

HTMA Results

SAMPLE

Oxidation Status

Refers to the speed of your metabolism. The goal is always balance. **Measured using the Ca/P, Ca/K, and Na/Mg ratios.**

SLOW 1 Sluggish Adrenals Sluggish Thyroid	SLOW 2 Overactive Adrenals Sluggish Thyroid	SLOW 3 Sluggish Adrenals Overactive Thyroid	SLOW 4 Overactive Adrenals Overactive Thyroid	FAST 1 Overactive Adrenals Overactive Thyroid	FAST 2 Overactive Adrenals Sluggish Thyroid	FAST 3 Sluggish Adrenals Overactive Thyroid	FAST 4 Sluggish Adrenals Sluggish Thyroid
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In the big picture you could have optimal energy and be in any pattern.....as long as the ratios are not too high or low.

Ideal/Ranges	July 2025	Test 2	Test 3	Test 4	Test 5	Test 6
2.6 > 2.6 Slow Oxidizer < 2.6 Fast Oxidizer	5.33 Slow 2					

Slow 2

Slower metabolism, slower thyroid + faster adrenals

Alarm state of stress; adrenals are dominant causing energy fluctuations. May experience both elevated and depressed energy levels and mood swings

Slow Ox Symptoms	Possible Causes
Weight accumulates in lower hip/thigh region Constipation or <1 bowel movement per day Poor ability to sweat Low energy/Fatigue Brain Fog Often feel cold Drier skin/hair Strong cravings for sweets and starches Tendency for chronic low blood sugar Low stomach acid levels (poor digestion) Joint pain due to tendency for mineral deposits/calcification Premature gray hair Fibromyalgia symptoms More introverted/inward focus	Chronic emotional stress Poor diet and lifestyle (<i>especially low protein diets</i>) Some nutrition supplements (Ca, Vit D) Toxic metals and environmental chemicals Copper Dysregulation (<i>drives slow pattern</i>) Iodine deficiency (<i>iodine helps bring Ca down</i>) Chronic infections Some drugs (<i>blood pressure, sedatives, tranquilizers, sleeping pills, marijuana, pain pills</i>)

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/Range	Test 1	Test 2	Test 3	Test 4	Test 5	Test 6
Calcium	42 (32-48)	64					

- Primary structural element- **99% is in the bone and teeth**
- Supports **fat digestion** + maintains **pH balance**
- Controls the **nervous system + muscle contractions**
- **Inhibits thyroid hormone uptake**
- **Insulin release** is dependent on calcium being available.
- Calcium absorption is dependent on **optimal acidity in the stomach**
- **Estrogen increases** Ca absorption

Symptoms of High Calcium	Sources/Causes
<p style="text-align: center;">Physical Symptoms:</p> <p style="text-align: center;">Sluggish metabolisms + energy levels Calcification in soft tissues + joints; stiffness Fatigue Premature aging of the skin Reduced mobility/flexibility of the spine Brain Fog Restless leg syndrome Constipation Kidney stones (<i>calcium is what makes up kidney stones</i>) Excessive thirst Muscle aches Memory loss Hearing difficulties Low libido</p> <p style="text-align: center;">Emotional Symptoms:</p> <p style="text-align: center;">Blocks you from experiencing emotions Lack of "feeling"- no joy, no pain, no excitement Socially withdrawn Foggy thinking Depression + emotional suppression Introvert type behavior Lack of motivation Stuck in trauma patterns (<i>not wanting to let it go</i>) Trouble hearing + understanding concepts</p>	<p style="text-align: center;">Have enough calcium in the body, but it is not where it should be and needs help getting back there!</p> <p style="text-align: center;">Calcium-fortified milk, cereals, breads, etc. Stress and/or adrenal exhaustion Magnesium deficiency Excess estrogen (<i>reduces calcium excretion</i>) Vitamin D supplementation Calcium supplementation (<i>found in most multivitamins</i>) TUMS (<i>calcium carbonate- increases kidney stone risk and causes constipation</i>) Hard Well Water Iodine deficiency Emotional Trauma Iron dysregulation Biounavailable buildup of copper</p> <p style="text-align: center;">What Will Help?</p> <p style="text-align: center;">Magnesium, Vitamin K2, Boron + Potassium</p>

Mineral	Ideal/Range	Test 1	Test 2	Test 3	Test 4	Test 5	Test 6
Magnesium	6 (4-8)	8.4					

- Needed for over **600 different enzyme reactions** and every organ in the body needs Mg to function
- **The body's #1 anti-stress mineral** (*helps calm the adrenals and control the nervous system*)
- But, it is **easily burned up in times of high stress**
- Is a **muscle relaxant to our muscles and can improve sleep**
- 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*)
- Without adequate magnesium, is **easily burned up in times of high stress**
- **Helps raise the body's natural levels of Vitamin D** (*but taking supplemental D lowers Mg over time!*)

How Much Do We Need & Why Do We Need It?

Slow Oxidizers: need about 3x your body weight in Magnesium grams per day

Our food has lost a lot of its magnesium content over time. Vegetables have lost 25-35%, meat has lost 10-20% and dairy has lost 40-70% of the magnesium content compared to 50 years ago.

Symptoms of Low Magnesium (or High aka Loss)	Sources/Causes
<p>Physical Symptoms: Inflammatory response throughout body Fatigue "Fight or flight" reactions Muscle spasms/cramps/twitching Unstable blood sugar Cardiac rhythm problems, heart attacks PMS + Heavy Menstrual Periods High blood pressure (<i>ensures Ca + Na do not accumulate in the cell which can lead to high BP</i>) Constipation Low Potassium Levels Adrenal issues Thyroid Issues Excessive sweating Convulsions/epilepsy/tremors Noise sensitivity Osteoarthritis/osteoporosis Dreamless sleep or you don't recall your dreams Ringing in the Ear</p> <p>Emotional Symptoms: A lot of mental/emotional stress Addictions Hyperactivity Schizophrenia Anxiousness Anger + Rage Depression Beligerence + Anter Irritability Anxiety or panic attacks</p>	<p style="text-align: center;">Stress Response Vitamin D supplementation Fluoride in water + toothpaste Sugar, Caffeine, Alcohol + Cannabis Low Stomach Acid</p> <p>Processing of Foods: most Mg in grains is lost through milling, nuts/seeds through roasting, greens through cooking</p> <p>Glyphosate + Pesticides + Fertilizers: Pulls out Mg, making you more sensitive to stress</p> <p>Depleted Soil: Carrots have lost 75% of their Mg content as they had in the 1940s</p> <p style="text-align: center;">Too Much Calcium Intake: Blocks Mg absorption</p> <p style="text-align: center;">Additionally Could Be From: Antacids, Cancer, Celiac disease, Colon removal, Diabetes, taking too much magnesium oxide, Estrogen therapy, excessive or prolonged lactation, excessive menstruation, fasting, kidney issues, insulin resistance, low salt intake, liver issues, pregnancy, deficiency of boron or vitamin B6</p>

