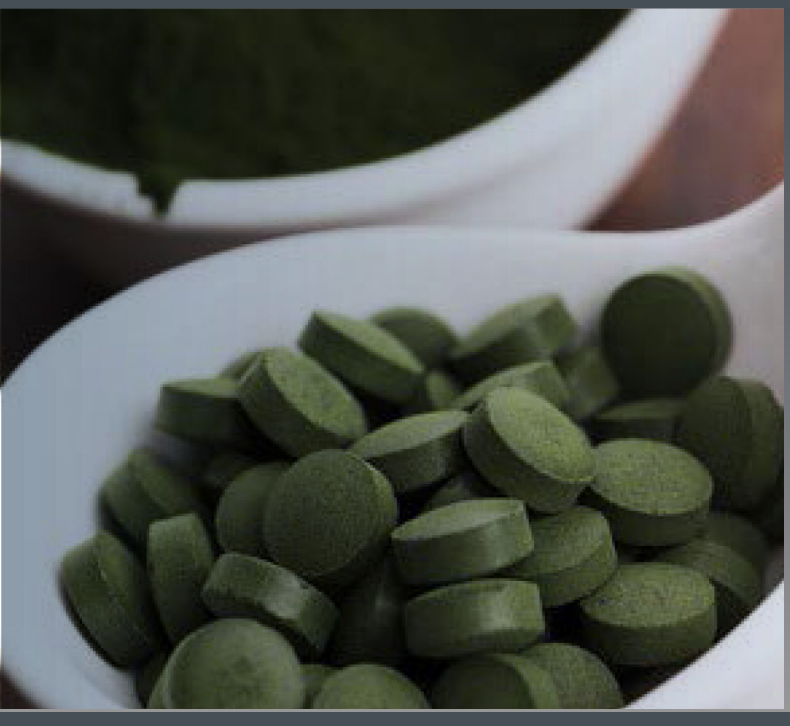
Genomic Supplementation Report

Client: frank zappa



VITAMIN B12

GENE	GENO TYPE
FUT2(1)	AA
FUT2(2)	GG
FUT2(3)	GG
MTR	AA
MTRR A66G	AG
MTHFR 677T	GG
VDR taq	AA
COMT	GG

Since your body can't make vitamin B12, you should get it either from supplements or food sources. Foods that contain vitamin B12 are all animal products or have been fortified with B12. See end of report for foods high in B12.

INCREASED

SUPPLEMENTATION NEED

It's estimated that 40 percent of American's don't get enough vitamin B12.

Vitamin B12 is absorbed through the stomach lining typically in the form of animal-based foods. There are four types of vitamin B12 that have slightly different characteristics.

1. **Methylcobalamin** – The most active form in the body, which protects the brain cells by crossing the blood-brain barrier without assistance.
2. **Cyanocobalamin** – Synthetic B12 which is created in labs. It's cheap but must be stabilized with cyanide. The amount of cyanide needed is not dangerous to your body but does require energy to convert and remove.
3. **Hydroxocobalamin** – Naturally created by bacteria, this form of vitamin B-12 is the most common form found in food.
4. **Adenosylcobalamin** – Another naturally occurring form of B12 but the least stable, making it the least common type in supplements.

Benefits of Vitamin B12

B12 deficiency can contribute to fatigue and brain fog. Benefits to increasing your vitamin B12 intake, including:

- Increased energy – Because your body needs B12 to convert carbohydrates into glucose, it increases your overall energy and reduces fatigue.
- Improved brain function – Vitamin B12 helps make DNA and keep your nervous system healthy by reducing depression, stress levels, and reducing brain shrinkage.
- Healthy digestive system – B12 helps the gut and prevents heart disease by curbing cholesterol levels, protecting against stroke, and high blood pressure.

INTERPRETATIVE NOTES:

Low absorption of B12. Focus on injections. Despite strong methylation, I would still recommend that you use methylcobamin as opposed to cyanocobalamin.

VITAMIN B6

GENE	GENO TYPE
NBPF3	TT
ALPL(1)	CT
ALPL(2)	AG

If you'd like to increase your vitamin B6 intake, you can do so naturally by adding certain foods to your diet. Foods that are notably high in B6 are listed at the end of this report.

TYPICAL SUPPLEMENTATION NEED

Vitamin B6, also called pyridoxine, helps your body turn food into energy, supports adrenal function, maintains a healthy nervous system, is important in metabolic processes, and supports the healthy development in babies' brains during pregnancy and breastfeeding.

Considered one of the most common vitamin deficiencies, vitamin B6 is consumed through diet or supplements.

