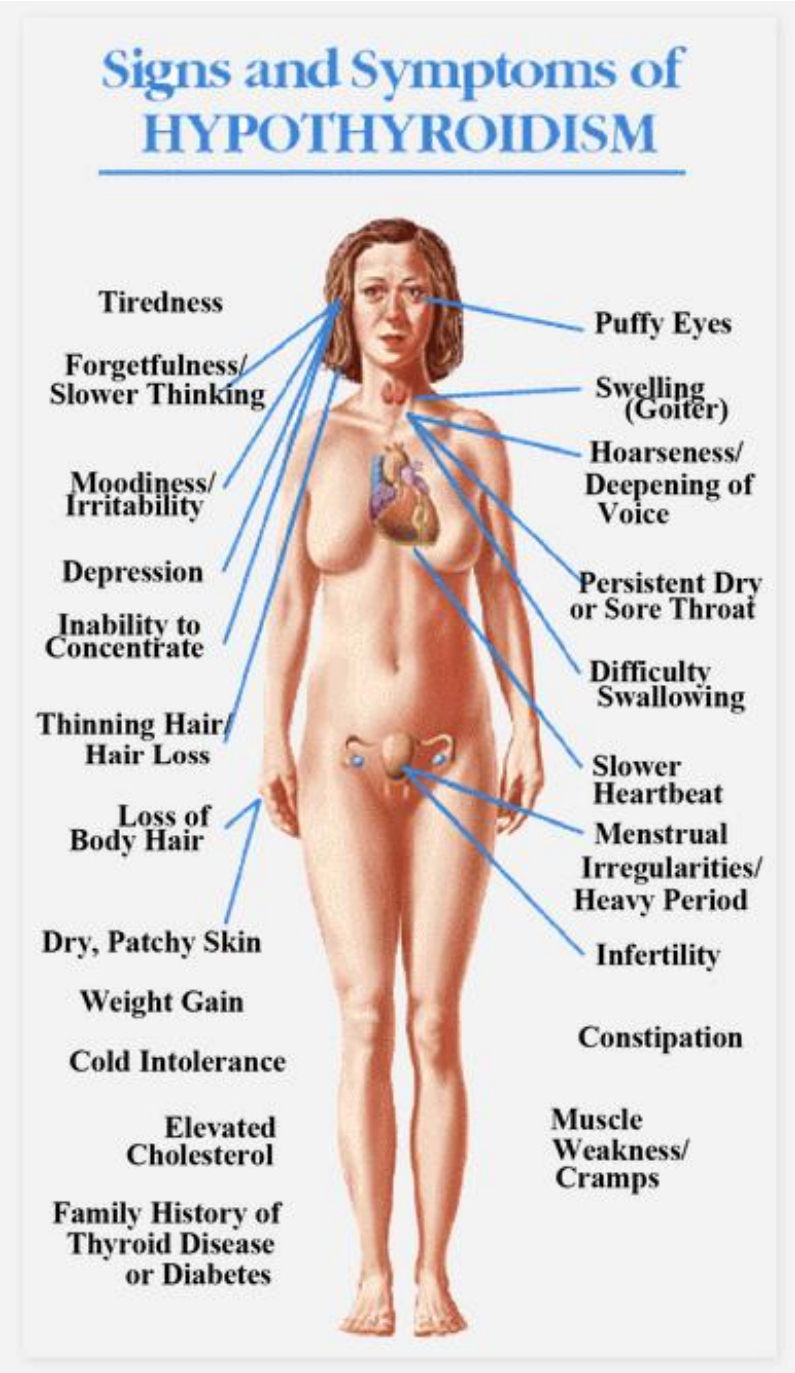
Thyroid Issues

HypoThyroid (low thyroid)

- This should be in consideration with ALL patients struggling with fatigue as this is often poorly diagnosed. Especially those who are considered PRE-HYPOTHYROID
- Many patient will say they've already had their thyroid tested by their medical provider, but they often had TSH tested – maybe T4 if they are lucky.
- This is a classic example of how doing too little testing can be misleading and a disservice to the patient!



Thyroid Issues

- Thyroid symptoms go way beyond fatigue and weight gain:
  - Muscle weakness
  - Muscle soreness
  - Cold hands and feet
  - Affecting female hormones and fertility
  - The most common cause of female hair loss
  - Increases cholesterol – lowering cholesterol can depend on improving thyroid function.
  - Mood / irritability / depression
  - and more!

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Here's how we place lab results together into groups:

- Thyroid Function Group
  - TSH
  - Thyroxine (Total T4)
  - T3 Uptake
  - Free Thyroxine Index
  - Triiodothyronine (Total T3)
  - Triiodothyronine Free, Serum (Free T3)***
  - Reverse T3
  - T4, Free (Direct)
  - Thyroid Peroxidase (TPO) Ab
  - Thyroglobulin Ab

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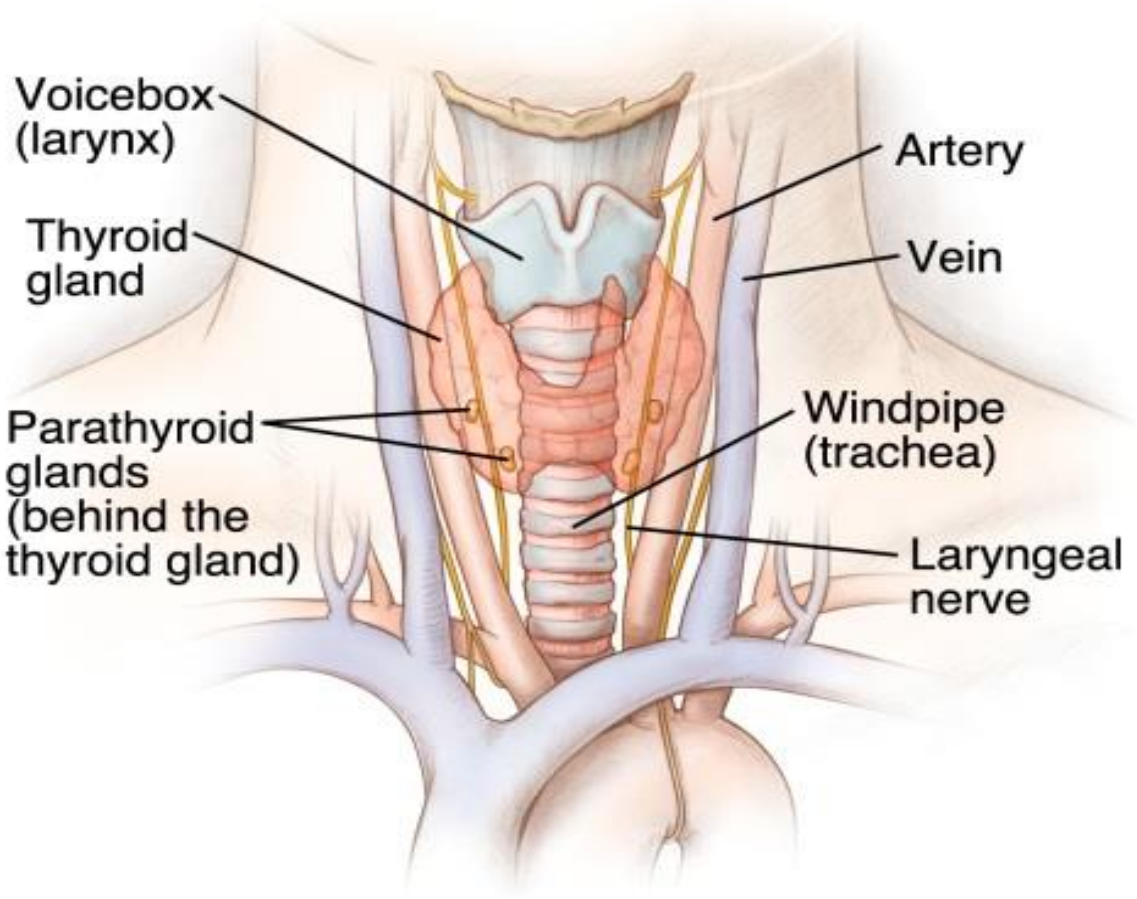
Welcome to Thyroid School

Where is the thyroid gland located?



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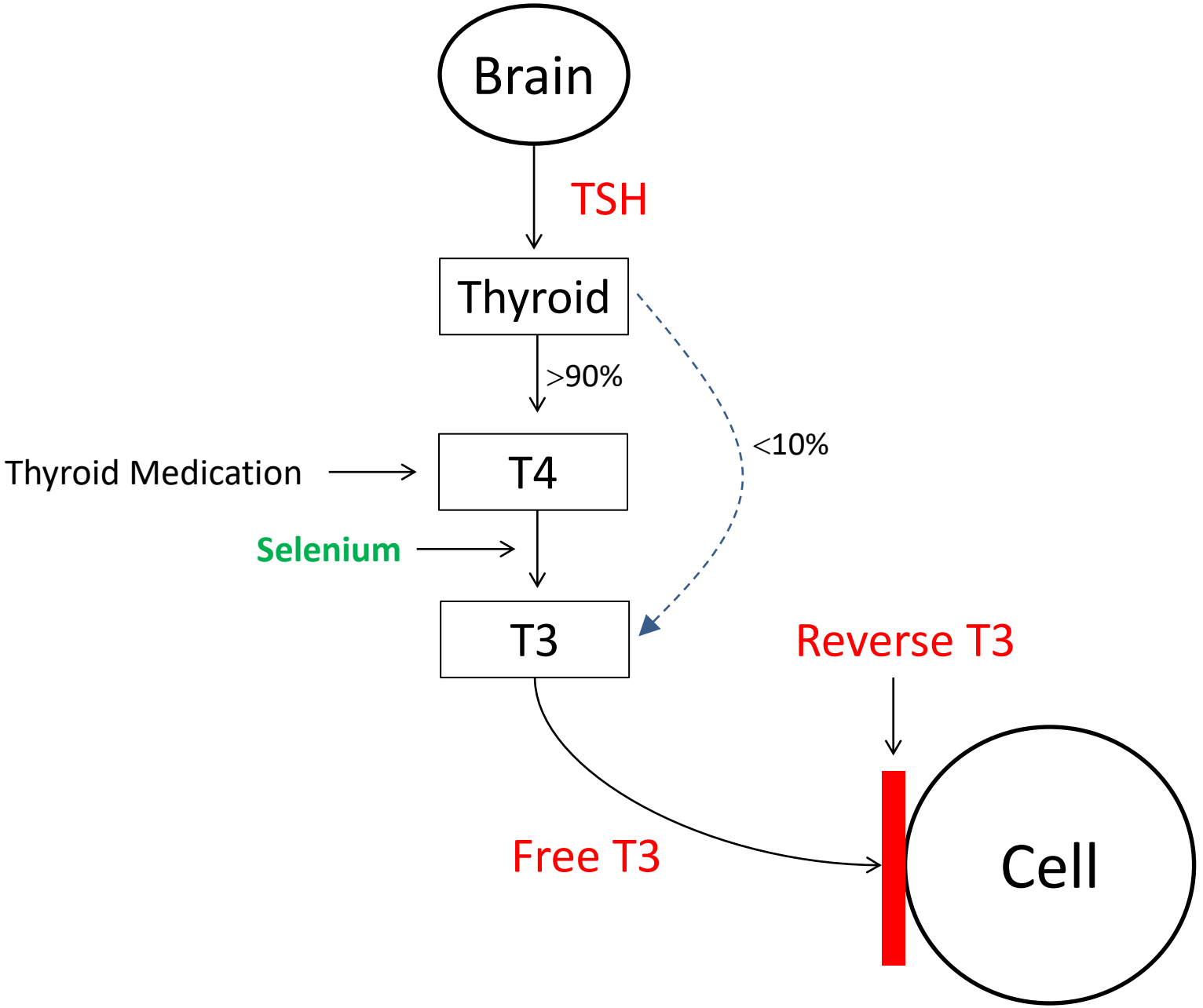
Welcome to Thyroid School



Lab Test Review: Thyroid & Adrenal Function

TSH – Thyroid Stimulating Hormone:

QT – High: Hypothyroid
QT – Low: Hyperthyroid, low pituitary function

What is it?
A hormone that tells the thyroid to increase or decrease its output of thyroid hormone.

Where does it come from?
Pituitary

Lab Test Review: Thyroid & Adrenal Function

TSH – Thyroid Stimulating Hormone:

Why do we care about it clinically?

Gives a quick read if someone has too much or too little thyroid hormone in their body, but not as accurate as looking at the thyroid hormone levels directly.

What does it mean if it's too high?

- Functional high: Pre-Hypothyroid
- Clinical High: Clinical Hypothyroid.

What does it mean if it's too low?

- Hyperthyroid – too much thyroid hormone in the body.
- Low pituitary function – not able to produce enough TSH.

Lab Test Review: Thyroid & Adrenal Function

Triiodothyronine, Free (Free T3):

QT – High: Hyperthyroid
QT – Low: Hypothyroid

What is it?
Measures only the Free T3 in the body

Where does it come from?
Very little comes from the thyroid. Mostly comes from the conversion of T4 into T3 elsewhere in the body – mostly liver and some in the intestinal system.

Lab Test Review: Thyroid & Adrenal Function

Triiodothyronine, Free (Free T3):

Why do we care about it clinically?

- Free T3 is the bioactive form of thyroid hormone.
- This is the most important measure of thyroid function in regards to metabolism and energy levels.
- Free T3 is what communicates to the mitochondria of the cells to stimulate energy production.

What does it mean if it's too high?

- Hyperthyroid
- Thyroid medication dose is too high

What does it mean if it's too low?

- Hypothyroid
- Low selenium as selenium is a critical nutrient needed for proper conversation of T4 into T3.
- Poor liver function
- Poor digestive function / intestinal issues.

Lab Test Review: Thyroid & Adrenal Function

Reverse T3:

QT – High: Reverse T3 Dominance, Low selenium, high stress/cortisol, excess T4

QT – Low: Hypothyroid, too little T4 in the body

What is it?

Helps the body clear excess T4 out of circulation. Considered biologically inactive – this is questionable.

Where does it come from?

Conversion of excess T4 into Reverse T3 takes place mostly in the liver.

Lab Test Review: Thyroid & Adrenal Function

Reverse T3:

Why do we care about it clinically?

Reverse T3 Dominance. Reverse T3 can occupy binding sites on the cell wall and has a blocking effect on Free T3 preventing Free T3 from binding with cells. This means lower energy production = slower metabolism and more fatigue.

What does it mean if it's too high (Reverse T3 Dominance)?

- Too much T4 in the body due to hyperthyroidism or thyroid medication dose is too high.
- Higher cortisol levels due to high stress.
- Low selenium levels. Regardless of the reason for high Reverse T3 . . . more selenium is need to remove the high Reverse T3.

What does it mean if it's too low?

Possibly hypothyroid due to too little T4 in the body.