Ways to Support Magnesium

Animal Products: Bone Broth, Chicken Breast, Chicken Liver, Beef

Seafood: Mackerel, Salmon

Dairy: Raw or Grass-Fed Dairy Products (*Butter, Kefir, Yogurt, Cheese, etc.*)

Pantry: Pumpkin Seeds, Sunflower Seeds, Sesame Seeds, Quinoa, Chia Seeds, Almonds, Cashews, Black Beans, Peanut Butter, Blackstrap Molasses, Brown Rice, Cacao Powder, Wild Rice

Produce: Cooked Dark Leafy Greens (*Swiss Chard, Spinach, Kale, Kelp, Spirulina*), Avocado, Potato, Bananas

Herbs: Alfalfa, Nettle, Horsetail, Red Clover, Oregano, Dill, Marjoram

Supplements: Magnesium glycinate, malate, threonate, chloride, [Earthley's magnesium cream](#), [Magnesium flakes](#) in the bath
(multiple options on DSS/Fullscript)

Mineral	Ideal/Range	Test 1	Test 2	Test 3	Test 4	Test 5	Test 6	Test 6
Sodium	24 (16-30)	40						

- Considered **the body's battery**
- **The body's great solvent** (*helps keep minerals in solution, especially Ca + Mg*); **99% is found extracellular** (outside the cell)

- **The “stress” mineral**- during periods of external/internal stress (*emotional, mental, physical or nutritional*), sodium will rise
- 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 **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

Table Salt vs. Sea Salt

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 High Sodium	Sources/Causes
High Energy + Heightened awareness Aggressiveness + irritability + anger Edema/swelling + water retention Headaches High blood pressure Nervousness Mental Strength Quick to Judge: <i>especially if Na/K ratio is high</i>	Inflammation (can be driven by heavy metals) Fast Oxidation Stress Mg + Ca are at a loss when Na is high

Mineral	Ideal/Range	Test 1	Test 2	Test 3	Test 4	Test 5	Test 6
Potassium	10 (6-14)	2					

- **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*)
- **Important for nerve and muscle activity, intracellular fluid balance, and transport of nutrients into the cell**
- Helps to **reduce high blood pressure** and **lowers heart rate**
- **Involved in carbohydrate metabolism** 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*)
- Sensitizes the cell to **thyroid hormone** (*low K = hypothyroid or sluggish*)
- **Deficiency is running rampant**; 99% of women are deficient; 74% of men are
 - **Our daily requirement for potassium is 4,700 mg/day**, but It has also been noted that our ancestors used to get closer to 10,500mg per day!
- **Magnesium** helps support potassium absorption
- **If you're chronically low in B9 (folate) or B12**, you're likely to be potassium deficient

Symptoms of Low Potassium (*or loss*)

Sources/Causes

<p>Physical Symptoms: Fatigue Low stomach acid levels Digestion issues Low blood sugar Heart Palpitations Sweet cravings Frequent urination Allergies Constipation Abdominal cramps Water retention + Excess thirst Dizziness + Nausea Skin Problems Cramps + Twitches in arms/legs Muscle Weakness Thyroid Issues Unable to retain Vitamin B12 or B9 (<i>folate</i>)</p> <p>Emotional Symptoms: Mental Fatigue Depression Person who "pushed" physically with excessive activities Mental worry or fear Remains in fight or flight even though body is very tired</p>	<p>Stress Response in body (<i>excrete cellular potassium to maintain potassium levels in the plasma/blood</i>) Excess caffeine intake Over-exercising Rheumatoid Arthritis: need 6-7k per day Insulin resistance Excess carbs in diet Kidney issues Magnesium Deficiency Vitamin D supplementation (<i>depletes K</i>)</p> <p>Mold/Mycotoxins: body uses potassium + molybdenum to help expel molds and mycotoxins</p> <p>This is more intense when Na/K ratio is high</p>
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Ways to Support Potassium

Animal Products: Beef, Bone Broth
Dairy: Raw or Grass-Fed Dairy Products (*Milk, Butter, Kefir, Yogurt, Cheese, etc.*)
Seafood: Salmon, Sardines, Clams
Pantry: Coconut Water (*no sugar added*), [Lakewood Aloe Juice](#), Cream of Tartar (*1/2 tsp mixed in your water*), Lima Beans, White Beans, Blackstrap Molasses, Tart Cherry Juice, Rice Bran, Lentils
Produce: Avocado, Potatoes, Acorn Squash, Delicata Squash, Sweet Potato, Celery, Green Peas, Beets + Beet Greens, Spinach, Swiss Chard, White Mushrooms, Apricots, Banana, Parsnips
Herbs: Nettle, Parsley, Basil, Dill, Tarragon, Coriander, Turmeric
Supplements: [Potassium Cocktail](#) (*can also find cheaper on DSS or Fullscript*)

Significant Ratios

Ratio	Ideal/Range	Test 1	Test 2	Test 3	Test 4	Test 5	Test 6
Ca/P Metabolic	2.6 (2.4 - 2.8)	5.33					

- Tells you about the **dominance of the autonomic nervous system** (parasympathetic or sympathetic dominance)
- **Ideally we want you in the middle/balanced**

Evaluating Your Metabolic Ratio

> 20: Physical & emotional disorders
 15 - 20: Low levels of energy (poor health)
 7 - 15: Moderate to low levels of energy
2.5 - 7 Moderate levels of energy
 2.4: Optimal, tremendous energy (*as long as mineral levels are near optimal*)
 2.2 - 2.3: Moderate levels of energy
 1.2 = 1.9: Low levels of energy (*poor health*)
 < 1.2: Physical & emotional disorders

