

## Complete Gene Mutation Report for Customer: f4df0b86-6d18-46bd-9e21-49761cef249a

### Instructions:

NutraHacker reports mutations (single nucleotide polymorphisms) in this uploaded genome. Genes not reported in this report are either normal, not actionable, or not currently detected by NutraHacker. The expected allele is the one seen in a normally functioning gene. The high risk alleles reported are the ones measured from the uploaded genome. NutraHacker reports the effects of these mutations as discovered by published empirical data and suggests nutritional supplements that can mitigate potential issues caused by these mutations.

This report is meant to serve as a guide for nutritional supplementation for the owner of the genome and is not applicable to any other individual. Supplement quantities and dosages are not included as they are indicated on the purchased product. Multiple recommendations for the same supplement does not mean that the dosage should be multiplied. In the case of a conflict (such as a particular vitamin being both encouraged and discouraged), the owner of the genome should assess his/her own personal biology to decide whether to include or discard that particular supplement.

### NOTICE:

State law allows any person to provide nutritional advice or give advice concerning proper nutrition--which is the giving of advice as to the role of food and food ingredients, including dietary supplements. This state law does NOT confer authority to practice medicine or to undertake the diagnosis, prevention, treatment, or cure of any disease, pain, deformity, injury, or physical or mental condition and specifically does not authorize any person other than one who is a licensed health practitioner to state that any product might cure any disease, disorder, or condition.

NutraHacker reports are for scientific, educational and nutritional information only and are not intended to diagnose, cure, treat or prevent any disease, disorder or condition.

Thank you for using NutraHacker. To your health!

Gender of customer: Male

A total of 68 mutations were detected at this time for your genome out of the 195 polymorphisms assessed.

There were 11 homozygous mutations.

There were 2 sex-linked mutations.

There were 55 heterozygous mutations.

Please continue to the next page to begin your discovery process.

Category	RSID	Gene	Expected	Genotype: Risk	Genotype Freq	Gene Function	Consequences	Encourage	Avoid
Detoxification	rs2606345	CYP1A1	C	AC: 1/2	44.4935%	Phase I xenobiotic metabolism, PAH's, metabolize E2 to 2-hydroxyestradiol	Reduced function of enzyme, effects vary with race	Diindolylmethane	
Detoxification	rs72547513	CYP1A2	C	AA: 2/2	N/A	Hydroxylation or dealkylation of xenobiotics, Phase I, metabolize E2 to 2-hydroxyestradiol	CYP1A2*11 allele with approximately 5% activity of that of the CYP1A2 wild type	Induce with broccoli, Cabbage, Diindolylmethane, Glucarate, NAC, Cardamom, Sulforaphane	Curcumin, Cumin, Grapefruit
Detoxification	rs762551	CYP1A2	A	AC: 1/2	46.8902%	Hydroxylation or dealkylation of xenobiotics, Phase I, metabolize E2 to 2-hydroxyestradiol	Slow to metabolize caffeine, Main liver pathway	Induce with broccoli, Cabbage, Diindolylmethane, Glucarate, NAC, Cardamom, Sulforaphane	Curcumin, Cumin, Grapefruit
Detoxification	rs1800440	CYP1B1	A	CT: 1/2	21.5369%	4-hydroxylation of estrogen	Probable increased enzyme function, increased deleterious estrogen metabolism and activation of pro-carcinogens	Diindolylmethane	
Detoxification	rs1065852	CYP2D6	C	AG: 1/2	30.2957%	Detoxifies 20% of prescription drugs	Poor metabolizer		Substrates of this enzyme
Detoxification	rs3892097	CYP2D6	G	CT: 1/2	17.5214%	Detoxifies 20% of prescription drugs	CYP2D6*4 - nonfunctioning variant; the most common variant		Substrates of this enzyme
Detoxification	rs1800668	GPX1	C	AG: 1/2	22.4286%	Glutathione peroxidase functions in the detoxification of hydrogen peroxide, and is one of the most important antioxidant enzymes in humans.	Decreased activity of glutathione peroxidase	Selenium	

