



## Ultimate Wellness

PERSONAL GENOMIC REPORT

Patient Name: testa test  
Patient No.: 1234  
Ordering Practitioner: Dr. Who

Date Of Birth: 03/06/1978  
Date Collected: 09/14/2018  
Report Date: 10/09/2018

## **Congratulations on taking steps toward personalized health.**

### **Your Personalized Genomic Report**

This personalized report has been created specifically for you. It contains analysis of your genomic SNPs that can give insight into what makes you unique. Your genomic test report can be used to help you find answers to a current health issue, be proactive in prevention of chronic diseases, or both. Empowered with this information, you can create an environment that is healthiest for your genes.

### **Understanding Genomic SNPs**

Your DNA contains your genetic code- the blueprint for everything that happens in your body. DNA is short for deoxyribonucleic acid, and it is composed of long strands made up of four different nucleotides called adenine, guanine, thymine, and cytosine, or A, G, T, and C for short. It exists as two long strands that are paired in a specific manner to form 23 pairs of chromosomes. The DNA is grouped into functional units called genes, which can be large or small. Each time your genetic material is copied, it can make mistakes.

Gene SNPs (pronounced "snips") result from a change in one of the A, G, T or C nucleotides in a DNA sequence. That is why they are called "single nucleotide polymorphisms". Unlike genetic mutations, gene SNPs represent predispositions, not definite outcomes. Sometimes SNPs can be potentially beneficial, while others can be potentially harmful. Ultimately it is the impact of genes interacting with each other and with the environment that can determine a health outcome.

### **The Polygenic Model**

Research has grown from looking at only one or a few genes at a time to looking at the interaction between multiple genes in a system, and between multiple biological systems. Your genomic report is based on this more advanced approach, called the Polygenic Model. Each gene SNP has a potentially small impact, but this can be additive with multiple gene SNPs. Each gene may also have a different impact in different systems. You may also find that some gene SNP results seem to contradict each other. In reading your report, you'll want to look at both the impact of individual genes, as well as the overall system.

### **Reading Your Report**




Everything in each section is organized alphabetically. The first section is a color-coded overview, followed by a list of the genes included in your report and their normal functions. In the main section, you'll find detailed information about your results, with specific steps for diet, lifestyle, exercise and nutritional supplements as they apply to each gene. We also provide biomarkers - lab tests that can help you and your practitioner assess the effectiveness of changes you are making. Lastly, the Supplement Chart serves as a guide to choosing what is right for you.

### **Your Personalized Plan**

Genomic testing is a powerful tool, especially when integrated into a whole-person model. This is where your healthcare professional is so valuable in helping you understand what your results mean for you, and prioritizing where to focus your diet and lifestyle changes. Together you'll use your genomic test results to create a comprehensive, personalized plan for a healthier you.

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Panel	Category	 -High Impact	 -Moderate Impact	 -Mild/No Impact
Bone Health	Bone Formation	DHCR7 VDR FokI	BCMO1-1 BCMO1-3 COL1A1 CYP27B1 CYP2R1 GC-1 GC-2 GC-3 GSTM1 VDR BsmI	BCMO1-2 GSTT1 VDR Taq1
	Bone Resorption/Inflammation	DIO2	CRP IL6 TNF-alpha	APOE IL-6R IL17A MTHFR-1
Cardiovascular Health	Endocrine	ADIPOQ-2 DIO2	LEP	ADIPOQ-1 LEPR
	Folate Cycle/Homocysteine	MTR MTRR	BHMT MTHFR-2 SLC19A1	CBS FUT2 MTHFD1 MTHFR-1 TCN2
	Histamine		HDC	
	Hypertension	MR-1	AGT eNOS3	ACE-1 ACE-2

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Gene and Gene Functions	
Gene	Gene Functions
ABCA1	Gene encodes for ATP-binding cassette protein 1, one of a group of proteins in the ATP-binding cassette family, which transports molecules across cell membranes. This protein, found predominately in liver cells and macrophages, moves cholesterol and phospholipids across the cell membrane to outside of the cell, regulates cholesterol efflux to lipid-free apolipoproteins A1, A2, and E, and is a key regulator of HDL levels.
ACE	Gene encodes for angiotensin converting enzyme, which converts angiotensin I to angiotensin II, a vasoconstrictor and key regulator of blood pressure. It is part of the renin-angiotensin-aldosterone system, and is believed to play a role in the development of end organ damage in essential hypertension.
ACTN3	Gene encodes for alpha-actinin-3, a protein which bridges actin filaments in fast twitch muscle fibers needed for generating force at high velocity (sprinting and power activities).
ADIPOQ	Genes encode for adiponectin, a fat-secreted hormone linked with insulin sensitivity, fatty acid oxidation, and inhibition of inflammation.
ADRB2	Gene encodes for $\beta$ 2 adrenergic receptor, a member of the G protein-coupled receptor superfamily; is involved in regulation of cardiac, pulmonary, vascular, endocrine, and central nervous systems..
ADRB3	Gene encodes for the beta-3 adrenergic receptor, which mediates the impact of catecholamines, modulates vasodilation, and plays a key role in energy metabolism by stimulating thermogenesis and lipid mobilization in adipose tissue.
AGT	Gene encodes for pre-angiotensinogen, involved in regulation of blood pressure as part of the renin-angiotensin system. Produced in the liver, pre-angiotensinogen is then converted to angiotensinogen by renin in response to lowered blood pressure.
ALDH2	Gene encodes for alcohol dehydrogenase, an enzyme that metabolizes alcohol.
APOA1	Gene encodes for apolipoprotein A1, which mediates cholesterol transport from other tissues to the liver through the activation of lecithin cholesterol acyltransferase. Apo A1 is a lipoprotein that is the major protein component of HDL. Closely linked with Apo A5 and ApoC3 genes.
APOA2	Gene encodes for apolipoprotein A2, a major lipoprotein in the plasma, and the second most abundant component protein of HDL.
APOA5	Gene encodes for apolipoprotein A5, produced only in the liver, and is a component of VLDL, HDL, and chylomicrons. It is a major determinant in regulating plasma triglyceride levels, most likely by activating lipoprotein lipase, thus inhibiting VLDL-TG production and increasing VLDL-TG hydrolysis. It may also increase hepatic uptake of TG through LDL receptors. Closely linked with ApoA1 and ApoC3.

