GX SCIENCES
Innovative Genomic Solutions

Gene Comprehensive Nutrigenomic Report

Accession Number: ##########
Specimen Collected: ##/##/####
Specimen Received: ##/##/####
Report Generated: September 17, 2019
Specimen Type: Buccal Swab
Provider: ######### #########
Patient Name: ####### #######
Patient DOB: ##/##/####
Patient Gender: Female

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.

GX Sciences | 844-258-5564 | www.GXSciences.com
Lab | 4150 Freidrich Lane, Ste H | Austin, TX 78744
Laboratory Director: James W. Jacobson, Ph.D

– 26 – Female

(-/-) No clinical abnormality | (+/-) Heterozygous result | (+/+) Homozygous result

rsID	Gene	Genetic Result	Therapeutics Associated With Positive Result	Highly Recommended Therapeutics / Supplement Formulas	Provider Discretion: As Needed Formula Recommendations	Lifestyle Recommendations	Laboratory Recommendations
Neurological / Psych							
Neurotransmitters							
rs4680	COMT V158M	+/+	Taurine, Choline, Trimethylglycine (TMG), Dimethylglycine (DMG), Methionine, SAMe, Inositol		May Benefit from Full Focus+™ for anxiety, depression or focus issues		Consider Neurotransmitter Metabolite Testing
rs769407	GAD1	+/-	Prescription Amantadine, Glycine, Beta Phenyl GABA, Zinc, Magnesium, Elderberry, L-Theanine, Melatonin	**Consider Pro GAD Enhancer™ If Anxiety or Depression is Present** **May benefit from Prescription Amantadine**	Consider Pro GAD Enhancer™ if Anxiety is Present Consider Neuro-Night Essentials™ if Sleep Initiation is an Issue	Be cautious with MSG (Monosodium Glutamate) Be cautious with Glutamine Supplementation	
rs3828275	GAD1	+/-					
rs6323	MAO-A	+/-	B2 (Riboflavin) Methyl Donors (Taurine, Choline, TMG, DMG, Inositol, SAMe)		Consider Full Focus+™ if Focus or Anxiety Present		
rs1799836	MAO-B	-/-					
rs6313	HTR2	+/+	5-HTP (Hydroxytryptophan)		Consider 5-HTP or Mood Plus™ if Depression or Anxiety Present	May Have Less Than Optimal Response To SSRIs	Consider PGx Testing
rs1042173	SLC6A4	+/-					
rs4570625	TPH2	+/-	L-5-Methyl THF, Niacinamide, 5-HTP		Consider Mood Plus™ if Anxiety Present	May have increased response rate to SSRI medication	Consider Neurotransmitter Metabolite Testing
rs1108580	DBH	+/-	Vitamin C Copper		Vitamin C May Consider Strattera if You have an Issue with Focus		Consider Neurotransmitter Metabolite Testing

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Neurological / Psych							
Neuro-Inflammation							
rs10402876	C3	+/-	Anti-Inflammatory Therapy: Curcumin, Omega 3s, Resveratrol, Quercetin, Low Dose Naltrexone (LDN), CBD Oil	**CBD Oil** **PEA Soothe Support™** **Prescription Low Dose Naltrexone (LDN)**		Consider Low Inflammatory Diet	Consider Pregnenolone, Cortisol, Progesterone, Testosterone
rs2569191	CD14	+/+					
rs1143634	IL1B	-/-					
rs2069812	IL5	+/-					
rs1800795	IL6	-/-					
rs1800925	IL13	-/-					
rs10181656	STAT4	-/-					
rs1800629	TNF	-/-					
rs231775	CTLA4	+/+					
rs1076560	DRD2	-/-	Increased Efficacy of Naltrexone				