Common symptoms of low vitamin B6 are irritability, depression, and anxiety. Some scientists believe that the levels for considering someone vitamin B6 deficient should be increased.

Benefits of Vitamin B6

Vitamin B6 is responsible for over 100 enzyme reactions in your metabolism. Making sure you are getting enough vitamin B6 in your diet may help with many known benefits, including:

- **Adrenal function** – Through regulating hormones, B6 helps you battle stress, stabilize your mood, and stay happy.
- **Metabolism** – Crucial to your hundreds of metabolic processes, B6 helps your body turn food into energy.
- **Healthy nervous system** – Vitamin B6 is often referred to as the happy vitamin because it helps make serotonin and norepinephrine, which impact your mood.
- **Digestive support** – B6 helps maintain healthy digestive processes.

INTERPRETATIVE NOTES:

A good multivitamin should supply adequate amounts.

VITAMIN A

GENE	GENO TYPE
BCMO1(1)	CC
BCMO1(2)	AT
BCMO1(3)	AG
BCMO1(4)	AG
BCMO1(5)	n/a
BCMO1(6)	GT

Vitamin A is a nutrient that is easy to add to your diet with both supplements and food. Some of the best food sources are listed at the end of this report, add to your meals for a boost in skin, eye, and teeth health.

LOW

CONVERSION EFFICIENCY

Vitamin A is also called beta-carotene or retinoic acid. When it's found in food it's in the form of beta-carotene. In supplements, vitamin A can be in either form or both. Beta-carotene is the naturally occurring form that is converted by the body into retinoic acid, which is its usable version.

The gene BCMO1 is what the body relies to properly convert beta-carotene into its usable form. Your body relies on this conversion of vitamin A for healthy maintenance of the heart, kidneys, lungs, and eyes.

Benefits of Vitamin A

Vitamin A is commonly known for its role in eye health and vision – it's why parents joke with their children that carrots will improve their eyesight. Beyond vision, vitamin A has an extensive list of benefits including:

- **Improved immune system** – Vitamin A boosts the immune system and helps it fight infection by increasing the lymphocytic responses against antigens. It also helps keep important mucus membranes stay moist, which helps strengthen white blood cell activity.
- **Healthy skin** – With the ability to trap free radicals and toxins, vitamin A keeps your skin soft through moisture retention.
- **Increased tooth strength** – Through forming a hard material just beneath the surface of your teeth called dentin, vitamin A keeps your teeth strong.
- **Eye health** – Your eyes are kept moist, which allows them to adjust to light changes, because of vitamin A.

INTERPRETATIVE NOTES:

Your multivitamin should contain vitamin in both forms - beta-carotene and a retinyl ester such as palmitate due to low conversion.

SELENIUM

GENE	GENO TYPE
GPx1	GG
SEPP1	CC
AGA	AA
BHMT	CC

While you can add selenium to your diet with a supplement, there are several foods that are naturally high in selenium. Some of these selenium-rich foods are listed at the end of this report.

INCREASED

SUPPLEMENTATION NEED

Selenium is an antioxidant, meaning it protects your body from harmful free radicals and oxidative stress. This delays cell damage and helps protect your body from oxidizing agents caused by many diseases and pollutants.

Also, as an immunomodulatory, Selenium is a more potent antioxidant than vitamins A, C or E. It's nutritionally essential for everyone, supports thyroid hormone metabolism, and protects you from infections.

Benefits of Selenium

As one of the most powerful antioxidants, it's no wonder selenium has many health benefits. Some of the benefits of selenium include:

- **Thyroid support** – Selenium is an important cofactor for three of the four thyroid hormone deiodinases, which activate and deactivate thyroid hormones and metabolites. It's so important to thyroid function, that deficiency may lead to symptoms similar to low thyroid activity.
- **DNA repair** – By neutralizing free radicals, selenium protects DNA, preventing serious damage.
- **Metal detoxification** – Studies have shown that organic selenium supports the excretion of the harmful element mercury.
- **Reproductive health** – Selenium is vital for both male and female reproductive health. In men, it enables sperm movement. In women, low selenium can negatively impact fertility and fetal development.

INTERPRETATIVE NOTES:

Again a good multivitamin should supply you with healthy levels.

MAGNESIUM

GENE	GENO TYPE
CNNM2	GG
MUC1	CT
DCDC5	CT
Shroom3	AG
TRPM6(1)	CT
TRPM6(2)	CT

Magnesium is found in both plants and animal-based foods, making it easy to add to your diet. Foods that are rich in magnesium are listed at the end of this report.

