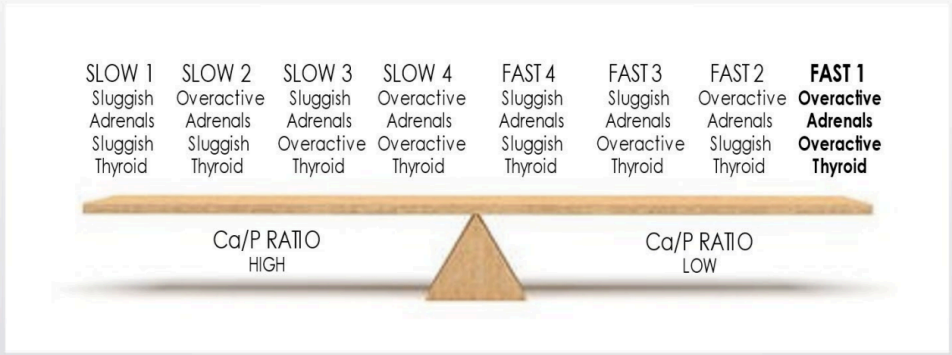
Mindfully Well
Holistic Health

HTMA Results

SAMPLE REPORT

Oxidation Status

Refers to the speed of your metabolism. The goal is always balance. Measured using the Ca/P ratio.



Ideal (Optimal Range)	Test 1	Test 2	Test 3	Notes/Comments
2.6 > 2.6 Slow Oxidizer < 2.6 Fast Oxidizer	2.87			**Slow 1: Slow adrenal + thyroid activity** The glands themselves _ the sympathetic nervous system, are both usually depleted of nutrients and do not function well. **A resistance or exhaustion stage of stress**

Slow Ox Symptoms	Possible Causes
Sugar cravings and/or Low blood sugar Apathy or depression or social withdrawal Postural hypotension *(get dizzy standing up)* Constipation Thyroid symptoms Dry skin Brain fog Cold sensitivity Joint pain Weight in the hips and thighs Poor ability to sweat Low blood pressure Osteoarthritis and/or osteoporosis Fatigue Premature gray hair Fibromyalgia symptoms	Chronic emotional stress Poor diet and lifestyle *(especially low protein diets)* Some nutrition supplements (Ca, Vit D) Toxic metals and environmental chemicals Copper toxicity *(drives slow pattern)* Iodine deficiency *(iodine helps bring Ca down)* Chronic infections Some drugs *(blood pressure, sedatives, tranquilizers, sleeping pills, marijuana, pain pills)*

What This Means

- **Metabolizes food at a rate slower than required** for production of optimal energy to perform basic body functions
- **Poor retention of sodium + potassium (***May eat a lot of salt and/or potassium, but don't hold onto it)*
- Due to low Na/K, **calcium + magnesium move out of cells/bones and build up in soft tissue + become biounavailable**
- **Mineral balancing will take some time:** For some it can take 3+ years *(especially with copper issues/trauma)*

Core Four Minerals

Mineral	Ideal (Optimal Range)	Test 1	Test 2	Test 3	Notes/Comments
Calcium	**42** (32-64)	**43**			

- Primary structural element- **99% is in the bone and teeth**.
- Affects **protein absorption** and helps move fats through intestinal wall
- Controls the **nervous system + muscle contractions**
- **Inhibits thyroid hormone**
- **Insulin release i**s dependent on calcium being available.
- Calcium absorption is dependent on **optimal acidity in the stomach**

Mineral	Ideal (Optimal Range)	Test 1	Test 2	Test 3	Notes/Comments
Magnesium	**6** (4-10)	**6**			

- Needed for over **600 different enzyme reactions** and every organ in the body needs Mg to function
- It is **a stress-reducing, calming mineral** *(helps calm the adrenals and control the nervous system)*
- Is a **muscle relaxant to our muscles and can improve sleep**
- Is **easily burned up in times of high stress**
- Vital for **heart health** *(helps prevent blood clotting, keeps heart rhythms steady)*
- Essential for **energy production** *(most magnesium is found in the mitochondria of each cell)*
- Supports **detoxification pathways** *(especially aluminum)* and needed to make glutathione
- **Heavy metals compete with magnesium to deposit in the brain** (low magnesium = higher heavy metals allowed in)
- Helps raise the body's natural levels of **Vitamin D** *(but taking supplemental D lowers Mg over time!)*

