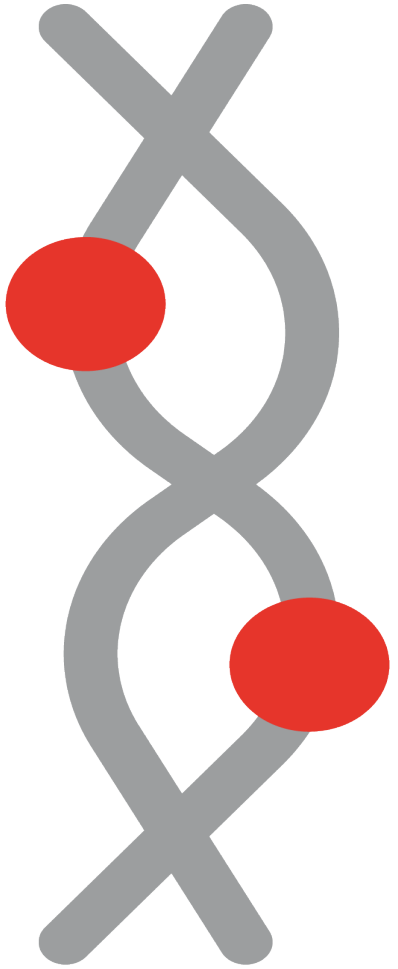
ELITE GENE LABS

GENETIC POTENTIAL FOR OPTIMAL PERFORMANCE



Gene Comprehensive Nutrigenomic Report

Accession Number: ##########
Specimen Collected: ##/##/####
Specimen Received: ##/##/####
Report Generated: August 12, 2025
Specimen Type: Buccal Swab
Provider: ######## ########
Patient Name: ###### ######
Patient DOB: ##/##/####
Patient Gender: Male

Do not make any decisions about your health solely based on the information contained in this report.
Always consult with a licensed and experienced health practitioner when you receive this report.

Fagron Genomics US | 844-258-5564 | FagronGenomicsUS.com
Lab | 807 Las Cimas Pkwy, Suite 145 | Austin, TX 78746
Laboratory Director: James W. Jacobson, Ph.D

– 46 – Male

(-/-) Normal Risk | (-/+) Medium Risk | (+/+) High Risk

rsID	Gene	Genetic Result	Therapeutics Associated With Positive Result	Highly Recommended Therapeutics	Provider Discretion: As Needed Formula Recommendations	Lifestyle Recommendations	Laboratory Recommendations
VITAMINS							
Fat Soluble Vitamins							
rs7501331	BCO1	C/T (+/-)	Vitamin A				
rs12934922	BCO1	A/A (-/-)					
rs6994076	TTPA	A/A (-/-)	Vitamin E		Vitamin E (200 IU/day)	Consume Foods High in Vitamin E	
rs2108622	CYP4F2	C/C (+/+)					
rs2282679	GC	T/T (-/-)	Vitamin D, Vitamin K, Calcium				
rs2228570	VDR	A/G (+/-)	Vitamin D, Vitamin K				
rs9923231	VKORC1	C/C (-/-)	Vitamin K			Consider Consuming Foods High in Vitamin K, Unless Contraindicated by Clot Risk or Medication	
rs2108622	CYP4F2	C/C (+/+)					

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rsID	Gene	Genetic Result	Therapeutics Associated With Positive Result	Highly Recommended Therapeutics	Provider Discretion: As Needed Formula Recommendations	Lifestyle Recommendations	Laboratory Recommendations
Water Soluble Vitamins							
rs1395	SLC5A6	A/G (+/-)	Biotin (B7) and Pantothenate (B5)		Biotin (5,000 mcg/day) Pantothenate (500 mg/day)	Consume Foods High in Biotin and Pantothenate	
rs1801198	TCN2	G/G (+/+)	Methylcobalamin, Adenosylcobalamin	**B12 Balance twice daily**		Consume Foods High in Vitamin B12	Serum Vitamin B12 Plasma Homocysteine AND/OR Methylmalonic Acid
rs33972313	SLC23A1	C/C (-/-)	High Dose Vitamin C				