There are a lot of delicious foods that contain magnesium so increasing your intake shouldn't be a problem. Though, if you think you are magnesium deficient you can also take it in supplement form.

TYPICAL SUPPLEMENTATION NEED

Magnesium one of the seven macronutrients that is needed by your body in relatively high amounts. It's recommended that you consume at least 100 milligrams per day. Magnesium is vital to over 300 enzymatic reactions in your body including metabolism, transmission of nerve impulses, and synthesis of fatty acids and proteins.

It impacts several bodily systems and can even affect your mood. Making sure you get sufficient magnesium is important to maintaining optimal health. Because it's an abundant mineral it's relatively easy to add to your diet.

Magnesium isn't a supplement that should be taken in excess. Too much magnesium can cause diarrhea and upset stomach. While it's an essential nutrient, finding the right balance is best for your body.

Benefits of Magnesium

Magnesium is essential to high-functioning health as it supports several bodily functions. Some of the benefits of maintaining healthy magnesium levels include:

- **Bone strength** – Magnesium helps assimilate calcium into your bones by activating vitamin D in your kidneys.
- **Healthy metabolism**– Through both carbohydrate and glucose metabolism, magnesium supports healthy metabolic function.
- **Good heart health** – Magnesium is responsible for keeping your heart muscles healthy and strong. It also helps with the transmission of electrical signals throughout the body. Proper magnesium levels have shown to lower artery calcification, hypertension, and atherosclerosis (fatty buildup on artery walls).
- **Anxiety** – Low magnesium levels have been shown to increase anxiety.
- **Relieving constipation** – Magnesium works as a stool softener and can relieve constipation naturally.

INTERPRETATIVE NOTES:

Due to low absorption and increased loss from the kidneys, supplementation is beneficial. Mag threonate during the day and mag glycinate at night - this will also help with the glutamic acid mitigation.

CHOLINE

GENE	GENO TYPE
BHMT	AG
CHDH	TT
MTHFD1	AG
PEMT	TT

Your liver produces choline, but not in sufficient quantities. Add choline to your diet through food or through supplements. Both vegetables and animal products contain choline. Not surprisingly, beef liver is the highest source of choline. Foods high in choline are listed at the end of this report.

Increasing your intake of these food or adding choline to your diet through a supplement can improve overall health. But you can take too much choline, so be careful when adding it to your diet in supplement form.

TYPICAL SUPPLEMENTATION NEED

Though your body can produce some choline, it doesn't produce sufficient quantities of this essential nutrient to maintain optimal health. In fact, less than 10 percent of Americans get enough choline in their diet.

Choline is used in many essential health processes including maintaining cell structure, DNA synthesis, metabolism, and nervous system functions. To ensure you're getting enough choline, you can add choline-rich foods to your diet and add it in supplement form.

Most people are not getting enough choline. Some risks of choline deficiency include muscle damage, anxiety, brain fog, and fatty liver.

People that are at risk for choline deficiency include:

- Pregnant women
- Choline depleted diet
- People with genetic variations needing a higher choline diet

It's particularly important for pregnant women and babies to get enough choline to ensure healthy brain development. Though choline is a lesser known nutrient, it's essential to your overall health.

Benefits of Choline

Choline is vital for critical processes in your body. Some of the most important functions choline supports include:

- **Cell structure** – Your body relies on choline to make the fats that help maintain the structural integrity of all cell membranes.
- **Cell messaging** – Choline assists with the production of compounds that act as cell messengers.
- **Fat transport and metabolism** – Insufficient choline levels can cause fatty liver because it makes a substance that transports cholesterol away from the liver.
- **DNA synthesis** – Choline, vitamin B12, and folate are three vital nutrients in DNA synthesis.
- **Nervous system health** – Acetylcholine, a neurotransmitter involved in memory, muscle movement, and regulating heartbeat, needs choline to be made.

INTERPRETATIVE NOTES:

Most people have deficiencies but you eat plenty of egg yolks so this should keep levels healthy.

VITAMIN C

GENE	GENO TYPE
SLC23A1(1)	AG
SLC23A1(2)	CC
SLC23A2	AA

Citrus foods, such as oranges, are notorious for having high vitamin C levels but there are many foods that have high concentrations of vitamin C other than oranges, all listed at the end of this report. By adding these fruits and vegetables to your diet or increasing your intake you'll reap the benefits of vitamin C for your health.

INCREASED

SUPPLEMENTATION NEED

Also, known as ascorbic acid, vitamin C is a nutrient that plays several key roles in bodily functions. Vitamin C is a powerful antioxidant, trapping free radicals and preventing the harmful effects of toxins. It isn't produced by the body naturally and must be consumed in the form of fruits and vegetables.