Mineral	Ideal (Optimal Range)	Test 1	Test 2	Test 3	Notes/Comments
Sodium	**24** (16-35)	**3**			

- **The body's great solvent** *(helps keep minerals in solution, especially Ca + Mg)*
- **99% is found extracellular (**outside the cell)
- Regulated by the **adrenal glands** (aldosterone = to retain sodium)
- Regulates **blood pressure & increased heart rate**
- Maintains **fluid balance & pH levels**
- **Influences stomach acid levels** *(chronic low acid = common to have Na issues)*

Table Salt vs. Sea Salt

Table salt is sodium (Na) + chloride (Cl) is 50% sodium whereas something like **Celtic sea salt is only 33% sodium and contains 60-90 additional trace minerals; much more balanced than table salt**

Our ancestors consumed 10,000- 70,000 mg sodium per day- more than 2.5x our current average intake and the prevalence of hypertension (high blood pressure) was around 10%, compared to now that number being 3x as high

The Salt + Blood Pressure Myth

High blood pressure may be related to low sodium as BP is regulated by balance between Na/K.

When salt intake is limited, the body begins to activate rescue systems that try to retain MORE salt and water from the diet. This can cause the arteries to become more constricted, making the heart work harder and thus the pressure of blood coming out of the heart increases- placing stress on the heart and arteries. **This makes us more vulnerable to chronically elevated blood pressure.**

Further Salt/Sodium Resources

Book: The Salt Fix
Article: Rethinking the War on Salt
Article: What are the Benefits of Using an Unrefined Sea Salt?
Article: Do You Really Need to "Hold the Salt" to be Healthy?

Symptoms of Low Sodium	Sources/Causes
Fatigue Salt cravings/thirst Poor digestion High blood pressure or higher heart rate Low stomach acid levels Infrequent urination Hypothyroidism Kidney issues High cholesterol and/or Triglycerides High insulin levels Obesity Type II diabetes Bloating Reproduction failure (aka fertility issues) + a reduced sex drive, erectile dysfunction	Low stomach acid levels High sugar/refined carb diet Keto diet (low-carb) High levels of physical activity Excessive caffeine intake Low vegetable intake Gut issues When we restrict our salt intake, our heart rate goes up, reducing our blood and oxygen circulation and increasing heart's need for oxygen, **increasing risk of heart attack** **The body increases insulin when sodium deficiency** is present due to insulin's role in helping the kidneys retain more sodium. **We need 3,000 - 4,000 mg sodium x day and 5,000 - 7,000 on workout days.**

Mineral	Ideal (Optimal Range)	Test 1	Test 2	Test 3	Notes/Comments
Potassium	**10** (6-14)	**3**			

- **Electrolyte balance +** pH level of the body
- **99% in the cell** *(if elevated in blood tells us losing it from cell into blood; actually in desperate need of it)*
- **Deficiency is running rampant;** 99% of women are deficient; 74% of men are
- **Regulates blood pressure** with sodium
- Sensitizes the cell to **thyroid hormone** *(low K = hypothyroid or sluggish)*
- **Lowers heart rate** and dilates arteries
- We need **4x as much K than we do Na**
- **Magnesium** helps support potassium absorption
- **Our daily requirement for potassium is 5,000 mg/day,** but It has also been noted that our ancestors used to get closer to 10,500mg per day!
- **You need one molecule of potassium for every one glucose molecule** (*if you're deficient in potassium, you won't store glucose well and it will convert it into fat tissue)*
- **If you're chronically low in B9 (folate) or B12,** you're likely to be potassium deficient.