High Ca/P Ratio Symptoms	Possible Causes
<p>Worn out and exhausted state (<i>especially when very high</i>) Diminished Thyroid + Adrenal Activity Chronic constipation Dry Skin + Hair Feeling Cold Low Blood Sugar Poor Digestion Strong Cravings for Sweets/Starches Overall Low Energy</p>	<p>As the body starts to deplete the Sympathetic Nervous System (fight-or-flight) it moves into Parasympathetic dominance (rest + digestion)</p> <p>Calcium is controlled by the parasympathetic; the higher calcium gets, the more parasympathetic we become.</p>

Ratio	Ideal/Range	Test 1	Test 2	Test 3	Test 4	Test 5	Test 6
Na/K Stress	2.4 (2.2 - 2.7)	20					

- **The most important mineral ratio**
- On every cell of the body there is a Na/K pump and **the difference in these concentrations is what controls the movement in and out of the cells**
- Tells us about **electrical potential of cells, kidney, liver, and adrenal function**

Evaluating Your Stress Ratio

> 7.01: Very High
 3.61 - 7.0: High
 2.81 - 3.6: Slightly High
 2.4 - 2.8: Ideal Range
 1.61 - 2.39: Slightly Low
 1.16 - 1.6: Low
 < 1.15: Very Low

High Na/K Symptoms	Possible Causes
<p>Angry, snappy, and/or easily irritable Judgmental about yourself + others Very stressed PMS symptoms (<i>associated with estrogen dominance</i>) Pain + Inflammation Water retention or edema High blood pressure</p>	<p>Inflammation Copper Toxicity/Dysregulation Kidney or Liver Stress Acute Alarm Phase of Stress Heavy Metals: <i>specifically aluminum, copper, mercury and cadmium</i></p>

Ratio	Ideal/Range	Test 1	Test 2	Test 3	Test 4	Test 5	Test 6
Ca/K Thyroid	4.2 (3.8 - 4.4)	32					

- Thyroid hormone controls calcium in the body via the production of calcitonin
- **The higher the calcium, the lower the thyroid gland activity**
- Potassium is associated with sensitivity of the tissues to thyroid hormone
- **When potassium is low, thyroid hormone is poorly utilized**
- May not always match up with blood work thyroid levels; **this is looking at the deeper, cellular level**

Evaluating Your Thyroid Ratio

>15.01: Very High
 6.21 - 15.0: High

4.41 - 6.20: Slightly High
 3.80 - 4.40 Ideal Range
 2.51 - 3.79: Slightly Low
 1.51 - 2.50: Low
 < 1.50 Very Low

High Ca/K Symptoms	Possible Causes
<p>Sluggish thyroid activity: <i>thyroid hormones have difficulty getting into the cell</i> Slower metabolic rate Weight gain Cold hands and feet Lack of sweating Fatigue Dry skin + hair Constipation</p>	<p>Elevated tissue calcium Can be driven by Copper Dysregulation, iodine deficiency, stress</p> <p>May not correlate with blood tests (early warning sign)- <i>Mismatch can be due to increased or decreased cell permeability</i></p>

Ratio	Ideal/Range	Test 1	Test 2	Test 3	Test 4	Test 5	Test 6
Zn/Cu Hormone	8 (7.0 - 9.0)	7.08					

- Zinc and Copper represent **hormones and their balance**

Evaluating Your Hormone Ratio

> 16.01: Very High
 11.01 - 16.00: High
 9.01 - 11.0: Slightly High
7.0 - 9.0: Ideal Range
 5.00 - 6.99: Slightly Low
 3.01 - 4.99: Low
 < 3.00 Very Low

Ratio	Ideal/Range	Test 1	Test 2	Test 3	Test 4	Test 5	Test 6
Na/Mg Adrenals	4 (3.5 - 5.0)	4.76					

- Tells about the **health and functioning of the adrenal glands**

Evaluating Your Adrenal Ratio

> 15.01: Very High
 8.01 - 15.00: High
 5.01 - 8.0: Slightly High
3.50 - 5.0: Ideal Range
 2.51 - 3.49: Slightly Low
 1.51 - 2.50: Low
 < 1.50 Very Low

Ratio	Ideal/Range	Test 1	Test 2	Test 3	Test 4	Test 5	Test 6
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Ca/Mg Blood Sugar	7.0 (5.5 - 8.5)	7.62					
<ul style="list-style-type: none"> Calcium aids in insulin release; magnesium inhibits insulin release, impacting blood sugar balance 							
Evaluating Your Blood Sugar Ratio							
<p>> 13.51: Very High 9.51 - 13.50: High 8.51 - 9.50: Slightly High 5.50 - 8.50: Ideal Range 4.31 - 5.49: Slightly Low 3.01 - 4.30: Low < 3.0: Very Low</p>							

Ratio	Ideal/Range	Test 1	Test 2	Test 3	Test 4	Test 5	Test 6
Fe/Cu Infection	0.90 (0.80 - 1.10)	0.42					
<ul style="list-style-type: none"> This shows possible signs of infections but needs to be confirmed with bioresonance testing and bloodwork 							
Evaluating Your Infection Ratio							
<p>> 2.31: Very High 1.61 - 2.30: High 1.11 - 1.60: Slightly High 0.80 - 1.10: Ideal Range 0.50 - 0.79: Slightly Low 0.20 - 0.49: Low < 0.20: Very Low</p>							

Low Fe/Cu Ratio Symptoms	Possible Causes
Thyroid issues Copper-induced iron deficiency	Gallbladder or Liver Stress Chronic Viral Infection Copper Dysregulation: <i>High copper predisposes to recurring viral infections</i>

Iodine Status
<ul style="list-style-type: none"> Every cell of the body utilizes iodine in some form or another Important for endocrine (thyroid), blood, and metabolism <ul style="list-style-type: none"> Iodine helps form part of T4 and T3 along with Tyrosine Iodine, vitamin A, copper, sodium, and selenium are essential for the thyroid Every drop of blood in our body flows through our thyroid once every 17 minutes. As the blood goes through it, the blood should be saturated in iodine Plays a role in dismantling microbes Iodine researchers, Dr. Guy Abraham & Dr. David Brownstein tested 35,000 people for iodine status and found that 96% were deficient One of the main problems today is not necessarily iodine DEFICIENCY, but environmental contaminants that act as iodine antagonists <ul style="list-style-type: none"> Fluoride, bromine, chlorine, and perchlorate all compete with iodine for absorption Intake of iodine through diet may be ineffective if receptors are clogged with halides Without enough iodine, TSH levels can become elevated which can lead to enlargement of the thyroid gland (goiter). <ul style="list-style-type: none"> This is the body's way to trap more iodine from the circulation Iodine doesn't get excreted through hair, but several ratios and markers on the HTMA can alert us of an iodine deficiency