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Neurological / Psych							
Neurotrophic Factors							
rs1142636	SYN1	-/-	RG3, Nicotinamide Riboside, Ginseng				
rs6265	BDNF	-/-	D-Chiro-Inositol, 12 Hour Fasting, Exercise				
Autophagy Efficacy							
rs10210302	ATG16L1	-/-	Curcumin, Lithium Orotate, D-Chiro-Inositol, Catechins, Resveratrol, Caffeine, 12 Hour Fasting	**N.A.S. Enhancer™** **DCI 500 or Metabolic Stimulator™**		Consider Intermittant Fasting (12-15 Hours) Routine Exercise	Routine Blood Sugar, Insulin and Hb A1c
rs26538	ATG12	+/-					
rs510432	ATG5	+/-					
rs3798963	PARK2 (Parkin)	-/-	Curcumin, Lithium Orotate, D-Chiro-Inositol, Catechins, Resveratrol, 12-15 Hour Fasting				
rs7412	APOE	-/-	Increased Risk of Memory Disorders		N.A.S. Enhancer™ Metabolic Stimulator™	Discuss APOE findings with Physician	Routine Lipid Panel
rs429358	APOE	+/-					
Detoxification							
rs1021737	CTH	-/-	N-Acetyl Cysteine (NAC)	**N-Acetyl Cysteine**		Herbicide and Pesticide Avoidance	Consider Homocysteine Level
rs819147	AHCY	+/-					

rs7483	GSTM3	+/-	Glutathione NRF2 Enhancers	**N.A.S. Enhancer™**	Consider Glutathione Therapies	Herbicide and Pesticide Avoidance Pre-Anesthesia Glutathione Treatment Recommended	

Summary for Neurological / Psych

Highly Recommended Therapeutics / Supplement Formulas

- Consider Pro GAD Enhancer™ If Anxiety or Depression is Present
- May benefit from Prescription Amantadine
- CBD Oil
- PEA Soothe Support™
- Prescription Low Dose Naltrexone (LDN)
- N.A.S. Enhancer™
- DCI 500 or Metabolic Stimulator™
- N-Acetyl Cysteine

Provider Discretion

- May Benefit from Full Focus+™ for anxiety
- depression or focus issues
- Consider Pro GAD Enhancer™ if Anxiety is Present
- Consider Neuro-Night Essentials™ if Sleep Initiation is an Issue
- Consider Full Focus+™ if Focus or Anxiety Present
- Consider 5-HTP or Mood Plus™ if Depression or Anxiety Present
- Consider Mood Plus™ if Anxiety Present
- Vitamin C
- May Consider Strattera if You have an Issue with Focus
- Metabolic Stimulator™
- Consider Glutathione Therapies