Symptoms of Low Potassium	Sources/Causes

Allergies Constipation Fatigue Blood sugar issues Low blood pressure Muscle weakness Skin problems Water retention Slow oxidation Twitching Irregular heartbeats Unable to retain Vitamin B12 or VB9 *(folate)*	Vitamin D supplementation (*depletes K)* Excess caffeine intake Over-exercising Rheumatoid Arthritis: need 6-7k per day Insulin resistance Excess carbs in diet Kidney issues

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Significant Ratios

Ratio	Ideal (Optimal Range)	Test 1	Test 2	Test 3	Notes/Comments
Ca/P Metabolic	**2.6** (2.4 - 2.8)	**2.87**			

High Ca/P Ratio:
Typically represents a worn out and exhausted state *(especially when very high)* We can get so burnt out and exhausted that we end up in an **unhealthy parasympathetic state** Calcium is controlled by the parasympathetic branch of the ANS; **the higher calcium gets, the more parasympathetic**

Ratio	Ideal (Optimal Range)	Test 1	Test 2	Test 3	Notes/Comments
Na/K Stress	**2.4** (2.2 - 2.7)	**1.00**			

Low Na/K Ratio Symptoms:
Very depleted state Often feel exhausted, run down, frustrated, fatigued, chronically stressed, decreased immunity, poor digestion, allergies are common, carbohydrate intolerance is common, resentment, hostility, liver and kidney stress, HCL (stomach acid) deficiency Hostile, resentful, frustrated, little awareness around emotions and how you feel

Ratio	Ideal (Optimal Range)	Test 1	Test 2	Test 3	Notes/Comments
Ca/K Thyroid	**4.2** (3.8 - 4.4)	**14.33**			

High Ca/K Symptoms:	**Possible Causes:**
Sluggish thyroid activity (thyroid hormones have difficulty getting into the cell) Weight gain	Can be driven by copper toxicity, iodine deficiency, stress May not correlate with blood tests (early warning sign)- *Mismatch*

Cold hands and feet Lack of sweating Fatigue Dry skin + hair Constipation	*can be due to increased or decreased cell permeability*

Ratio	Ideal (Optimal Range)	Test 1	Test 2	Test 3	Notes/Comments
Zn/Cu Hormone	**8** (7.0 - 9.0)	**28.75**			

High Zn/Cu Ratio:
Hidden copper toxicity or bio-unavailable *(unbound copper)*

Ratio	Ideal (Optimal Range)	Test 1	Test 2	Test 3	Notes/Comments
Na/Mg Adrenals	**4** (3.5 - 5.0)	**0.50**			

Low Na/K Ratio Symptoms:
Sluggish adrenal activity; *The lower the ratio, the slower the adrenal gland activity* Tendency for fatigue/exhaustion, decreased stamina, hypoglycemia, weight fluctuations, poor digestion *(difficulty tolerating fat and meat protein)*, allergies

Ratio	Ideal (Optimal Range)	Test 1	Test 2	Test 3	Notes/Comments
Ca/Mg Blood Sugar	**7** (4.5 - 8.5)	**7.17**			

Ratio	Ideal (Optimal Range)	Test 1	Test 2	Test 3	Notes/Comments
Fe/Cu Infection	**0.9** (0.8 - 1.10)	**0.75**			

Low Fe/Cu Symptoms:	**Possible Causes:**
Thyroid issues Copper-induced iron deficiency	**Copper Toxicity** *High tissue copper predisposes to recurring viral infections* **Gallbladder/Liver congestion** Could indicate a chronic viral infection *Infections are more likely present when seen with a Na/K < 1.0 (which indicates immune deficiency)*

Heavy Metals

Metal	Ideal (Optimal Range)	Test 1	Test 2	Test 3	Notes/Comments
Aluminum	-	**0.3**			

- **Destroys the pineal gland in the brain + causes you not to sleep**; if you can't sleep, your brain can't detox like it should.
- **Oxidizes the thyroid gland, inhibits iodine uptake**, **limits thyroid hormone production** + can mislead the immune system to attack the thyroid
- **Impairs your body's ability to excrete mercury** by impeding your glutathione production – your body's master antioxidant. Glutathione is your most important intracellular detoxifier, required for reversing oxidative stress. If your aluminum load is high, your body will potentially become more toxic from the mercury because you are now on "aluminum overload" and your detoxification system no longer functions well
- Primarily eliminated through urine, so **kidney function is essential**