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Detoxification	rs1695	GSTP1	G	AA: 2/2	48.1693%	Conjugation toxins to glutathione	Persons having the alleles AA or AG had an increase in inflammatory interleukin-6 (IL-6) upon supplementing alpha-tocopherol (the most common form of Vitamin E in a North American diet) while those with GG saw a decrease.	NAC, Whey	Vitamin E
Detoxification	rs1041983	NAT2	C	CT: 1/2	N/A	This gene encodes an enzyme that functions to both activate and deactivate arylamine and hydrazine drugs and carcinogens.	Decreased activity	NAC, Vitamin B2, Vitamin B3, Vitamin B5, Molybdenum	
Detoxification	rs1208	NAT2	A	AG: 1/2	47.2515%	This gene encodes an enzyme that functions to both activate and deactivate arylamine and hydrazine drugs and carcinogens.	Fast metabolizer	NAC, Vitamin B2, Vitamin B3, Vitamin B5, Molybdenum	
Detoxification	rs1799929	NAT2	C	CT: 1/2	N/A	This gene encodes an enzyme that functions to both activate and deactivate arylamine and hydrazine drugs and carcinogens.	Decreased activity	NAC, Vitamin B2, Vitamin B3, Vitamin B5, Molybdenum	
Detoxification	rs1799930	NAT2	G	AG: 1/2	38.4846%	This gene encodes an enzyme that functions to both activate and deactivate arylamine and hydrazine drugs and carcinogens.	Slow metabolizer	NAC, Vitamin B2, Vitamin B3, Vitamin B5, Molybdenum	
Detoxification	rs1801280	NAT2	T	CT: 1/2	46.1933%	This gene encodes an enzyme that functions to both activate and deactivate arylamine and hydrazine drugs and carcinogens.	Decreased activity	NAC, Vitamin B2, Vitamin B3, Vitamin B5, Molybdenum	
Detoxification	rs2910397	SULT2A1	G	CT: 1/2	39.7265%	Catalyze the sulfate conjugation of many hormones, neurotransmitters, drugs, and xenobiotic compounds	Decreased enzyme function	NAC, MSM, Taurine	
Neurotransmitter Levels	rs578776	CHRNA5	T	AG: 1/2	48.4664%	Neuronal acetylcholine receptor subunit alpha-5	Increased nicotine intake		Nicotine

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Neurotransmitter Levels	rs165722	COMT	A	CT: 1/2	48.9738%	Degrades catecholamines, Phase II, inactivates hydroxy-estrogens	Decreased COMT activity	Hydroxy B12 (hydroxycobalamin)	Methyl B12, Methyl donors
Neurotransmitter Levels	rs4633	COMT	C	CT: 1/2	48.7173%	Degrades catecholamines, Phase II, inactivates hydroxy-estrogens	Same amino acid sequence, lower expression of gene, less breakdown of catecholamines	Hydroxy B12 (hydroxycobalamin)	Methyl B12, Methyl donors
Neurotransmitter Levels	rs4646312	COMT	G	CT: 1/2	41.2943%	Degrades catecholamines, Phase II, inactivates hydroxy-estrogens	Decreased COMT activity	Hydroxy B12 (hydroxycobalamin)	Methyl B12, Methyl donors
Neurotransmitter Levels	rs4680	COMT	G	AG: 1/2	48.2074%	Degrades catecholamines, Phase II, inactivates hydroxy-estrogens	Slower breakdown dopamine, oestrogen, worrier, prone to anxiety, more sensitive to green tea	Hydroxy B12 (hydroxycobalamin)	Methyl B12, Methyl donors, Cannabis
Neurotransmitter Levels	rs6269	COMT	A	AG: 1/2	44.7595%	Degrades catecholamines, Phase II, inactivates hydroxy-estrogens	Decreased COMT activity	Hydroxy B12 (hydroxycobalamin)	Methyl B12, Methyl donors
Neurotransmitter Levels	rs2391191	DAOA	G	AG: 1/2	49.3000%	D-amino acid oxidase activator, which degrades D-serine, a potent activator of NMDA receptors	Associated with cognitive manic symptoms	Idebenone, Piracetam, Magnesium, Taurine, Lithium orotate	
Neurotransmitter Levels	rs701567	DAOA	G	CT: 1/2	49.9551%	D-amino acid oxidase activator, which degrades D-serine, a potent activator of NMDA receptors	Associated with cognitive manic symptoms	Idebenone, Piracetam, Magnesium, Taurine, Lithium orotate	
Neurotransmitter Levels	rs2241165	GAD1	A	CT: 1/2	49.1201%	Catalyzes production of GABA from glutamate	High glutamate, low GABA	Taurine, Theanine, NAC, Glycine	MSG
Neurotransmitter Levels	rs3749034	GAD1	A	AG: 1/2	28.4383%	Catalyzes production of GABA from glutamate	High glutamate, low GABA	Taurine, Theanine, NAC, Glycine, Vitamin B3	MSG
Neurotransmitter Levels	rs2072743	MAO-A	T	C: 1/1	N/A	Oxidizes serotonin, dopamine, epinephrine, norepinephrine	Increased expression MAO-A	Curcumin	
Neurotransmitter Levels	rs6323	MAO-A	G	T: 1/1	N/A	Oxidizes serotonin, dopamine, epinephrine, norepinephrine	Lower expression of MAO A	Progesterone	Curcumin, Estrogens, Androgens
Neurotransmitter Levels	rs2070762	TH	T	AG: 1/2	47.8166%	Tyrosine hydroxylase, produces dopamine from tyrosine	Low dopamine	N-acetyl-tyrosine, Mucuna pruriens (with caution)	