Lab Test Review: Thyroid & Adrenal Function

Free T4 (Direct):

QT – High: Hyperthyroid

QT – Low: Hypothyroid

What is it?

Measures only the free form of T4 in the body.

Where does it come from?

The thyroid produces mostly T4, and very little T3.

Lab Test Review: Thyroid & Adrenal Function

Free T4 (Direct):

Why do we care about it clinically?

Tells us if the thyroid is working well enough to produce enough thyroid hormone.

What does it mean if it's too high?

- Hyperthyroid – overactive thyroid.
- T4 thyroid medication (Synthroid / Levothyroxine) dose is too high.

What does it mean if it's too low?

- Hypothyroid – underactive thyroid.
- Taking a T3 only medication - Cytomel.

Lab Test Review: Thyroid & Adrenal Function

Thyroid Peroxidase (TPO) Antibody:

QT – High: Autoimmune thyroid

QT – Low: No concern.

What is it?

Antibody that attacks the enzyme (Thyroid Peroxidase) that helps bring iodine in to the thyroid follicle to make thyroid hormones.

Where does it come from?

The immune system as an abnormal (autoimmune) reaction.

Lab Test Review: Thyroid & Adrenal Function

Thyroid Peroxidase (TPO) Antibody:

Why do we care about it clinically?
Helps us learn of thyroid dysfunction is in-part due to an autoimmune reaction.

What does it mean if it's too high?
Autoimmune thyroid that can lead to a hyperthyroid and/or hypothyroid problem.

What does it mean if it's too low?
No concern

Lab Test Review: Thyroid & Adrenal Function

Thyroglobulin Antibody:

QT – High: Autoimmune thyroid

QT – Low: No concern.

What is it?

Antibody that attacks the protein Thyroglobulin which is a precursor to the creation of thyroid hormones T4 and T3. the enzyme (Thyroid Peroxidase) that helps bring iodine in to the thyroid follicle to make thyroid hormones.

Where does it come from?

The immune system as an abnormal (autoimmune) reaction.

Lab Test Review: Thyroid & Adrenal Function

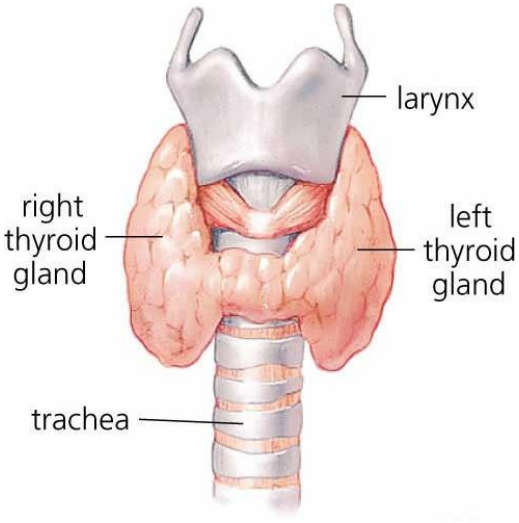
Thyroglobulin Antibody:

Why do we care about it clinically?
Helps us learn of thyroid dysfunction is in-part due to an autoimmune reaction.

What does it mean if it's too high?
Autoimmune thyroid that can lead to a hyperthyroid and/or hypothyroid problem.

What does it mean if it's too low?
No concern

The Auto-Immune Thyroid



3 Things that promote the development of aggravation of the auto-immune thyroid problem:

Hashimoto's Thyroiditis
Grave's Disease

1. Invading Organisms
2. Toxic Heavy Metals
3. Food allergy / sensitivity
4. Inflammation

A couple key nutrients that are helpful in an auto-immune problem:

1. Vitamin D3
2. Omega-3 Fish Oil

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Thyroid Issues

Lab Test	Current Lab Results on Jan 03, 2022	Clinical Low	Functional Low	Optimal	Functional High	Clinical High
Hemoglobin A1c	7.0	0.0 - 4.7	4.8 - 5.1	5.2 - 5.6	5.7 - 5.9	6.0 or higher
Magnesium, Serum	2.0	0.0 - 1.5	1.6 - 2.0	2.1 - 2.6	NA	2.7 or higher
Bilirubin, Total	0.8	NA	NA	0.0 - 1.2	NA	1.3 or higher
Iron, Serum	75	0 - 34	35 - 79	80 - 125	126 - 155	156 or higher
Ferritin, Serum	69	0 - 30	31 - 79	80 - 250	251 - 400	401 or higher
C-Reactive Protein, Cardiac	1	NA	NA	0.00 - 0.99	1.00 - 3.00	3.01 or higher
TSH	1.90	0.000 - 0.449	0.450 - 0.999	1.000 - 2.500	2.501 - 4.500	4.501 or higher
Triiodothyronine, Free, Serum (Free T3)	2.4	0.0 - 1.9	2.0 - 2.9	3.0 - 3.8	3.9 - 4.4	4.5 or higher
T4, Free (Direct)	0.68	0.00 - 0.81	0.82 - 1.02	1.03 - 1.56	1.57 - 1.77	1.78 or higher

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Thyroid Issues

TSH	102.200	0.000 - 0.449	0.450 - 0.999	1.000 - 2.500	2.501 - 4.500	4.501 or higher
Thyroxine (Total T4)	1.1	0.0 - 4.4	4.5 - 5.9	6.0 - 12.0	NA	12.1 or higher
T3 Uptake	19	0 - 23	24 - 26	27 - 37	38 - 39	40 or higher
Free Thyroxine Index	0.2	0.0 - 1.1	NA	1.2 - 4.9	NA	5.0 or higher
Triiodothyronine (Total T3)	50	0 - 70	71 - 98	99 - 180	NA	181 or higher
Triiodothyronine, Free, Serum (Free T3)	1.1	0.0 - 1.9	2.0 - 2.9	3.0 - 3.8	3.9 - 4.4	4.5 or higher
Reverse T3, Serum	4.9	NA	NA	0.0 - 19.9	20.0 - 24.1	24.2 or higher
T4, Free (Direct)	0.28	0.00 - 0.81	0.82 - 1.02	1.03 - 1.56	1.57 - 1.77	1.78 or higher
Thyroid Peroxidase (TPO) Ab	1317	NA	NA	0 - 19	20 - 34	35 or higher
Thyroglobulin Antibody (if <1.0 enter 0.9)	2534.0	NA	NA	0.0 - 0.9	NA	1.0 or higher
Vitamin D, 25-Hydroxy	13.8	0.0 - 29.9	30.0 - 59.9	60.0 - 80.0	80.1 - 100.0	100.1 or higher

Thyroid Issues

HypoThyroid (low thyroid)

- Let's move from the technical to a more practical level with thyroid and your patients.
- This is an area where it is best to take out the guesswork and just get the proper testing done.
- If you feel comfortable making recommendations for testing or therapies . . . do it!
- If it's outside your comfort zone or if you just don't have any interest getting into it then don't . . . but don't leave your patient hanging. Don't leave them stuck in a cycle of bad testing and not feeling better!

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Welcome to the "KNOW YOUR NUMBERS" health series.

Spotlight on:

Thyroid Function

It is estimated that about 200 million people worldwide have a thyroid problem. According to the American Thyroid Association an average of 1 out of every 8 women will be affected by a thyroid disorder during her lifetime, and an estimated 20 million Americans currently have some form of thyroid disease with up to 60% of these people unaware of their thyroid problem.

Poor thyroid function begins a "domino effect" of health problems within the body that can lead to: fatigue, weight gain, high cholesterol, hair loss, depression, memory problems, female hormone problems, digestive problems, and more. When you look more critically at lab results to identify what is truly optimal for thyroid function . . . we see the number of people suffering with a thyroid problem is much MUCH higher.

In this "KNOW YOUR NUMBERS" health series we are giving you the straight answers to know if you're health is at risk due to a thyroid problem. It's time to take back control of your health. Here's what you need to know:

TSH	4.51 or above	Clinically high levels. You are hypothyroid and this should be taken seriously.
	2.51 - 4.50	Higher then optimal. TSH increases as thyroid function goes lower (slower). You are in a range that would be considered pre-hypothyroid and we should take action.
	1.00 - 2.50	Optimal - this is where you want to be.
	0.45 - 0.99	Lower than optimal. TSH decreases as thyroid function goes higher (faster).
	0.00 - 0.44	Clinically low levels. You are hyperthyroid, or your thyroid medication dose is too high.
Free T4	1.78 or above	Clinically high levels. You are hyperthyroid, or your thyroid medication dose is too high.
	1.57 - 1.77	Higher than optimal. You may be hyperthyroid, or medication dose might be too high.
	1.03 - 1.56	Optimal - this is where you want to be.
	0.82 - 1.02	Lower than optimal. Support to improve your thyroid function is likely needed.
	0.00 - 0.81	Clinically low levels. You are hypothyroid, or your medication dose is too low.
Free T3	4.5 or above	Clinically high levels. You are hyperthyroid, or your thyroid medication dose is too high.
	3.9 - 4.4	Higher than optimal. You may be hyperthyroid, or medication dose might be too high.
	3.0 - 3.8	Optimal - this is where you want to be. Free T3 is called the bio-active form of thyroid hormone because it has the most action on your cells and metabolism. Free T3 needs to be in the optimal range to be confident you have great thyroid function.
	2.0 - 2.9	Lower than optimal. Support to improve your thyroid function is likely needed.
	0.0 - 1.9	Clinically low levels. You are hypothyroid, or your medication dose is too low.
Reverse T3	24.2 or above	Clinically high levels. This elevation is likely due to high cortisol (stress) or low selenium. We are concerned because Reverse T3 essentially blocks Free T3 from its action on cells.
	20.0 - 24.1	Higher than optimal. This elevation is likely due to high cortisol (stress) or low selenium.
	0.0 - 19.9	Optimal - this is where you want to be.

We also recommend you get tested for an autoimmune thyroid problem by testing Thyroperoxidase Antibody (TPO) and Thyroglobulin Antibody as this may change the approach on how to bring your thyroid function back to optimal. Ask us how you can get a better testing of your thyroid and other lab testing to help you get healthy and stay healthy!

This information is brought to you by Dr. John W. Larson, DC. Dr. Larson is a national expert in lab testing and using dietary, nutritional and lifestyle therapies to improve overall health. Dr. Larson teaches doctors and holistic health providers around the country on the benefits of using lab testing to determine the best dietary and nutrition therapies for their patients. He is also creator of the BLT System and the Wholesale Blood Lab Testing Service which brings lab testing to everyone at a much lower cost (www.bltsystem.com - click on "Order Lab Tests"). Dr. Larson is in private practice at Healing Choices - Natural Healthcare located in Elk River, MN and he is available for consultations in Minnesota by calling 763-241-5436 or visit www.HealingChoices.com .

Thyroid Issues

- It's OK to say *"I'm glad you are sharing this concern with me (or these lab results with me) but I am not an expert in thyroid testing. However, I know some who is . . . and this is what he recommends."*
- Give them a copy of the handout.
- Tell them to share their result with whoever you recommend.
- If you don't have someone to refer to that you feel confident in we are happy to help them via our Elk River, MN office.
- This handout can be found at: www.bltsystem.com/documents

Blood Lab Testing System

Simple • Effective • Scientific

Poor Sleep / Sleep Apnea

- We won't spend a lot of time on this section.
- There isn't much you can do for lab testing related to sleep, but more people are having the fitness watches or devices that will measure sleep (accuracy questionable).
- It's more about understanding the connections between sleep and fatigue and sleep and pain.
- Let's jump right into the more practical thinking and application of better sleep.

Poor Sleep / Sleep Apnea

- We should always be asking about the amount and quality of sleep when a person is struggling with fatigue . . . usually one of the first things I will ask.
- An interesting pattern is that some people struggling with ongoing pain may feel better when they get better sleep.
- Sleep issues are common among those diagnosed with fibromyalgia.
- When a person achieves a prolonged deep sleep . . . this is when the body does a lot of healing and repairing, detoxifying, hormones change to make it easier to lose weight, destress the body, and more!

Blood Lab Testing System

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Poor Sleep / Sleep Apnea

- Some variables of interrupted sleep are hard to avoid . . . infants waking up, pets, etc.
- Its always good to discuss “Sleep Hygiene”. The routine of sleep.
- What are some simple suggestions for your patient about falling asleep or staying asleep more easily?:
  - Sleep formula – some combination of valerian root, passion flower, magnesium
  - Melatonin (hit or miss effect)
  - L-Theanine – helps calm the mind

Poor Sleep / Sleep Apnea

- What if the challenge is simply taking too long to fall asleep?
  - Could be elevated cortisol in the evening. This can be measured via 4x cortisol saliva testing.
  - There are nutritional products that can help bring down elevated cortisol such as phosphatidyl serine, and more. Talk to your nutrition company reps.

Blood Lab Testing System

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Poor Sleep / Sleep Apnea

- What if the issue is waking up during the night after falling asleep?
  - Many people will say it's to get up to go to the bathroom, but often they woke up for a different reason and then decided to go the bathroom
  - Could be due to toxicity in the body. In the Horary Cycle (Chinese Medicine Body Clock) the liver is most active in the 1 am – 3 am timeframe.
  - Toxins can be stimulating.
  - Supporting liver or detox process (7-Day Detox) could be helpful.

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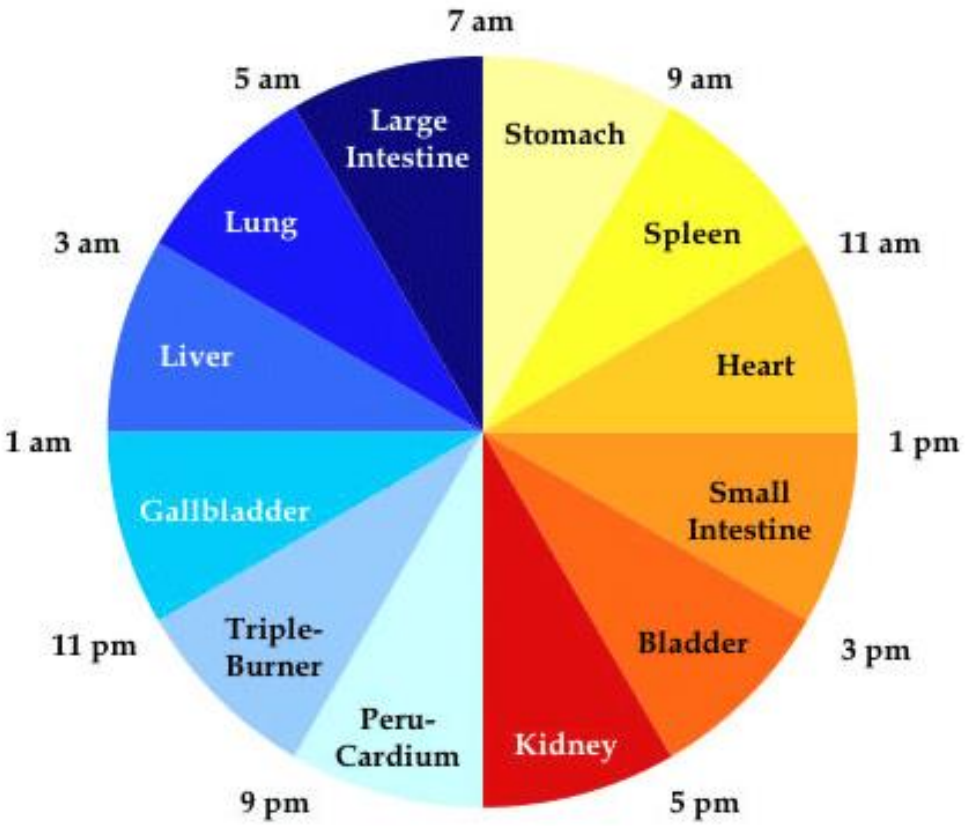
Poor Sleep / Sleep Apnea



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Poor Sleep / Sleep Apnea

- The most common cause for waking up at night is due to low blood sugar!
- Sugar (glucose) is the main fuel for the brain and nervous system. The brain does not like it when glucose levels go too low, so the brain will first tell the adrenals to produce cortisol as a more gentle way to increase blood sugar.
- If it's not happening fast enough the brain will tell the adrenals to produce adrenaline as an aggressive way to increase blood sugars.
- Very stimulating = waking up and wide awake at night. Might take hours to fall back asleep.