Criteria		Test 1	Test 2	Test 3	Test 4	Test 5	Test 6
Calcium	> 50	X					
Potassium	< 4	X					
Copper	>2.0 or <1.5	X					
Ca/K Ratio	>10.1	X					
Lithium	< 0.004	X					
Selenium	< 0.08	X					
Mercury (Hg)	> 0.02	Borderline					

Iodine Deficiency Symptoms	Possible Causes
<p>Fatigue Frustration/Depression/Irritability/Anxiety Low Blood Sugar Slow Thyroid Cold hands/feet Slow Oxidation Weight Gain Infertility Hair Loss Autoimmune Issues Vaginal Infections</p> <p>Primary issues will be with ESTROGENS: Estrogen dominance, endometriosis, fibroids, fibrocystic breast disease, ovarian cysts and nodules, breast cysts and nodules, breast cancer</p> <p>And THYROID issues: Hypothyroid, hyperthyroid, Hashimoto's, Grave's Disease, thyroid cancer, thyroid cysts and nodules</p> <p>With iodine deficiency, hard to hold onto lithium + potassium</p> <p>Prior to implementing, need to have sufficient stores of magnesium, lithium, selenium, Vitamin C, B2 + B3</p> <p>Learn More: The Great Iodine Debate (article) The Iodine Crisis (book) Iodine: Why You Need It, Why You Can't Live Without It (book)</p>	<p>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</p> <p>Chlorine Exposure: Drinking water + Swimming pools</p> <p>Fluoride Exposure: Tap Water (well or city) Toothpaste, Mouthwash + Dentist Visits Prescription drugs: Prozac, Flonase, Lipitor</p> <p>Bromine Exposure: Consumption of Baked Goods (<i>brominated flour</i>) Exposure to new electronics (<i>brominated flame retardants</i>) Older Furniture (<i>brominated flame retardants</i>) Soft drinks (<i>brominated vegetable oil</i>)</p> <p>Pesticides Plastics</p> <p>Lack of Dietary Iodine Current Iodine RDA in the USA is 150 mcg per day (<i>just enough to prevent Goiter</i>)- in comparison, Japanese people on average consume 6.25 - 45 mg (MG, not mcg) per day</p> <p>Lack of access to fresh sea products and/or avoidance of fish due to potential mercury contamination</p>

Second + Third Level Minerals

Mineral	Ideal/Range	Test 1	Test 2	Test 3	Test 4	Test 5	Test 6
Copper	2.0 (1.0 - 2.0)	2.4					

- Extremely important mineral in the body, but it **must be in a usable form**
- Involved in the **electron transport chain, supports cellular energy, the immune response, melatonin production + the nervous system**

- Needed for **neurotransmitter activity, cardiovascular health/vein integrity, synthesis of collagen and elastin**
- The body's primary **anti-fungal, anti-mold and anti-bacterial** mineral
- important for **hemoglobin synthesis** (*i.e. important for iron utilization*)
- Copper **relies on other elements and organ functioning to be bioavailable** and make it usable by the body- specifically **strongly functioning adrenals, zinc, magnesium and Vitamins A, B6, B2, C**
- From a mineral perspective, **copper is associated with estrogen**

Copper Dysregulation

- **A buildup of biounavailable copper in the body's tissues**, that at excessive levels, causes physical and mental dysfunction.
- Copper is unbound and unstable and thus creates a **simultaneous toxicity/deficiency situation**- Copper dysregulation is the primary cause of copper deficiency
- Copper accumulates in the body's tissues, **primarily in the liver and then the brain**
- **Copper has a direct antagonistic effect on zinc within the body**; even with a healthy level of zinc intake you may have a greater need for it to help balance copper
- 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 Dysregulation 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	Test 4	Test 5	Test 6
Calcium	> 50	OVERT TOXICITY					
Sodium	< 12						
Potassium	<4						
Copper	> 2.5 or < 1.5						
Zinc	< 12 or >20						
Phosphorus	< 12						
Ca/K Ratio	> 10.1						
Na/K Ratio	< 2.1						
Zn/Cu Ratio	> 12.1 or < 6.1						
Mercury	> .002						
Cu/Mo Ratio	>850						

Progression of Copper Dysregulation + Build Up

Step 1: Ongoing exposure to copper or synthetic estrogen

Initially the body compensates with healthy adrenal, bile function and zinc stores

Step 2: Copper is an excitotoxin and stimulates the adrenal glands

Eventually the adrenal glands weaken due to too much stimulation

Potassium drops and sodium rises (*intensifies the stress response*)

Magnesium declines

Tissue calcium rises (loss pattern)

Zinc declines

Ceruloplasmin (*made in adrenals*) begins to decline due to weakened adrenal function

Step 3: Copper transport declines and copper starts to build up in the liver

Increased copper stimulates estrogen production and decreases DHEA

Estrogen stimulates the liver to remove more cholesterol from the blood and divert it into bile which causes the bile to thicken and

function to decline
Copper removal from the body is slowed

Step 4: Once liver is saturated with copper, build up continues in the brain and individual begins to experience mental health issues

- Thyroid and metabolism decline (higher tissue calcium and lower tissue potassium, phosphorus)
- Calcium shell pattern may develop (causing emotional numbness and spaciness)
- Copper stimulates adrenaline, leading to anxiety and panic
- Pushes dopamine into adrenaline (causing dopamine to decline and adrenaline to increase)
- Histamine breakdown is inhibited (rashes, hives are common symptoms)
- Oxidizes serotonin (prevents it from working and can lead to depression)