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### Bone Health Panel

#### Bone Formation

##### BCMO1-1

Result: 

**Discussion:** Associated with decreased enzyme activity and reduced conversion of beta carotene to retinoic acid, which is important in Vitamin D metabolism, and may increase risk of lower BMD. See also other BCMO1 genes.

#### Recommended Action Steps

**Diet** Increase intake of retinol-rich foods, primarily found in animal products. Minimize alcohol consumption.

**Supplements** Retinyl acetate, retinyl palmitate.

**Biomarker** Retinol.

##### BCMO1-2

Result: 

**Discussion:** No impact.

##### BCMO1-3

Result: 

**Discussion:** Associated with decreased enzyme activity and reduced conversion of beta carotene to retinoic acid, which is important in Vitamin D metabolism, and may increase risk of lower BMD. See also other BCMO1 genes.

#### Recommended Action Steps

**Diet** Increase intake of retinol-rich foods, primarily found in animal products. Minimize alcohol consumption.

**Supplements** Retinyl acetate, retinyl palmitate.

**Biomarker** Retinol.

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### Bone Health Panel

#### Bone Resorption/Inflammation

##### IL6

Result: 

**Discussion:** Associated with increased osteoclast activity, with higher risk of lower bone mineral density and osteoporosis at femoral neck and distal radius.

#### Recommended Action Steps

**Diet:** Increase intake of turmeric, plant sterols, and foods rich in omega 3 fatty acids.


**Lifestyle:** Stress management, adequate sleep.

**Exercise:** Regular weight-bearing exercise, strength training. See exercise genes for activities best suited to your genotype.

**Supplements:** EPA/DHA, curcumin, beta-sitosterol.

**Biomarker:** IL-6, bone mineral density, collagen cross-linking markers, C-telopeptide.

##### MTHFR-1

Result: 

**Discussion:** No impact.

##### TNF-alpha

Result: 

**Discussion:** Associated with increased TNF-alpha production, increased osteoclast maturation, and structural differences in bone that although do not increase bone density, they increase bone bending strength and are associated with decreased hip fracture risk in the presence of adequate antioxidant intake.

#### Recommended Action Steps

**Diet:** Ensure adequate intake of colorful fruits and vegetables rich in antioxidants.

**Supplements:** Antioxidants including Vitamins A, C, E; Resveratrol.

**Biomarker:** Bone mineral density.

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### Cardiovascular Health Panel

#### Endocrine

##### ADIPOQ-1

Discussion: No impact.

Result: 

##### ADIPOQ-2

Discussion: Associated with lower adiponectin levels, and increased risk of metabolic syndrome.

Result: 

#### Recommended Action Steps

**Diet:** Minimize intake of sugars and simple carbohydrates.

**Biomarker:** Adiponectin.

##### DIO2

Discussion: Associated with decreased enzyme activity, decreased conversion of T4 to T3, with increased risk of dyslipidemia and cardiovascular disease.

Result: 

#### Recommended Action Steps

**Diet:** Ensure adequate intake of foods rich in iodine, selenium, and zinc.

**Supplements:** Iodine, selenium, zinc.

**Biomarker:** TSH, free T4, free T3, reverse T3; fractionated lipid panel.

##### LEP

Discussion: Associated with lower leptin levels, and increased BMI and obesity risk, which have been associated with increased risk of cardiovascular disease.

Result: 


#### Recommended Action Steps

**Diet:** Monitor portion sizes; minimize intake of saturated fats, sugars and simple carbohydrates.

**Biomarker:** Leptin.

##### LEPR

Discussion: No impact.

Result: 

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### Cardiovascular Health Panel

#### Folate Cycle/Homocysteine

##### BHMT

Result: 

**Discussion:** Associated with reduced enzyme activity and poor recycling of homocysteine, which may lead to elevated homocysteine levels. Associated with increased risk for cardiovascular disease especially with lower intake of folate and vitamin B6.

#### Recommended Action Steps


**Diet:** Increase intake of foods rich in folate, vitamin B6, and betaine.

**Supplements:** Betaine, choline, folate, Vitamin B6.

**Biomarker:** Homocysteine.


##### CBS

**Discussion:** No impact.

Result: 


##### FUT2

**Discussion:** No impact.

Result: 


##### MTHFD1

**Discussion:** No impact.

Result: 

##### MTHFR-1

**Discussion:** No impact.

Result: 



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### Cardiovascular Health Panel

#### Hypertension

##### ADRB3

Discussion: No impact.

Result: 

##### AGT

Discussion: Associated with increased enzyme activity and higher levels of angiotensin, and increased risk for hypertension. May also increase risk of heart failure, stroke, and MI.

Result: 


#### Recommended Action Steps

**Diet:** Minimize intake of sodium-rich foods and salt; ensure adequate intake of potassium.

**Biomarker:** Angiotensin, blood pressure.

##### EDN1

Discussion: No impact.

Result: 

##### eNOS3

Discussion: Associated with decreased enzyme activity, lower nitric oxide levels; may increase risk for hypertension, stroke, coronary artery disease and MI. May also increase risk for pregnancy-induced hypertension and preeclampsia.