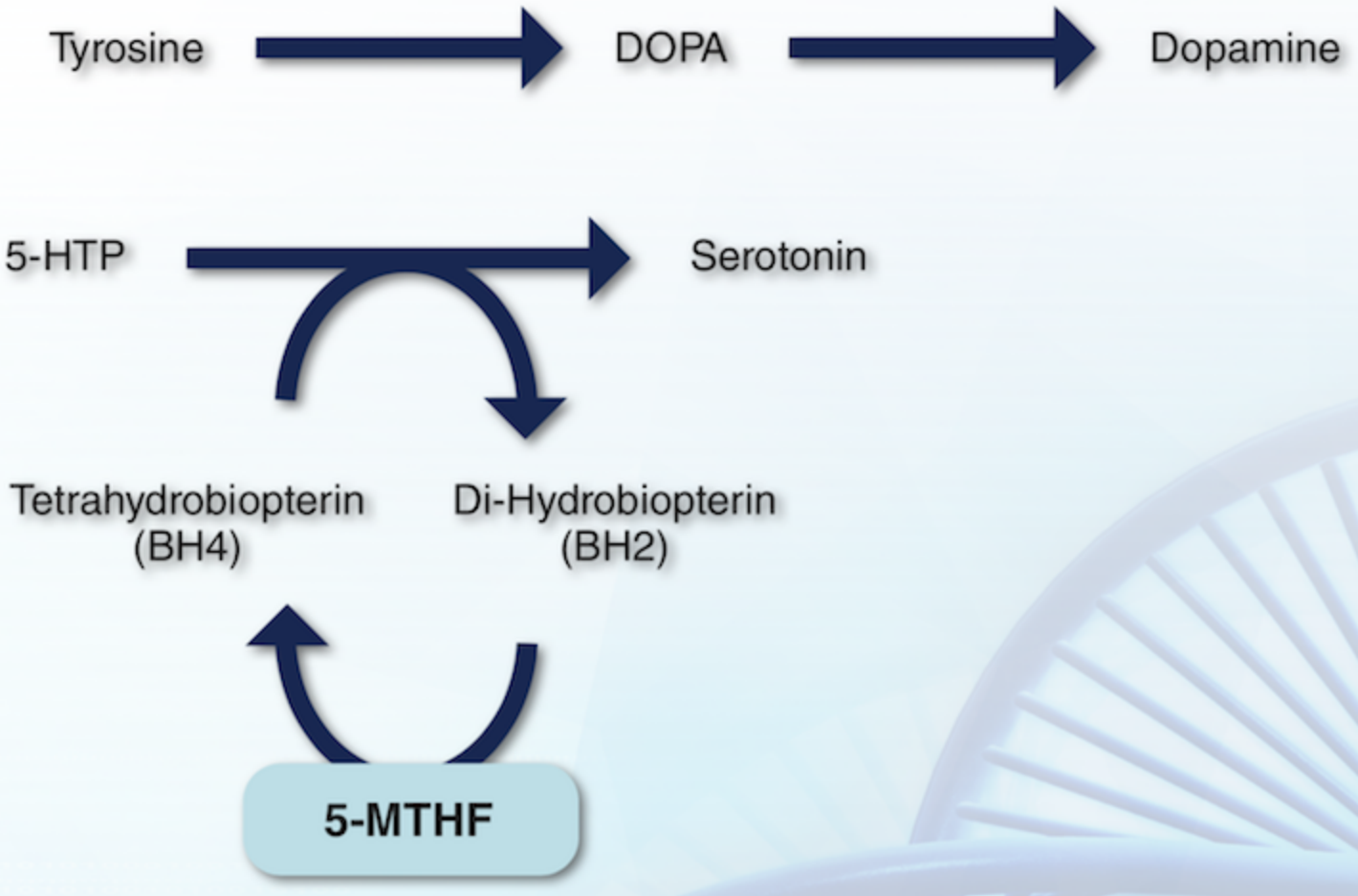
Lifestyle Recommendations

- Be cautious with MSG (Monosodium Glutamate)
- Be cautious with Glutamine Supplementation
- May Have Less Than Optimal Response To SSRIs
- May have increased response rate to SSRI medication
- Consider Low Inflammatory Diet
- Consider Intermittant Fasting (12-15 Hours)
- Routine Exercise
- Discuss APOE findings with Physician
- Herbicide and Pesticide Avoidance
- Pre-Anesthesia Glutathione Treatment Recommended

Laboratory Recommendations

- Consider Neurotransmitter Metabolite Testing
- Consider PGx Testing
- Consider Pregnenolone
- Cortisol
- Progesterone
- Testosterone
- Routine Blood Sugar
- Insulin and Hb A1c
- Routine Lipid Panel
- Consider Homocysteine Level

5-MTHF & Neurotransmitter Production



Gene Information Key

rsID	Gene	"-" variant	"+" variant
rs819147	AHCY	T	C
rs429358	APOE	T	C
rs7412	APOE	C	T
rs26538	ATG12	T	C
rs10210302	ATG16L1	C	T
rs510432	ATG5	C	T
rs6265	BDNF	C	T
rs10402876	C3	G	C
rs2569191	CD14	T	C
rs4680	COMT V158M	G	A
rs1021737	CTH	G	T
rs231775	CTLA4	A	G
rs1108580	DBH	A	G
rs1076560	DRD2	C	A
rs769407	GAD1	G	C
rs3828275	GAD1	C	T
rs7483	GSTM3	C	T
rs6313	HTR2	G	A
rs1800925	IL13	C	T
rs1143634	IL1B	G	A
rs2069812	IL5	A	G
rs1800795	IL6	G	C
rs6323	MAO-A	T	G
rs1799836	MAO-B	T	C
rs3798963	PARK2 (Parkin)	A	T
rs1042173	SLC6A4	A	C
rs10181656	STAT4	C	G
rs1142636	SYN1	A	G
rs1800629	TNF	G	A
rs4570625	TPH2	G	T