High or Hidden Copper Symptoms	Possible Causes
<p style="text-align: center;">Slow Oxidation <i>(depletes potassium, magnesium, pushes calcium out of bones)</i></p> <p style="text-align: center;">Debilitating Fatigue/Exhaustion (Adrenal Burnout) <i>Copper stimulates the adrenals; keeps you in the sympathetic "go go go" depletes zinc, leading to more copper accumulation; eventually tanks adrenal glands</i></p> <p style="text-align: center;">Brain Symptoms: Brain Fog Mental health issues (<i>anxiety, panic attacks, OCD, irritability, pseudo bi-polar disorder</i>) Hyperactivity (<i>ADD/ADHD</i>) Mood Swings Headaches Learning disabilities Racing Mind Concentration/Memory Problems</p> <p style="text-align: center;">Estrogen Dominance: <i>when copper is elevated, there is a strong possibility of high levels of estrogen which may contribute to:</i> Candida Chronic yeast infections Skin Conditions: Acne, rashes/hives, slow wound healing Excessive or Prolonged menstrual flow Increased PMS Fibroids, Cysts, Endometriosis Water Retention + Weight gain (<i>especially in belly/thighs</i>) Low libido Infertility Postpartum Depression</p> <p style="text-align: center;">Other Symptoms: Allergies + Mold Sensitivity Hair loss and/or Whitening of Hair Appetite disturbance Low Thyroid Activity Chocolate Cravings Insomnia Constipation Lowered immunity Joint pain Anemia (<i>Iron</i>)</p>	<p style="text-align: center;">Birth Control (<i>especially longer term use</i>) Copper IUDs Hormone Replacement Therapy Vegan or vegetarian diets Chronic Stress Dental amalgams ("silver" fillings) Hot Tub use Copper cookware/drinkware Environmental Chemicals (Xenoestrogens, DDT) Most plastics (like BPA) Poor liver, gallbladder and/or adrenal function Gallbladder removal surgery Fertilizers + Fungicides (<i>especially organic ones</i>) Slow Oxidation mineral pattern Vitamin D Supplementation Copper drinking water pipes (<i>in home or from city water</i>) Multivitamin use Swimming Pool use Zinc deficiency High Mercury</p> <p>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; it may take several months for symptoms of copper accumulation to occur.</p> <p>Hormonal Birth Control (the pill, rings + hormonal IUDs) or Estrogen Hormone Replacement Therapy: Estrogen enhances copper retention and synthetic "progesterin" 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</p> <p>In Utero Exposure: passed down from mother to fetus (<i>why this is becoming worse generation to generation</i>)</p>

Mineral	Ideal/Range	Test 1	Test 2	Test 3	Test 4	Test 5	Test 6
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Zinc	16 (14 - 18)	17					
<ul style="list-style-type: none"> Zinc is the body's most abundant intracellular trace mineral and is a cofactor for 300 enzymes Important for the innate and adaptive immune system, protein synthesis, hair/skin/nails, digestion, reproduction, digestion, blood sugar balance, nervous systems + sense of smell Body has no storage system for zinc, thus a steady intake is required Absorption is inhibited by fiber, phytates, tannins (tea/coffee) and oxalates Iron + Zinc compete for absorption at the intestines 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 From a mineral perspective, zinc is associated with progesterone in women and testosterone in men 							

Mineral	Ideal/Range	Test 1	Test 2	Test 3	Test 4	Test 5	Test 6
Phosphorus	16.0 (14 - 18)	12					
<ul style="list-style-type: none"> Stimulatory mineral that makes up adenosine triphosphate, or ATP, which is the primary molecule of the energy cycle. Important for energy production, growth/development, glucose utilization, and bone growth (<i>about 85% is located in bones and tissues</i>) Activates the sympathetic nervous system (<i>fight or flight</i>) Supports the cellular membrane (i.e., gatekeeper of the cells as phospholipids) One marker that can be used for overall vitality + energy levels 							

Low Phosphorus Symptoms	Possible Causes
Overall Low protein synthesis Generalized muscle weakness Poor appetite Anxiety Stiff joints Fatigue Stunted or delayed bone growth Bone diseases or bone pain Bloating/digestive issues	Low protein intake Poor digestion/absorption (low stomach acid/enzymes) Fungal or bacterial infections Extreme stress Excessive calcium levels Heavy Metals Copper Dysregulation Magnesium or Zinc deficiency Cortisol and steroid containing drugs, like prednisone

Ways to Support Phosphorus
<p style="text-align: center;">Animal Products: Beef, Chicken, Pork, Lamb Shoulder Seafood: Oysters, Sardines, Crab (<i>canned</i>) Dairy: Raw or Grass-Fed Dairy Products (<i>Butter, Kefir, Yogurt, Cheese, etc.</i>) Pantry: Pumpkin Seeds, Hemp Seeds, Tahini (<i>sesame butter</i>), Chickpeas, Lentils, Cocoa Powder, Cashews, Almonds, Oatmeal, Nutritional Yeast Flakes Produce: Mushrooms, Spinach, Avocado, Organic Tofu Supplements: Organ Complex (Equip Foods or PaleoValley)</p>

Mineral	Ideal/Range	Test 1	Test 2	Test 3	Test 4	Test 5	Test 6
Iron	1.8 (1.2 - 1.8)	1.0					
<ul style="list-style-type: none"> Present in every cell, component of hemoglobin Functions include oxygen transport, muscle function, energy production, and detoxification Regulated and kept in balance with copper by the adrenals and liver Iron levels on HTMA are not the best measure of iron, so a full iron blood serum panel test may be recommended 							

Mineral	Ideal/Range	Test 1	Test 2	Test 3	Test 4	Test 5	Test 6
Manganese	0.06 (0.02 - 0.10)	.012					

- Regulates **blood sugar**, supports **ligaments + connective tissues** and **detoxification in the liver**
- Plays a role in mucin production which helps prevent pathogens from entering the body
- **Enhances the ability of natural killer cells** (type of immune cell that kills cells infected with a virus)
- Important for **bone formation, reproductive system, blood clotting + a healthy immune system**
- **Required for normal thyroid function** and is involved in the formation of T4 (*if low T4, think about manganese*)
- **Called the "maternal mineral"** because animals fed low manganese diets exhibited less maternal behavior towards their young