Result: 

#### Recommended Action Steps

**Diet:** Increase intake of colorful fruits and vegetables, foods rich in arginine.

**Exercise:** Regular aerobic exercise; see exercise genes for activities best suited to your genotype.

**Supplements:** L-arginine, resveratrol and other antioxidants.

**Biomarker:** Oxidative stress markers; blood pressure.

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### Cardiovascular Health Panel

#### Inflammation

##### TNF-alpha

Result: 

**Discussion:** Associated with increased production of TNF-alpha, which is associated with increased inflammation, metabolic syndrome, cardiovascular disease and acute myocardial infarction.

#### Recommended Action Steps

**Diet:** Increase intake of turmeric, foods rich in quercetin and omega 3 fatty acids.


**Lifestyle:** Stress management, adequate sleep.

**Supplements:** EPA/DHA, curcumin, quercetin.

**Biomarker:** TNF-alpha.

#### Lipid Metabolism

##### ABCA1

Result: 


**Discussion:** No impact.

##### ADIPOQ-1

Result: 

**Discussion:** No impact.

##### ADIPOQ-2

Result: 


**Discussion:** Associated with lower adiponectin levels, with decreased HDL, increased TG and increased risk of metabolic syndrome, all of which have been associated with increased risk for cardiovascular disease.

#### Recommended Action Steps

**Diet:** Minimize intake of saturated fat, sugars and simple carbohydrates.

**Biomarker:** Adiponectin, HDL, triglycerides.

##### ADRB3

Result: 

**Discussion:** No impact.

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### Cardiovascular Health Panel

#### Others

##### OBFC-1

Result: 

**Discussion:** Associated with increased risk of cardiovascular disease.

#### Recommended Action Steps


**Diet:** Increase intake of colorful fruits and vegetables.

**Lifestyle:** Stress management; adequate sleep.

**Supplements:** Antioxidants including resveratrol.

**Biomarker:** Oxidative stress markers; telomere length.

##### RTEL-1

Result: 

**Discussion:** No impact.

#### Oxidation/Reduction

##### CAT

Result: 

**Discussion:** Associated with reduced enzymatic activity, leading to increased formation of free radicals and increased oxidative stress, which may increase risk for cardiovascular disease.


#### Recommended Action Steps

**Diet:** Increase intake of colorful fruits and vegetables.

**Supplements:** Antioxidants, including resveratrol.

**Biomarker:** Oxidative stress markers.

##### GPx

Result: 

**Discussion:** No impact.

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### Cognitive Health Panel

#### Neurocognition

##### APOE

Result: 

**Discussion:** Genotype E4/E4, associated with increased risk of Alzheimer's disease; this may be compounded if history of TBI. In patients with Alzheimer's disease, no improvement in cognition noted with ketogenic diet.

#### Recommended Action Steps

**Diet:** Increase intake of colorful fruits and vegetables, turmeric, foods rich in omega 3 fatty acids; limit intake of saturated fats, alcohol.


**Lifestyle:** Regular activities to boost cognitive function.

**Exercise:** Regular aerobic exercise; see exercise genes for activities best suited to your genotype.

**Supplements:** Sublingual B12; curcumin, EPA/DHA.

**Biomarker:** Neurocognitive function assessment.

##### COMT

Result: 

**Discussion:** Associated with lower enzyme activity, and associated with increased risk of Alzheimer's disease, which may be compounded if also have ApoE4 genotype. Associated with increased perseverative errors, impact greater if also SNP on MTHFR-1.

#### Recommended Action Steps

**Diet:** Increase intake of foods rich in B-complex vitamins and magnesium.


**Lifestyle:** Stress management, engage regularly in cognitive exercises.

**Exercise:** Regular exercise; avoid extreme sports that may increase catecholamine production. See exercise genes for activities best suited to your genotype.

**Supplements:** SAMe, Vitamin B6, Vitamin B12, magnesium.

**Biomarker:** Neurotransmitters.

##### FUT2

Result: 

**Discussion:** No impact.

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### Cognitive Health Panel

#### Traumatic Brain Injury

##### TNF-alpha

Result: 

**Discussion:** Associated with higher levels of TNF-alpha, and poorer outcome after TBI.

#### Recommended Action Steps

**Diet:** Increase intake of turmeric, foods rich in quercetin and omega 3 fatty acids.

**Lifestyle:** Early intervention after TBI event. Stress management.

**Supplements:** EPA/DHA, curcumin, quercetin.

**Biomarker:** TNF-alpha.

### Detoxification Panel

#### Oxidation/Reduction

##### CAT

Result: 

**Discussion:** Associated with reduced enzymatic activity, leading to increased formation of free radicals and impaired redox balance, increased oxidative stress. Oxidative stress is linked to many chronic diseases, cancer, and aging.

#### Recommended Action Steps

**Diet:** Increase intake of fresh fruits and vegetables.

**Supplements:** Antioxidants including resveratrol.

**Biomarker:** Oxidative stress markers.

##### GPx

Result: 

**Discussion:** No impact.

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### Detoxification Panel

#### Phase II

#### SULT1A1

Result: 

**Discussion:** Associated with increased risk of bladder and colorectal cancers, especially in longer-term or heavier smokers, and with higher intakes of charbroiled meats.

#### Recommended Action Steps

**Diet:** Increase intake of colorful fruits and vegetables, including cruciferous vegetables, onions, leeks. Avoid consuming charbroiled meats.

**Lifestyle:** Avoid smoking.


**Supplements:** Antioxidants, Quercetin.

**Biomarker:** Organotoxins.

### Diabetes Panel


#### Glucose Regulation

#### ADIPOQ-1

Result: 

**Discussion:** No impact.

#### ADIPOQ-2

Result: 


**Discussion:** Associated with lower adiponectin levels, increased risk of type 2 diabetes; associated with higher fasting insulin levels in Caucasian children.