Interferes with: Vitamin C, magnesium, zinc, calcium
(low levels of these minerals may make you more susceptible to storing aluminum)

Aluminum Sources + Causes:	**Symptoms of Toxicity:**
Aluminium Foil + Tin Foil + Aluminum Cookware Animal feed Auto Exhaust Baby food + Formulas Baking Powders + Bleached Flours Beverages in Aluminium Cans *(soda, beer, sparkling water)* Cheese (processed) Cigarette Filters + Tobacco Smoke Cosmetics Dental Amalgams + Conventional Toothpastes Deodorant *(antiperspirant or stones/crystal type)* Herbal Teas (*especially mint + peppermint)* Medications: Antacids, Nasal sprays Pesticides on produce + non-organic grains Table Salt Tap Water Vaccines Welding	Destroys the pineal gland and causes sleep issues **Brain Issues:** Dementia, Alzheimers, ALS, Autism, Colic in babies **Thyroid Issues:** Hair loss, inhibits iodine uptake **Susceptibility for Infection:** Autoimmune disorders, Lyme disease, candida, yeast, recurring UTI **Others;** Production of free radicals (inflammation), emotional instability, aching muscles, anemia, liver/kidney issues, hormone issues, dry skin, heartburn, excessive gas

Metal	Ideal (Optimal Range)	Test 1	Test 2	Test 3	Notes/Comments
Arsenic	-	**.001**			

- Naturally occurring in the earth's crust but **human exposure is higher due to industry**
- **Tobacco and rice plants** easily take up arsenic
- Excess arsenic is an enzyme inhibitor and also **interferes with uptake of folate (vitamin B9)**
- Commonly **used as an anti-caking agent in TABLE salt** *(not Celtic salt)*

Interferes with: Molybdenum, Selenium + Phosphorus
(low levels of these minerals may make you more susceptible to storing arsenic)

Arsenic Sources + Causes:	**Symptoms of Toxicity:**
Ammunition Beer (some types) Cosmetics	Many **neurological symptoms,** highly **carcinogenic *(may cause bladder and lung cancer),***

Metal Adhesives Paper + Textiles Pesticides + Fungicides Paint Poultry (non-organic turkey + chicken) Protein powders Rice products (*not as high in white vs. brown rice)* Gluten-free products made with rice Seafood Table Salt Tap + Well Water Wood preservatives **Note on Rice:** Rice grown in the United States may contain higher levels of arsenic than in other countries due to soil contamination from previous farming practices. Due to the high prevalence of rice-based flours in gluten-free foods, may want to limit the use of gluten-free foods with rice flour-based ingredients.	Associated with **pregnancy issues, infant mortality and developmental issues in children.** **Skin issues:** eczema, pigmentation changes, skin lesions and hard patches on the palms and soles of the feet *(hyperkeratosis),* **In Children:** higher levels of arsenic have been found to be associated with early-stage hearth disease

Metal	Ideal (Optimal Range)	Test 1	Test 2	Test 3	Notes/Comments
Mercury	-	**.003**			

- **Serves no physiological role in the human body**. It was
- used extensively by **doctors in the 1800's and early 1900's to treat disease**.
- **The most common metal toxicity,** but also most challenging to eliminate.
- In people over 60, ⅓ **of all adults have toxic levels of mercury in their thyroid**
- **Three types in our environment:**
  - Elemental mercury *(dental amalgams, thermometers)*
  - Organic methylmercury *(bioaccumulates in the environment, ie. fish)*
  - Inorganic mercury *(white powder typically found in fungicides, disinfectants)*

Interferes with: Zinc, Selenium, Iodine, Chromium, Manganese
(low levels of these minerals may make you more susceptible to storing mercury)