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rsID	Gene	Genetic Result	Therapeutics Associated With Positive Result	Highly Recommended Therapeutics	Provider Discretion: As Needed Formula Recommendations	Lifestyle Recommendations	Laboratory Recommendations
MINERALS							
rs2274924	TRPM6	T/T (-/-)	Magnesium				
rs11126936	SLC30A3	G/T (+/-)	Zinc				
rs4704397	PDE8B	A/G (+/-)	Iodine, Selenium, Increased Risk of Hypothyroidism		Iodine Selenomethionine	Consider Consuming Foods with High Iodine Content	Urinary Iodine OR Comprehensive Micronutrient/Mineral Analysis Serum Thyroglobulin Thyroid Panel
rs2235544	DIO1	C/C (-/-)	Selenium				

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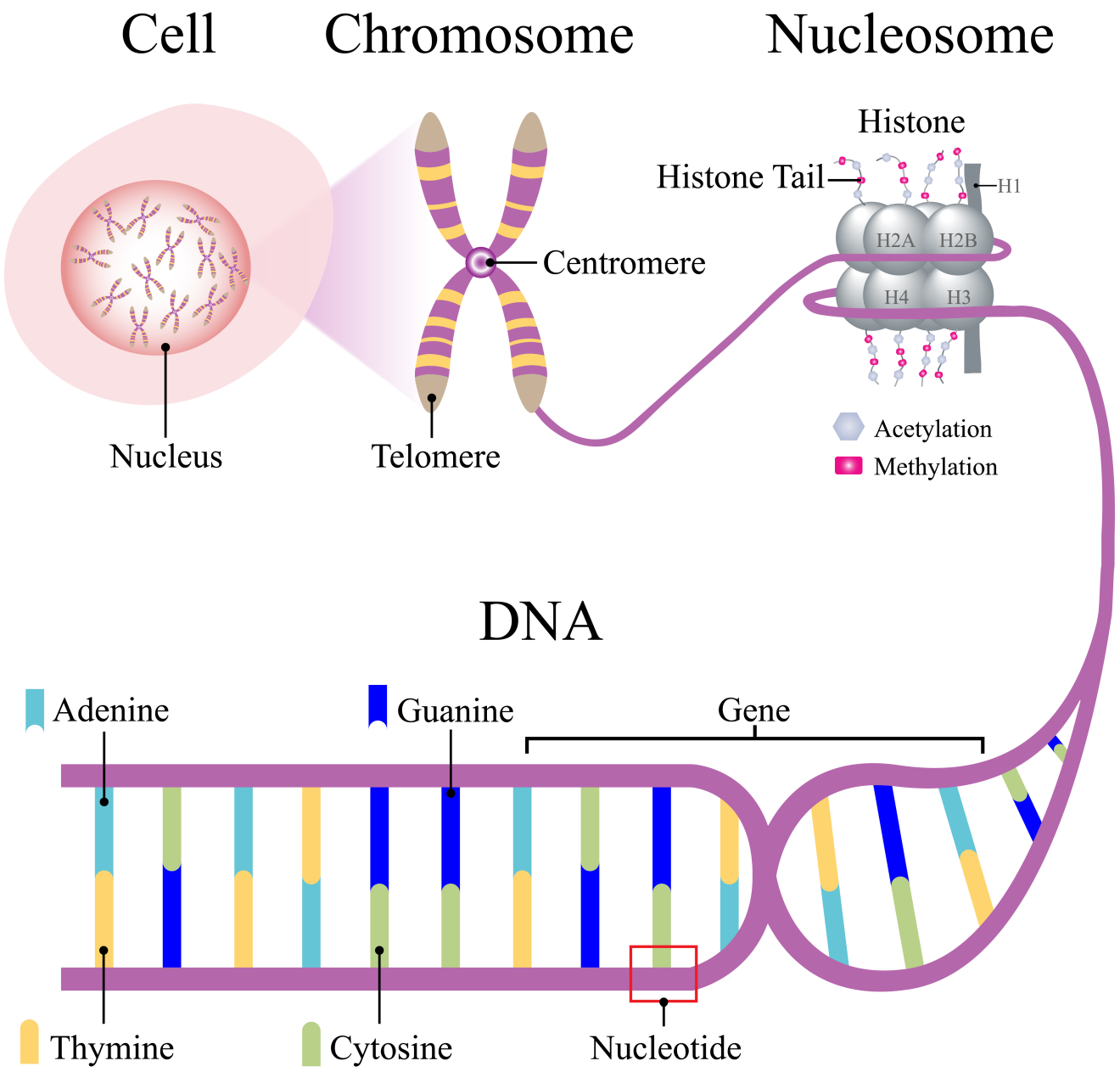
rsID	Gene	Genetic Result	Therapeutics Associated With Positive Result	Highly Recommended Therapeutics	Provider Discretion: As Needed Formula Recommendations	Lifestyle Recommendations	Laboratory Recommendations
ESSENTIAL NUTRIENTS							
CoQ10							
rs1800566	NQO1	G/G (-/-)	Coenzyme Q10, Pyrroloquinoline Quinone (PQQ), Riboflavin				
rs2072183	NPC1L1	C/G (+/-)	CoQ10, PQQ				
Essential Fatty Acids							
rs174547	FADS1	T/T (-/-)	Long-chain essential fatty acids: EPA, DHA, AA				