Definitions

DETOXIFICATION	Detoxification enzymes are responsible for clearing environmental chemicals and metabolites from our body. Accumulation of these chemicals and by-products can damage intracellular biochemical functions. Alterations in these systems can have a significant negative effect on the nervous system and immune systems functions. These polymorphisms can result in decreased "quality of life" and even decreased "life-span".
AHCY	Adenosylhomocysteinase (AHCY) is an enzyme that breaks down S-adenosylhomocysteine (SAH) to homocysteine and adenosine. Polymorphisms in this gene will lead to lower levels of homocysteine and glutathione.
CTH	Glutathione production is dependent on the function of the enzyme cystathionine gamma-lyase (CTH). CTH converts cystathionine to cysteine. Individuals with mutations in the CTH gene are predicted to have decreased glutathione-mediated detoxification.
GSTM3	Glutathione S-transferase mu 3 is an enzyme that detoxifies drugs, environmental toxins, and carcinogens by conjugating toxins to glutathione and subsequent excretion by the kidneys. Mutations in GSTM3 are associated with decreased clearance of toxins, anesthetics and drugs from the nervous system.
DEVELOPMENTAL	The SNPs in this category have been identified as potential areas of weakness in the recovery of developmental disorders.
APOE: 130	Individuals homozygous for the C/C allele at rs429358 may harbor the APOE E4 allele. Consult with a provider to determine APOE risk allele status.
APOE: Arg176Cys	Individuals homozygous for T/T at rs7412 are assumed to have the E2 allele of the gene APOE. APOE encodes a protein involved in cholesterol and lipid transport and metabolism
ATG12	Autophagy-related 12 protein is part of the core autophagy machinery inside the cell. Autophagy, a form of cellular "recycling" is necessary for many cell functions. ATG12 is specifically involved in turning off the innate immune response. Mutations in the ATG12 gene are predicted to lead to increased activity of the innate immune response, and overall inflammation.
BDNF	The BDNF (Brain Derived Neurotrophic Factor) gene encodes for a member of the nerve growth factor family of proteins. BDNF acts on both the central nervous system and the peripheral nervous system helping to support the survival of existing neurons and encourage the growth and differentiation of new neurons and synapses. It is highly expressed in the brain, as well as, the retina, cochlear-vestibular system and motor neurons. Although the vast majority of neurons in the brain are formed prenatally, parts of the adult brain retain the ability to grow new neurons from neural stem cells in a process known as neurogenesis. BDNF helps to stimulate and control neurogenesis, as well as playing an important role in normal neural development. Binding of this protein to its cognate receptor promotes neuronal survival in the adult brain. Expression of this gene is reduced in Alzheimer's, Parkinson's and Huntington's disease. This gene may play a role in the regulation of the stress response and the biology of mood disorders. Several mechanisms to increase BDNF have been discovered. These mechanisms revolve around autophagy stimulation. These include Intermittent Fasting with a single meal of 600 calories on the fast day can increase BDNF production by 50-400%. Cognitive Stimulation, Calorie Restriction, Exercise, Hormone therapy and supplements including Quercitin, Caffeine, Curcumin, Niacinamide, Lithium Oratate, Magnesium Threonate, Resveratrol, Ginseng, Theanine, Olive Leaf Extract and NAC.
PARK2	PARK2 is a protein involved in normal turnover of damaged or old proteins inside the cell. Mutations in the PARK2 gene are associated with heritable Parkinson's disease.
SYN1	SYN1 (Synapsin) codes for Synapsins that are responsible for synaptogenesis and the modulation of neurotransmitter release, suggesting a potential role in several neuropsychiatric diseases. This member of the synapsin family plays a role in regulation of axonogenesis and synaptogenesis. Mutations in this gene may be associated with X-linked disorders with primary neuronal degeneration such as Rett syndrome. Additionally, polymorphisms in this gene are associated with numerous neurological conditions, as well as, decreased recovery potential for neurological insults.
INFLAMMATORY	This Enzyme category has significant effects on the inflammatory state of a person's body. Polymorphisms in these specific enzymes will significantly increase the levels of inflammation in the body. By supplementing these enzyme deficiencies, the patient will effectively reduce inflammatory damage to the body.
ATG16L1	The ATG16L1 gene encodes a protein that is a vital component of a protein complex necessary for the cellular phenomena known as autophagy. Autophagy is the process of degrading and cleaning of inert debris of the cell. Weakness in autophagy leads to abnormal accumulation of cellular "garbage" that will eventually affect the cellular function and lead to autophagy related disease states in including many neurological and immunological diseases, DM Type 2 and fatty liver disease.
ATG5	Autophagy-related 5 protein (ATG5) is an important intracellular mediator of the autophagy response. ATG5 is involved in a wide range of "quality control" features inside the cell: autophagy vesicle formation, innate immune system signaling, consumption of damaged mitochondria, and apoptosis. Mutations in the ATG5 gene are associated with numerous neurological, immunological and endocrine syndromes.
C3	Essential for the immune response, C3 is a protein involved in initiation of the complement system. C3 polymorphisms are associated with susceptibility to asthma and other inflammatory disorders.
CD14	The CD14 protein is a macrophage cell surface receptor that binds bacterial cell wall components. As one of the initiators of the innate immune response, fully functional CD14 is necessary for normal response to potential pathogens. Mutations in the CD14 gene are associated with susceptibility to asthma and other allergen-mediated inflammatory processes.