Vitamin C assists the body in forming and maintaining connective tissues, bones, skin, and blood vessels. Without vitamin C, the body can become lethargic, ill, and the gums may become inflamed or bleed easily. And without treatment, severe vitamin C deficiency is deadly.

People at risk for inadequate levels of vitamin C are those with particular lifestyle habits, genetics, or diets lacking in vitamin C.

Benefits of Vitamin C

Vitamin C has lots of benefits to your health because of its role as an antioxidant and as a facilitator in maintain important tissues of the body. Some of the benefits of proper vitamin C levels include:

- **Collagen synthesis** – Vitamin C helps repair and regenerate tissues. This helps you keep your youthful appearance and allows the body to more easily repair damage of wounds.
- **Protection against heart disease** – Through increasing the body's level of glutathione, vitamin C protects the arteries.
- **Iron absorption** – Through iron absorption, vitamin C prevents anemia and related symptoms of scurvy such as bleeding gums and tooth loss.
- **"Bad" cholesterol and triglyceride reduction** – Through protecting arteries against damage and reducing plaque buildup, vitamin C reduced the risk of heart attack and stroke.
- **Limiting the negative effects of oxidative stress** – In diseases such as cancer, vitamin C has shown to help prevent damage and prevent further development by limited the effects of free radicals.

INTERPRETATIVE NOTES:

This should mainly be obtained from foods, no need for additional supplementation.

VITAMIN E

GENE	GENO TYPE
CD36	CT
GSTP1	AG
TNF	GG
IL10	TT

Vitamin E is relatively easy to add to your diet in plant-based forms. Foods that are high in Vitamin E are listed at the end of this report.

TYPICAL

SUPPLEMENTATION NEED

HIGH

INFLAMMATION RISK

Vitamin E is a fat-soluble antioxidant that plays a vital role in many aspects of your health including maintaining your immune system and neutralizing harmful oxidation of fat. This means it can help maintain healthy cholesterol levels, reduce cancer causing processes, and prevent cognitive decline.

Vitamin E is a term that includes eight compounds in two subgroups (tocopherols and tocotrienols) that each vary in biological activity. Alpha-tocopherol is the only form of the eight that is readily absorbed and used by your body.

Your liver is primarily responsible for using the alpha-tocopherol form of vitamin E taken in through food, supplements, and by converting it from other vitamin E forms. Vitamin E is used in various bodily functions responsible for keeping you healthy.

Benefits of Vitamin E

Immune strength – Vitamin E strengthens the immune system and prevents illness through its strong antioxidant properties.

- **Helps store vitamins A, K, iron, and selenium** – Vitamin E helps maintain sufficient levels of many essential nutrients.
- **Supports the formation of red blood cells** – Red blood cells rely on vitamin E to strengthen their interior lining, which is another way it toughens the immune system.
- **Keeping skeletal, cardiac, and smooth muscles healthy** – Vitamin E is important for both the structural functional and maintenance of these.
- **Prevent eye damage** – Studies have suggested that relatively high vitamin E intake may reduce the risk of macular degeneration and cataracts in elderly individuals.

There are many benefits of vitamin E that have been suggested by studies. One thing is for certain, vitamin E plays a diverse role in the body and is key to overall health.

INTERPRETATIVE NOTES:

Avoid additional vitamin E as this can lead to increased inflammation. What is supplied in a multivitamin should be sufficient.

VITAMIN D

GENE	GENO TYPE
GC	TT
CYP2R1	GG
CYP2R1(2)	AG
CYP27B1	TT
CYP24A1	AG
Klotho	GT
DHCR7	CC
VDR fok	GG
VDR bsm	CC
VDR taq	AA

Admittedly, vitamin D isn't as easy as other nutrients when it comes to increasing your intake. One option for increasing your vitamin D intake is increased sunlight - so long as you aren't increasing your risk of sun damage. Another option is consuming foods which are high in vitamin D, listed at the end of this report.

TYPICAL SUPPLEMENTATION NEED

YES

SUNLIGHT BENEFIT

YES

TESTING CAUTION

Vitamin D is a fat-soluble nutrient that isn't readily found in many foods. It supports important functions such a bone strength and muscle growth. Even though this vital vitamin improves health because it's hard to add to diets, and not surprisingly, many are lacking in sufficient vitamin D levels.

An estimated 70 percent of the population is thought to be vitamin D deficient. This is concerning because it's a nutrient that's responsible for regulating over 1000 genes in the human genome. Vitamin D's role in regulating genetic expression is due to the metabolic process, which produces a steroid hormone.