Mercury Sources + Causes:	Symptoms of Toxicity:
Dental amalgams + “silver” fillings Bleached fours Calomel lotion Chinese herbs Contact lens solution Cosmetics Exhaust from cars Felt Fungicides Jewelry Preparation H + laxatives Psoriasis ointment Tap Water Tattoos Thermometers Vaccines *(contain thimerosal, which contains mercury)* **Note on Flu Shots:** Certain flu shots contain 50,000 ppb of mercury. The EPA classifies just 200 ppb as hazardous waste and the limit for drinking water is 2 ppb. **Household products:**	**Conditions:** Implicated in several long-term chronic conditions such as Autism, Alzheimer's disease, Allergies, Chronic Fatigue Syndrome, Multiple Sclerosis, Parkinson’s disease, and Autoimmune Thyroiditis. **Susceptibility to Infection:** Candida, yeast, recurring UTI, anemia, **Hormonal Symptoms:** Hair loss, weight issues, liver/kidney issues, skin problems, water retention, insulin resistance, PCOS **Neurological Symptoms:** Tremors, insomnia, memory loss, headaches, immune system damage, cognitive + motor dysfunction, vision problems, tingling in extremities **Psychological Symptoms:** Irritability, excitability, temper outbursts, quarreling, fearfulness/anxiety, restlessness, depression + insomnia **Prenatal Exposures:**

Ajax, Dove soap, Comet, Lysol, Ivory soap, bleach **Food Sources:** Large fish (tuna, swordfish, king mackerel, grouper, marlin, bluefish, shark, orange roughy, and tilefish) and slow growing fish **Industrial/Environmental Sources:** Agriculture, municipal wastewater discharges, mining, incineration, industrial wastewater, fossil fuels	Mental retardation, seizures, vision + hearing loss, delayed development, language disorders, memory loss **Body Location:** Brain is the primary storage site *(very neurotoxic),* Accumulates in the kidneys and liver and affects the nerves, kidneys, immune system, endocrine system and muscles. Depletes body of glutathione (*liver's antioxidant)* Major impact on thyroid gland + liver; mercury lowers iodine uptake in the thyroid and prevents thyroid hormone production.

Metal	Ideal (Optimal Range)	Test 1	Test 2	Test 3	Notes/Comments
Uranium	-	**.0013**			

- Naturally occurring elements in the earth and **present in soil, rock and water**
- Enters the body through **drinking water (especially well water), diet, inhalation and skin contact**
- Higher levels are found in **granite rock formations**
- **Radon gas is usually found along with Uranium**

Interferes with: n/a

Uranium Sources + Causes:	**Symptoms of Toxicity:**
Areas where there is granite rock *(very prevalent in California, Midwest and Southwest US)* Well Water Artillery Coal combustion Coloring agents Glassworks Mining operations Nuclear fallout + Nuclear power plants Parsley Phosphate fertilizers Pottery glazes Root vegetables **Soil-based crops** such as potatoes, parsnips, turnips, and sweet potatoes contribute the highest amounts of uranium to the diet, due to uranium's ability to 'stick' to these vegetables as they grow in the soil- Ingested uranium is less toxic than inhaled uranium.	Hair Loss Diabetes/Blood Sugar Issues Some Cancers Weight issues Kidney stress Reproduction issues Lung/respiratory issues Immune system issues DNA issues

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Iodine Status

Iodine doesn't get excreted through hair *(is through urine),* but several ratios and markers on the HTMA can alert us of an iodine deficiency.

Iodine Status Criteria		Test 1	Test 2	Test 3	Notes/Comments
Calcium	**>63**	-			
Potassium	**<5**	X			
Copper	**>2.6 or <1.5**	X			

Ca/K Ratio	**>10.1**	X			
Lithium	**<0.005**	X			
Selenium	**<0.08**	X			
Mercury (Hg)	**>0.02**	X			