CTLA4	Cytotoxic T-lymphocyte Associated protein 4 (CTLA4) is an important inhibitor of T-cell activity: CTLA4 is part of the signaling cascade that turns off overactive T cells. Mutations in the gene that encodes CTLA4 are associated with a host of diseases characterized by a heightened immune state.
DRD2	Dopamine receptor D2 is an important component of the neuroinflammation process. Activation of DRD2 signaling is thought to decrease TNFalpha release from inflammatory mast cells. Polymorphisms associated with decreased DRD2 signaling activity are predicted to lead to pro-inflammatory phenotypes.
IL13	IL13 (Interleukin 13) is a member of the interleukin family of chemical messengers of the immune system. Polymorphisms in this gene are associated with changes in IL13 gene expression and increase the risk of more severe inflammatory responses to allergens.
IL5	The protein product of the Interleukin 5 gene (IL5) is important for normal development of B lymphocytes and eosinophils (a pro-inflammatory white blood cell). Inactivating mutations in the IL5 gene are associated with susceptibility to certain viral infections and increased aggression of inflammatory response. These polymorphisms are also associated with increased aggression of allergies, asthma and eosinophilia.
IL6	Interleukin 6, IL6, is an important pro-inflammatory cytokine. Polymorphisms in this gene leads to a more aggressive inflammatory response. Patients with IL-6 mutations require assistance with inflammatory control.
STAT4	The Signal Transducer and Activator of Transcription 4 (STAT4) gene encodes a transcription factor that responds to extracellular growth factors and cytokines. Mutations in the STAT4 gene are associated with inflammatory disorders like lupus and rheumatoid arthritis.
TNF	Tumor necrosis factor, TNF, is an important pro-inflammatory signaling molecule. Polymorphisms in the protein coding part of this gene are associated with more severe pro-inflammatory responses and require supplementation for inflammatory control.
NEUROTRANSMITTER	Neurotransmitters are chemicals that are used to produce specific effects in the nervous system. These specific neurotransmitter genomics assess a person's risk for anxiety, depression and dysphoria.
COMT V158M	Catechol-O-methyltransferase (COMT) is one of several enzymes that degrade catecholamine neurotransmitters such as dopamine, epinephrine, and norepinephrine. COMT's main function is to inactivate neurotransmitters (dopamine, epinephrine, and norepinephrine) by the addition of a methyl group to the catecholamine. Normal COMT function allows people to rapidly reverse feelings of anxiety or depression. COMT (+/-) patients have sluggish ability to alter anxiety or depression episodes. COMT (+/+) patients are more prone to prolonged episodes of anxiety, depression and OCD.
DBH	DBH (Dopamine Beta Hydroxylase) is an oxidoreductase belonging to the copper type II, ascorbate-dependent monooxygenase family. The encoded protein, expressed in neurosecretory vesicles catalyzes the conversion of dopamine to norepinephrine, which functions as both a hormone and sympathetic nervous system function. Polymorphisms in this gene lower the production of norepinephrine which causes poor autonomic and cardiovascular function, including hypotension and ptosis. Polymorphisms in this gene have also been linked to Autism, ADD, bipolar disorder and major depression.
GAD1	Glutamic Acid Decarboxylase (GAD 1) is the enzyme responsible for conversion of glutamic acid (a stimulant neurotransmitter) to GABA (a calming neurotransmitter). Deficiency of GABA from polymorphisms in this enzyme are associated with sleep disorders, "half glass empty" syndrome, dysphoria, and spasticity.
HTR2	5-hydroxytryptamine receptor 2 (HTR2) is one of the neuronal receptors for the neurotransmitter serotonin. Mutations in the HTR2 gene are associated with individual response to antidepressants, appetite, and mood.
IL1B	Interleukin 1B is the pro-inflammatory cytokine responsible for inducing cyclooxygenase-2 (COX2) expression in the central nervous system. COX2 enzymatic function leads to prostanoid signaling that increases pain sensation associated with inflammation. Mutations in the IL1B gene are associated with many chronic inflammation disorders.
MAO-A	Monoamine oxidase A (MAOA) is one of the classic neurotransmitter degradation enzymes. By degrading serotonin, dopamine, epinephrine, and norepinephrine, MAO-A ends neuronal signaling induced by those neurotransmitters. Mutations in the MAO-A gene leads to decreased degradation of these neurotransmitters and can be associated with increased aggression, mood disorders and drug addiction.
MAO B	Monoamine Oxidase B (MAO B) catalyzes the neuroactive amines, such as dopamine, epinephrine, norepinephrine, and plays a role in the stability of mood in the central nervous system,. MAO B's primary purpose is to degrade dopamine. Patients who possess polymorphisms of MAO B have a higher risk of clinical depression and mood disorders.
SLC6A4	The SLC6A4 gene encodes the serotonin transporter, also known as SERT. The serotonin transporter is responsible for clearing the serotonin neurotransmitter from the synaptic space. SERT is the target of many therapeutic drugs. Polymorphisms in the SLC6A4 gene are associated with increased risk of anxiety and depression and less effective response to SSRI medications.
TPH2	TPH2 (Tryptophan Hydroxylase 2) gene catalyzes the first and rate limiting step in the biosynthesis of serotonin (5HT), an important hormone and neurotransmitter. Mutations in this gene have been shown to be associated with psychiatric diseases such as bipolar affective disorder, anxiety and major depression. Polymorphisms in this gene are also correlated to an increased response rate to SSRI medications.