Also, due to its complex nature, people tend to vary in their ability to process vitamin D. This means that there's a difference in the baseline amount needed to maintain healthy vitamin D levels from person to person.

Benefits of Vitamin D

The benefits of vitamin D are vast. It a complex nutrient that impacts a range of functions and systems, including:

- **Bone health** – Through increasing calcium and phosphorus absorption, vitamin D strengthens bones throughout your life.
- **Prevention of diabetes** – Studies have shown that vitamin D can decrease your risk of getting both Type 1 and Type 2 diabetes.
- **Heart health** – Studies have shown vitamin D deficiency as a risk factor for congestive heart failure and heart attacks.
- **Mood regulator** – Vitamin D is thought to reduce or prevent depression.
- **Muscle growth** – Vitamin D has been shown to aid in muscle growth and retention in both adults and the elderly

INTERPRETATIVE NOTES:

You may want to periodically check 1,25 OH D levels due to this potentially being too high with normal 25 OH D levels. The KLOTHO variant you carry is a strong longevity indicator.

VITAMIN K

GENE	GENO TYPE
APOE(1)	TT
APOE(2)	CC

INCREASED

SUPPLEMENTATION NEED

Vitamin K includes a family of compounds, including vitamin K1 and vitamin K2. Also known as phylloquinone, vitamin K1 is found in plants, mostly leafy green vegetables. Vitamin K2 or menaquinones, is usually of bacterial origin and can be found in some animal-based and fermented foods but is mostly converted by the large intestine from vitamin K1.

Most people get an adequate amount of vitamin K through their diet. It's also present in most multivitamin supplements. Vitamin K is a vitamin that's difficult to take too much of due to its low toxicity levels. Because of its blood clotting properties, vitamin K should be carefully considered when taken in combination with anticoagulants.

Most of those conditions listed are due to malabsorption of vitamin K through the gut. Vitamin K absorption is something that should be considered if you suffer from any of the above illnesses.

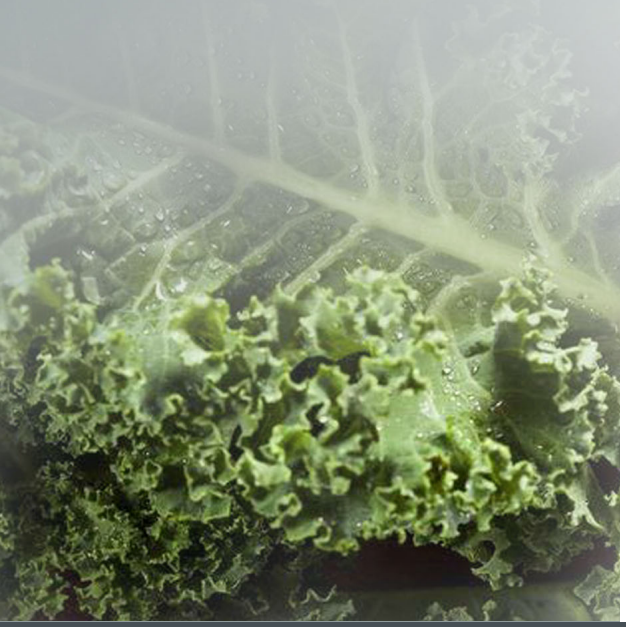
Benefits of Vitamin K

Vitamin K keeps your bones, blood, and heart healthy. Through maintaining proper levels of vitamin K, you'll reap the benefits, which include:

- **1Bone health** – In a study in the Netherlands, vitamin K2 was three times more effective in raising osteocalcin than K1, which is important to bone metabolism.
- **Blood clotting** – Vitamin K is essential to blood clotting. In fact, in studies of severe vitamin K deficiency, clotting was almost impossible.
- **Supporting the efficacy of vitamin D** – Vitamin K improves the impact of vitamin D when they are taken in combination.

INTERPRETATIVE NOTES:

A vitamin D + K2 vitamin will be beneficial.



FOLATE

GENE	GENO TYPE
MTHFR 677T	GG
MTHFR 1298C	TT
DHFR	TT
FOLR1	GG

TYPICAL SUPPLEMENTATION NEED

Folate or vitamin B9 is a water-soluble nutrient that's available in many foods and typically found in multivitamin supplements. Getting enough folate is important to cognitive function, cardiovascular disease, cancer, birth defects, and depression.

While it's difficult to get too much folate from food, it's possible to take too much folic acid in the form of supplements.