Causes of Iodine Deficiency	Symptoms of Iodine Deficiency
Halide Toxicity- commonly found in drinking water Iodine is a halogen and is in the same chemical group as chlorine, fluoride, and bromine. An increased exposure to these chemicals displaces healthy iodine for your body- but the same is true if you have enough iodine *(will keep those at bay).* **Chlorine Exposure:** Drinking water Swimming pools **Fluoride Exposure:** Toothpaste Dentist's office Prescription drugs (a lot are made with fluoride- Prozac, Flonase, Lipitor) **Bromine Exposure:** Consumption of Baked Goods (brominated flour) Exposure to new electronics (brominated flame retardants) Older Furniture (brominated flame retardants) Soft drinks (brominated vegetable oil) **Pesticides** **Plastics** **Lack of Dietary Iodine** Current Iodine RDA in the USA is 150 mcg per day (just enough to prevent Goiter) Lack of access to fresh sea products and/or avoidance of fish and sea products due to metal contamination	**Primary issues will be with ESTROGENS:** Estrogen dominance, endometriosis, fibroids, fibrocystic breast disease, ovarian cysts and nodules, breast cysts and nodules, breast cancer **And THYROID issues:** Hypothyroid, hyperthyroid, Hashimoto's, Grave's Disease, thyroid cancer, thyroid cysts and nodules With iodine deficiency, hard to hold onto lithium + potassium Iodine researchers, Dr. Guy Abraham & Dr. David Browstein **tested 35,000 people for iodine status and found that 96% were deficient** **Learn More:** The Iodine Crisis Iodine: Why You Need It, Why You Can't Live WIthout It

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Second + Third Level Minerals

Mineral	Ideal (Optimal Range)	Test 1	Test 2	Test 3	Notes/Comments
Copper	**2.0** (1.0 - 2.5)	**0.8**			

- An extremely **important mineral in the body**, but it must be in a usable form
- Involved in the electron transport chain and iron utilization,
- Needed for neurotransmitter activity, immune system health, cardiovascular health, synthesis of collagen and elastin
- Is the body's primary **anti-fungal, anti-mold and anti-bacterial**

Copper Toxicity/Bioavailability

- **A buildup of biounavailable copper in the body**, that at excessive levels, causes physical and mental dysfunction.
- Copper is unbound and unstable and thus creates a **simultaneous toxicity/deficiency situation**- Copper toxicity is the

primary cause of copper deficiency

- Copper accumulates in the body's tissues, **primarily in the liver and then the brain.**
- If you have a buildup of biounavailable copper in the liver, **it can lead to conception issues as copper is needed for conception.**
- **The most common scenario is that copper toxicity is "hidden"- meaning it will show up as "normal" on the HTMA**
  - If adrenal function and metabolism are slow, copper doesn't move
  - This is very common in slow oxidizers; Rarely will you see high copper in a SO unless there is current exposure

Criteria		Test 1	Test 2	Test 3	Notes/Comments
Calcium	**> 50**	-			
Sodium	**< 12**	X			
Potassium	**<4**	X			
Copper	**> 2.6 or < 1.5**	X			
Zinc	**< 12 or >20**	X			
Phosphorus	**< 12**	-			
Ca/K Ratio	**> 10.1**	X			
Na/K Ratio	**< 2.1**	X			
Zn/Cu Ratio	**> 12.1 or < 6.1**	X			
Mercury	**> .002**	X			
Cu/Mo Ratio	**>850**	-			
History of Exposure	Birth control, copper pipes, etc.	X			

Causes of High Copper	Symptoms of High Copper
Long-term birth control usage **Vegan or vegetarian diet** **Long-term/chronic stress** **Environmental Chemicals** (Xenoestrogens, DDT) **Most plastics** (like BPA) **Poor liver, gallbladder and/or adrenal function** **Gallbladder removal surgery removes the storage site for bile** **Slow oxidation** **Vitamin D Supplementation** **Copper drinking water pipes (in home or from city water)** **Multivitamin use** **Public swimming pool usage** **Zinc deficiency** **High mercury** **Copper IUD:** promoted as a safe "non-hormonal" birth control option, but will cause increased copper in blood and hair. A copper IUD does not cause issues initially if zinc status is optimal and adrenal/liver health is good; ilt may take several months for symptoms of copper accumulation to occur. **Hormonal Birth Control (the pill, rings + hormonal IUDs) or Estrogen Hormone Replacement Therapy:** Estrogen enhances copper retention and synthetic "progestin" does not have a true progesterone effect. Blood clot risk of the pill is due to the fact that copper raises tissue calcium and lowers magnesium	**Debilitating fatigue/exhaustion + brain fog** **Burnout + mental health issues** (anxiety, OCD, irritability) **Panic attacks + racing mind** **ADD/ADHD** **Hypothyroid** **Low libido** **Lowered immunity** **Chronic yeast infections** **PMS** **Constipation** **Joint pain** **Weight gain** **Infertility** **Hair loss** **Estrogen dominance** **Low zinc, Vitamin B6, Potassium Magnesium, Vitamin C, Phosphorus** **Depletes gut microflora** and promotes yeast and candida overgrowth Progression of Copper Toxicity + Ways it Impacts Your Life