Low Manganese Symptoms	Possible Causes
Impaired growth/Weak Bones Fatigue Hyperactivity + ADHD Low Immunity Worsened PMS Impaired reproductive function- <i>infertility, poor sperm motility, miscarriage, birth defects</i> Mitochondrial dysfunction Impaired ability to make bile Issues with blood sugar/glucose Skeletal abnormalities; increased bone fractures Poor nervous system function/anxiety/panic disorders	Born with low manganese due to deficiencies in your mother Eat refined/chemicalized foods (<i>low in manganese</i>) Eat too much raw food like salads (<i>can't break down vegetable fibers</i>) Glyphosate Lyme Disease High iron and/or Calcium

Ways to Support Manganese

Seafood: Mussels, Oysters

Pantry: Oats, Almonds, Teff, Rye, Brown Rice, Amaranth, Adzuki Beans, Chickpeas, Macadamia Nuts, White Beans, Black Beans, Buckwheat

Produce: Pineapple, Sweet Potato, Blueberries, Strawberries

Mineral	Ideal/Range	Test 1	Test 2	Test 3	Test 4	Test 5	Test 6
Chromium	0.05 (0.03 - 0.07)	.03					

- One of the **most important alkaline-forming trace elements**
- **Needed for blood sugar regulation + can help protect DNA from damage**
- **Neutral or alkaline environment + phytates** inhibit absorption

Mineral	Ideal/Range	Test 1	Test 2	Test 3	Test 4	Test 5	Test 6
Selenium	0.08 (0.65 - 0.10)	.06					

- Plays a role in **reproduction, 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

Low Selenium Symptoms	Possible Causes
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Weakened immune system Stress in cardiovascular system Irregular thyroid function Respiratory stress Reproductive Health stress/Infertility <i>May exacerbate iodine deficiency</i>	Heavy Metals: Aluminium, Cadmium, Mercury or Tin Iron Overload EBV/Viral Issues Excessive Zinc, Vitamin C, E or K supplementation Poor dietary intake Poor thyroid activity
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Ways to Support Selenium

Animal Products: Beef Liver, Chicken, Turkey, Eggs, Pork, Lamb
Dairy: Raw or Grass-Fed Dairy Products (*Butter, Kefir, Yogurt, Cheese, etc.*)
Seafood: Sardines, Oysters, Salmon, Clams, Cod, Scallops
Pantry: Brazil Nuts, Navy Beans, Sunflower Seeds, Rice
Produce: Shiitake Mushrooms
Supplements: [Organ Complex](#), [Fish Eggs/Roe](#)

Mineral	Ideal/Range	Test 1	Test 2	Test 3	Test 4	Test 5	Test 6
Boron	0.5 (0.3 - 0.7)	.15					

- Increases **absorption and regulates calcium, magnesium, and phosphorous levels, making it important for bone formation and healthy teeth**
- Assists with **insulin sensitivity and blood sugar regulation**
- **Largest concentration is found within the parathyroid gland** (*responsible for controlling calcium*)
- Is **protective against parasite and fungal overgrowth**
- Protects against **pesticide-causing inflammation**
- Boosts the impact of **sex hormones** and their balance- **like progesterone, testosterone + estrogen**
- Helps to maintain **memory and brain function**

Low Boron Symptoms	Possible Causes
Low hormones Worsened PMS or Menopausal issues Vaginal dryness Muscle cramps Poor sleep Joint inflammation Weak bones or muscles Restless Leg Syndrome Poor wound healing Tooth decay Brain fog Poor memory Aging skin	Chronic Stress Inflammation Magnesium deficiency Potassium deficiency Soft tissue calcification Poor dietary intake

Ways to Support Boron

Dairy: Raw or Grass-Fed Dairy Products (*Butter, Kefir, Yogurt, Cheese, etc.*)
Pantry: Almonds, Brazil Nuts, Walnuts, Red Kidney Beans, Lentils, Cashews, Hazelnuts
Produce: Celery, Prunes/Prune Juice, Potatoes, Peaches, Avocado, Apples, Grape Juice, Pears
Lifestyle: Foot soaks with [Borax](#)

Mineral	Ideal/Range	Test 1	Test 2	Test 3	Test 4	Test 5	Test 6
Cobalt	0.003 (.002 - .004)	.001					

- Required by the body in the **form of B12**
- Cobalt **sits in the middle of Vitamin 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**

Low Cobalt Symptoms	Possible Causes
<ul style="list-style-type: none"> Gut infection symptoms Fatigue/low energy Brain fog/memory issues Muscle weakness/pain Numbness/tingling Depression/anxiety Migraines/headaches Low blood pressure Miscarriage/Infertility 	<ul style="list-style-type: none"> Generally sign of gut infection Glyphosate exposure (<i>pesticide</i>) B12 deficiency Need for lithium High copper Low stomach acid (<i>H. pylori, low zinc, low sodium, SIBO, stress, alcohol consumption, antibiotic use, NSAIDs, veganism</i>)

Ways to Support Cobalt/B12

- Animal Products:** Beef, Organ Meats, Eggs
- Dairy:** Raw or Grass-Fed Dairy Products (Butter, Kefir, Yogurt, Cheese, etc.)
- Seafood:** Muscles, Oysters, Clams, Sardines, Salmon, King Mackerel
- Pantry:** [Nutritional Yeast Flakes](#)
- Supplements:** Organ Complex ([Equip Foods](#) or [PaleoValley](#)), [Fish Eggs/Roe](#)

Mineral	Ideal/Range	Test 1	Test 2	Test 3	Test 4	Test 5	Test 6
Molybdenum	0.005 (.003 - .007)	.002					

- Ultra trace mineral- **Concentrates in the liver, kidney, bone, and dental enamel**
- Important for **metabolism, cardio, respiratory + pancreas**
- Cofactor for many enzymatic reactions, including **breaking down iron + sulfites and detoxing toxins and waste products like uric acid and excess copper**
- Important for the production of **nitric oxide**
- Reduces **blood sugar spikes**
- Breaks down **waste products of candida and alcohol consumption**

Low Molybdenum Symptoms	Possible Causes
<ul style="list-style-type: none"> Intolerance to sulfites Slower liver detox pathways Hormone issues Blood sugar swings Brain fog Headaches Nausea Changes in metabolism Tooth decay Impaired growth Male impotence <i>Copper Dysregulation symptoms</i> 	<ul style="list-style-type: none"> Copper Dysregulation Mold Issues Overloaded Liver Stress Often see it in kids: copper will "look" low but will cause molybdenum to be really high