Blood Lab Testing System

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Poor Sleep / Sleep Apnea

- A simple and practical method to see if waking up at night is due to low blood sugar levels:
  - Eat a small protein / healthy fat snack at night before going to bed.
  - This should keep blood sugar levels more stable for a longer period of time during the night so they can stay asleep.
  - Do this every night for 2 weeks and have the patient report back to you.
  - If sleep is better then there is likely some blood sugar control issues that need to be addressed!

Blood Lab Testing System

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Poor Sleep / Sleep Apnea

- Sleep apnea is a whole different situation and can become a downward spiral to fatigue and worsening health.
- Sometimes a spouse or partner can tell if there is interrupted breathing during the night.
- Best option is to do a sleep study!
- Some people will report from a sleep study they stop breathing 60+ times per hour. If this is happening most of the night they are putting their body in oxygen deprivation for 1/4 to 1/3 of a 24 hour day.

Lab Test Review: Electrolytes & Iron Status

Carbon Dioxide, Total:

QT – High: Kidney problem, respiratory problem, sleep apnea
QT – Low: Acidic body chemistry

What is it?
An electrolyte. Total Carbon Dioxide is actually a measure of a bicarbonate (an alkaline molecule), and not a measure of the CO2 gas in the blood since carbon dioxide in the blood occurs mostly in the form of a bicarbonate molecule.

Where does it come from?
Cellular respiration and regulated by the kidneys.

Lab Test Review: Electrolytes & Iron Status

Carbon Dioxide, Total:

Why do we care about it clinically?

Bicarbonate (what we call Total Carbon Dioxide in blood lab testing) is a highly alkaline molecule which helps to neutralize metabolic acids and very important in maintaining acid-alkaline balance of your body chemistry.

What does it mean if it's too high?

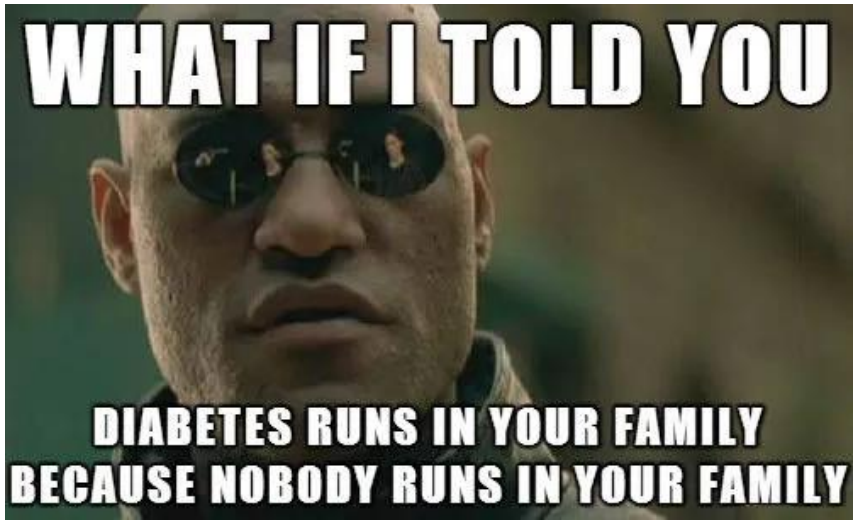
- Alkaline body chemistry
- Kidney problem
- Respiratory problem / sleep apnea
- Low HCL
- Excessive bicarbonate antacid intake
- Hyper-adrenal function

What does it mean if it's too low?

- Acidic body chemistry
- Kidney problem
- Hypo-adrenal

Blood Sugar Issues / Insulin Resistance

A large-scale study by UCLA in 2016 did testing in over 40,000 households in California and found that 55% of adults have diabetes or prediabetes. That's 1 out of every 2 adults!



- Both low blood sugars and high blood sugars are BAD!!!
- Both can contribute to fatigue, and both can trigger inflammation in the body leading to more pain.
- It can be difficult to get any autoimmune disease or condition under control when blood sugar control issues are present.

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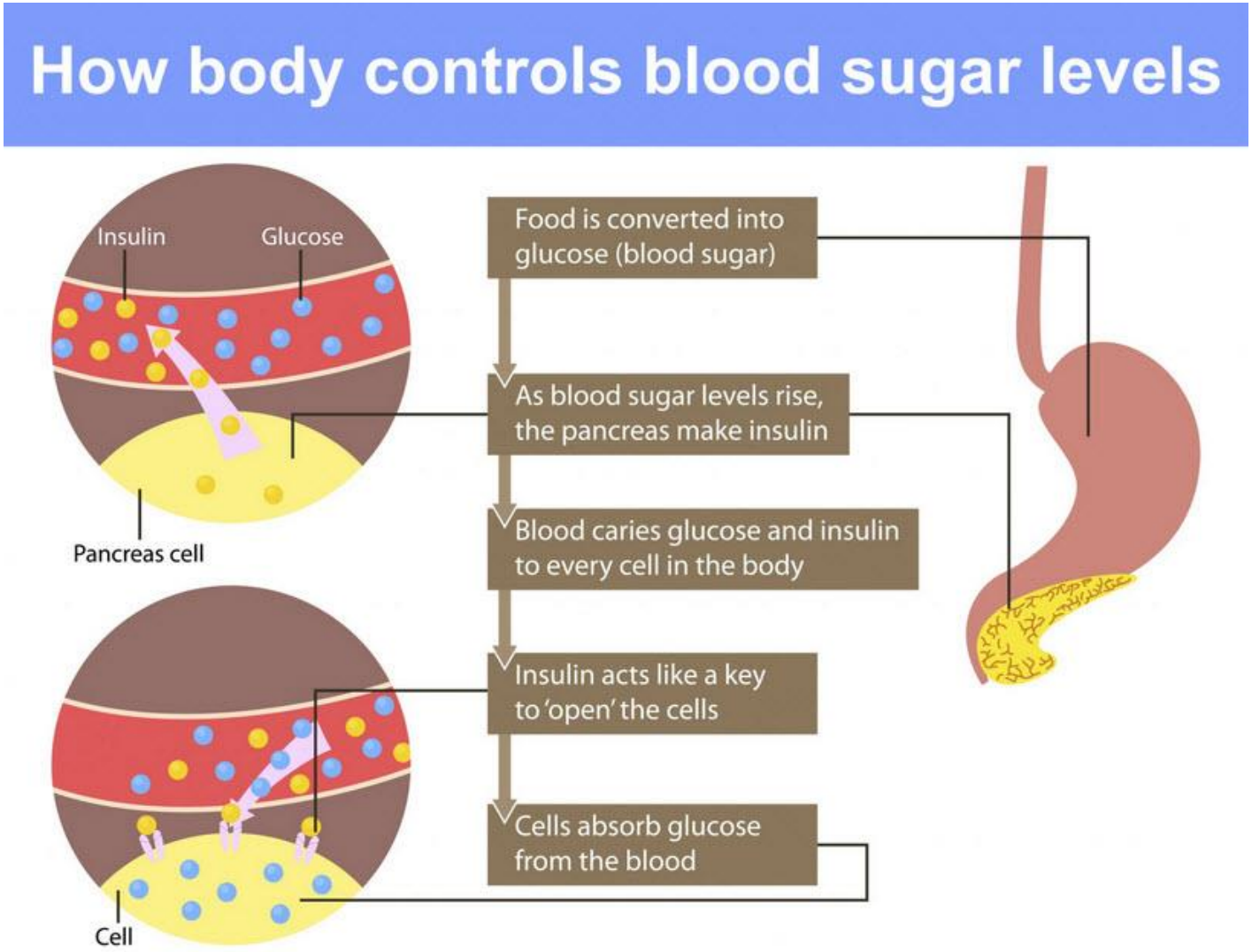
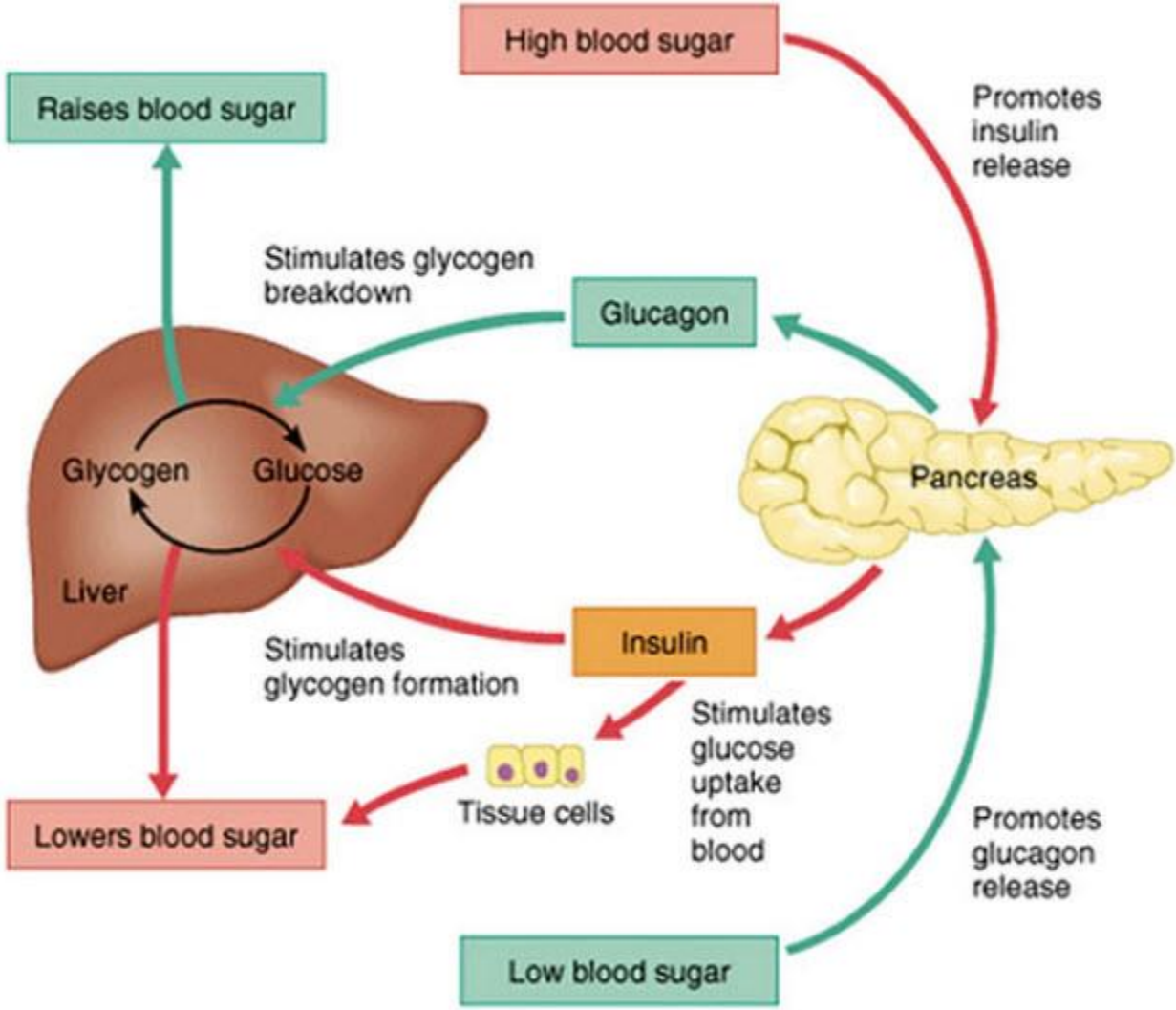
Lab Test Review: Blood Sugar Control



Lab Test Review: Blood Sugar Control



Lab Test Review: Blood Sugar Control

- Blood Sugar Levels / Blood Sugar Control Group
    - Glucose, Serum
    - Hemoglobin A1c
    - Triglycerides – normally included within cholesterol testing (Lipid Panel)
    - Insulin, Fasting

Blood Sugar Issues / Insulin Resistance

Lab Test	Current Lab Results on Oct 07, 2021	Clinical Low	Functional Low	Optimal	Functional High	Clinical High
Glucose, Serum	278	0 - 64	65 - 79	80 - 94	95 - 99	100 or higher
Hemoglobin A1c	10.7	0.0 - 4.7	4.8 - 5.1	5.2 - 5.6	5.7 - 5.9	6.0 or higher
Cholesterol, Total	225	0 - 99	100 - 154	155 - 199	NA	200 or higher
Triglycerides	174	NA	0 - 74	75 - 100	101 - 149	150 or higher
HDL Cholesterol	33	0 - 39	40 - 59	60 - 80	81 - 99	100 or higher
VLDL Cholesterol	32	NA	NA	0 - 30	31 - 40	41 or higher
LDL Cholesterol	160	NA	NA	0 - 99	100 - 129	130 or higher
T. Chol/HDL Ratio	6.8	NA	NA	0.0 - 2.5	2.6 - 4.4	4.5 or higher
C-Reactive Protein, Cardiac	8.50	NA	NA	0.00 - 0.99	1.00 - 3.00	3.01 or higher
Insulin, Fasting	38.5	NA	NA	0.0 - 9.9	10.0 - 24.9	25.0 or higher

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Lab Test Review: Blood Sugar Control

Glucose, Serum

Quick Thoughts (QT) – High: Pre-Diabetes, Diabetes
Quick Thoughts (QT) – Low: Reactive or Clinical Hypoglycemia

What is it?
A simple sugar that is an important energy source in living organisms and is a component of many carbohydrates.

Where does it come from?
The foods we eat. All carbohydrates become blood glucose.

Lab Test Review: Blood Sugar Control

Glucose, Serum

Why do we care about it clinically?
The primary source of fuel for the brain and nervous system
Gets incorporate into most or all of your cells to create energy or ATP. Excess glucose is very acidic.