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Folate One-Carbon Metabolism / Methylation (FOCM)	rs651852	BHMT08	T	CC: 2/2	35.7726%	Methylates homocysteine to methionine	Downregulation	Phosphatidylcholine, TMG, Phosphatidylserine, Zinc	
Folate One-Carbon Metabolism / Methylation (FOCM)	rs1643649	DHFR	T	CT: 1/2	27.2580%	Reduces dihydrofolate to tetrahydrofolate	Decreased function of enzyme	Reduced forms of folate, Glycine	Green tea, EGCG
Folate One-Carbon Metabolism / Methylation (FOCM)	rs2236225	MTHFD1	G	AA: 2/2	13.0933%	Three distinct enzymatic activities related to folate	Increased requirement for choline	Choline	
Folate One-Carbon Metabolism / Methylation (FOCM)	rs6495446	MTHFS	C	CT: 1/2	39.5684%	MTHFS is the only enzyme known to catalyze a reaction with folinic acid.	The problem with this is that folinic acid normally acts as a regulator of folate metabolism by inhibiting enzymes in this metabolism. In particular, it inhibits the serine hydroxymethyltransferase (SHMT) enzyme, which normally is the main enzyme that converts tetrahydrofolate to 5,10 methylene tetrahydrofolate, which in turn is the substrate for making methylfolate. So, a deficiency in MTHFS will allow folinic acid to rise inhibiting SHMT, which will lower 5,10 methylene tetrahydrofolate, and thus will also lower production of methylfolate, which is needed by methionine synthase in the methylation cycle.	Methylfolate, Magnesium	Folate, Folinic acid
Folate One-Carbon Metabolism / Methylation (FOCM)	rs1802059	MTRR	G	AG: 1/2	42.7445%	Methylates, recycles vitamin b12	Less active enzyme	Methyl B12	

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Folate One-Carbon Metabolism / Methylation (FOCM)	rs2287780	MTRR	C	CT: 1/2	8.30590%	Methylates, recycles vitamin b12	Less active enzyme	Methyl B12	
Folate One-Carbon Metabolism / Methylation (FOCM)	rs7946	PEMT	C	CT: 1/2	48.4137%	Converts phosphatidylethanolamine to phosphatidylcholine	Fatty liver due to low choline	Phosphatidylcholine	
Folate One-Carbon Metabolism / Methylation (FOCM)	rs3788200	SLC19A1	A	GG: 2/2	23.8097%	Membrane protein, transporter of folate	Reduced transport folate	Folate in optimal form	
HPA axis / Endocrine	rs1501299	ADIPOQ	C	GT: 1/2	43.8136%	Important adipokine involved in the control of fat metabolism and insulin sensitivity, with direct anti-diabetic, anti-atherogenic and anti-inflammatory activities.	Decreased adiponectin	Omega-3 fatty acids like fish oil, Coffee, Leucine, Magnesium, Fiber, Exercise	
HPA axis / Endocrine	rs3774261	ADIPOQ	A	AG: 1/2	49.5221%	Important adipokine involved in the control of fat metabolism and insulin sensitivity, with direct anti-diabetic, anti-atherogenic and anti-inflammatory activities.	Decreased adiponectin	Omega-3 fatty acids like fish oil, Coffee, Leucine, Magnesium, Fiber, Exercise	
HPA axis / Endocrine	rs1501899	CaSR	G	AA: 2/2	14.7929%	Calcium sensitive receptor	s7652589 and rs1501899 were also associated with nephrolithiasis in patients with normal citrate excretion	Vitamin K, Magnesium	Calcium
HPA axis / Endocrine	rs1049353	CNR1	G	CT: 1/2	27.7148%	Cannabinoid Receptor 1	The rs1049353 polymorphism of the CNR1 gene is associated with decreased levels of adiponectin.	Omega-3 fatty acids like fish oil, Coffee, Leucine, Magnesium, Fiber	
HPA axis / Endocrine	rs728524	ESR1	A	AG: 1/2	28.0942%	Estrogen receptor alpha	Female health affected	Diindolylmethane	
HPA axis / Endocrine	rs1256031	ESR2	T	AG: 1/2	48.9262%	Estrogen receptor beta	Female health affected	Diindolylmethane	