Ways to Support Molybdenum

- Animal Products:** Beef Liver + Organ Meats
- Dairy:** Raw or Grass-Fed Dairy Products (*Butter, Kefir, Yogurt, Cheese, etc.*)
- Pantry:** Black-eyed Peas, Lima Beans, Lentils
- Produce:** Bananas, Leafy Greens, Potatoes

Mineral	Ideal/Range	Test 1	Test 2	Test 3	Test 4	Test 5	Test 6
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Sulfur	4722 (4300 - 5000)	4756					
<ul style="list-style-type: none"> • Very abundant, acid-forming mineral in the body • Essential for bone health, hair health, nail health, • Helps conversion of proteins, carbohydrates, and fats into energy • Critical for liver detoxification + bile production (<i>very hard to get this kind of sulfur from vegetarian/vegan diets</i>) <ul style="list-style-type: none"> ◦ 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) + glutathione, the liver's antioxidant 							

Mineral	Ideal/Range	Test 1	Test 2	Test 3	Test 4	Test 5	Test 6
Lithium	.004 (.002 - .006)	.002					
<ul style="list-style-type: none"> • Lithium has a role in inducing and sustaining detox pathways (known as the gateway mineral to detox), and it's also involved in the production of glutathione • In the same class of minerals as sodium + potassium • Stimulates brain to generate new stem cells which develop into neurons, improving focus, memory + cognitive function • Required for Vitamin B12 transport into the cell; if not getting B12 into the cell, not methylating → not detoxing. High B12 in blood can signify lithium deficiency. • It's also an important mineral for mental health and balancing mood, most know it as prescription lithium that is given to people who are in a manic state or who have bi-polar disorder • It may support serotonin activity, and the levels are affected by iodine status, which means with low iodine you'll have trouble holding onto lithium • For more info on Lithium, click here 							

Heavy Metals

Metal	Ideal/Range	Test 1	Test 2	Test 3	Test 4	Test 5	Test 6
Aluminum	-	0.5					
<ul style="list-style-type: none"> • The third most abundant ingredient in the earth's crust • After ingestion, bloodstream carries it to the kidneys • Accumulates in tissues with long-lived cells, like bone + neurons in the brain • 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 • Glyphosate binds to aluminum + transports it into the bloodstream and straight to the brain • Lyme + Co-infections will keep coming back until you get rid of aluminum as it serves as a growth factor for borrelia and bartonella <p style="text-align: center;">Interferes with: Vitamin C, Magnesium, Zinc, Calcium (<i>low levels of these minerals may make you more susceptible to storing</i>)</p>							

Possible Symptoms	Possible Sources + Causes
<p>Destroys the pineal gland and causes sleep issues</p> <p style="text-align: center;">Brain Issues:</p> <p>Dementia, Alzheimers, ALS, Autism, MS, Colic in babies, Confusion, Headaches, Learning delays/disabilities, Memory loss, Neuropathy, Numbness</p>	<p>Aluminium Foil + Tin Foil + Aluminum Cookware</p> <p>Animal feed</p> <p>Antacids</p> <p>Auto Exhaust</p> <p>Baby food + Formulas</p> <p>Baking Powders + Bleached Flours</p>

<p style="text-align: center;">Mouth/Skin: Dry mouth, dry skin, excessive perspiration</p> <p style="text-align: center;">Kidney Issues: Aluminum has massive impact on the kidneys</p> <p style="text-align: center;">Thyroid/Parathyroid Issues: Hair loss, inhibits iodine uptake</p> <p style="text-align: center;">Susceptibility for Infection: Autoimmune disorders, Lyme disease, candida, yeast, recurring UTI</p> <p style="text-align: center;">Others; Production of free radicals (inflammation), emotional instability, aching muscles, anemia, liver/kidney issues, hormone issues, heartburn, excessive gas, slow growth in infants (<i>commonly found in most childhood vaccines</i>)</p>	<p>Beverages in Aluminium Cans (<i>soda, beer, sparkling water</i>) Cheese (processed) Cigarette Filters + Tobacco Smoke Cookware + Baking with Aluminum Foil Cosmetics Dental Amalgams + Conventional Toothpastes Deodorant (<i>antiperspirant or stones/crystal type</i>) Herbal Teas (<i>especially mint + peppermint</i>) Medications: Antacids, Nasal sprays Pesticides on produce + non-organic grains Table Salt Tap Water Vaccines Welding</p>
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Metal	Ideal/Range	Test 1	Test 2	Test 3	Test 4	Test 5	Test 6
Arsenic	-	.002					

- Naturally occurring in the earth's crust but **human exposure is higher due to industry**
- **The absorption rate of arsenic in the GI tract is greater than any other metal at 90%**
- Binds to **red blood cells** and deposits in **liver, kidneys, muscle, bone, hair, skin + nails**
- **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 sea salt*)

Interferes with: **Molybdenum, Zinc, Selenium, Iodine, Vitamin C, Phosphorus**
(*low levels of these minerals may make you more susceptible to storing*)

Possible Symptoms	Possible Sources + Causes
<p>Neurological symptoms: confusion, convulsions, drowsiness, nervousness, peripheral neuritis, headaches, mood disorders</p> <p>Respiratory: coughing, chest pain, lung cancer, ringing in the ears</p> <p>Renal System Issues: kidney stress/issues, bladder cancer</p> <p style="text-align: center;">Resistant weight loss/weight gain</p> <p>Highly carcinogenic: increased risk of liver/lung/skin cancers</p> <p>Associated with pregnancy issues, infant mortality and developmental issues in children: higher levels of arsenic have been found to be associated with early-stage heart disease</p> <p>Skin, Nail + Hair issues: eczema, hair loss, brittle nails, pigmentation changes, skin lesions and hard patches on the palms and soles of the feet, dermatitis, hyperpigmentation of nails/skin, jaundice</p> <p style="text-align: center;">Thyroid gland impacts</p> <p>Gastroenteritis: Burning in mouth/esophagus/stomach</p>	<p>Well Water Ammunition Beer Cosmetics Metal Adhesives Paper + Textiles Pesticides + Fungicides (lead arsenate) Paint Poultry (<i>due to chicken/turkey feed</i>) Protein powders Rice products (<i>not as high in white vs. brown rice</i>) Gluten-free products made with rice Seafood Table Salt Wood preservatives</p>