Summary for Elite Nutrients

Highly Recommended Therapeutics	Provider Discretion: As Needed Formula Recommendations	Lifestyle Recommendations	Laboratory Recommendations
VITAMINS			
	• Vitamin E (200 IU/day)	• Consume Foods High in Vitamin E	
		• Consider Consuming Foods High in Vitamin K, Unless Contraindicated by Clot Risk or Medication	
	• Biotin (5,000 mcg/day) • Pantothenate (500 mg/day)	• Consume Foods High in Biotin and Pantothenate	
• B12 Balance twice daily		• Consume Foods High in Vitamin B12	• Serum Vitamin B12 • Plasma Homocysteine AND/OR Methylmalonic Acid
MINERALS			
	• Iodine • Selenomethionine	• Consider Consuming Foods with High Iodine Content	• Urinary Iodine OR Comprehensive Micronutrient/Mineral Analysis • Serum Thyroglobulin • Thyroid Panel
ESSENTIAL NUTRIENTS			


Cell
Chromosome
Nucleosome
Nucleus
Telomere
Centromere
Histone
Histone Tail
H1
H2A
H2B
H4
H3
Acetylation
Methylation
DNA
Adenine
Guanine
Gene
Thymine
Cytosine
Nucleotide

VITAMIN D

FOOD SOURCES

Tuna

Mushrooms

Eggs

Mackerel

Milk Products
(including fortified
alternatives such as
almond, coconut,
oat, etc.)

BENEFITS AS YOU AGE

Lower Risk
of Fractures

Improves
Heart Function

Supports
Immune System

Speeds
Wound Healing

DEFICIENCY CAUSES

- Bone Pain
- Arthritis
- Obesity
- Backache
- Depression
- Diabetes
- Hypertension
- Osteoporosis
- Heart Disease
- Skin Conditions

VITAMIN E

VARIANTS IN THE TTPA GENE HAVE BEEN ASSOCIATED WITH VITAMIN E DEFICIENCY

BENEFITS

Promotes a strong immune system

Protects the body from damage against harmful substances called free radicals

Forms red blood cells

Helps prevent: heart diseases, cancers, eye disorders & cognitive decline

Prevents blood clots

DEFICIENCY VS HIGH INTAKE

Deficiency

Hemolytic anemia in premature babies

High intake

Risk of bleeding in the brain

Increased risk of birth defects

FOODS HIGH IN VITAMIN E

Vegetable oils
(wheat germ, sunflower, safflower, corn and soybean oils)

Fruit (kiwi, mango)

Vegetables
(spinach, broccoli, tomato)

Nuts
(almonds, peanuts, hazelnuts)

Sunflower seeds

Fortified foods (breakfast cereals, fruit juices, margarine, spreads)

BIOTIN & PANTOTHENATE

VARIANTS IN THE SLC5A6 GENE HAVE BEEN ASSOCIATED WITH HAIR LOSS, SKIN RASHES, BRITTLE NAILS AND TINGLING OF THE EXTREMITIES