Mineral	Ideal (Optimal Range)	Test 1	Test 2	Test 3	Notes/Comments
Zinc	**16** (13 - 20)	**23**			

- Zinc is the body's **most abundant intracellular trace mineral** and is a **cofactor for 300 enzymes**
- **Body has no storage system for zinc**, thus a steady intake is required.
- Highest level of zinc **found in choroid of the eye, optic nerve & skin**
- **Adequate levels are required for:** immune function and wound healing, protein synthesis, DNA synthesis, taste acuity, heme biosynthesis, night vision, reproductive health/hormones/fertility, HCL (stomach acid), digestive enzymes and bile production, brain development, hair/skin/nail + eye health

Causes of "High" Zinc	Symptoms of High Boron
Can represent zinc loss or really high biounavailable zinc that is accumulating in soft tissue (typical in slow oxidation or slow metabolism). **If you have too much copper, it might drive zinc out of the body** If actually high, could also be from: Natural (zinc-based) sunscreen Head + Shoulders shampoo or other anti-dandruff products	Anemia *(due to copper antagonistic effects),* High cholesterol Infections

Mineral	Ideal (Optimal Range)	Test 1	Test 2	Test 3	Notes/Comments
Phosphorus	**16** (13 - 20)	**15**			

- Stimulatory mineral that makes up adenosine triphosphate, **or ATP, which is the primary molecule of the energy cycle**.
- Promotes **bone growth and structural development** *(about 85% is located in bones and tissues*)
- Activates the **sympathetic nervous system** (*fight or flight)*
- **Supports the cellular membrane** (i.e., gatekeeper of the cells as phospholipids)

Mineral	Ideal (Optimal Range)	Test 1	Test 2	Test 3	Notes/Comments
Iron	**1.8** (0.8 - 2.0)	**0.6**			

- **Present in every cell**, component of hemoglobin
- Involved in the **Electron Transport Chain, oxidases and oxygenases**
- Regulated and **kept in balance with copper in the liver, by the adrenals and liver**

Causes of Low Iron	Symptoms of Low Iron
Low stomach acid Parasites **Copper toxicity or deficiency** is, by far, one of the most common causes of iron deficiency anemia	Anemia, Pica. Chronic Candida, recurring Herpes viral infections, Impaired thyroid function, difficulty swallowing

Mineral	Ideal	Test 1	Test 2	Test 3	Notes/Comments

	(Optimal Range)				
Manganese	**0.06** (0.02 - 0.10)	**.01**			

- Typically found in the liver, thyroid, pituitary, pancreas, kidneys, and bones
- **Located largely in the mitochondria and activates many enzymes** associated with fatty acid metabolism, protein synthesis and is involved in neurological function
- **Required for normal thyroid function** and is involved in the formation of T4 *(if low T4, think about manganese)*
- **Helps to keep blood sugar balanced**, supports **ligament and connective tissue health**, needed for detoxification, wound healing and serves as an antioxidant

Causes of Low Manganese	Symptoms of Low Manganese
Glyphosate Lyme Disease	Impaired growth **Impaired reproductive function**- infertility, poor sperm motility, miscarriage, birth defects Mitochondrial dysfunction Impaired ability to make bile Issues with blood sugar/glucose Issues with carbohydrate and/or fat metabolism Skeletal abnormalities; increased bone fractures Poor nervous system function/anxiety/panic disorders

Mineral	Ideal (Optimal Range)	Test 1	Test 2	Test 3	Notes/Comments
Chromium	**0.05** (0.02 - 0.08)	**.03**			

- One of the most important alkaline-forming trace elements
- **Needed for blood sugar regulation**
- It is known that chromium is a constituent of the glucose tolerance factor (GTF) and is synergistic with insulin in promoting cellular glucose uptake