#### Recommended Action Steps

**Diet:** Minimize intake of sugars and simple carbohydrates.

**Biomarker:** Adiponectin; fasting insulin, glucose; HbA1C.

#### ADRB3

Result: 

**Discussion:** Associated with reduced risk of type 2 diabetes.

#### Recommended Action Steps

**Biomarker:** Fasting glucose/insulin; 2-hour glucose tolerance test with insulin; HbA1C.

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## Diabetes Panel

### Inflammation

#### IL6

Result: 

**Discussion:** Associated with increased IL6, with increased risk for chronic inflammation, which has been linked to glucose dysregulation and type 2 diabetes.

#### Recommended Action Steps

**Diet:** Increase intake of turmeric, plant sterols, and foods rich in omega 3 fatty acids.


**Lifestyle:** Ensure adequate sleep, stress management.

**Supplements:** EPA/DHA, curcumin, beta-sitosterol.

**Biomarker:** IL6; fasting glucose/insulin; HbA1C.

### Insulin Secretion

#### ADIPOQ-2

Result: 


**Discussion:** Associated with higher fasting insulin levels in Caucasian children.

#### Recommended Action Steps

**Diet** Minimize intake of sugar and simple carbohydrates. Increase intake of fiber.

**Biomarker** Fasting glucose/insulin; 2-hour glucose tolerance test with insulin; HbA1C.

#### ETV5

Result: 

**Discussion:** Associated with increased risk for glucose intolerance and impaired insulin secretion, which may increase risk for type 2 diabetes.

#### Recommended Action Steps

**Diet:** Minimize intake of sugar and simple carbohydrates. Increase intake of fiber.

**Exercise:** Regular exercise, especially after meals, can help improve glucose metabolism. See exercise genes for activities best suited to your genotype.

**Supplements:** Glutamine, chromium, zinc.

**Biomarker:** Fasting glucose, insulin; HbA1C; 2-hour glucose tolerance test with insulin.

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### Eating Behaviors Panel

#### Cravings/Emotional Eating

##### BDNF

Discussion: No impact.

Result: 

##### COMT

Discussion: Associated with reduced enzyme activity and increased risk for emotional eating, impulsive eating. COMT function may be further impaired by elevated homocysteine levels. See also genes related to homocysteine.

Result: 

#### Recommended Action Steps

**Diet:** Ensure adequate intake of protein, and increase intake of foods rich in B complex vitamins, magnesium.

**Lifestyle:** Stress management, address emotional issues, consider counseling if needed.

**Exercise:** Regular exercise; avoid extreme sports that may increase catecholamine production. See exercise genes for activities best suited to your genotype.

**Supplements:** SAMe, Vitamin B6, Vitamin B12, magnesium.

**Biomarker:** Neurotransmitters, homocysteine.

##### DRD2-1

Discussion: Associated with impaired receptor function, and increased risk for food cravings and addictions, binge eating and overeating.

Result: 

#### Recommended Action Steps

**Diet:** Monitor food portions, intake of sweets. Increase intake of green tea, foods rich in tyrosine and Vitamin B6, fermented foods.

**Lifestyle:** Increase pleasurable activities that boost endorphin levels in a healthy way; counseling if needed. Avoid distracted eating, such as eating while watching tv.


**Exercise:** Regular exercise to boost endorphin levels. See exercise genes for activities best suited to your genotype.

**Supplements:** L-tyrosine, Vitamin B6, green tea extract, mucuna pruriens.

**Biomarker:** Neurotransmitters.

##### FTO-1

Discussion: No impact.

Result: 



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### Eating Behaviors Panel

#### Macro Food Choices

##### TAS1R3

Discussion: No impact.

Result: 

##### TAS2R38

Discussion: Associated with altered receptor function and increased sensitivity to bitter taste, and may lead to decreased consumption of beneficial foods such as green tea, green leafy and cruciferous vegetables.

Result: 

#### Recommended Action Steps

**Diet:** Avoid excess use of sugar, fat or salt to mask bitter taste in foods. Increase intake of colorful vegetables. Consider greens powder in smoothies.

**Supplements:** Antioxidants, B-complex vitamins.


**Biomarker:** Antioxidant, B vitamin levels.

### Emotional Health Panel

#### Addiction


##### ALDH2

Discussion: No impact.

Result: 

##### BDNF

Discussion: No impact.

Result: 

##### COMT

Discussion: Associated with reduced enzymatic activity, increasing availability of prefrontal dopamine, with reduced risk of polysubstance abuse, addiction.

Result: 

#### Recommended Action Steps

**Diet:** Ensure adequate intake of foods rich in magnesium, B-complex vitamins.

**Biomarker:** Neurotransmitters.

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### Emotional Health Panel

#### Inflammation

##### TNF-alpha

Result: 

**Discussion:** Associated with increased production of TNF-alpha, with increased inflammation and increased stimulation of HPA axis.

#### Recommended Action Steps

**Diet:** Increase intake of turmeric, foods rich in quercetin and omega 3 fatty acids.

**Lifestyle:** Stress management.

**Exercise:** Regular aerobic exercise of moderate intensity; see exercise genes for activities best suited to your genotype.

**Supplements:** EPA/DHA, curcumin, quercetin.

**Biomarker:** TNF-alpha, cortisol.

#### Mood

##### BDNF

Result: 

**Discussion:** Associated with increased risk of loneliness in adolescents, and increased risk of depression in adolescents in response to peer victimization within previous 6 months.