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HPA axis / Endocrine	rs560887	G6PC2	T	CT: 1/2	24.9832%	This gene encodes an enzyme belonging to the glucose-6-phosphatase catalytic subunit family. These enzymes are part of a multicomponent integral membrane system that catalyzes the hydrolysis of glucose-6-phosphate, the terminal step in gluconeogenic and glycogenolytic pathways, allowing the release of glucose into the bloodstream. The family member encoded by this gene is found in pancreatic islets.	Fasting blood glucose level higher. This is actually the more common form	Chromium, Vanadium	High carb diets
HPA axis / Endocrine	rs2918419	NR3C1	C	TT: 2/2	77.3072%	Glucocorticoid receptor	Mutation associated with generalized glucocorticoid resistance, high cortisol, CFS	Phosphatidylserine, Possibly ketogenic diet	
HPA axis / Endocrine	rs6196	NR3C1	G	AA: 2/2	72.2843%	Glucocorticoid receptor	Mutation associated with generalized glucocorticoid resistance, high cortisol, CFS	Phosphatidylserine, Possibly ketogenic diet	
HPA axis / Endocrine	rs860458	NR3C1	A	GG: 2/2	N/A	Glucocorticoid receptor	Mutation associated with generalized glucocorticoid resistance, high cortisol, CFS	Phosphatidylserine, Possibly ketogenic diet	
HPA axis / Endocrine	rs1866388	NR3C1	G	AG: 1/2	34.8177%	Glucocorticoid receptor	Mutation associated with generalized glucocorticoid resistance, high cortisol, CFS	Phosphatidylserine, Possibly ketogenic diet	
HPA axis / Endocrine	rs258750	NR3C1	G	AG: 1/2	37.6046%	Glucocorticoid receptor	Mutation associated with generalized glucocorticoid resistance, high cortisol, CFS	Phosphatidylserine, Possibly ketogenic diet	
HPA axis / Endocrine	rs6188	NR3C1	A	AC: 1/2	38.5099%	Glucocorticoid receptor	Mutation associated with generalized glucocorticoid resistance, high cortisol, CFS	Phosphatidylserine, Possibly ketogenic diet	



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HPA axis / Endocrine	rs852977	NR3C1	G	AG: 1/2	37.5797%	Glucocorticoid receptor	Mutation associated with generalized glucocorticoid resistance, high cortisol, CFS	Phosphatidylserine, Possibly ketogenic diet	
HPA axis / Endocrine	rs5522	NR3C2	A	CT: 1/2	19.1509%	Mineralocorticoid receptor, mediates aldosterone actions on salt and water balance	Increased amygdala reactivity to stress, decreased cortisol binding	Multiple minerals, Phosphatidylserine	
Cardiovascular	rs3211956	CD36	T	GT: 1/2	20.2519%	Also known as FAT (fatty acid translocase)	Significant predictor of HDL	Watch cholesterol	
Cardiovascular	rs5882	CETP	G	AG: 1/2	48.7481%	Cholesterol ester transfer protein	Cholesterol levels affected	Low fat diet	
Cardiovascular	rs5275	COX2	A	AG: 1/2	47.5291%	Involved in the conversion of arachidonic acid to prostaglandin H2, an important precursor of prostacyclin and thromboxane A2, among others.	Increased response to fish oil	Omega-3 fatty acids like fish oil	