What does it mean if it's too high?
Poor blood sugar control, Diabetes Type I, II and III. You need to confirm they truly did a 12 hour fasting prior to the blood draw. Can be falsely elevate if patient has a phobia of needles as the stress response will increase cortisol which puts more sugar (glucose) into the blood.

Lab Test Review: Blood Sugar Control

Glucose, Serum

What does it mean if it's too low?
Reactive Hypoglycemia. Typically of their fasting glucose is at 79 or less I will start asking them about symptoms of reactive hypoglycemia. *"When you go too long between meals do you ever feel weak, shaky, headachy, more fatigued . . . and you feel like you need to eat something to feel better?"*

Clinical hypoglycemia is quite rare and I would likely refer out for medical evaluation.

Lab Test Review: Blood Sugar Control

Types Of Sugars- Simple

Sugars	Common Names	Sources
Glucose	Blood sugar or blood glucose, dextrose	All carbohydrates have glucose, become blood glucose
Fructose	Fruit sugar	Fruits and juices, honey, table sugar, high fructose corn syrup
Sucrose (glucose + fructose)	Sugar, table sugar granulated sugar	Sugar, brown sugar, molasses, turbinado, raw sugar, cane sugar, powdered sugar, fruits
Maltose (glucose + glucose)	Malt sugar	Molasses, bread
Lactose (glucose + galactose)	Milk sugar	Milk, dairy products, whey

Lab Test Review: Blood Sugar Control

Hemoglobin A1c

QT – High: Pre-Diabetes, Diabetes
QT – Low: Hypoglycemia

What is it?
Measures the number of glucose molecules attached to the hemoglobin in the red blood cells.

Where does it come from?
During the average 120 day lifespan of a red blood cell . . . some glucose molecules are attaching to the hemoglobin (glycosylated) to form a “glycohemoglobin” complex. The glucose molecule stays attached for the life of that RBC.

Lab Test Review: Blood Sugar Control

Hemoglobin A1c

Why do we care about it clinically?
More of a long-term measure of blood sugar control over @ the past 2-3 months. A better measure if someone is moving towards pre-diabetes or diabetes than Serum Glucose alone.

What does it mean if it's too high?
Poor blood sugar control leading to pre-diabetes or diabetes.

What does it mean if it's too low?
Frequent low blood sugar (hypoglycemia).
<5.0 may indicate a need for Folic Acid.

Lab Test Review: Electrolytes & Iron Status

Triglycerides:

QT – High: Insulin Resistance, hypo-thyroid, too much alcohol

QT – Low: Hyper-thyroid, autoimmune with HDL >80

What is it?

A Triglyceride is a substance that has sugar and fat combined together. Fuel source for cells.

Where does it come from?

Liver and Diet

Lab Test Review: Electrolytes & Iron Status

Triglycerides:

Why do we care about it clinically?
Strong indicator for insulin resistance when elevated.
Strong indicator of excessive alcohol intake.

What does it mean if it's too high?

- Blood sugar issues / excessive sugar, carb or fat intake.
- Hypo-thyroid / Hypo-adrenal
- Genetic predisposition
- Extremely high Triglycerides can indicate pancreatitis or excessive alcohol intake.

What does it mean if it's too low?

- Poor liver function
- Hyper-thyroid / Hypo-adrenal
- Digestive problem / poor fat absorption / very low fat intake
- A possible autoimmune condition - especially with a high HDL at >80.

Lab Test Review: Blood Sugar Control

Insulin (fasting)

QT – High: Insulin Resistance

QT – Low: Pancreas problem – Type I Diabetes, insulin "bank account" is depleted.

What is it?

A hormone that helps glucose move from the blood (serum) to inside the tissue and cells of the body so that glucose can be used in the creation of cellular energy (ATP).

Where does it come from?

The pancreas . . . more specifically the beta cells of the pancreatic islets (islets of Langerhans).

Lab Test Review: Blood Sugar Control

Insulin (fasting)

Why do we care about it clinically?

- With no insulin (or insulin resistance) glucose increases in the blood and can begin to damage cells and tissues. ↑ glucose makes the body chemistry more acidic which makes it easier for illness, infection, disease and cancer to develop.
- Insulin also helps move glucose from the blood and into storage in the fat cells, skeletal muscle and liver.
- ↑ insulin and/or ↑ glucose = more body fat.
- ↑ insulin strongly inhibits movement of glucose out of the liver which then converts to fat = fatty liver disease.
- ↑ insulin can directly suppress a normal ovulation leading to ovarian cysts or PCOS, estrogen dominance, excess estrogen can directly suppress thyroid function, and a whole domino effect of bad things keep happening.

Lab Test Review: Blood Sugar Control

Insulin (fasting)

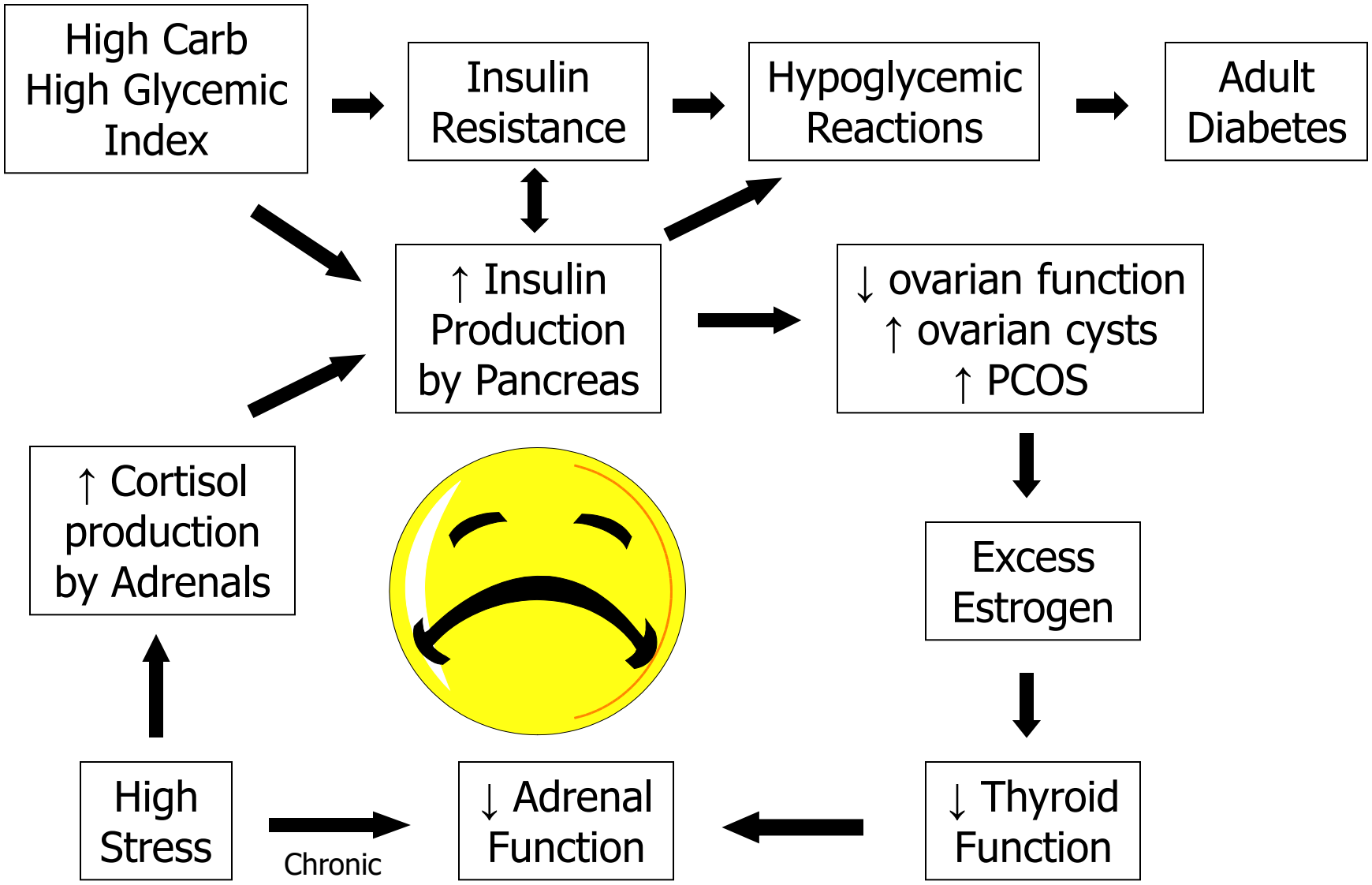
What does it mean if it's too high?

- Increased production by the pancreas due to insulin resistance (cells have become resistant to insulin).
- Excess and abnormal production by an insulin producing tumor (very rare).
- ALWAYS confirm if they truly did a 12 hour fasting prior to their blood draw.

What does it mean if it's too low?

- Poor production / no production by the pancreas. Sugar (glucose) in the blood increases. Cells are starving for energy. Brain is starving for fuel . . . and the brain is unhappy.
- To make the brain happy again we produce ketones (produced by liver) as the back-up energy supply (the back-up generator) – good in the short-term but proceed with caution in the long-term.

Blood Sugar & Hormone Imbalances



Blood Sugar Issues / Insulin Resistance

There are several easy options on how you can help your patient with blood sugar control issues . . . even if you are not the one doing the lab testing!

- I tend to look for blood sugar support formulas that in corporate several ingredients:
  - **Gymnema** – "sugar destroyer", can also help with sugar cravings.
  - **Cinnamon Bark extract** – mimics insulin.
  - **Chromium** – helps cells become more sensitive to insulin.
  - **Berberine** – can have some similar effexts as metformin
  - **Thiamin (B1)** – helps in glucose metabolism.
  - **Alpha Lipoic Acid** – helps lower blood sugar levels and can help with diabetic neuropathy.
  - **L-Carnitine** – helps transport triglycerides to cells for energy

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Blood Sugar Issues / Insulin Resistance

There are several easy options on how you can help your patient with blood sugar control issues . . . even if you are not the one doing the lab testing!

- To go a step beyond the obvious recommendation of decreasing sugar and carb and alcohol intake:
  - Exercise will be very helpful. Any exercise is better than none, but HIIT will offer extra benefit.
  - Some version of intermittent fasting (16-8) is a great option to more quickly improve blood sugar control AND insulin resistance.
  - Some type of detox process (7-day Detox) as a way to more quickly improve blood sugar and decrease sugar / carb cravings.
  - Increasing intake of protein and healthy fats can help to control hunger.

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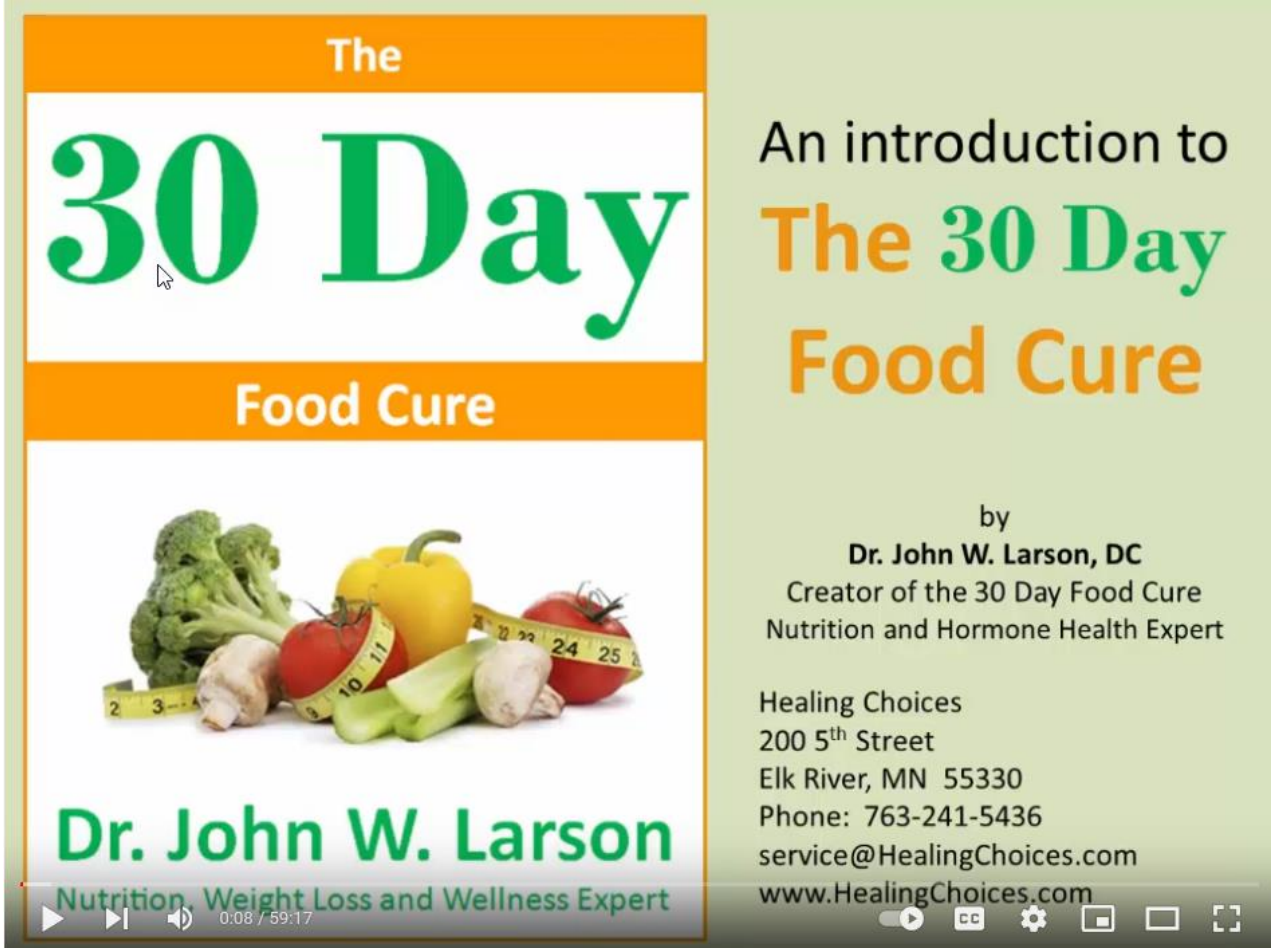
Blood Sugar Issues / Insulin Resistance



https://www.healingchoices.com/the-30-day-food-cure

Blood Lab Testing System

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Welcome to the "KNOW YOUR NUMBERS" health series.

Spotlight on:

Blood Sugar Control

A recent study released in March of 2016 revealed some alarming information about the health of Americans. In this large-scale study done by UCLA . . . lab testing was done in over 40,000 households in the state of California. While it's no surprise that diabetes and prediabetes is common in American culture, this new study reveals that 55% of adults have diabetes or prediabetes. That's 1 out of 2 people!