#### Recommended Action Steps

**Lifestyle:** Ensure adequate social and emotional support following episode of peer victimization.

**Biomarker:** Psychological assessment.

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### Emotional Health Panel

#### Neuropeptides


##### NPY

Discussion: No impact.

Result: 

##### TH

Discussion: No impact.

Result: 

#### Oxidation/Reduction

##### CAT

Discussion: Associated with reduced enzyme activity, increased oxidative stress and increased risk of depression.

Result: 

#### Recommended Action Steps

**Diet** Increase intake of fresh fruits and vegetables rich in antioxidants.

**Supplements** Antioxidants including resveratrol.

**Biomarker** Oxidative stress markers.


##### GPx

Discussion: No impact.

Result: 

##### NQO1

Discussion: Associated with reduced enzyme activity, increased oxidative stress and increased risk for depression.

Result: 

#### Recommended Action Steps

**Diet** Increase intake of foods rich in ubiquinone.

**Lifestyle** Stress management; minimize exposure to toxins which may increase free radical production.

**Biomarker** Ubiquinol, oxidative stress markers.

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### Emotional Health Panel

#### Stress Response

**OXTR**

Result: 

**Discussion:** Associated with a lower stress response in the presence of social support.

#### Recommended Action Steps

**Lifestyle:** Ensure social support with stressful events.

**TH**

Result: 

**Discussion:** No impact.

### Estrogen Metabolism Panel


#### Oxidation/Reduction

**GPx**

Result: 

**Discussion:** No impact.

**NQO1**

Result: 

**Discussion:** Associated with significantly reduced to no enzyme activity and altered intracellular redox status resulting in increased oxidative stress, decreased reduction of carcinogenic quinones, and increased risk of breast cancer.

#### Recommended Action Steps

**Diet:** Increase intake of foods rich in ubiquinone.

**Lifestyle:** Stress management; use caution with exogenous hormones.

**Supplements:** Ubiquinol.

**Biomarker:** Ubiquinol, oxidative stress markers.

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### Estrogen Metabolism Panel

#### Phase I

##### CYP17A1

Result: 

**Discussion:** Associated with increased enzyme activity, which can lead to increased levels of DHEA, androstenedione, and estrogen . May have increased risk shorter menstrual cycles. Associated with increased risk of fibroids and estrogen-related breast cancer, especially if also SNPs in other estrogen-metabolizing pathway genes. May have increased risk for behavioral problems in male offspring.

#### Recommended Action Steps

**Diet:** Ensure adequate intake of colorful fruits and vegetables.

**Lifestyle:** Use caution with DHEA, pregnenolone, progesterone, and androstenedione supplementation.

**Supplements:** Resveratrol.

**Biomarker:** 17OH pregnenolone, 17OH progesterone, DHEA, androstendione, estradiol.

##### CYP17A2

Result: 

**Discussion:** No impact.

##### CYP19A1

Result: 

**Discussion:** No impact.

##### CYP1A1

Result: 

**Discussion:** No impact.

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### Exercise Panel

#### Altitude

##### ACE-1

Result: 

**Discussion:** Associated with elite mountaineers, and lack of impact on O2 saturation with acute or rapid ascent in altitude; no benefit with slow ascent or chronic altitude change.

#### Caffeine


##### CYP1A2

Result: 

**Discussion:** Associated with improved cycling times in longer distances with caffeine intake; impact may be reduced with regular caffeine consumption.


#### Carbohydrate Metabolism

##### BDNF

Result: 

**Discussion:** No impact.

##### FTO-2

Result: 

**Discussion:** No impact.

##### LEP

Result: 

**Discussion:** Associated with increased benefit of exercise to improve carbohydrate metabolism.

#### Recommended Action Steps

**Exercise:** Regular aerobic exercise; see exercise genes for activities best suited to your genotype.

**Biomarker:** Fasting glucose, insulin, HbA1C.

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### Exercise Panel

#### Cardiovascular Health

##### EDN1


Discussion: No impact.

Result: 

#### Endurance vs Power: Endurance

##### ACE-1

Discussion: Associated with endurance performance.

Result: 

#### Recommended Action Steps

**Exercise:** Emphasize aerobic activities with less intensity and more endurance, and muscle efficiency with lighter weights with more repetitions.

##### ACTN3

Discussion: Associated with endurance performance.


Result: 

#### Recommended Action Steps

**Exercise:** Emphasize aerobic activities with less intensity and more endurance, and muscle efficiency with lighter weights with more repetitions.

##### ADRB2-1

Discussion: Associated with endurance performance.


Result: 

#### Recommended Action Steps

**Exercise:** Emphasize aerobic activities with less intensity and more endurance, and muscle efficiency with lighter weights with more repetitions.

##### BDKRB2

Discussion: Associated with endurance performance; may have higher fluid loss with exercise.

Result: 

#### Recommended Action Steps

**Diet:** Ensure adequate hydration with exercise.

**Exercise:** Emphasize aerobic activities with less intensity and more endurance, and muscle efficiency with lighter weights with more repetitions.

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Ordering Practitioner: Dr. Who

Date Of Birth: 03/06/1978  
Date Collected: 09/14/2018  
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### Exercise Panel

#### Endurance vs Power: Mixed

IL6


Result: 

Discussion: No predisposition for either power or endurance performance.

#### Recommended Action Steps

Exercise: Emphasize mixed power and endurance activities.

VDR Taq1

Result: 

Discussion: No predisposition for either power or endurance performance.

#### Recommended Action Steps

Exercise: Emphasize mixed power and endurance activities.

#### Endurance vs Power: Power

ADRB3

Result: 

Discussion: Associated with strength and power performance.

#### Recommended Action Steps

Exercise: Emphasize power activities with shorter bursts of high intensity, and strength training with heavier weights, fewer repetitions.