From fetal development to preventing dementia later in life, folate is a nutrient your body relies on in a variety of ways. Crucial parts of your body – your brain, heart, and all the way down to your DNA – rely on sufficient folate levels for optimal health.

Benefits of Folate

Folate is essential to numerous functions of the body and mind. Health benefits of proper folate levels include:

- **DNA synthesis and repair** – Functioning as a coenzyme, folate helps with the synthesis of DNA and RNA and the metabolism of amino acids.
- **Tissue growth** – Folate's role in synthesis makes it essential to tissue and cell growth.
- **Cardiovascular health** – Studies have shown that folate encourages normal cholesterol levels.
- **Neurological health** – Most observational studies show that higher folate levels correlate with low Alzheimer's disease and dementia.

INTERPRETATIVE NOTES:

Excellent overall methylation which should translate into long term good health.

THIAMINE

GENE	GENO TYPE
SLC19A3	CT

TYPICAL SUPPLEMENTATION NEED

Thiamine is a vitamin that is also referenced as vitamin B1. Thiamine is essential to many body functions, including nervous system integrity, muscle function, digestion, and carbohydrate metabolism. Very little thiamine is stored in the body and depletion can occur quickly when not supplied through diet or supplementation. It is sometimes called an "anti-stress" vitamin because it can strengthen the immune system and improve the body's ability to withstand stressful conditions.

Deficiencies can lead to symptoms of headache, fatigue, irritability, and depression. Thiamine deficiency can cause difficulty digesting carbohydrates. In severe deficiencies this allows a substance called pyruvic acid to build up in the bloodstream, causing a loss of mental alertness, difficulty breathing, and potentially heart damage.

Most people are not getting enough choline. Some risks of choline deficiency include muscle damage, anxiety, brain fog, and fatty liver.

Benefits of Thiamine

- **Energy production** - Vitamin B1 is responsible for converting sugar into energy. The vitamin acts as a co-enzyme in oxidizing sugar to produce energy for the smooth functioning of the body organs, especially the heart, brain, lungs, and kidneys.
- **Cardiovascular functions** - B1 is responsible for the production of acetylcholine, a neurotransmitter that relays messages to the muscles and nerves.
- **Eye health benefits** - Essential fatty acids Omega-3 and Omega-6 together with vitamin B1 help ensure eye health and prevent the formation of cataracts.
- **Improves brain function** - It ensures smooth functioning of the brain and helps improve memory and concentration. Vitamin B1 helps relieve stress and also helps strengthen the nerves.

Dietary sources of thiamine include beef, brewer's yeast, legumes (beans, lentils), milk, nuts, oats, oranges, pork, rice, seeds, wheat, whole-grain cereals, and yeast. In industrialized countries, food made with white rice or white flour is often enriched with thiamine.

INTERPRETATIVE NOTES:

Multivitamin and food should supply all the necessary thiamine.

IRON

GENE	GENO TYPE
TMPRSS6	AG
TF	GG
TFR2	AA
HFE(1)	CC
HFE(2)	GG

INCREASED

SUPPLEMENTATION NEED

TYPICAL

RISK FOR EXCESS

Iron is a mineral and most of us don't think of it as an essential nutrient to good health but it is the world's most common nutritional deficiency disease and is most prevalent among children and women of childbearing age. Almost 10% of women in developed countries are iron deficient.

The health benefits of iron include; treating many causes of fatigue, strengthening the immune system, building concentration, treating insomnia, and regulating body temperature.

Inadequate intake of vitamin C can also contribute to iron deficiency as vitamin C is needed to absorb iron found in plant foods (non-heme iron).

Benefits of Iron

- **Hemoglobin production** - Dietary iron is a critical component in the formation of hemoglobin. Hemoglobin carries oxygen throughout our bodies.
- **Oxygen transport** - Not only is iron involved in the formation of hemopglobin but it is also involved in the transfer of oxygen from one body cell to another.
- **Muscle function** - A form of hemoglobin found in muscle cells is myoglobin. Myoglobin carries oxygen from hemoglobin and diffuses it throughout muscle cells. Myoglobin is an essential component involved in the contraction of muscles.
- **Brain function** - Iron is critical for oxidative metabolism in the brain and it is a co-factor in the synthesis of neurotransmitters. Insufficient iron in the diet is associated with decreased brain iron and with changes in behavior and cognitive functioning.

INTERPRETATIVE NOTES:

The increased need for iron is only relevant if your labs indicate and issue.

