dnaPower

POWER OVER YOUR HEALTH

YOUR healthPower RESULTS

Your Personal DNA Results

Congratulations on making the decision to take Power over your Health!

Your personalized DNA results contain information unique to **your body**, giving you the power to make informed decisions about your health.

WHY DNA IS IMPORTANT

DNA is our personal biological roadmap. It guides the development and functioning of our bodies. DNA sequences, known as genes, contain genetic markers that differ among people. dnaPower's genetic testing zeros in on specific genes and genetic markers that have been scientifically proven to impact health, nutrition, fitness, and disease and that may vary between people.

HOW GENETIC VARIATIONS CAN IMPACT YOUR HEALTH

Hereditary and environmental factors can cause genetic variations or mutations in your DNA. Some mutations have minimal effects, while others may alter a gene in such a way that its function is changed or lost. When this occurs, there is a risk that your gene may not function at an optimum level.

HOW YOUR DNA RESULTS CAN HELP YOU

Your dnaPower results provide a snapshot of selected genetic variations that have been proven through scientific studies to impact your health. By knowing your genetic variations, you can learn where you may be predisposed to good or poor health related traits. By understanding this information, you can take proactive steps to enhance your wellbeing. The good news is that through healthy diet, nutrition and exercise, you can change or improve how your DNA functions.

RELIABLE RESULTS

dnaPower uses a state of the art Agena MassArray genotyping platform to provide greater than 99.7% accuracy in the genes and SNPs (Single Nucleotide Polymorphisms) that we test. We test genetic sites that identify the most common DNA markers scientifically studied and proven to be associated with certain conditions. We report on genes that have a high incidence relationship. It is important to note that DNA research is constantly evolving. There may be variations related to a condition that are yet to be discovered and may in future improve on the accuracy and thoroughness of the results.

MAXIMIZING YOUR RESULTS

Knowledge is power. We encourage you to use your dnaPower results to understand potential impacts to your health and to take positive action. We recommend consulting a qualified health practitioner to gain further insight and advice for a program specific to you.

How To Read Your Report

YOUR SUMMARY
A snapshot of each area tested and your genetic composition results.

PAGE 4

YOUR ACTION PLAN
Key suggested actions based on areas with higher variations.

PAGE 6

YOUR DETAILED TEST AREA DESCRIPTIONS
Detailed information on each test area along with further tips to take power over your health.

PAGE 9

YOUR GENETIC PROFILE
Your personal genotype results for each gene tested.

PAGE 40

READING YOUR GENETIC COMPOSITION GRAPH

Your personal results are represented in a genetic composition graph.

Green is Good. Indicates the percentage of gene(s) or SNPs tested that are normal. With good health decisions, your gene(s) should function properly.

Red is Poor. Indicates there are variations in the gene(s) or SNPs that have potential to impact your health. This is a possible area of risk. Take proactive action to look after your health.

In your report, focus on areas that are 50% red or more as this is where you are more likely to experience issues over time.

YOUR healthPower SUMMARY

Your personal report covers your genetic composition for results related to how well your body regulates sex hormones, detoxification, inflammation, immune response and tumour response, and methylation. The results give you an indication of your predisposition to the health factors tested. Your genetics are your blueprint. You can enhance and improve your health outcomes through diet, fitness and environment.

AREA TESTED	TELLS YOU (Risk Potential)	YOUR GENETIC COMPOSITION RESULTS	PAGE
DETOXIFICATION			
Detoxification Phase 1 - Activation	*How efficiently your body manages oxidation*	75% / 25%	10
Detoxification Phase 2 - Conjugation	*How efficiently your body neutralizes drugs, hormones and various toxins into water soluble substances for elimination*	100%	12
Detoxification Phase 2 - Acetylation	*How efficiently your body catalyzes acetylation reactions to detoxify harmful carcinogens*	80% / 20%	13
Detoxification Phase 2 - Methylation	*How efficiently your body metabolizes dopamine, epinephrine (adrenalin), norepinephrine (noradrenaline), and estrogen*	50% / 50%	14
Detoxification Phase 2 - Oxidative Protection	*How efficiently your antioxidant enzymes can protect you against reactive oxygen species*	50% / 50%	16
HORMONE HEALTH			
Biosynthesis of Androgens and Estrogens	*How effectively your body regulates sex steroids, androgen and estrogen*	50% / 50%	18
Phase 1 - Metabolism of Estrogens	*Your body's ability to metabolize estrogen*	100%	19
Phase 2 - Elimination of Estrogen Metabolites	*Your body's ability to eliminate estrogen and estrogen metabolites*	50% / 50%	20

Normal Genes Variations

YOUR healthPower SUMMARY

Your personal report covers your genetic composition for results related to how well your body regulates sex hormones, detoxification, inflammation, immune response and tumour response, and methylation. The results give you an indication of your predisposition to the health factors tested. Your genetics are your blueprint. You can enhance and improve your health outcomes through diet, fitness and environment.