Sadly, about 90% of people with pre-diabetes are unaware of their condition, and according to this study 70% of people with prediabetes will develop full diabetes later in life. It's like a tsunami of prediabetic people are about to crash down on a healthcare system that is already expensive and overwhelmed . . . not to mention the pain and suffering associated with this condition.

In this "KNOW YOUR NUMBERS" health series we are giving you the straight answers to know if you are at risk. It's time for you to take back control of your health and not become part of this statistic. Are you walking on the edge of the "Diabetic Cliff"? Here's what you need to know:

Fasting Glucose	70 - 79 mg/dl	Normal, but may have occasional hypoglycemic (low blood sugar) issues.
	80 - 89 mg/dl	Optimal with a level near 85 as ideal.
	90 - 99 mg/dl	Higher then optimal. You may want to consider reducing sugar and carbohydrate intake.
	100 - 125 mg/dl	Pre-diabetes is here! It's time to take action to prevent more severe health problems.
	126 or above	Diabetes is here! You can improve this with the right plan to include better food choices, proper nutritional supplements, more activity and losing excess body weight.
Hemoglobin A1c	5.6 or less	Optimal with 5.4 or lower even better.
	5.7 - 5.9	Higher than optimal and becoming prediabetes.
	6.0 - 6.4	Pre-diabetes is here! It's time to take action so you don't fall off the "Diabetic Cliff".
	6.5 or above	Diabetes is here! Hemoglobin A1c is a better measure of becoming diabetic as this measures blood sugar control of the past 2-3 months.
Triglycerides	Under 100	Optimal ... this is the goal.
	100 - 149	Higher than optimal. We are getting concerned about sugar intake and insulin resistance.
	150 or above	Clinically high. A triglyceride is a combined sugar/fat molecule, and this will often be related to what is happening with blood glucose levels. Triglycerides are also greatly affected by alcohol intake. Alcohol is simply another form of a sugar (fermented sugar).
Fasting Insulin	10 or less	Optimal ... this is the goal.
	11 - 24.9	Higher than optimal. We are getting concerned about sugar intake and insulin resistance.
	25 or above	Clinically high. Insulin is the primary hormone that moves sugar out of the blood and gets it into your cells to be used as energy. Insulin increases (insulin resistance) when the cells in your body have become resistant to the effect of insulin.

Do you have Insulin Resistance? Do this simple calculation. Multiply Fasting Insulin x Fasting Glucose. Divide that number by 405. If this calculation is greater than 1.8 you have insulin resistance.

This information is brought to you by Dr. John W. Larson, DC. Dr. Larson is a national expert in lab testing and using dietary, nutritional and lifestyle therapies to improve overall health. Dr. Larson teaches doctors and holistic health providers around the country on the benefits of using lab testing to determine the best dietary and nutrition therapies for their patients. He is also creator of the BLT System and the Wholesale Blood Lab Testing Service which brings lab testing to everyone at a much lower cost (www.bltsystem.com - click on "Order Lab Tests"). Dr. Larson is in private practice at Healing Choices - Natural Healthcare located in Elk River, MN and he is available for consultations in Minnesota by calling 763-241-5436 or visit www.HealingChoices.com .

Blood Sugar Control

- It's OK to say *"I'm glad you are sharing this concern with me (or these lab results with me) but I am not an expert in blood sugar testing. However, I know some who is . . . and this is what he recommends."*
- Give them a copy of the handout.
- Tell them to share their result with whoever you recommend.
- If you don't have someone to refer to that you feel confident in we are happy to help them via our Elk River, MN office.
- This handout can be found at: www.bltsystem.com/documents

Blood Lab Testing System

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Inflammation

- Of our topics . . . you may be the most familiar with inflammation if you provide structural or pain care.
- We care about inflammation not only because it is often connected to pain, but inflammation often precedes many of the chronic disease associated with older age.
- Even lower levels of inflammation gone unchecked can lead to big consequences down the road.
- This is very easy to test for!

Blood Lab Testing System

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Blood Sugar Issues / Insulin Resistance

Lab Test	Current Lab Results on Oct 07, 2021	Clinical Low	Functional Low	Optimal	Functional High	Clinical High
Glucose, Serum	278	0 - 64	65 - 79	80 - 94	95 - 99	100 or higher
Hemoglobin A1c	10.7	0.0 - 4.7	4.8 - 5.1	5.2 - 5.6	5.7 - 5.9	6.0 or higher
Cholesterol, Total	225	0 - 99	100 - 154	155 - 199	NA	200 or higher
Triglycerides	174	NA	0 - 74	75 - 100	101 - 149	150 or higher
HDL Cholesterol	33	0 - 39	40 - 59	60 - 80	81 - 99	100 or higher
VLDL Cholesterol	32	NA	NA	0 - 30	31 - 40	41 or higher
LDL Cholesterol	160	NA	NA	0 - 99	100 - 129	130 or higher
T. Chol/HDL Ratio	6.8	NA	NA	0.0 - 2.5	2.6 - 4.4	4.5 or higher
C-Reactive Protein, Cardiac	8.50	NA	NA	0.00 - 0.99	1.00 - 3.00	3.01 or higher
Insulin, Fasting	38.5	NA	NA	0.0 - 9.9	10.0 - 24.9	25.0 or higher

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Lab Test Review: Electrolytes & Iron Status

C-Reactive Protein (CRP), Cardiac (High Sensitivity):

QT – High: Inflammation, infection , trauma.

QT – Low: Possible viral issue when very low.

What is it?

- CRP is not inflammation.
- CRP is a protein whose levels rise in response to inflammation.

Where does it come from?

IL-6 stimulates the liver to produce CRP. IL-6 is produced by macrophages and adipocytes.

Lab Test Review: Electrolytes & Iron Status

C-Reactive Protein (CRP), Cardiac (High Sensitivity):

Why do we care about it clinically?

CRP is a more sensitive and accurate reflection of the acute phase response than the ESR. ESR may be normal while CRP is elevated.

What does it mean if it's too high?

Inflammation, infection, trauma, malignancy , allergic reaction, sleep apnea.

What does it mean if it's too low?

We want it to be low, but if it's surprisingly low may indicate a possible viral issue.

Inflammation

- We associate inflammation with:
  - Injury / Tissue Damage
  - Infection
  - Allergy
  - Autoimmune
  - Digestive Imbalance - ↑ LPS
  - Low cortisol
  - Obesity - ↑ IL6
  - Genetic Predisposition

Blood Lab Testing System
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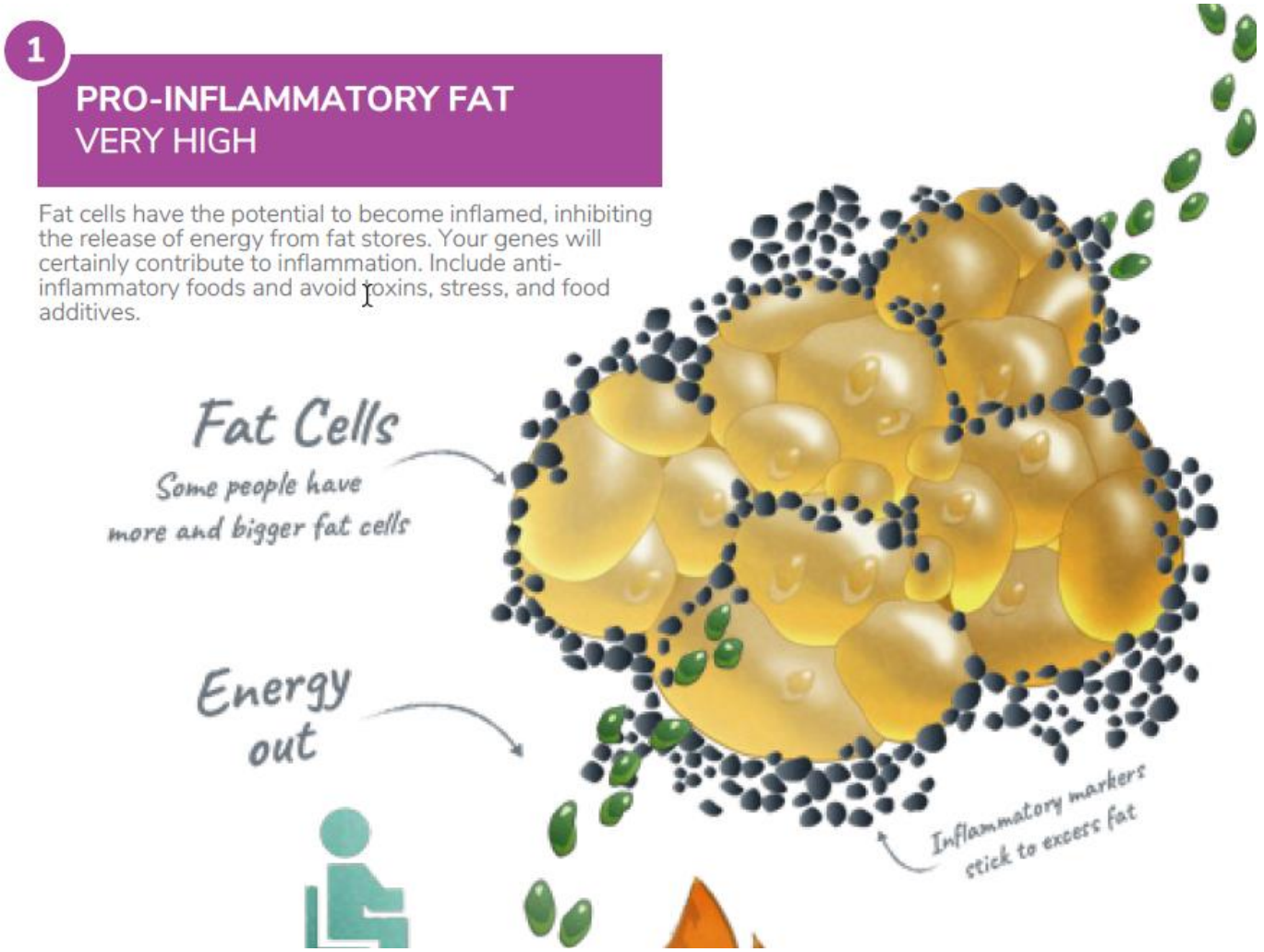
Inflammation



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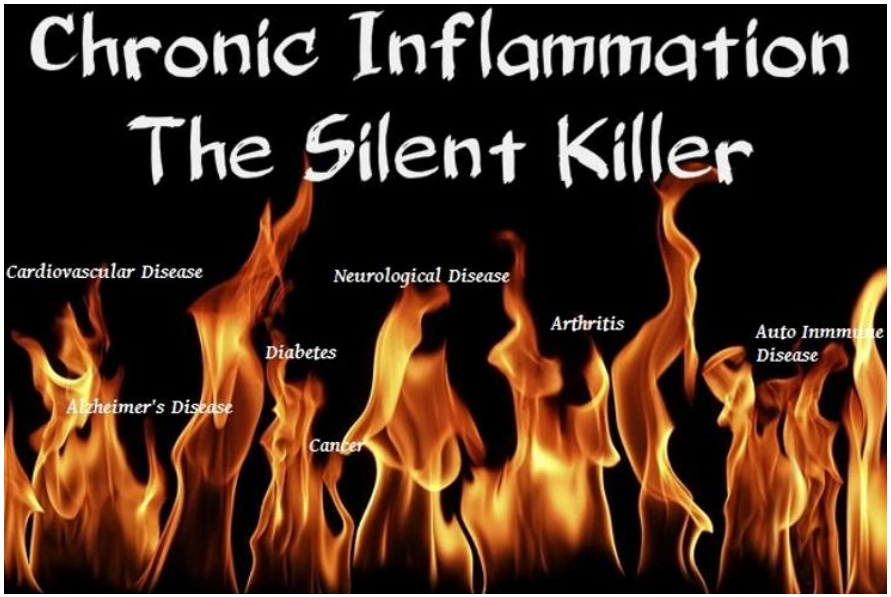
Inflammation

If we all had our C-Reactive Protein tested on a regular basis just like we test glucose or cholesterol . . . this would be a HUGE step in the right direction for a prevention focused healthcare system!



- There are many options to consider to reduce inflammation, but I do think it's best to test CRP initially to get a baseline. Then as you implement therapies you can retest to make sure CRP is improving.
- You could do specialty testing of the different type of cytokines if you want to get very detailed and specific in inflammatory markers.

Blood Lab Testing System

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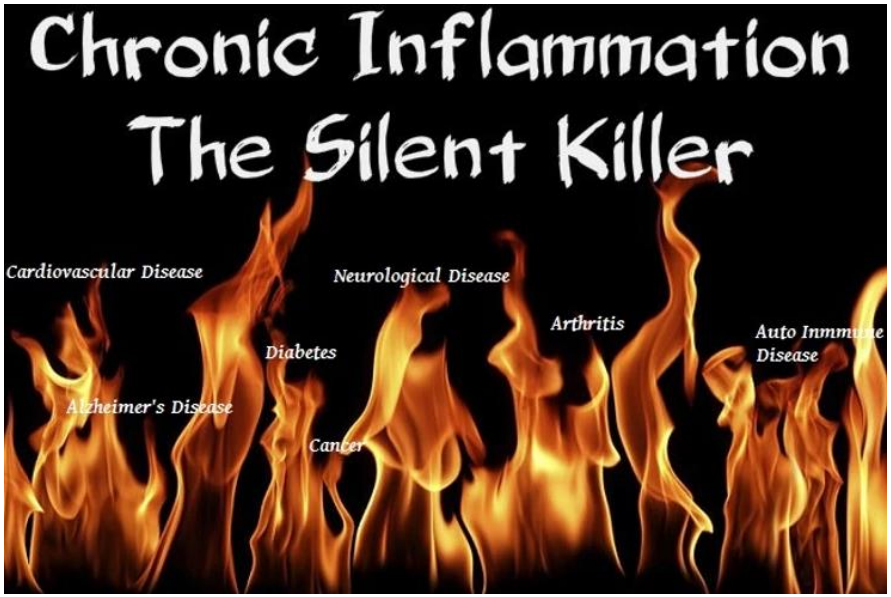
Inflammation

If we all had our C-Reactive Protein tested on a regular basis just like we test glucose or cholesterol . . . this would be a HUGE step in the right direction for a prevention focused healthcare system!