BENEFITS

Facilitate growth and development

Role in the production of hormones and cholesterol

Help the body break down and use food

DEFICIENCY VS HIGH INTAKE

Deficiency
- Tingling of hands and feet
- Restlessness
- Fatigue
- Muscle pain
- Dermatitis
- Swelling of the tongue
- Skin rashes
- Hair loss
- Brittle nails

High intake
- Diarrhea
- Gastrointestinal distress

FOODS HIGH IN BIOTIN & PANTOTHENATE

Meat & Fish (chicken, beef, organ meat (liver, kidney), pork, tuna, salmon)

Dairy products (milk, cheddar cheese, greek yogurt)

Nuts (almonds, peanuts)

Fruits (apples, clementines)

Eggs

Vegetables (avocado, broccoli, kale, cabbages, potatoes, mushrooms, tomatoes)

Grains (whole-grain cereals, brown rice, oats, whole-wheat breads, whole-wheat pita, breakfast cereals)

Chocolate

Chickpeas

Legumes & Lentils

IODINE

WAYS TO INCREASE LEVELS

Seafood – fish (tuna, cod), shrimp

Vegetables/Legumes – green peas, lima beans, corn

Seaweed

Iodized salt

Dairy products

Eggs

Whole grains (unless gluten free)

Supplements

Fruits – prunes, bananas

FUNCTIONS

Synthesizes thyroid hormones (T3 & T4) for metabolic pathways

Role in growth & development

Role in immune response

DEFICIENCY VS HIGH INTAKE

Deficiency

- Developmental issues
- Improper thyroid hormone production
- Fertility issues

High intake

- Thyroid disorders
- Acute poisoning
  - Burning in mouth & throat
  - Fever
  - Abdominal pain
  - Nausea
  - Vomiting
  - Diarrhea

SELENIUM

WAYS TO INCREASE LEVELS

Brazil nuts

Low-fat milk products

Meats & seafood – fish (tuna, halibut, sardines), ham, shrimp, beef, liver, chicken, turkey

Boiled eggs

Wheat germ, Brewer's yeast

Whole grains (unless gluten free)

Supplements

FUNCTIONS

Role in proper thyroid function & thyroid hormone metabolism

Role in DNA synthesis

Role in reproduction

Protection from infection & oxidative damage

DEFICIENCY VS HIGH INTAKE

Deficiency

- Cardiovascular disorders
- Developmental issues
- Thyroid disorders
- Joint & bone issues
- Infertility issues
- Cancers

High intake

- Metallic taste in mouth
- Garlic odor of breath
- Hair and nail loss or brittleness
- Nervous system abnormalities
- Nausea
- Diarrhea
- Skin rashes
- Fatigue
- Irritability

Gene Information Key

rsID	Gene	"-" variant	"+" variant
rs12934922	BCO1	A	T
rs7501331	BCO1	C	T
rs2108622	CYP4F2	T	C
rs2235544	DIO1	C	A
rs174547	FADS1	T	C
rs2282679	GC	T	G
rs2072183	NPC1L1	G	C
rs1800566	NQO1	G	A
rs4704397	PDE8B	G	A
rs33972313	SLC23A1	C	T
rs11126936	SLC30A3	T	G
rs1395	SLC5A6	A	G
rs1801198	TCN2	C	G
rs2274924	TRPM6	T	C
rs6994076	TTPA	A	T
rs2228570	VDR	G	A
rs9923231	VKORC1	C	T