Fat Loss

ADRB2-2

Result: 

Discussion: Associated with decreased fat loss response to exercise.

#### Recommended Action Steps

Exercise: May require higher levels of exercise for effective fat loss.

Biomarker: Subcutaneous fat.



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### Exercise Panel

#### Fat Loss

##### ADRB3

Result: 

**Discussion:** Associated with decreased fat loss response to exercise; may be exacerbated by low estrogen states including menopause.


#### Recommended Action Steps

**Exercise:** May require higher levels of exercise for effective fat loss.

**Biomarker:** Subcutaneous fat.

#### Injury/Recovery

##### BDNF

Result: 

**Discussion:** No impact.

##### COL1A1


Result: 

**Discussion:** Associated with decreased collagen matrix formation and resulting reduced strength of tendons and ligaments, with increased risk for ligament injuries.

#### Recommended Action Steps


**Exercise:** Use caution engaging in sports activities involving sudden changes in speed or direction, traction on shoulders. Consider increasing strengthening of supporting muscles to reduce injury risk. Ensure adequate stretching and warm-up.

##### COL3A1

Result: 

**Discussion:** No impact.

##### COL5A1

Result: 

**Discussion:** Associated with increased risk of tendon and ligament injuries, shoulder dislocation.

#### Recommended Action Steps

**Exercise:** Use caution when engaging in sports activities involving sudden changes of speed or direction, or excess traction on shoulders, and consider increasing strengthening of supporting muscles to reduce injury risk. Ensure adequate stretching and warm-up.

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### Exercise Panel

#### VO2 Max

#### PPAR-gamma C1A

Discussion: No impact.


Result: 

### Immune Health Panel

#### Circadian Rhythm

#### CLOCK-1

Discussion: No impact.

Result: 

#### CLOCK-2

**Discussion:** Associated with disruption of central circadian rhythm and sleep/wake cycles, delayed sleep onset, reduced quality and quantity of sleep. May be associated with reduced or delayed melatonin production. Reduced melatonin production has been associated with increased risk of chronic inflammation, and many chronic diseases including autoimmune diseases.

Result: 

#### Recommended Action Steps

**Diet:** Minimize intake of caffeine (see CYP1A2).

**Lifestyle:** Establish healthy sleep habits, including regular bedtime, reduce ambient light, avoid tv, computers and other electronic devices with luminescent screens before bedtime.

**Supplements:** Melatonin.

**Biomarker:** Sleep study; melatonin.

#### Histamine

#### DAO-1

**Discussion:** Associated with reduced enzyme function, with decreased degradation of histamine and increased sensitivity to NSAIDs.

Result: 

#### Recommended Action Steps

**Lifestyle:** Use NSAIDs with caution.

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### Immune Health Panel

#### Others

**HLA DQ2.5** Result: 

**Discussion:** Associated with increased risk of celiac disease especially in European caucasians; this risk may be increased if also SNP in HLA DQ8 or TNF-alpha. May also increase risk of non-celiac gluten sensitivity and diarrhea-prominent IBS. Associated with increased risk glutamic acid decarboxylase antibodies and development of T2DM; primary membranous nephropathy with anti-PLA2R. antibodies; and lupus.

#### Recommended Action Steps

**Diet:** Avoid excessive intake of gluten-containing foods, foods high in sugar or simple carbohydrates.

**Lifestyle:** Stress management, adequate sleep.

**Biomarker:** Tissue transglutaminase, endomysial and deamidated gliadin peptide antibodies; PLA2R antibodies; GAD antibodies; fasting insulin and glucose; ANA; HLA genotyping if direct confirmation indicated.

**HLA DQ8** Result: 

**Discussion:** No impact.

#### Oxidation/Reduction

**CAT** Result: 

**Discussion:** Associated with reduced enzymatic activity, leading to increased formation of free radicals and impaired redox balance of immune system, increasing inflammatory response and decreasing innate immunity, antibody production and T-cell immunity.

#### Recommended Action Steps

**Diet:** Increase intake of fresh fruits and vegetables.

**Supplements:** Antioxidants including resveratrol.

**Biomarker:** Oxidative stress markers.

**GPx** Result: 

**Discussion:** No impact.

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### Immune Health Panel

#### TH-1 Cytokines

##### IL6

Result: 

**Discussion:** Associated with higher levels of IL-6 and increased inflammatory response; elevated IL-6 has been associated with activation of the HPA axis, many chronic diseases including obesity, depression, inflammatory bowel disease, autoimmune diseases; sun-induced premature aging of skin; may also be associated with increased risk of lung, gastric, colorectal, vulvar and ovarian cancer; may also be associated with increased risk of breast cancer in postmenopausal Caucasian women. May also increase CRP levels.

#### Recommended Action Steps

**Diet:** Increase intake of turmeric, plant sterols, and foods rich in omega 3 fatty acids.

**Lifestyle:** Stress management; adequate sleep.

**Supplements:** EPA/DHA, curcumin, beta-sitosterol.

**Biomarker:** IL-6, hsCRP.

#### TH-2 Cytokines

##### IL10-1

Result: 

**Discussion:** Associated with lower IL-10 levels and decreased ability to inhibit pro-inflammatory cytokines, linked to increased risk of viral infections including HBV and HIV.

#### Recommended Action Steps

**Diet:** Increase intake of turmeric, foods rich in omega 3 fatty acids, quercetin.

**Lifestyle:** Stress management, adequate sleep.

**Exercise:** Avoid extreme or excessive exercise.

**Supplements:** EPA/DHA, curcumin, quercetin.

**Biomarker:** IL-10.

##### IL13

Result: 

**Discussion:** No impact.

##### IL17A

Result: 

**Discussion:** No impact.

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### Micronutrients Panel

#### CoQ10

#### NQO1

Result: 

**Discussion:** Associated with significantly decreased to no enzyme activity, reducing conversion of CoQ10 to its active form, ubiquinol, which may result in lower levels of ubiquinol. Associated with various cancers, including breast, colorectal, and bladder especially in Caucasians.