NITRIC OXIDE

GENE	GENO TYPE
NOS1(1)	CC
NOS1(2)	GG
NOS1(3)	AA
NOS2(1)	GG
NOS2(2)	GG
NOS3(1)	GG
NOS3(2)	CT

HIGH

SUPPLEMENTATION NEED

Our bodies are capable of producing nitric oxide but some genetic variants can alter that ability. Nitrates are the natural forms of nitric oxide that the body can utilize. Nitrates have had a negative connotation over the years due to the suspicion of causing health problems such as stomach cancer. This was due to their association with the nitrosamines that could be found in cured and smoked meats as well as fermented foods. In many countries the amount of nitrates in processed meats has been substantially reduced and they add vitamin C which reduces the chances of nitrosamine formation during high heat cooking.

Kale and spinach will generally have substantially more nitrate content than a hot dog or bacon.

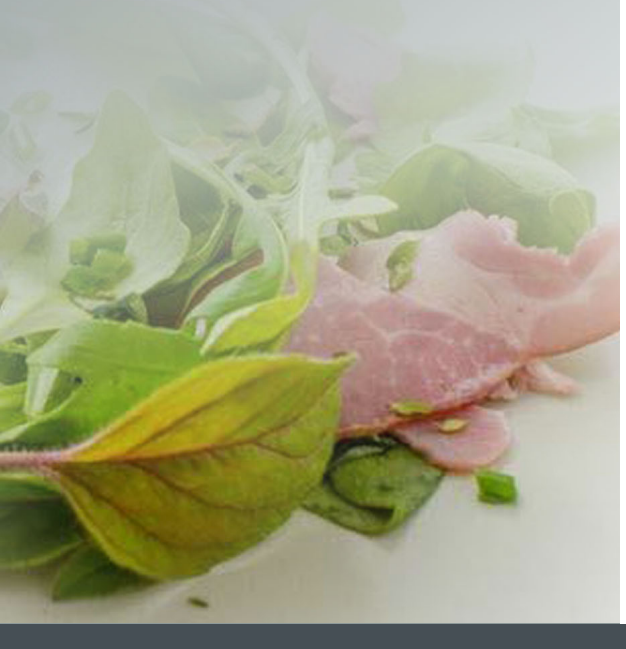
80% of the nitrates in our diet come from vegetables. Interestingly, organic vegetables have less nitrates than conventionally farmed food due to reduced use of nitrogen based fertilizers.

Benefits of Nitric Oxide

- **Cardiovascular** – Nitric oxide, endogenously produced or from nitrates can lower blood pressure and dilate blood vessels.
- **Exercise** – Nitrates have been shown to decrease oxygen requirements of muscles during exercise and lead to greater time to fatigue.
- **Brain** – Nitric oxide is a potentent antioxidant in the brain and it serves a function as a neurotransmitter.
- **Immunity** – Nitric oxide is used by our immune cells to kill invading bacteria.

INTERPRETATIVE NOTES:

Definite need to assess nitric oxide status as this translates into cardiovascular health and athletic performance.



SODIUM

GENE	GENO TYPE
ADD1	GT
ACE del	AG
NEDD4L	AA
WNK1	GG
AGT	AG

INCREASED

SENSITIVITY RISK

Sodium or salt is another nutrient that has had its share of bad press. It the healthy human state, sodium balance is one of the most exquisitely monitored systems in the body. Because sodium is so important to the maintenance of health, it is finely tuned to a very narrow and precise level. Taking excess sodium for most people will not result in health problems, assuming the body is functioning well.

One aspect to keep in mind is the genetics we possess may impart an increased risk for taking excess sodium in the diet. There are genetic variations that can result in an alteration in the processing pathways which can create potential adverse reactions to too much salt in the diet.

Many people will make the incorrect assumption that other forms of salt (something other than table salt) might be better for you. Salt as a chemical is sodium chloride and we are talking about sodium sensitivities here so table salt and sea salt or mineral salt will all still contain sodium. Granted there are some benefits to some of the exotic salts in that they contain additional minerals but they are still basically sodium.

Types of Sodium:

- **Table salt:** sodium chloride and iodine
- **Sea salt:** sodium chloride and trace minerals
- **Himalayan salt:** slightly lower sodium plus calcium, potassium, iron oxide (pink color)
- **Celtic salt:** slightly lower sodium and trace minerals

INTERPRETATIVE NOTES:

This may or may not be an issue but if you do notice any blood pressure issues, you may want to consider reduction of sodium intake.

CAFFEINE

GENE	GENO TYPE
CYP1A2(1)	AC
CYP1A2(2)	CC
AHR	CT
ADORA2A	CT
ADA	CC

SLOW

METABOLISM

LOW

ANXIETY RISK

Caffeine is one of the most researched substances in the history of science. The consensus on good or bad will change with the wind so what do you do?