Definitions

BCO1 Ala379Val	The BCO1 (beta-carotene oxygenase 1) gene encodes an enzyme essential for converting beta-carotene, the most abundant provitamin A carotenoid in the diet, to vitamin A by cleaving it into two retinal molecules. Carotenoids are lipophilic pigments produced by plants; beta-carotene, for example, is found in yellow and orange fruits and vegetables as well as green leafy vegetables. The polymorphism rs7501331 results in a valine substitution for an alanine residue in the enzyme at position 379. The T allele, which encodes a valine residue, leads to diminished catalytic activity of the enzyme, reducing the conversion of beta-carotene to vitamin A. T allele carriers for both rs12934922 and rs7501331 were shown to have reduced conversion of beta-carotene to retinal after supplementation with beta-carotene and higher levels of fasting beta-carotene consistent with reduced BCO1 activity.
BCO1 Arg267Ser	The BCO1 (beta-carotene oxygenase 1) gene encodes an enzyme essential for converting beta-carotene, the most abundant provitamin A carotenoid in the diet, to vitamin A by cleaving it into two retinal molecules. Carotenoids are lipophilic pigments produced by plants; beta-carotene, for example, is found in yellow and orange fruits and vegetables as well as green leafy vegetables. The polymorphism rs12934922 results in a serine substitution for an arginine residue in the enzyme at position 267. The T allele, which encodes a serine residue, leads to diminished catalytic activity of the enzyme, reducing the conversion of beta-carotene to vitamin A. T allele carriers for both rs12934922 and rs7501331 were shown to have reduced conversion of beta-carotene to retinal after supplementation with beta-carotene and higher levels of fasting beta-carotene consistent with reduced BCO1 activity.
TTPA rs6994076	The TTPA (alpha tocopherol transfer protein) gene encodes a carrier protein that binds alpha-tocopherol, the predominate form of vitamin E in the body, and facilities its export from the liver to circulation. The polymorphism rs6994076 occurs in the promoter region of the gene, and mechanistic studies found that the variant encoded by the T allele reduces transcription of TTPA. In clinical studies, carrier of the T allele had lower levels of circulating vitamin E.
CYP4F2 rs2108622	The CYP4F2 (cytochrome P450 family 4 subfamily F member 2) gene encodes the rate-limiting enzyme responsible for hydroxylation and oxidation of vitamin E and vitamin K in the liver. The polymorphism rs2108622 results in a methionine substitution for a valine residue at position 433. Mechanistic studies have shown that the C allele, which encodes a valine residue, results in an enzyme with higher enzyme activity than the enzyme encoded by the T allele. Consistently, individuals with the C allele may be at risk for reduced plasma levels of vitamin E and vitamin K and may benefit from increased vitamin E and vitamin K intake or supplementation.
GC	The GC (group-specific component) gene encodes a carrier protein from the albumin gene family that transports vitamin D and its metabolites to target tissues. As a result, the product of the GC gene is also termed the vitamin D binding protein (VDBP). The polymorphism rs2282679 is located in intron 12, and it has a strong genome-wide association with 25-hydroxyvitamin D3 concentrations. The G allele variant is associated with lower levels of VDBP and vitamin D in the blood. Furthermore, since vitamin D is needed to maintain calcium and phosphorous homeostasis, the G allele of rs2282679 is associated with reduced calcium level.
VDR rs2228570	The VDR (vitamin D receptor) gene encodes a receptor for vitamin D3 that is highly expressed in the intestines. VDR is a member of the nuclear hormone receptor superfamily, so when activated by vitamin D, it can impact transcription of many genes involved in mineral metabolism, cell proliferation, and immune activation. The polymorphism rs2228570, sometimes termed FokI for the restriction enzyme that can detect it, results in a threonine substitution for a methionine residue in the first codon of the protein, altering the translation start site. As a result, translation of the receptor produced by the A allele, which does not contain the FokI restriction site (f) and encodes a methionine residue, is 427 amino acids in length, whereas the receptor produced by the G allele, which does contain the FokI restriction site (F) and encodes a threonine residue, is three amino acids shorter. Mechanistic studies indicate that the shorter variant encoded by the G allele has greater capacity to bind vitamin D and more transcriptional activity in response to vitamin D. Consistent with these findings, A allele carriers were less responsive to vitamin D supplementation, and A allele carriers were shown to have reduced calcium absorption and bone mineral density. Furthermore, vitamin D supplementation was less effective at reducing inflammatory markers in carriers of the A allele, and the A allele is associated with risk for celiac disease and type 2 diabetes.
VKORC1 rs9923231	The VKORC1 (vitamin K epoxide reductase complex, subunit 1) gene encodes the enzyme that catalyzes the rate-limiting step of vitamin K recycling. VKORC1 coverts vitamin K epoxide to the reduced and active form of vitamin K, which is an important cofactor for blood clotting proteins and may protect against artery calcification. The polymorphism rs99232361 occurs in the promoter region of the gene, and mechanistic studies have found that the variant encoded by the T allele can reduction transcription and ultimately enzyme activity by up to 50%. Furthermore, VKORC1 is the target of the anticoagulant drug, warfarin, which works in opposition of vitamin K. Carriers of the T allele required lower doses of warfarin, suggesting that T allele carriers had reduced VKORC1 activity and reduced recycling of active vitamin K. Therefore, T allele carriers may benefit from increasing vitamin K intake to compensate for the reduction in vitamin K recycling.
SLC5A6	The SLC5A6 (solute carrier family 5 member 6) gene encodes a sodium-dependent transporter that transports pantothenate (vitamin B5) and biotin (vitamin B7) across cell membranes. It functions in a variety of tissues, including the intestinal brush border, the blood brain barrier, and the blood placental barrier. Both pantothenate and biotin are essential for the metabolism of carbohydrates, proteins, and fats. A deficiency of pantothenate can lead to tingling in extremities, and a deficiency of biotin can lead to muscle pain, skin rashes, hair loss, and brittle nails. The polymorphism rs1395 results in a phenylalanine substitution for a serine residue in the transporter at position 481. Genome-wide association studies have found that the A allele, which encodes a phenylalanine residue, results in increased levels of pantothenate, suggesting that pantothenate absorption is increased.
TCN2	The TCN2 (transcobalamin 2) gene encodes a carrier protein that binds vitamin B12 (cobalamin) and delivers it to all tissues. Around 30% of circulating vitamin B12 is bound to TCN2. The polymorphism rs1801198 results in an arginine substitution for a proline residue in the protein at position 259, which occurs in the binding region for vitamin B12. In individuals with adequate vitamin B12 status, carriers of the G allele, which encodes an arginine residue, had less vitamin B12-bound TCN2 than C allele carriers. A large meta-analysis also reported that individuals with the GG genotype had significantly lower concentrations of vitamin B12-bound TCN2 and higher concentrations of homocysteine, a functional indicator of vitamin B12 status, compared to individuals with the CC genotype. Lastly, carriers of the C allele were shown to have lower levels of methylmalonic acid, which is converted to succinyl CoA in a vitamin B12-dependent reaction, suggesting that G allele carriers may have reduced levels of vitamin B12.