AREA TESTED	TELLS YOU (Risk Potential)	YOUR GENETIC COMPOSITION RESULTS	PAGE
INFLAMMATION RESPONSE			
Inflammatory Immune Response	*How effectively your immune system fights inflammation*	40% / 60%	23
Inflammatory Tumour Response	*How effectively your immune system fights acute inflammatory diseases*	100%	25
METHYLATION			
Methylation - MTHFR	*How effectively you metabolize folate into its active form*	75% / 25%	29
Methylation - SHMT1	*How effectively you convert folate and regulate homocysteine*	100%	30
Methylation - MTR	*How efficiently you transform homocysteine into methionine with folate and B12*	100%	31
Methylation - MTRR	*How efficiently you regenerate B12 for methionine synthesis*	100%	32
Methylation – AHCY	*How well you recycle methyl groups for energy, mood, and detox*	50% / 50%	33
Methylation - FUT2	*How effectively you absorb B12 for healthy methylation*	50% / 50%	34
Methylation - TCN2	*How effectively you transport B12 to cells for use in methylation*	50% / 50%	35

Normal Genes Variations

YOUR healthPower ACTION PLAN

Your personal DNA results provide valuable insights into your body based on your unique genetic code.
This is a suggested healthPower Action Plan based on your personal DNA results. We have provided you with Action Tips that may help support your DNA and health.

The areas below are where you have higher genetic variations (>50% red in the Genetic Composition graphs). This increases your risk potential in that area over time. By taking action to support your health in these areas and managing lifestyle factors such as diet, exercise, sleep, stress and environmental factors, you increase the opportunity for your genes to function optimally.

AREA TESTED	ACTION TIPS	PAGE
DETOXIFICATION		
Detoxification Phase 2 - Methylation	*Maintain adequate magnesium intake. Foods high in magnesium include pumpkin seeds, spinach and chard, avocado, banana, yogurt or kefir and dark chocolate. Include vitamin C rich foods like citrus (tangerines and oranges) as well as strawberries and bell peppers. Have adequate intake of foods containing folate, include dark leafy greens, mushrooms, oranges, whole grains and cereals in your diet.*	14
Detoxification Phase 2 - Oxidative Protection	*Protect against oxidative stress by consuming foods rich in antioxidants such as colorful vegetables and fruits. Foods including brocolli, spinach, artichokes, berries, pecans, and turmeric are high in antioxidants. Include dietary sources of manganese, a cofactor for SOD2, found in chickpea, spinach, sweet potato and brown rice. Consider supplementation such as coenzyme Q10 and zinc to support antioxidant function. Reduce exposure to carcinogenic toxins and environmental pollutants.*	16
HORMONE HEALTH		
Biosynthesis of Androgens and Estrogens	*Your body may have greater issues regulating sex steroids, androgen and estrogen. Consider hormone free meat and dairy, and produce free of herbicides, pesticides and other chemicals. Use glass rather than plastic and reduce exposure to household chemicals.*	18
Phase 2 - Elimination of Estrogen Metabolites	*To help eliminate estrogen and estrogen metabolites, consider a diet rich in antioxidants, vitamin B complex and manganese. Avoid exposure to radiation and carcinogens.*	20

» Additional Tips are available throughout the report. Focus on areas where you have high red variations.

» These Action Tips are based on your genetic predisposition only. They are intended to support better health. They are not an indication of a problem and do not take into account where your health may be today.

» Consult with a healthcare practitioner before embarking on any major lifestyle changes.