- On a practice level we want to see if we can find out where this chronic inflammation is coming from:
  - Obesity
  - Poor Blood Sugar Control
  - Injury / Tissue Damage
  - Infection
  - Allergy
  - Autoimmune
  - Digestive Imbalance - ↑ LPS
  - Low cortisol
  - Genetic Predisposition

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Inflammation

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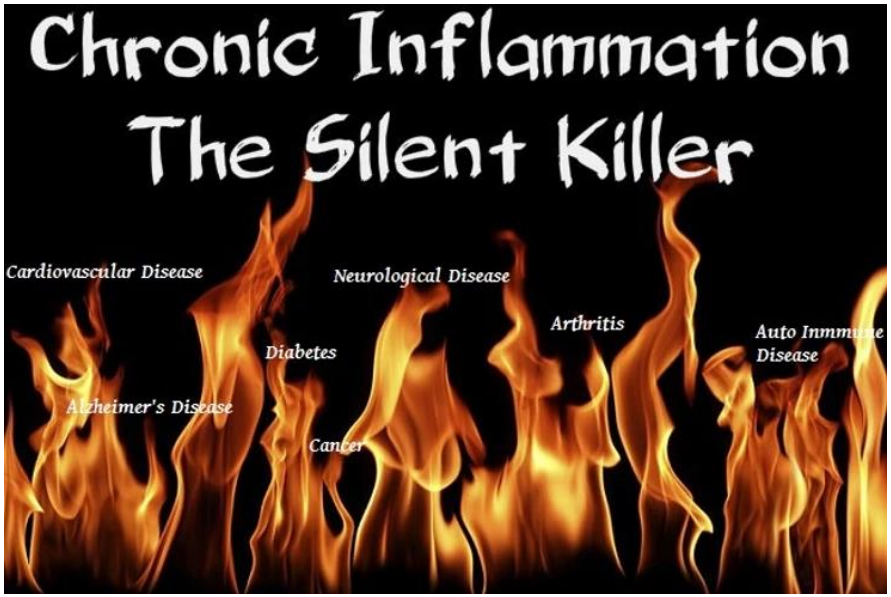

- You have many options available for a more natural approach to inflammation:
  - Curcumin / Turmeric*
  - Omega 3 EFA
  - Boswellia
  - Bromelain
  - Proteolytic enzymes
  - White Willow Bark
  - Bioflavonoids
  - 7-Day Detox
- Talk to your friendly neighborhood nutrition rep to see what options they have available for you!

Blood Lab Testing System

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Welcome to the "KNOW YOUR NUMBERS" health series.

Spotlight on:

Inflammation & Pain

Pain is one of the most common reasons people seek help from a healthcare provider. According to the Institute of Medicine more than 100 million Americans suffer with chronic pain. This exceeds the combined number of ALL people suffering with diabetes, heart disease and cancer.

Pain can be caused by many things, but when there is pain there is often inflammation. Inflammation may in fact be the cause of your pain. Even more concerning is inflammation has the nickname of the "silent killer". This is because inflammation will often precede (happen before) many of the chronic diseases we see in the elderly population. Conditions like Alzheimer's, cardiovascular disease, bad arthritis, and more . . . often began as inflammation that was never identified or properly dealt with earlier in life.

In this "KNOW YOUR NUMBERS" health series we are giving you the straight answers to know if you are at risk due to inflammation. It's time for you to take back control of your health. Here's what you need to know:

C-Reactive Protein, Cardiac	0.00 - 0.99	Optimal - this is where you want to be.
	1.00 - 3.00	Higher then optimal. We still want to take action as even low levels of inflammation can cause problems for your future health.
	3.01 or above	Inflammation is here and definitely a problem and should be taken seriously. More investigation may be needed to identify the cause of your inflammation. This may require both dietary changes and natural / nutritional therapies to bring under control.
Sedimentation Rate (ESR)	0 - 10	Optimal - this is where you want to be.
	11 - 30	Higher then optimal. We still want to take action as even low levels of inflammation can cause problems for your future health.
	31 or above	Inflammation is here and definitely a problem and should be taken seriously. More investigation may be needed to identify the cause of your inflammation.
Uric Acid	0.0 - 3.6	Lower than optimal. Possibly a deficiency of Folic Acid, B12 or Molybdenum.
	3.7 - 5.7	Optimal - this is where you want to be.
	5.8 - 8.6	Higher than optimal. May have more aches and pains throughout body (Pseudogout).
	8.7 or above	Clinically high levels. This may result in a condition called Gout which can cause mild to severe pain and inflammation in only one joint or multiple joints of the body.
Cortisol, AM	0.0 - 6.1	Very low. Cortisol helps to reduce inflammation in the body. Too little cortisol means inflammation is more likely to happen in the body. Adrenal fatigue is likely a problem.
	6.2 - 9.9	Lower than optimal. May need to support adrenals to prevent this from getting worse.
	10.0 - 15.0	Optimal - this is where you want to be.
	15.1 - 19.4	Higher than optimal. We are getting concerned about too much stress.
	19.5 or above	Clinically high levels. Cortisol is a stress hormone, and this is indicating too much stress.

Even low levels of inflammation can slowly damage cells and tissues causing health problems later in life. Don't let inflammation keep you from having a healthy mind and body as you get older. Ask us how you can get your body tested for inflammation along with other important lab tests to get healthy and stay healthy!

This information is brought to you by Dr. John W. Larson, DC. Dr. Larson is a national expert in lab testing and using dietary, nutritional and lifestyle therapies to improve overall health. Dr. Larson teaches doctors and holistic health providers around the country on the benefits of using lab testing to determine the best dietary and nutrition therapies for their patients. He is also creator of the BLT System and the Wholesale Blood Lab Testing Service which brings lab testing to everyone at a much lower cost (www.bltsystem.com - click on "Order Lab Tests"). Dr. Larson is in private practice at Healing Choices - Natural Healthcare located in Elk River, MN and he is available for consultations in Minnesota by calling 763-241-5436 or visit www.HealingChoices.com .

Inflammation

- It's OK to say *"I'm glad you are sharing this concern with me (or these lab results with me) but I am not an expert in inflammation testing. However, I know some who is . . . and this is what he recommends."*
- Give them a copy of the handout.
- Tell them to share their result with whoever you recommend.
- If you don't have someone to refer to that you feel confident in we are happy to help them via our Elk River, MN office.
- This handout can be found at: www.bltsystem.com/documents

Blood Lab Testing System

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Low Iron

- Some people are more sensitive to even smaller changes in iron levels then contributing to fatigue.
- More often a problem in women.
- You have patients right now who are more tired due to low iron.
- This is one area you don't want o guess, and it's very easy to test for issues of low iron.
- The most useful tests are Serum Iron and Ferritin and Hemoglobin. Other related tests can be an indicator.

Blood Lab Testing System

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Low Iron

Lab Test	Prior Lab Results on Apr 05, 2018	Current Lab Results on Mar 05, 2019	Clinical Low	Functional Low	Optimal	Functional High	Clinical High
Iron Bind. Cap. (TIBC)	350	299	0 - 249	NA	250 - 350	351 - 450	451 or higher
UIBC	257	210	0 - 149	150 - 199	200 - 300	301 - 375	376 or higher
Iron, Serum	93	89	0 - 34	35 - 79	80 - 125	126 - 155	156 or higher
Iron Saturation	27	30	0 - 14	15 - 19	20 - 40	41 - 55	56 or higher
Ferritin, Serum	73	186	0 - 30	31 - 79	80 - 250	251 - 400	401 or higher

This is what we want to see!

Low Iron

Lab Test	Current Lab Results on Sep 21, 2020	Clinical Low	Functional Low	Optimal	Functional High	Clinical High
Iron Bind. Cap. (TIBC)	330	0 - 249	NA	250 - 350	351 - 450	451 or higher
UIBC	252	0 - 149	150 - 199	200 - 300	301 - 375	376 or higher
Iron, Serum	78	0 - 34	35 - 79	80 - 125	126 - 155	156 or higher
Iron Saturation	24	0 - 14	15 - 19	20 - 40	41 - 55	56 or higher
Ferritin, Serum	45	0 - 30	31 - 79	80 - 250	251 - 400	401 or higher

More often this is what we see!

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Low Iron

Lab Test	Current Lab Results on Jan 08, 2020	Clinical Low	Functional Low	Optimal	Functional High	Clinical High
Iron Bind. Cap. (TIBC)	370	0 - 249	NA	250 - 350	351 - 450	451 or higher
UIBC	302	0 - 149	150 - 199	200 - 300	301 - 375	376 or higher
Iron, Serum	68	0 - 34	35 - 79	80 - 125	126 - 155	156 or higher
Iron Saturation	18	0 - 14	15 - 19	20 - 40	41 - 55	56 or higher
Ferritin, Serum	21	0 - 30	31 - 79	80 - 250	251 - 400	401 or higher

Far too often we see this!

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Here's how we place lab results together into groups:

- Iron Levels / Iron Status Group
  - Iron Bind. Cap. (TIBC)
  - UIBC
  - Iron, Serum
  - Iron Saturation
  - Ferritin, Serum

Here's how we place lab results together into groups:

- Red Blood Cell Health / Platelet Group
  - RBC
  - Hemoglobin
  - Hematocrit
  - MCV
  - MCH
  - MCHC
  - RDW
  - Platelets

Low Iron

Lab Test	Current Lab Results on Jan 08, 2020	Clinical Low	Functional Low	Optimal	Functional High	Clinical High
RBC	4.89	0.00 - 3.76	3.77 - 4.09	4.10 - 4.70	4.71 - 5.28	5.29 or higher
Hemoglobin	12.9	0.0 - 11.0	11.1 - 13.4	13.5 - 15.5	15.6 - 15.9	16.0 or higher
Hematocrit	39.3	0.0 - 33.9	34.0 - 36.9	37.0 - 46.6	NA	46.7 or higher
MCV	80	0 - 78	79 - 83	84 - 92	93 - 97	98 or higher
MCH	26.4	0.0 - 26.5	26.6 - 27.9	28.0 - 32.0	32.1 - 33.0	33.1 or higher
MCHC	32.8	0.0 - 31.4	31.5 - 32.5	32.6 - 34.6	34.7 - 35.7	35.8 or higher
RDW	15.9	0.0 - 11.7	NA	11.8 - 13.0	13.1 - 15.4	15.5 or higher

Same patient we saw earlier with the low Ferritin.

Lab Test Review: Electrolytes & Iron Status

TIBC (Total Iron Binding Capacity):

QT – High: Iron levels too low

QT – Low: Iron levels too high

What is it?

Measure how much iron is able to bind to a protein (transferrin) that is responsible for transporting iron throughout the body.

Where does it come from?

Nowhere. This is a calculated measurement.

Lab Test Review: Electrolytes & Iron Status

TIBC (Total Iron Binding Capacity):

Why do we care about it clinically?
Only slightly useful as an indicator of iron status.

What does it mean if it's too high?
A lot of binding sites are available on transferrin indicating there may no be enough iron in the body.

What does it mean if it's too low?
Very few binding sites are available on transferrin indicating there may be too much iron in the body.

Lab Test Review: Electrolytes & Iron Status

UIBC (Unsaturated Iron Binding Capacity):

QT – High: Iron levels too low

QT – Low: Iron levels too high

What is it?

Measure the portion of the transport protein for iron (transferrin) that has been not saturated with iron. Essentially a duplicate measurement of TIBC.

Where does it come from?

Nowhere. This is a calculated measurement.

Lab Test Review: Electrolytes & Iron Status

UIBC (Unsaturated Iron Binding Capacity):

Why do we care about it clinically?
Only slightly useful as an indicator of iron status.

What does it mean if it's too high?
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.

What does it mean if it's too low?
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.

Lab Test Review: Electrolytes & Iron Status

Iron, Serum:

QT – High: Excess iron in the body

QT – Low: Iron deficiency

What is it?

Mineral

Where does it come from?

Iron comes from food, water, supplements we consume.

Lab Test Review: Electrolytes & Iron Status

Iron, Serum:

Why do we care about it clinically?

- Iron is necessary for healthy hemoglobin which transports oxygen throughout the body.
- Low iron = low hemoglobin = low oxygen in the body = fatigue and not feeling good.

What does it mean if it's too high?

- Person is consuming too much iron.
- Hemochromatosis – genetic condition resulting in high iron.
- Inflammatory process in the body.

What does it mean if it's too low?

- Person is likely not consuming enough iron.
- Person is losing iron due to bleeding.
- Poor iron digestion – low HCL.
- Poor liver function.

Lab Test Review: Electrolytes & Iron Status

Iron Saturation:

QT – High: Excess iron in the body

QT – Low: Iron deficiency

What is it?

Iron Saturation is a measure of how much Transferrin is saturated with iron, and this is measured as a percentage.

Where does it come from?

Nowhere. This is a calculated measurement.

Lab Test Review: Electrolytes & Iron Status

Iron Saturation:

Why do we care about it clinically?

Helps us understand if too much or too little iron is in the body.

What does it mean if it's too high?

- Person is consuming too much iron.
- Hemochromatosis – genetic condition resulting in high iron.
- Inflammatory process in the body.

What does it mean if it's too low?

- Person is likely not consuming enough iron.
- Person is losing iron due to bleeding.
- Poor iron digestion – low HCL.
- Poor liver function.

Lab Test Review: Electrolytes & Iron Status

Ferritin, Serum:

QT – High: Excess iron in the body, inflammation

QT – Low: Iron deficiency

What is it?

A protein found within the cells that stores iron in the body.

Where does it come from?

Found mostly in the bone marrow, liver, spleen, brain and skeletal muscle. Very little ferritin in the blood (normally).

Lab Test Review: Electrolytes & Iron Status

Ferritin, Serum:

Why do we care about it clinically?
Tells us if iron storage has exceeded capacity, or if there is to little iron stored away in reserves.

What does it mean if it's too high?

- Person is consuming too much iron.
- Hemochromatosis – genetic condition resulting in high iron.
- Inflammatory process in the body.

What does it mean if it's too low?

- Person is likely not consuming enough iron.
- Person is losing iron due to bleeding.
- Poor iron digestion – low HCL.
- Poor liver function.

What about iron overload?

Lab Test	Current Lab Results on Jan 09, 2018	Clinical Low	Functional Low	Optimal	Functional High	Clinical High
Iron Bind. Cap. (TIBC)	264	0 - 249	NA	250 - 350	351 - 450	451 or higher
UIBC	130	0 - 149	150 - 199	200 - 300	301 - 375	376 or higher
Iron, Serum	134	0 - 34	35 - 79	80 - 125	126 - 155	156 or higher
Iron Saturation	51	0 - 14	15 - 19	20 - 40	41 - 55	56 or higher
Ferritin, Serum	1409	0 - 30	31 - 79	80 - 250	251 - 400	401 or higher

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Lab Test Review: Immune Function and RBC Health

RBC – Red Blood Cells:

QT – High: Dehydration, excess iron, high testosterone
QT – Low: Anemia, deficiency of iron/B12/Folic acid

What is it?
Primary cell of the blood to transport oxygen and carbon dioxide..

Where does it come from?
Bone marrow

Lab Test Review: Immune Function and RBC Health

RBC – Red Blood Cells:

Why do we care about it clinically?
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.

Lab Test Review: Immune Function and RBC Health

RBC – Red Blood Cells:

What does it mean if it's too high?

- Dehydration
- Excess iron in body
- High testosterone levels
- Excess production by bone marrow (Polycythemia Vera)
- Kidney tumor resulting in excess production of erythropoietin
- Decreased oxygen in the body – smoking, asthma, sleep apnea

What does it mean if it's too low?