SLC23A1	The SLC23A1 (solute carrier family 23 member 1) gene encodes a sodium-dependent vitamin C transporter required for the absorption of vitamin C and its distribution to tissues throughout the body. The polymorphism rs33972313 results in a leucine substitution for a valine residue at amino acid position 264, which occurs in a transmembrane domain of the transporter. The T allele, which encodes a leucine residue, has been associated with decreased levels of vitamin C, and levels were further reduced in individuals with the TT genotype.
TRPM6	The TRPM6 (transient receptor potential cation channel subfamily M member 6) gene encodes a membrane transporter that is essential for magnesium homeostasis. TRPM6 is expressed in gut and kidneys, and it is needed for magnesium absorption. The polymorphism rs2274924 results in a nucleotide change that causes translation of the transporter to terminate prematurely, resulting in a truncated version of the transporter that is approximately 500 amino acids shorter than the full-length protein. Carriers of the C allele, which encodes the truncated protein, are at increased risk for hypomagnesemia, with individuals with the CC genotype at greater risk.
SLC30A3	The SLC30A3 (solute carrier family 30 member 3) genes encodes a transmembrane transporter that enables the movement of zinc from cells to circulation. The polymorphism rs11126936 occurs in the first intron, and individuals with the GG genotype had significantly lower levels of circulating zinc compared to T allele carriers, suggesting that these individuals may benefit from supplementation with zinc.
PDE8B rs4704397	The PDE8B (phosphodiesterase 8B) gene encodes a enzyme that catalyzes the hydrolysis of cAMP, a second messenger crucial for cellular energy sensing. The polymorphism rs4704397 occurs in the first intron, and numerous studies have found that the A allele is associated with increased levels of TSH, consistent with hypothyroidism. Additionally, the A allele has been associated with sub-clinical hypothyroidism, hypothyroidism, and infertility.
DIO1 rs2235544	The DIO1 (iodothyronine deiodinase 1) gene encodes an enzyme that converts prohormone thyroxine (T4) to bioactive thyroid hormone, triiodothyronine (T3), by cleaving iodine residues. Deiodinases are selenium-containing enzymes, and DIO1 the main enzymes responsible for T3 levels in the bloodstream. The polymorphism rs2235544 occurs in the third intron, and numerous studies have found that carriers of the A allele have decreased deiodinase activity. Therefore, A allele carriers have reduced conversion of thyroxine (T4) to triiodothyronine (T3). Furthermore, for treatment of hypothyroidism, carriers of the A allele had better outcomes when receiving a combination of T3 and T4, whereas C allele carriers had better outcomes when receiving only T4.
NQO1 rs1800566	The NQO1 (NAD(P)H quinone dehydrogenase 1) gene encodes a riboflavin-dependent enzyme that protects against oxidative stress. Moreover, it regenerates the antioxidant capacity of CoQ10 by reducing it. The polymorphism rs1800566 results in a serine substitution for a proline residue at position 187, which occurs in the FAD-binding site. The A allele, which encodes a serine residue, produces a variant with reduced stability due to reduced ability to bind FAD, a necessary co-factor. Because CoQ10 is sensitive to oxidative stress, molecular studies suggest that NOQ1 has a role in maintaining CoQ10 status, and a clinical study found an association with NOQ1 and CoQ10 status and response to supplementation. Lastly, molecular studies have found that NOQ1 function is also dependent on adequate levels of riboflavin.
NPC1L1 rs2072183	The NPC1L1 (NPC1 like intracellular cholesterol transporter 1) gene encodes a transmembrane protein that has a crucial role in the intestinal absorption of cholesterol, vitamin E, and CoQ10. The polymorphism rs2072183 results in a nucleotide substitution in exon 2. Carriers of the minor, C allele were shown to be less responsive to CoQ10 supplementation, suggesting that intestinal absorption may be reduced.
FADS1 rs174547	The FADS1 (fatty acid desaturase 1) gene encodes an enzyme that desaturates omega-3 and omega-6 polyunsaturated fatty acids (PUFA) to produce long-chain PUFAs, such as eicosatetraenoic acid (EPA), arachidonic acid (AA), and docosahexaenoic acid (DHA). These long-chain PUFAs are essential for the integrity of cellular membranes. The polymorphism, rs174547, occurs in the ninth intron, and studies have found that T allele carriers had higher levels of DHA whereas C allele carriers had lower levels of EPA. This suggests that the enzyme encoded by the C allele has reduced capacity to synthesize long-chain PUFAs.