Disclaimers

METHODOLOGY AND LIMITATIONS:

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, 4150 Freidrich Lane, Ste H, Austin, TX. 78744. 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 GX Sciences' laboratory pursuant to Clinical Laboratory Improvement Amendments (CLIA) requirements.
CLIA #: 45D2144988 Laboratory Director: James Jacobson, PhD

DISCLAIMER:

This test was developed and its performance characteristics determined by GX Sciences. It has not been cleared or approved by the FDA. The laboratory is regulated under CLIA and qualified to perform high-complexity testing. This test is used for clinical purposes. It should not be regarded as investigational or for research. rsIDs for the alleles being tested were obtained from the dbSNP database (Build 142).

DISCLAIMER:

UND Result: 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. Please refer to the GX Sciences genetic knowledge database for more information: https://www.gxsciences.com/kb_results.asp

DISCLAIMER:

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DISCLAIMER:

These products are not approved by the Food and Drug Administration and are not intended to diagnose, treat, cure or prevent a disease. These recommendations are for report purposes only and an individual is not required to use such products. These are recommendations only and do not replace the advisement of your own healthcare practitioner.

GX Sciences SNP References

DETOXIFICATION SNP References

AHCY

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CTH

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GSTM3

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DEVELOPMENTAL SNP References

APOE: 130

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APOE: Arg176Cys

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ATG12

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BDNF

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PARK2

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SYN1

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