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Cardiovascular	rs174537	FADS1	G	TT: 2/2	5.32040%	Fatty Acid Desaturase 1	Regulation of saturation of fatty acids, significantly associated with lower concentrations of long-chain PUFA. At baseline, men with the rs174537T allele had lower arachidonic acid (AA) and AA/linoleic acid (LA), and higher interleukin (IL)-6 levels than rs174537GG counterparts. After 3 years, rs174537GG men had significantly increased AA (P = 0.022), AA/dihomo-gamma-linolenic acid (DGLA) (P = 0.007), docosapentaenoic acid (DPA), low-density lipoprotein (LDL) cholesterol, and oxidized LDL (ox-LDL), but decreased eicosatrienoic acid. The rs174537T group showed significantly increased gamma-linolenic acid and ox-LDL, and decreased eicosadienoic acid, eicosapentaenoic acid (EPA)/alpha-linolenic acid (ALA), and IL-6.	Omega-3 fatty acids like fish oil, Plant oils	
Cardiovascular	rs2727270	FADS2	C	CT: 1/2	23.5859%	Fatty Acid Desaturase 2	Significantly associated with lower concentrations of long-chain PUFA	Omega-3 fatty acids like fish oil, Plant oils	

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Cardiovascular	rs662	PON1	A	CT: 1/2	49.3911%	Major antiatherosclerotic component of HDL	Glutamine high activity, arginine low activity, position 192, Low serum PON1 activity in NIDDM may be related to an increased tendency to lipid peroxidation and may also increase susceptibility to toxicity from organophosphate exposure.	Omega-3 fatty acids like fish oil, Fat soluble antioxidants, Vitamin K	High fat diet
Cardiovascular	rs2516839	USF1	G	CT: 1/2	49.8381%	Upstream Stimulatory Factor 1	Cholesterol levels affected	Fiber	High fat diet
Cardiovascular	rs9923231	VKORC1	C	CT: 1/2	47.9961%	Reduces vitamin K 2,3-epoxide to the enzymatically activated form.	Related to vitamin K recycling.	Vitamin K	
Digestion / Elimination	rs11645428	BCMO1	G	AG: 1/2	24.3749%	Key enzyme in beta-carotene metabolism to vitamin A.	reduced catalytic activity by 51%	Vitamin A	
Digestion / Elimination	rs6564851	BCMO1	G	GT: 1/2	49.5664%	Key enzyme in beta-carotene metabolism to vitamin A.	reduced catalytic activity by 48%	Vitamin A	
Digestion / Elimination	rs7501331	BCMO1	C	CT: 1/2	27.3055%	Key enzyme in beta-carotene metabolism to vitamin A.	poor converter	Vitamin A	
Digestion / Elimination	rs492602	FUT2	T	AG: 1/2	49.6357%	Fucosyltransferase 2 enzyme which determines 'secretor status'	Reduced intestinal microbiota diversity but higher vitamin B12 levels	Probiotics	
Digestion / Elimination	rs601338	FUT2	G	AG: 1/2	49.5914%	Fucosyltransferase 2 enzyme which determines 'secretor status'	Reduced intestinal microbiota diversity, non secretor	Probiotics	
Digestion / Elimination	rs602662	FUT2	G	AG: 1/2	49.7883%	Fucosyltransferase 2 enzyme which determines 'secretor status'	Reduced intestinal microbiota diversity. Interferes with absorption of B12. Individuals on vegetarian diet with GG (homozygous major genotype) have significantly lower levels of vitamin B(12).	Probiotics	

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Digestion / Elimination	rs10889677	IL-23R	C	AC: 1/2	47.5499%	Important part of the inflammatory response against infection. It promotes upregulation of the matrix metalloprotease MMP9, increases angiogenesis and reduces CD8+ T-cell infiltration.	Affects intestinal health	Probiotics, Omega-3 fatty acids like fish oil, Vitamin D3	
Energy / Oxidation	rs10370	SOD2	G	TT: 2/2	N/A	Mitochondrial Superoxide Dismutase 2	Decreased gene function. Noise induced hearing loss, rs10370 'TT', rs4880 'GG' diplo-genotype (diplotype) was associated with more gray matter shrinkage in 76 individuals who report chronic high levels of alcohol consumption.	Manganese, Vitamin E in tocotrienol form	Alcohol, Noise (greater chance for hearing loss)
Energy / Oxidation	rs4880	SOD2	A	AG: 1/2	48.9123%	Mitochondrial Superoxide Dismutase 2	Decreased gene function. Noise induced hearing loss, rs10370 'TT', rs4880 'GG' diplo-genotype (diplotype) was associated with more gray matter shrinkage in 76 individuals who report chronic high levels of alcohol consumption.	Manganese, Vitamin E in tocotrienol form	Alcohol, Noise (greater chance for hearing loss)
Energy / Oxidation	rs2855262	SOD3	T	CT: 1/2	47.4262%	Manganese superoxide dismutase	Decreased gene function	Vitamin E in tocotrienol form, Manganese	