Disclaimers

TESTING:

Testing Performed By: AC

METHODOLOGY AND LIMITATIONS DISCLAIMER:

Testing for genetic variation/mutation on listed genes was performed using ProFlex PCR and Real-Time PCR with TaqMan® allele-specific probes on the QuantStudio 12K Flex. All genetic testing is performed by GX Sciences, LLC d/b/a Fagron Genomics US (“Fagron Genomics US”) (807 Las Cimas Pkwy, Suite 145, Austin, TX. 78746). This test will not detect all the known alleles that result in altered or inactive tested genes. This test does not account for all individual variations in the individual tested. Test results do not rule out the possibility that this individual could be a carrier of other mutations/variations not detected by this gene mutation/variation panel. Rare mutations surrounding these alleles may also affect our detection of genetic variations. Thus, the interpretation is given as a probability. Therefore, this genetic information shall be interpreted in conjunction with other clinical findings and familial history for the administration of specific nutrients. Patients should receive appropriate genetic counseling to explain the implications of these test results. Details of assay performance and algorithms leading to clinical recommendations are available upon request. The analytical and performance characteristics of this laboratory developed test (LDT) were determined by Fagron Genomics US’s laboratory (Laboratory Director: James Jacobson, PhD) pursuant to Clinical Laboratory Improvement Amendments (CLIA) requirements (CLIA #: 45D2144988).

MEDICAL DISCLAIMER:

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If you have received the result variant Undetermined (UND) this indicates that we were not able to determine your carrier status based on your raw data. You may request your sample to be run again by emailing info@fagrongenomicsus.com

Fagron Genomics US SNP References

BCO1 rs7501331

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BCO1 rs12934922

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Different Ethnic Groups. Frontiers in Nutrition, 9, 861619. https://doi.org/10.3389/fnut.2022.861619

TTPA rs6994076

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