Metal	Ideal/Range	Test 1	Test 2	Test 3	Test 4	Test 5	Test 6
Mercury	-	.02					

- **Powerful neurotoxin** since ancient Roman emperors would banish prisoners to mercury mines
- Was used extensively by **doctors in the 1800's and early 1900's to treat disease**
- **"Mad Hatter" phrase from Alice in Wonderland** derived due to neurological symptoms of Irish immigrants who work in toxic factories making hats
- **The most common metal toxicity**, but also **most challenging to eliminate**
- In people over 60, **1/3 of all adults have toxic levels of mercury in their thyroid**
- **1% of body burden of mercury is retained in CNS** but **90% of symptoms are neurological**
- **80% of body burden is retained in the kidneys**
- Passes through the placental barrier- **meaning if your mom had mercury fillings, you can have a high mercury load**
- **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)

Possible Symptoms	Possible Sources + Causes
<p>Major impact on thyroid gland: mercury lowers iodine uptake in the thyroid and prevents thyroid hormone production</p> <p>Organ Impact: The brain is the primary storage site (<i>very neurotoxic</i>), accumulates in the kidneys and liver and affects the nerves, kidneys, immune system, endocrine system and muscles. Depletes body of glutathione (<i>liver's antioxidant</i>)</p> <p>Conditions: Implicated in several long-term chronic conditions such as Autism, Alzheimer's disease, Allergies, Chronic Fatigue Syndrome, Multiple Sclerosis, Parkinson's disease, and Thyroid Gland Issues</p> <p>Susceptibility to Infection: Candida, yeast, recurring UTI, anemia</p> <p>Hormonal Symptoms: Hair loss, weight issues, liver/kidney issues, skin problems, water retention, insulin resistance, PCOS</p> <p>Neurological Symptoms: <i>Commonly deposits in the brain</i>, Tremors, insomnia, memory loss, headaches, immune system damage, cognitive + motor dysfunction, vision problems, tingling in extremities, depletion of B12, Tinnitus</p> <p>Psychological Symptoms: Nicknamed "the Mad Hatter" due to accumulation in the brain, Causes "intoxication" affecting mood, emotions & sleep, mood swings, depression, anxiety, slurred speech, irritability, excitability, temper outbursts, quarreling, fearfulness, restlessness, insomnia</p> <p>Prenatal Exposures: Mental retardation, seizures, vision + hearing loss, delayed development, language disorders, memory loss</p>	<p>Fish: Large fish (tuna, swordfish, king mackerel, grouper, marlin, bluefish, shark, orange roughy, and tilefish) and slow growing fish</p> <p>Dental amalgams + "silver" fillings Bleached fairs Calomel lotion/Psoriasis Lotion Chinese herbs Contact lens solution Cosmetics Exhaust from cars Fabric softeners Felt Fungicides Jewelry Preparation H + laxatives Tap Water Tattoos Thermometers <i>Vaccines (contain thimerosal, which contains mercury)</i></p> <p>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.</p> <p>Household Products: Ajax, Dove soap, Comet, Lysol, Ivory soap, bleach</p> <p>Industrial/Environmental Sources: Agriculture, municipal wastewater discharges, mining, incineration, industrial wastewater, fossil fuels</p>

Metal	Ideal/Range	Test 1	Test 2	Test 3	Test 4	Test 5	Test 6
Strontium	-	.88					

- Can be natural, man-made or **present in radioactive forms**
- **Displaces calcium** and primarily **targets the bone**
- When radioactive it **can act as a human carcinogen**

Interferes with: **Calcium, Phosphorus**

(low levels of these minerals may make you more susceptible to storing)

Possible Symptoms	Possible Sources + Causes
<p>Chronic kidney issues Bone diseases + deformities Impaired bone growth Bone tumors Stress of the nose + lungs</p> <p>Displaces calcium in the body; damage is worse in children</p>	<p>Air pollution Ceramics glazing/making + Glass Making Contamination from military testing facilities Scrapping metals, sorting, sales + brokerage Metal melting + casting Landfills Mining + Coal Burning Nuclear Waste Paint pigments Some fish Surface + underground water Red color in fireworks/flares Magnets Glow in the dark paints + plastics</p>

Metal	Ideal/Range	Test 1	Test 2	Test 3	Test 4	Test 5	Test 6
Uranium	-	.0272					

- 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- found in certain geographic regions**
- **Radon gas** is usually found along with Uranium
- In the body, it accumulates largely in **bone, liver and kidneys**

Interferes with: **Vitamin A, C, E and Iodine**
 (low levels of these minerals may make you more susceptible to storing)

Possible Symptoms	Possible Sources + Causes
<p>Physical Symptoms: Kidney Stress (<i>really hard on kidneys</i>) Hair Loss Skin Issues Diabetes/Blood Sugar Issues Some Cancers Weight issues Reproduction issues Lung/respiratory issues Bone Issues Liver Stress Infertility Poor Immunity Immune system issues DNA issues</p> <p>Mental-Emotional Symptoms: Poor sleep-wake cycles Poor memory Anxiety Depressive-like behaviors</p>	<p>Areas where there is granite rock (<i>very prevalent in California, Midwest and Southwest US</i>) Well Water Phosphate fertilizers Foods grown in soils in high uranium (root vegetables) Artillery Coal combustion Coloring agents Glassworks Mining + Milling Operations Nuclear fallout + Nuclear power plants Pottery Glazes</p> <p>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.</p>

Metal	Ideal/Range	Test 1	Test 2	Test 3	Test 4	Test 5	Test 6
Zirconium	-	.07					

- A common agent in **dental crowns as zirconium oxide (or zirconium), deodorants, toothpaste/mouthwash, and jewelry**
- Chemically **similar to titanium**

Interferes with: **Potassium**
(low levels of these minerals may make you more susceptible to storing)

Possible Symptoms	Possible Sources + Causes
<p>Liver Damage Hypotension Pulmonary effects (lung degradation, shortness of breath) Interstitial inflammation Adrenal insufficiency Acne Poor Digestion Fatigue Skin Irritation</p>	<p>Poison ivy treatments Pipes/Fittings Skin ointments Deodorants/antiperspirants Dental crowns Surgical instruments Nuclear power Aerospace industry Ceramics + porcelain + glass Abrasive and polishing materials Iron and steel manufacturing Bricks Artificial gemstones</p>

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