The answer may actually reside in your genetics. The interactions of caffeine in our body is a complex process and requires a full systems look to see if it is truly good or not so good for each individual.

Benefits of Caffeine

Choline is vital for critical processes in your body. Some of the most important functions choline supports include:

- **Energy** – caffeine can improve daily energy by interfering with a substance called adenosine.
- **Fat burning** – caffeine is one of only a handful of natural substances that has been proven to improve fat loss.
- **Physical performance** – caffeine is a true performance enhancing substance and can increase the levels of epinephrine in the blood
- **Reduced risk of neurodegenerative diseases** - Coffee itself has been linked to reduced risk of Parkinson's and Alzheimer's disease

In the genetics we can look at:

- **Metabolism** – How well do we metabolize the caffeine? The half-life of caffeine is 5.7 hours. Some people are rapid metabolizers while others are slower.
- **Anxiety** – How does your brain respond to caffeine? Brain wave patterns can have variable responses to caffeine depending on your individual genetics. Some people derive greater anxiety and difficulty focusing with caffeine.
- **Sleep** – Caffeine can assist some people with shaking off a nights sleep and clearing up the brain fog; while others will experience sleeplessness from even small doses of caffeine.

INTERPRETATIVE NOTES:

Avoidance of more than 100mg of caffeine a day is advisable.

INTERPRETIVE NOTES:

VITAMIN FOOD SOURCES:

Vitamin B12:

- Liver • Salmon • Milk • Yogurt • Tuna • Mackerel • Sardines • Red meat • Raw cheese • Eggs

Vitamin B6:

- Brewer's yeast • Bananas • Milk • Cheese • Eggs • Fish • Sunflower seeds • Carrots • Spinach • Peas • Legumes • Potatoes

Vitamin A:

- Fish liver oil • Cream • Egg yolk • Beef liver • Cheddar cheese • Butter • Sweet potato • Carrots • Broccoli • Mango • Spinach • Pumpkin • Apricot • Peach • Papaya • Collard greens

Selenium:

- Brazil nuts • Tuna • Halibut • Beef liver • Turkey • Sardines • Sunflower seeds • Pork • Mushrooms

Magnesium:

- Dark leafy greens • Sesame seeds • Brazil nuts • Mackerel • White beans • Quinoa • Avocados • Yogurt • Bananas • Dark chocolate

Choline:

- Beef liver • Eggs • Chicken breast • Cauliflower • Broccoli • Mushrooms • Soybeans • Dark leafy greens • Shellfish • Asparagus • Brussel sprouts • Bok choy • Cod

Vitamin C:

- Bell peppers • Guava • Dark leafy greens – especially turnip greens • Kiwi • Broccoli • Strawberries • Tomatoes • Peas • Papaya • And of course, citrus fruits – oranges, grapefruits, lemons

Vitamin E:

- Almonds • Sunflower seeds • Swiss chard • Pine nuts • Broccoli • Mustard greens • Avocado • Spinach • Turnip greens • Kale • Plant oils • Hazelnuts

Vitamin D:

- Fatty fish – Tuna, mackerel, salmon • Beef liver • Cheese • Egg yolks • Cod liver oil • Fortified drinks – Milk and sometimes orange juice • Fortified foods – Cereals and grains

Vitamin K:

- Spinach • Kale • Turnip greens • Collards • Swiss chard • Mustard greens • Parsley • Romaine • Brussel sprouts • Broccoli • Cauliflower • Cabbage

Folate:

- Beef liver • Spinach • Broccoli • Bananas • Strawberries • Oranges • Beans • Avocado • Tomatoes • Beets • Celery • Asparagus • Legumes • Yeast • Cereal • Mushrooms • Fish • Eggs

Nitric Oxide:

- Spinach • Kale • Beets • Carrots • Legumes • Celery • Eggplant • Ham • Bacon • Pastrami • Salami • Hot dogs • Sausages

Thiamine:

- Beef • Brewer's yeast • Legumes (beans, lentils) • Milk • Nuts • Oats • Oranges • Pork • Rice • Seeds • Wheat • Whole-grain cereals • Yeast • In industrialized countries, food made with white rice or white flour is often enriched with thiamine.

Iron:

- Legumes • Lentils • Soy beans • Whole grains • Green leafy vegetables • Cereals • Bread • Spinach • Turnip • Fish • Eggs • Meat (especially high in red meats) • Sprouts • Broccoli • Dry fruits