- Blood loss – ulcer, colon cancer, bladder or kidney infection, heavy menstrual bleeding
- Anemia – iron, B12, B6, Folic Acid, copper
- Autoimmune process
- Kidney damage or disease = less erythropoietin
- Bone marrow problem – not producing enough RBC

Lab Test Review: Immune Function and RBC Health

Hemoglobin:

QT – High: Same things that cause RBC to increase
QT – Low: Same things that cause RBC to decrease.

What is it?
The iron-containing protein in the red blood cells that transports oxygen.

Where does it come from?
Hemoglobin develops in cells in the bone marrow that become red blood cells. When red cells die, hemoglobin is broken up: iron is salvaged, transported to the bone marrow by proteins called transferrins, and used again in the production of new red blood cells.

Lab Test Review: Immune Function and RBC Health

Hemoglobin:

Why do we care about it clinically?
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.

What does it mean if it's too high?
Same as RBC info.

What does it mean if it's too low?
Same as RBC info.

Lab Test Review: Immune Function and RBC Health

Hematocrit:

QT – High:

QT – Low:

What is it?

Hematocrit is telling us what percentage of a blood sample is purely Red Blood Cells.

Where does it come from?

Nowhere and everywhere . . . it's like Batman!

Just kidding . . . it's just a calculation reflecting the percentage of the blood that is only RBC.

Lab Test Review: Immune Function and RBC Health

Hematocrit:

Why do we care about it clinically?
Helps to confirm anemia. RBC and Hemoglobin are more clinically useful.

What does it mean if it's too high?
Same things as high RBC

What does it mean if it's too low?
Same things as low RBC

Lab Test Review: Immune Function and RBC Health

MCV – Mean Corpuscular Volume:

QT – High: Folic acid and/or B12 deficiency
QT – Low: Iron deficiency

What is it?
Measures the average size or VOLUME of the Red Blood Cells.

Where does it come from?
It's a measure of volume in RBC.

Lab Test Review: Immune Function and RBC Health

MCV – Mean Corpuscular Volume:

Why do we care about it clinically?
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. A high MCV indicates your Red Blood Cells are larger than normal.

What does it mean if it's too high?

- Anemia due to Folic Acid or B12 deficiency
- Low HCL

What does it mean if it's too low?

- Anemia - Iron deficiency, hemolytic anemia
- Low HCL – poor iron digestion and absorption
- Blood loss
- Vitamin B6 deficiency
- Lead or other heavy metal toxicity

Lab Test Review: Immune Function and RBC Health

MCH – Mean Corpuscular Hemoglobin:

QT – High: Folic acid and/or B12 deficiency
QT – Low: Iron deficiency

What is it?
MCH refers to the Mean Corpuscular Hemoglobin, or the average weight or mass of hemoglobin inside a Red Blood Cell.

Where does it come from?
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.

Lab Test Review: Immune Function and RBC Health

MCH – Mean Corpuscular Hemoglobin:

Why do we care about it clinically?
When anemia is present the MCH, along with other measurements on the health of your Red Blood Cells, may help to determine the type of anemia.

What does it mean if it's too high?

- Anemia due to Folic Acid or B12 deficiency
- Low HCL

What does it mean if it's too low?

- Anemia - Iron deficiency, hemolytic anemia
- Low HCL – poor iron digestion and absorption
- Blood loss
- Vitamin B6 deficiency
- Lead or other heavy metal toxicity

Lab Test Review: Immune Function and RBC Health

MCHC – Mean Corpuscular Hemoglobin Concentration:

QT – High: Folic acid and/or B12 deficiency

QT – Low: Iron deficiency

What is it?

MCHC refers to Mean Corpuscular Hemoglobin Concentration, or how much of the Red Blood Cell is occupied by Hemoglobin.

Where does it come from?

It is calculate by dividing Hemoglobin by the Hematocrit.

Lab Test Review: Immune Function and RBC Health

MCHC – Mean Corpuscular Hemoglobin Concentration:

Why do we care about it clinically?

Can help us understand the type of anemia. This measurement is most helpful to evaluate if a person's treatment for anemia is working and their anemia is improving.

What does it mean if it's too high?

- Anemia due to Folic Acid or B12 deficiency
- Low HCL

What does it mean if it's too low?

- Anemia - Iron deficiency, hemolytic anemia
- Low HCL – poor iron digestion and absorption
- Blood loss
- Vitamin B6 deficiency
- Lead or other heavy metal toxicity

Lab Test Review: Immune Function and RBC Health

RDW – Red Cell Distribution Width:

QT – High: Anemia

QT – Low: Anemia

What is it?

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.

Where does it come from?

The average width on a sampling of Red Blood Cells.

Lab Test Review: Immune Function and RBC Health

RDW – Red Cell Distribution Width:

Why do we care about it clinically?

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. If anemia you will rely on other tests to determine what type.

What does it mean if it's too high?

Anemia

What does it mean if it's too low?

Anemia

Another case: 24 year old male with fatigue and just not feeling good.

Iron Bind. Cap. (TIBC)	348	0 - 249	NA	250 - 350	351 - 450	451 or higher
UIBC	218	0 - 149	150 - 199	200 - 300	301 - 375	376 or higher
Iron, Serum	130	0 - 34	35 - 79	80 - 125	126 - 155	156 or higher
Iron Saturation	37	0 - 14	15 - 19	20 - 40	41 - 55	56 or higher
Ferritin, Serum	659	0 - 30	31 - 79	80 - 250	251 - 400	401 or higher
Cholesterol, Total	241	0 - 99	100 - 154	155 - 199	NA	200 or higher
Triglycerides	871	NA	0 - 74	75 - 100	101 - 149	150 or higher
HDL Cholesterol	32	0 - 39	40 - 59	60 - 80	81 - 99	100 or higher
T. Chol/HDL Ratio	7.5	NA	NA	0.0 - 2.5	2.6 - 4.4	4.5 or higher
C-Reactive Protein, Cardiac	0.97	NA	NA	0.00 - 0.99	1.00 - 3.00	3.01 or higher
Homocysteine, Plasma	7.5	NA	NA	0.0 - 8.9	9.0 - 15.0	15.1 or higher

Hereditary Hemochromatosis

Result: H63D/H63D

Two copies of the same mutation (H63D and H63D) identified

Interpretation:

This patient's sample was analyzed for the hereditary hemochromatosis (HH) mutations C282Y, H63D, and S65C. Two copies of H63D were identified. Results for C282Y and S65C were negative. The mutations analyzed by LabCorp are most common in the Caucasian population. Although some patients with this genotype experience biochemically defined abnormalities of iron overload, the penetrance for clinical symptoms, such as cirrhosis, cardiomyopathy, diabetes and arthropathy, is low. The diagnosis of HH should not rely on DNA testing alone. Diagnosis of HH should include clinical findings and other test results, such as transferrin-iron saturation and/or serum ferritin studies and/or liver biopsy. HH is inherited in a recessive manner.

Low Iron

What can you do?

- Encourage your patients to get better testing to include:
  - Iron panel
  - Ferritin
  - CBC with Differential

- If they can't or won't do the testing with their medical provider they can easily get the testing done though the BLT System at:

  www.bltsystem.com

  Then click on "Order Lab tests"

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Low Iron

What can you do?

- If iron is low get them going on a good quality form of iron supplement . . . talk to your nutrition rep.
- You may need to add Vitamin C to improve the absorption of iron.
- You may need to add HCL to improve digestion of iron and other minerals.

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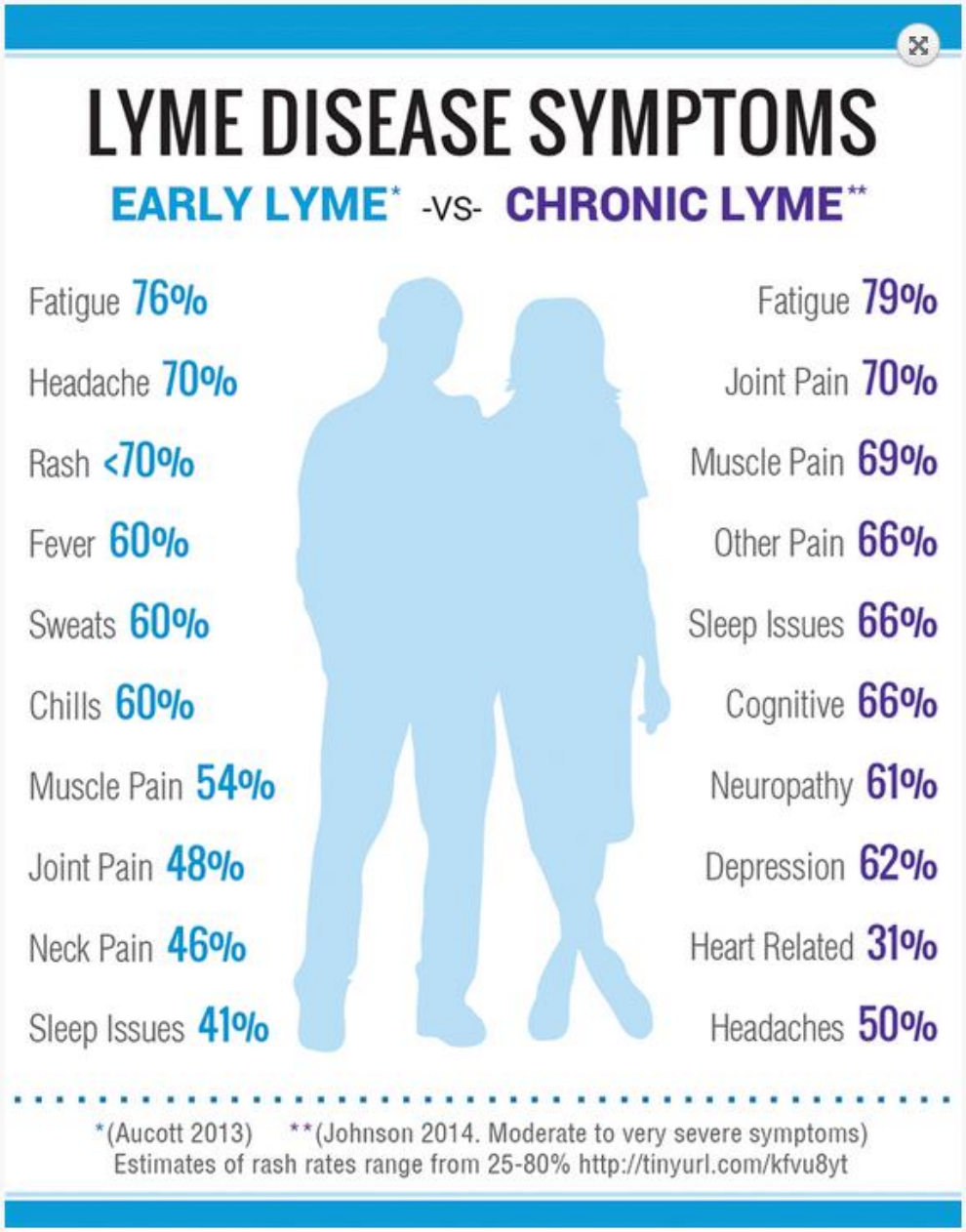
Lyme Disease – A quick discussion



- 49 year old female
- Seen many other chiros over time, and many medical specialists.
- Came to our office interested in both chiropractic and functional medicine
- She started with chiropractic care as we waited for her to provide us volumes of prior lab results.
- Easily aggravated with even very light chiro care. Something isn't right!
- Prior testing for Lyme's twice with medical provider.
- I'M NOT CONVINCED!!!

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Lyme Disease – A quick discussion

MEDICAL DIAGNOSTIC LABORATORIES L.L.C.

2439 KUSER ROAD
HAMILTON, NJ 08690-3303
TL: 609-570-1000 FX: 609-570-1050 TF: 877-269-0090
www.mdlab.com

Final

MDL#: 12041546

*** Test Results**

Patient Information: **SSN:** N/A **DOB:** [redacted] (Age:49)

[redacted]

Sex: Female

Ordering Physician/Lab: **NPI:** 1285642975
HEALING CHOICES- NATURAL HEALTHCARE CLINIC
JOHN W LARSON, DC
200 FIFTH STREET NORTHWEST
SUITE J
ELK RIVER, MN 55330

Tel: (763) 241-5436
Fax: (763) 241-5466

Patient ID: Date Received: **11/19/2021** Date Reported: **12/6/2021**

Test	Specimen	Date Collected / Comment	Results: Normal	Results: Abnormal	Reference/Units/Comments
Lyme disease Western blot (IgM / IgG)		11/18/2021	**IgGCDC Neg** **IgGAlt Neg** **IgMCDC Neg** **IgMAlt Neg**		**IgG: No bands present.** **IgM: No bands present.** **See attached report.**
313 Verified 12/4/2021	*Serum - 1*				

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MDL Lyme EUROLINE IgG

This is a membrane immunoassay based on the Immunoblot method. MDL Lyme EUROLINE IgG is recommended for the detection of IgG antibodies to Borrelia burgdorferi in human serum.

MDL Number:

Date: 03/12/2021

Patient ID: 12041546-1

Examiner:

Test: MDL Lyme EUROLINE IgG

Strip:

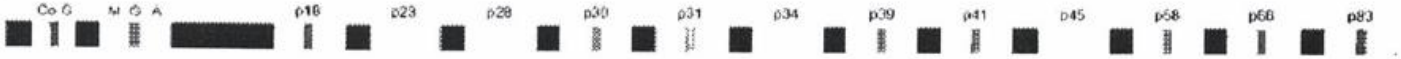
Bands	93	66	58	45	41	39	34	31	30	28	23	18
Intensity	4	8	8	6	10	7	5	12	23	2	12	4
Cut-off ratio	0.2	0.3	0.3	0.2	0.4	0.3	0.2	0.4	0.9	0.1	0.5	0.2

greater or equal to 26 is positive

greater or equal to 1.0 is positive

Patient strip:

Band locator:



Results:

MDL Lyme EUROLINE IgG — CDC Negative, Alt. Negative

Results for this specimen:

For results according to the CDC Criteria, please refer to the attached MDL Test Result form.