YOUR healthPower ACTION PLAN

AREA TESTED	ACTION TIPS	PAGE
INFLAMMATION RESPONSE		
Inflammatory Immune Response	*You are at a higher risk of ongoing or chronic inflammation. Boost your immune response by including vitamin C rich, turmeric, garlic and onion, berries and fish oil in your diet. Engage in physical activity to boost IL6 performance.*	23
METHYLATION		
MTRR Methylation - MTRR	*Include healthy sources of vitamin B12 such as eggs, sardines, clams, fortified nutritional yeast, grass-fed meat, and dairy to support methylation. Ensure adequate intake of zinc by eating shellfish, seeds, and legumes like lentils, chickpeas, and beans. Consider supplementing with a B-complex that includes methylated B12 (methylcobalamin) to help maintain active B12 levels. Good digestion is key for absorbing B12, so speak with your healthcare provider if you have digestive issues or are over age 50, as absorption may decline with age. Testing your vitamin B12 and homocysteine levels can help guide your next steps.*	32
Methylation – AHCY	*Focus on a nutrient-rich diet that includes foods such as eggs, turkey, beets, spinach, quinoa, and sunflower seeds. Ensure adequate intake of methylated B vitamins—especially B6, B12 (as methylcobalamin), and folate (as 5-MTHF)—which are essential cofactors. Support liver detoxification with cruciferous vegetables (broccoli, kale, Brussels sprouts), and consider liver-supporting herbs like milk thistle or dandelion root. Limit alcohol, processed foods, and exposure to environmental toxins to reduce methylation demands. Regular exercise, good sleep and reduced stress keep your metabolism running smoothly. If you're symptomatic or have MTHFR variations, talk to a healthcare provider about testing homocysteine levels and consider supplements such as SAMe or creatine.*	33
FUT2 Methylation - FUT2	*Support your FUT2 gene by eating plenty of vitamin B12-rich foods like eggs, clams, sardines, salmon, nutritional yeast, grass-fed meat, and dairy. Consider methylated or sublingual B12 supplements to improve absorption. Keep your gut healthy with a high-fiber diet and fermented foods like yogurt, kefir, and sauerkraut. Since B12 absorption can decline with age or digestive issues, talk to your healthcare provider about testing your B12 and homocysteine levels to ensure your body is using B12 effectively.*	34
TCN2 Methylation - TCN2	*Include plenty of vitamin B12-rich foods in your diet, such as eggs, clams, sardines, salmon, nutritional yeast, grass-fed meat, and dairy products. You may benefit from supplementing with methylated B12 (methylcobalamin) or hydroxocobalamin, to improve cellular uptake. Since B12 transport happens after absorption, also focus on maintaining good digestive health—especially if you're over 50 or have conditions like gastritis or low stomach acid, which can reduce intrinsic factor production. Consider speaking with your healthcare provider about testing your homocysteine and B12 levels, even if your blood B12 is normal, to ensure your cells are getting what they need.*	35

My personal action plan and notes:

DETOXIFICATION

Detoxification is the removal of toxic substances from the body. It is what your body does to neutralize, transform or get rid of unwanted materials or toxins. There are two major detoxification pathways inside the liver cells; Phase 1 and Phase 2 detoxification pathways. Phase 1 is primarily responsible for converting toxic substances into less harmful chemicals while Phase 2 works at turning drugs, hormones and various toxins into water soluble substances which can be excreted from the body.

This report contains information about your body's ability to rid itself of these environmental toxins and free radicals, both of which can be damaging to your tissues. Based on your genetic information, you will know if you have a higher need to support detoxification.

While you cannot completely eliminate harmful substances from entering or being created in your body, you can make choices to decrease your exposure to them:

» Lighten your toxin load.

» Eliminate or decrease your consumption of alcohol, coffee, cigarettes, refined sugars and saturated fats, all of which can act as toxins in the body and are obstacles to your healing process.

» Minimize use of chemical-based household cleaners and personal health care products (cleansers, shampoos, deodorants and toothpastes), and substitute natural alternatives.

» Avoid exposing your body to dangerous chemicals such as herbicides, pesticides, hormones, and unnecessary antibiotics.

» Help your body to clear free radicals using foods with anti-oxidant properties.

Detoxification Phase 1 - Activation

HOW EFFICIENTLY YOUR BODY MANAGES OXIDATION

Detoxification is the removal of toxic substances and impurities from the body, it is mainly carried out by the liver. In phase 1, toxicants are transformed to more easily eliminated forms through oxidation, reduction, hydrolysis, hydration and dehalogenation reactions.

Toxic substances, either molecules arising from metabolism (diet), or external factors (environmental), are processed by the liver on a continual basis, primarily through the cytochrome P450 enzymes. CYP450 enzymes initiate the phase 1 biotransformation, oxidizing these compounds into forms which are easily eliminated by the body.