#### Recommended Action Steps


**Diet:** Increase intake of foods rich in ubiquinone.

**Supplements:** Ubiquinol.

**Biomarker:** Ubiquinol, oxidative stress markers.

#### Folate Cycle/Homocysteine

#### BHMT

Result: 

**Discussion:** Associated with reduced enzyme activity and poor recycling of homocysteine, which may lead to elevated homocysteine levels. Associated with increased risk for cardiovascular disease, offspring with neural tube defects especially with lower intake of folate and vitamin B6.

#### Recommended Action Steps


**Diet:** Increase intake of foods rich in folate, vitamin B6, and betaine.

**Supplements:** Betaine, choline, folate, Vitamin B6.

**Biomarker:** Methionine, homocysteine.

#### CBS

**Discussion:** No impact.

Result: 

#### MTHFD1

**Discussion:** No impact.

Result: 

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### Micronutrients Panel

#### Omega Fatty Acids

##### FADS1

Result: 

**Discussion:** Associated with reduced enzymatic function, and impaired conversion of omega 3 and omega 6 fatty acids to EPA and AA. Vegetarians and vegans who consume only plant-based sources of omega 3 fatty acids may have increased risk of EPA and DHA deficiency. Low levels of EPA/DHA have been associated with immune, mood and cognitive dysfunction.


#### Recommended Action Steps

**Diet:** Increase consumption of animal-based omega 3 fatty acids, including fatty fish or fish oil, eggs.

**Supplements:** EPA/DHA.

**Biomarker:** Omega 3 and 6 fatty acids; EPA, DHA.

##### FADS2

Result: 

**Discussion:** Associated with reduced enzyme activity, with decreased production of DHA from EPA, and increased risk for DHA deficiency. To a lesser extent, also associated with decreased conversion ALA to SDA; LA to GLA.

#### Recommended Action Steps

**Supplements:** DHA.

**Biomarker:** DHA.

#### Selenium metabolism

##### GPx

Result: 

**Discussion:** Associated with lower RBC selenium levels with inadequate intake, and reduced response to selenium supplementation.

#### Recommended Action Steps

**Diet:** Increase intake of foods rich in selenium.

**Supplements:** Selenium.

**Biomarker:** RBC selenium.

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### Migraine Panel

#### Vitamin D metabolism

##### GC-1

Result: 

**Discussion:** Associated with reduced enzyme activity and increased risk of vitamin D deficiency. Low vitamin D has been associated with increased risk of migraines, especially at higher altitudes.

#### Recommended Action Steps

**Diet:** Increase intake of foods rich in Vitamin D, including cold water fish; check detoxification genes related to environmental toxins in fish.

**Lifestyle** Balance potential benefit of increased sun exposure for vitamin D production with potential risk of skin damage from ultraviolet light.

**Supplements:** Vitamin D3 emulsion.

**Biomarker:** 25-OH Vitamin D3; 1,25-OH2 Vitamin D3.

##### GC-2

Result: 

**Discussion:** Associated with reduced enzyme activity and increased risk of vitamin D deficiency. Low vitamin D has been associated with increased risk of migraines, especially at higher altitudes.

#### Recommended Action Steps

**Diet** Increase intake of foods rich in Vitamin D, including cold water fish; check detoxification genes related to environmental toxins in fish.

**Lifestyle** Balance potential benefit of increased sun exposure for vitamin D production with potential risk of skin damage from ultraviolet light.

**Supplements** Vitamin D3 emulsion.

**Biomarker** 25-OH Vitamin D3; 1,25-OH2 Vitamin D3.

##### GC-3

Result: 

**Discussion:** Associated with reduced enzyme activity and increased risk of vitamin D deficiency. Low vitamin D has been associated with increased risk of migraines, especially at higher altitudes.

#### Recommended Action Steps

**Diet** Increase intake of foods rich in Vitamin D, including cold water fish; check detoxification genes related to environmental toxins in fish.

**Lifestyle** Balance potential benefit of increased sun exposure for vitamin D production with potential risk of skin damage from ultraviolet light.

**Supplements** Vitamin D3 emulsion.

**Biomarker** 25-OH Vitamin D3; 1,25-OH Vitamin D3.

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### Oxidation-Reduction Panel

#### Oxidation/Reduction

##### GSTT1

Discussion: No impact.

Result: 

##### HMOX1

Discussion: Associated with decreased activity, and higher levels of oxidative stress, with lower antioxidant properties. Oxidative stress is linked to many chronic diseases, cancer, and aging.

Result: 

#### Recommended Action Steps

**Diet:** Increase intake of colorful fruits and vegetables rich in antioxidants.

**Supplements:** Antioxidants including Vitamins A, C, E; green tea and resveratrol.

**Biomarker:** Oxidative stress markers.

##### NFE2L2-1

Discussion: Associated with reduced activity and response to oxidative and xenobiotic stress, leading to disrupted cellular redox homeostasis, with increase in oxidative stress. Oxidative stress is linked with most chronic diseases, premature aging, and cancers. Impact may be increased if also SNPs in other redox genes including NRF2L2-2, GST, NQO1, HMOX1, GPX.

Result: 

#### Recommended Action Steps


**Diet:** Increase intake of cruciferous vegetables, green tea, foods rich in lycopene, resveratrol, quercetin.

**Supplements:** Antioxidants, including resveratrol, green tea, sulforaphane, quercetin.

**Biomarker:** Oxidative stress markers, cytokines.

##### NFE2L2-2

Discussion: No impact.