Result Interpretation:

IgG	Result	CDC Criteria (Antibody, CDC)*	Alternate Criteria (Antibody, Alt)*
	Negative (Non-Reactive)	No bands or less than five bands from: 18,23,28,30,39,41,45,58,66,93 kD	No B. burgdorferi specific bands
	Equivocal	N/A	One or two bands from: 23,31,34,39,93 kD
	Positive (Reactive)	Five or more bands from: 18,23,28,30,39,41,45,58,66,93 kD	Three or more bands from: 23,31,34,39,93 kD

* Bands presented as positive must have an intensity greater or equal to 26 and ratio greater or equal to 1.0

Lyme Disease – A quick discussion

Patient ID: Date Received: **11/19/2021** Date Reported: **12/6/2021**

Test	Specimen	Date Collected / Comment	Results: Normal	Results: Abnormal	Reference/Units/Comments
Lyme disease Western blot (IgM / IgG) 313 Verified 12/4/2021	*Serum - 1*	11/18/2021	**IgGCDC Neg IgGAIt Neg IgMCDC Neg IgMAIt Neg**		**IgG: No bands present. IgM: No bands present. See attached report.**
Lyme disease C6 Peptide by ELISA 417 Verified 12/3/2021	*Serum - 1*	11/18/2021		**Pos (Index=1.26)**	*** Index range: Neg: <= 0.90, Equivocal: 0.91 - 1.09, Pos: >= 1.10**
Anaplasma phagocytophilum IgG/IgM by IFA 439 Verified 12/4/2021	*Serum - 1*	11/18/2021	**Negative (IgM, IgG)**		**IgM:Negative; No significant level of detectable IgM antibodies (1:16 dilution negative). IgG:Negative; No significant level of detectable IgG antibodies (1:80 dilution negative).**
Babesia microti IgG/IgM by IFA 440 Verified 12/4/2021	*Serum - 1*	11/18/2021	**Negative (IgM, IgG)**		**IgM:Negative; No significant level of detectable IgM antibodies (1:16 dilution negative). IgG:Negative; No significant level of detectable IgG antibodies (1:64 dilution negative).**
Rickettsia species (RMSF and SFG) by Real-Time PCR 446 Verified 12/6/2021	*Blood - 2*	11/18/2021	**Negative**		

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Single-tier testing with the C6 peptide ELISA kit compared with two-tier testing for Lyme disease ☆, ☆☆, ★

Gary P. Wormser [a] ✉, Martin Schriefer [b], Maria E. Aguero-Rosenfeld [c], Andrew Levin [d], Allen C. Steere [e], Robert B. Nadelman [a], John Nowakowski [a], Adriana Marques [f], Barbara J.B. Johnson [b], J. Stephen Dumler [g]

Abstract

For the diagnosis of Lyme disease, the 2-tier serologic testing protocol for Lyme disease has a number of shortcomings including low sensitivity in early disease; increased cost, time, and labor; and subjectivity in the interpretation of immunoblots. In this study, the diagnostic accuracy of a single-tier commercial C6 ELISA kit was compared with 2-tier testing. The results showed that the C6 ELISA was significantly more sensitive than 2-tier testing with sensitivities of 66.5% (95% confidence interval [CI] 61.7–71.1) and 35.2% (95% CI 30.6–40.1), respectively ($P < 0.001$) in 403 sera from patients with erythema migrans. The C6 ELISA had sensitivity statistically comparable to 2-tier testing in sera from Lyme disease patients with early neurologic manifestations (88.6% versus 77.3%, $P = 0.13$) or arthritis (98.3% versus 95.6%, $P = 0.38$). The specificities of C6 ELISA and 2-tier testing in over 2200 blood donors, patients with other conditions, and Lyme disease vaccine recipients were found to be 98.9% and 99.5%, respectively ($P < 0.05$, 95% CI surrounding the 0.6 percentage point difference of 0.04 to 1.15). In conclusion, using a reference standard of 2-tier testing, the C6 ELISA as a single-step serodiagnostic test provided increased sensitivity in early Lyme disease with comparable sensitivity in later manifestations of Lyme disease. The C6 ELISA had slightly decreased specificity. Future studies should evaluate the performance of the C6 ELISA compared with 2-tier testing in routine clinical practice.

An Overview of the Types of Borrelia That Cause Lyme Disease

Lyme disease is caused by several species of spiral-shaped bacteria – or "spirochetes" – from the group *Borrelia*. Species of *Borrelia* that cause Lyme disease are collectively known as *Borrelia burgdorferi sensu lato*, but it's important to note that this group contains at least 18 known species of Lyme-causing bacteria. That's not to mention a related but separate group of *Borrelia* that cause Tick-Borne Relapsing Fever.

Why is it so important to understand the different species of Lyme disease *Borrelia*? Not all diagnostic tests are designed to detect all known species of Lyme-causing *Borrelia*. This can lead to false negatives if a person is tested for one species or strain but is actually infected with another.

This article will cover some of the most important known species of Lyme disease *Borrelia*, when they were discovered, where they are most common, and what doctors should know about testing for multiple species.

Lyme Disease – A quick discussion

Patient ID: Date Received: **11/19/2021** Date Reported: **12/6/2021**

Test	Specimen	Date Collected / Comment	Results: Normal	Results: Abnormal	Reference/Units/Comments
Lyme disease Western blot (IgM / IgG) 313 Verified 12/4/2021	*Serum - 1*	11/18/2021	**IgGCDC Neg IgGAIt Neg IgMCDC Neg IgMAIt Neg**		**IgG: No bands present. IgM: No bands present. See attached report.**
Lyme disease C6 Peptide by ELISA 417 Verified 12/3/2021	*Serum - 1*	11/18/2021		**Pos (Index=1.26)**	*** Index range: Neg: <= 0.90, Equivocal: 0.91 - 1.09, Pos: >= 1.10**
Anaplasma phagocytophilum IgG/IgM by IFA 439 Verified 12/4/2021	*Serum - 1*	11/18/2021	**Negative (IgM, IgG)**		**IgM:Negative; No significant level of detectable IgM antibodies (1:16 dilution negative). IgG:Negative; No significant level of detectable IgG antibodies (1:80 dilution negative).**
Babesia microti IgG/IgM by IFA 440 Verified 12/4/2021	*Serum - 1*	11/18/2021	**Negative (IgM, IgG)**		**IgM:Negative; No significant level of detectable IgM antibodies (1:16 dilution negative). IgG:Negative; No significant level of detectable IgG antibodies (1:64 dilution negative).**
Rickettsia species (RMSF and SFG) by Real-Time PCR 446 Verified 12/6/2021	*Blood - 2*	11/18/2021	**Negative**		

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Food Sensitivities

ELISA/ACT Biotechnologies®

LRA Results

Jones, Mary
Received: 10/30/2020
Sample ID: 92040

Strong Reactions

Avoid for at least 6 months.

- Tomato

Moderate Reactions

Avoid for at least 3 months.

- Grape/Raisin (Green)
- Lactalbumin
- Pea, Green/Snow
- Cherry
- Parsley

Thus of the 166 substance(s) tested, reaction is noted to 6 item(s) and 1 food group(s).

While both strong and moderate reactions are equally burdensome to your immune defense and repair systems, we have found that it takes about half as long to restore tolerance of moderate reactions as compared to the strong ones.

Food Sensitivities

ELISA/ACT Biotechnologies®

LRA Results

Jones, Mary
Received: 10/30/2020
Sample ID: 92040

Group to avoid, due to Moderate reactions:

COW DAIRY

Milk, Pasteurized (Cow)	Butter (Whole)	Lactoglobulin
Yogurt (Cow)	Casein	Milk, Raw (Cow)
Cheese, Brick (Cow)	Cheese, Cottage	
Cheese, Processed (Cow)	Cheese, Parmesan	
Lactalbumin	Whey	

Although we may not have detected a direct reaction to all of the items in the group(s) above, you should avoid all the items in these groups due to similarities with items to which you did have a reaction.

Goals for this 2-Hour Presentation on Pain & Fatigue

- To review a list of the most common causes of Pain and Fatigue in your patient population from a Functional Medicine perspective.
- To go into more detail on a handful of these causes – specifically the ones you are more likely to see in your patient care.
- Learn how to approach or discuss these concerns with your patient or client in a practical way.
- What to say or recommend to your patient if you are not wanting to do lab testing so you can be a better resource to them for their health.
- Easy ways to order low-cost lab testing and easy interpretation . . . if you are looking to do that with your patient.
- What to do if you are getting out of your comfort zone.

Questions

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Lab Test Review: Kidney & Liver Function

Uric Acid, Serum:

QT – High: Poor blood sugar control, Pseudo-Gout, Gout
QT – Low: B12 / Folic Acids deficiency, Molybdenum deficiency

What is it?
A nitrogen-containing byproduct during metabolic breakdown of purines and protein, and it is normally removed in the urine.

Where does it come from?
Purines are organic compounds found in high concentrations in meat and meat products . . . especially when eating organs like liver and kidney. Plant-based diets are usually low in purines.

Lab Test Review: Kidney & Liver Function

Uric Acid, Serum:

Why do we care about it clinically?

- Another indicator of poor blood sugar control – insulin resistance and/or elevated glucose.
- Could be contributing to general aches and pains throughout the body when in the functional high (pseudo-gout).
- Could be the origin of pain and inflammation in a specific joint of the body – classically big toe but could affect other joints as well.
- Can increase the formation of kidney stones (ammonium acid urate).

Lab Test Review: Kidney & Liver Function

Uric Acid, Serum:

What does it mean if it's too high?

- Insulin resistance
- Kidney's not filtering it out of blood . . . poor kidney function.
- Function High: possible pseudo-gout
- Clinical High: possible gout.
- Also can be increased with inflammation and stress.

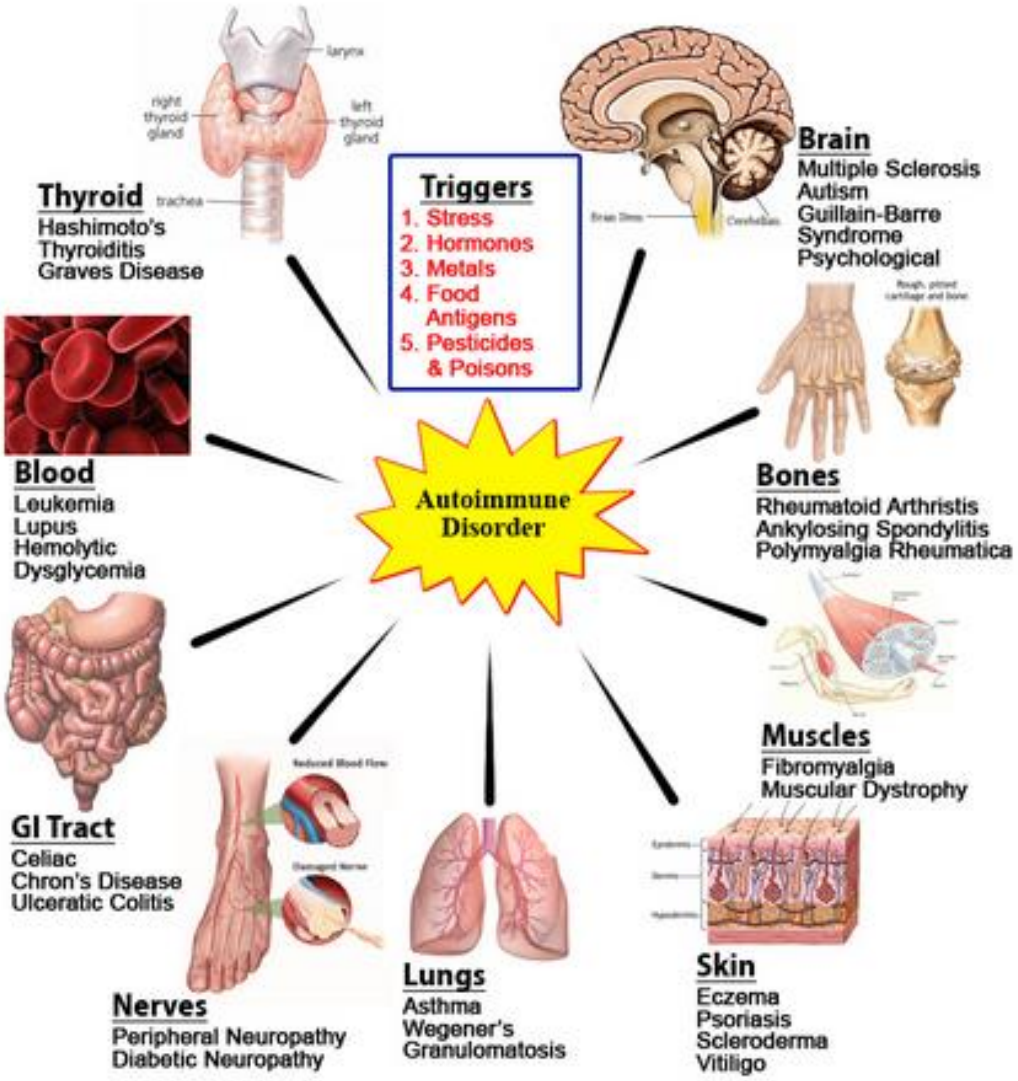
What does it mean if it's too low?

- Molybdenum deficiency -with MCV, MCH, and homocysteine levels normal.
- Vitamin B12 / Folic Acid deficiency – with MCV, MCH and/or homocysteine levels elevated.

Autoimmune Discussion

What exactly is an auto-immune condition?

Tissues of The Body Affected By Autoimmune Attack



Lab Test Review: Digestion and Individual Nutrients

Vitamin D, 25-Hydroxy:

QT – High: Excess Vitamin D intake

QT – Low: Low sun exposure, low Vitamin D intake.

What is it?

A fat-soluble "vitamin". In reality it is more like a hormone.

Where does it come from?

The major natural source of the vitamin is synthesis of cholecalciferol in the skin from cholesterol through a chemical reaction that is dependent on sun exposure.

Lab Test Review: Digestion and Individual Nutrients

Vitamin D, 25-Hydroxy:

Why do we care about it clinically?

Vitamin D is one of the most heavily research 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. It is responsible for increasing intestinal absorption of calcium, magnesium, and phosphate, and multiple other biological effects.

Some benefits of Vitamin D include:

- The pancreas needs enough Vitamin D to produce insulin.
- Important for hormone balance.
- Needed for balance of brain chemistry
- Affects energy production.
- Immune benefit – more of a viral benefit
- Cancer protective effects.
- Autoimmune regulation

Lab Test Review: Digestion and Individual Nutrients

Vitamin D, 25-Hydroxy:

What does it mean if it's too high?

- Excessive Vitamin D intake can lead to Hypervitaminosis D – resulting in calcium getting deposited abnormally in to wrong tissues such as the soft tissues (hypercalcemia).
- Nausea with excess vitamin D

What does it mean if it's too low?

- Low mineral absorption – calcium, magnesium, phosphate
- Refer to prior slide on benefits of Vitamin D.

Prioritizing Recommendations

Remove Negative Factors

- Infection
- Inflammation
- Chemical & Heavy Metal Toxicity
- Food Allergy / Sensitivity
- Excess Sugar in the Blood and your food
- Body pH that is too acidic
- Excess Hormones - Estrogen / Cortisol / Insulin
- Nerve Interference / Subluxation
- Other Excess Stress - Mental / Emotional / Physical

Bring in Positive Factors

- Correcting Nutrient Deficiencies:
  - Vitamins
  - Minerals
  - Amino Acids
  - Fatty Acids
  - Enzymes
- Balance or Improve Organ Function
- Correct Low Hormone Levels
- Improve Digestive Function
- Improve Immune Function

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