Mineral	Ideal (Optimal Range)	Test 1	Test 2	Test 3	Notes/Comments
Selenium	**0.08** (0.05 - 0.10)	**.05**			

- Plays a role in r**eproduction, thyroid hormone metabolism, iodine metabolism, DNA repair, liver detoxification, oxidative damage protection and immune system function**
- Mineral antagonist to mercury, lead and arsenic**, thus low selenium leaves you more vulnerable to accumulate these heavy metals**
- **Highest concentration in the thyroid gland**, involved in the conversion of thyroid hormone (inactive) T4 to (active) T3
- Also aids in **liver detoxification and is a glutathione cofactor** *(our body's primary antioxidant)*
- Has potent **antioxidant properties, protecting cells and other structures** from the harmful effects of free radicals

Causes of Low Selenium	Symptoms of Low Selenium
Excessive Zinc, Vitamin C, E or K supplementation Poor dietary intake Poor thyroid activity Iron overload Arsenic, cadmium, mercury or tin toxicity	Deficiency may exacerbate iodine deficiency and can also lead to hypothyroidism Cataracts, premature aging, iron-deficiency anemia, Cancer, immune system disorders, Cystic Fibrosis, Crohn's Disease,

	hypothyroid

Mineral	Ideal (Optimal Range)	Test 1	Test 2	Test 3	Notes/Comments
Boron	**0.06** (0.3 - 0.8)	**1.52**			

- **Regulates calcium balance, bone formation + wound healing**
- Works to keep **magnesium in the cell**
- Assists with **insulin sensitivity and blood sugar regulation**
- Protects against **pesticide-causing inflammation**
- Boosts the impact of **sex hormones and their regulation- like progesterone, testosterone + estrogen**

Causes of High Boron	Symptoms of High Boron
Very high can mean a boron loss, which could indicate inflammation in the body.	Toxicity is uncommon; usually a loss

Mineral	Ideal (Optimal Range)	Test 1	Test 2	Test 3	Notes/Comments
Cobalt	**0.004** (0.002 - 0.005)	**.001**			

- Required by the body in the **form of B12.**
- Cobalt sits in the middle of Vit B12 and for absorption will bind to an intrinsic factor *(secreted by the cells of the stomach with the help of HCL).*
- **B12 malabsorption will occur if stomach acid is low.**

Causes of Low Cobalt	Symptoms of Low Cobalt
Generally sign of gut infection Glyphosate exposure (*pesticide)* B12 deficiency Need for lithium Low stomach acid *(H. pylori, low zinc, low sodium, SIBO, stress, alcohol consumption, antibiotic use, NSAIDs, veganism)*	Gut infection symptoms fatigue/low energy Brain fog/memory issues Muscle weakness/pain Numbness/tingling Depression/anxiety Migraines/headaches Low blood pressure Miscarriage

Mineral	Ideal (Optimal Range)	Test 1	Test 2	Test 3	Notes/Comments
Molybdenum	**0.005** (.002 - .008)	**.002**			

- Ultra trace mineral- **Concentrates in the liver, kidney, bone, and dental enamel**
- Is i**nvolved in the formation of uric acid**
- Important for **detoxification and copper metabolism**

Mineral	Ideal (Optimal Range)	Test 1	Test 2	Test 3	Notes/Comments
Sulfur	**4722** (4200 - 5100)	**4256**			

- Very abundant, **acid-forming mineral in the body**
- Our body needs many different types of sulfur
- **Critical for liver detoxification** *(very hard to get this kind of sulfur from vegetarian/vegan diets)*- Don't stimulate detox if not eating meat
- Important for **connective tissue and flexibility of joints, tendons and ligaments**
- Precursor for the **utilization of amino acids** (70% are sulfur-based)

Causes of Low Sulfur:	Symptoms of Low Sulfur:
Typically common in most **vegan/vegetarian diets**, so will likely need sulfur **Usually low in cases of copper toxicity**	May indicate a deficiency or low sulfur in the diet **Low sulfur can impact detoxification and bile production**