Result: 



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### Weight Management Panel

#### Body Weight

##### APOA2

Discussion: No impact.

Result: 

##### BCMO1-1

Discussion: Associated with decreased enzymatic activity, with increased risk for Vitamin A deficiency and associated with decreased lipolysis in adipose cells and obesity. Impact may be increased if also SNPs in other BCMO1 genes.

Result: 

#### Recommended Action Steps


**Diet:** Increase intake of retinol-rich foods, primarily found in animal products. Minimize alcohol consumption.

**Supplements:** Retinyl acetate, retinyl palmitate.

**Biomarker:** Retinol.

##### BCMO1-2

Discussion: No impact.

Result: 

##### BCMO1-3

Discussion: Associated with decreased enzymatic activity, with increased risk for Vitamin A deficiency and associated with decreased lipolysis in adipose cells and obesity. See also other BCMO1 genes.

Result: 

#### Recommended Action Steps

**Diet:** Increase intake of retinol-rich foods, primarily found in animal products. Minimize alcohol consumption.

**Supplements:** Retinyl acetate, retinyl palmitate.

**Biomarker:** Retinol.

##### BDNF

Discussion: No impact.

Result: 

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### Weight Management Panel

#### Endocrine

##### MC4R-2

Result: 

**Discussion:** Associated with decreased receptor function, increased risk of higher BMI and obesity, especially in children; may have increased risk of longer term weight gain.

#### Recommended Action Steps

**Diet:** Emphasize lean proteins, high fiber; minimize intake of fats. Consider meal replacement shakes.

**Exercise:** Emphasize aerobic exercise; see exercise genes for activities best suited to your genotype.

**Biomarker:** Body mass index; body fat index.

#### Inflammation

##### CRP

Result: 

**Discussion:** Associated with increased production of CRP, increased inflammatory response; linked with increased visceral adiposity in both children and adults.

#### Recommended Action Steps

**Diet:** Increase intake of foods rich in omega 3 fatty acids, quercetin, turmeric.

**Lifestyle:** Stress management, adequate sleep.

**Exercise:** Regular aerobic exercise of moderate intensity, as higher intensity exercise may increase CRP; see exercise genes for activities best suited to your genotype.

**Supplements:** EPA/DHA, curcumin, quercetin.

**Biomarker:** hsCRP.

##### IL6

Result: 

**Discussion:** Associated with increased production of IL-6, increased inflammatory response; linked with increased visceral adiposity in both children and adults.

#### Recommended Action Steps

**Diet:** Increase intake of turmeric, plant sterols, and foods rich in omega 3 fatty acids.

**Lifestyle:** Stress management, adequate sleep.

**Exercise:** Regular aerobic exercise of moderate intensity, higher intensity exercise may increase IL-6; see exercise genes for activities best suited for your genotype.

**Supplements:** EPA/DHA, curcumin, beta-sitosterol.

**Biomarker:** IL-6.

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For your convenience, we have provided you with a summary list of recommendations for specific nutrients and/or supplements based on your genotype. Remember, your genomic results indicate only a predisposition, and your practitioner may recommend further assessment to determine your actual needs. These are general recommendations only, and do not take into account any additional factors or needs. Actual nutrients, supplements and amounts should be determined by your healthcare practitioner as part of your overall health plan. These recommendations are for informational purposes only, and are not intended to diagnose, treat, or provide medical advice. Any health claims have not been evaluated or approved by the FDA.

SUPPLEMENT CHART	
Supplement	Dosage Per Day
5-HTP	50 mg
Alpha Lipoic Acid	400 mg
Beta-sitosterol	117 mg
Betaine HCl	10 mg
Bilberry Fruit Extract	150 mg
Bioflavanoid Complex	20 mg
Calcium	1000 mg
Choline	100 mg
Choline stabilized orthosilic acid	6 mg
Chromium	200 mcg
Curcumin	600 mg
DimPro +	375 mg
EPA/DHA	3000 mg
Glycine	1000 mg
Grapeseed Extract	250 mg
Green tea extract (50mg polyphenols)	200 mg
Guggul	500 mg
Hydroxyapatite	300 mg
Iodine	150 mcg
L-arginine	6 gms
L-Glutamine	500 mg
L-Tryptophan	500 mg
L-tyrosine	1000 mg

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This report is for informational and educational use only, and is not intended to provide diagnosis or treatment, medical advice or replace services from a healthcare professional. We believe genomic results are best used in partnership with your healthcare professional as part of your overall health and wellness program.

The results of this report are based on genomics, which is the study of single nucleotide polymorphisms, or SNPs, and how they may interact with environmental factors to impact health. SNPs vary from one individual to another, and are what make us each unique. Some SNPs may be associated with an increased or decreased risk of certain health conditions based on current scientific studies. However, the impact of a particular gene SNP in an individual can vary, and is based on the interaction(s) between genes and the environment.

The information presented in this report is based on the latest scientific research. It is a rapidly growing field and it is very possible that further research will provide additional information about the genes contained in this report. The suggested action steps including biomarkers and nutritional supplements are based on current scientific and clinical research, and are suggestions provided for educational use only. Actual interventions and diagnostic testing are to be determined by you and your healthcare professional based on your individual health needs.

This test has been performed in a laboratory that is CLIA and CAP certified. While lab protocols are designed for optimal accuracy, the accuracy of genomic testing is not 100%. Results should be taken into clinical context. The absence of a particular SNP does not mean there is no risk of a health condition or disease; the presence of a particular SNP does not mean you will have a particular disease or health condition. The prevalence and significance of some genomic SNPs may vary depending on population; not all populations have been studied for all variations. This test has not been evaluated or approved by the FDA.