CYP450s are the major oxidative enzymes and the most actively studied in phase 1. They are responsible for metabolizing the large majority of therapeutic drugs and other foreign compounds. There are numerous CYP450 isozymes that are tested for in this panel. Genetic variants in CYP450 can have a functional impact on the efficiency and side effects of drugs.

Detoxification compounds produced naturally through the body include: cholesterol, fat soluble vitamins, sterols (including bile acids), prostaglandins, thromboxane A2, as well as both products of microbial metabolism and bacterial produced lipopolysaccharides. Chemicals, drugs, naturally occurring toxins or synthetic chemicals in food, food additives, plasticizers, organic solvents, drugs, pesticides, along with industrial waste contaminates are detoxification compounds found in the body from outside sources.

Individuals with variants in genes affecting phase 1 may be at higher risk for toxic overload as a result of damaging free radicals being produced at high levels. If these reactive molecules are not further metabolized by phase 2 detoxification, they may cause cell damage.

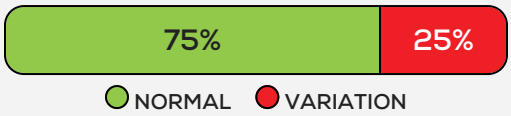
TIPS TO TAKE POWER OVER YOUR HEALTH

If you have variations in this panel, you may want to consider the following to improve your health:

» Eat a diet rich in antioxidants.

» Include citrus such as tangerines and oranges (but not grapefruit) as well as vitamin C rich foods such as strawberries and bell peppers.

YOUR GENETIC COMPOSITION %



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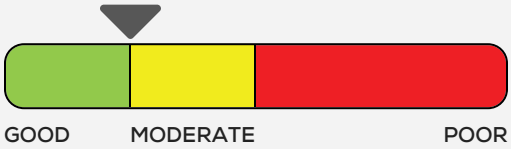

Your genes in this panel are functional. You have efficient oxidation capabilities via the CYP450 gene. If you are feeling symptoms of an increased toxic load it is likely due to variation in a different gene or environmental factors. As a preventative measure, reduce or eliminate exposure to cigarette smoke and other environmental toxins and carcinogens.

» Eat non-starchy vegetables, including brassica or crucifer vegetables (broccoli, brussels sprouts, cauliflower, rutabaga, turnips, kohlrabi, cabbage, collard greens, kale and mustard seed) that provide a wide variety of phytochemicals that impact detoxification and biotransformation.

» Include high-quality, absorbable protein in your diet (eggs & whey protein). It is an important source of amino acids for the production of the phase 1 CYP enzymes.

» Consider a lipotropic to support the liver such as cysteine, methionine, choline and inositol.

» Consider supplementing with vitamin C, B, magnesium and iron.

» Consider herbs such as milk thistle, sassafras, caraway and dill.

» Engaging in regular exercise can support metabolism and overall well-being, helping to mitigate the effects of genetic variations on health outcomes.

» Decrease exposure to xenobiotics (drugs, pesticides, or carcinogens) and xenoestrogens (chemical compounds which imitate estrogen).

Detoxification Phase 2 - Conjugation

HOW EFFICIENTLY YOUR BODY NEUTRALIZES DRUGS, HORMONES AND VARIOUS TOXINS INTO WATER SOLUBLE SUBSTANCES FOR ELIMINATION

Glutathione S-transferases (GSTs) are a multi-gene family of enzymes that are involved in the metabolism of a wide range of compounds and are generally recognized as detoxification enzymes. GSTs detoxify dangerous substances that are foreign to the body as well as those originating from within the body. Glutathione S-transferase P1 (GSTP1) is one such Glutathione S-transferases (GST).

GSTP1 is a multifunctional enzyme involved in the detoxification of reactive oxygen species produced during melanin synthesis and oxidative stress processes. Oxidative stress is an imbalance between reactive oxygen species and the antioxidant defense system. Oxidative stress is involved in many diseases. GSTP1 is important for detoxifying carcinogens, activating antineoplastic prodrugs, metabolizing chemotherapeutic agents, and is involved in cell cycle and cell death regulation.

If you have variation in your GSTP1 gene it may exhibit reduced detoxification ability and poorer antioxidant capacity. Decreased capacity can increase the overall toxic burden and oxidative stress. Variation in the GSTP1 gene, leading to low efficiency, is associated with resistance to certain anticancer drugs and to the risk of developing some types of cancer. GSTP1 has been related to increased risk of bladder cancer in some studies.

TIPS TO TAKE POWER OVER YOUR HEALTH

If you have a variation in this panel, you may want to consider the following to improve your health:

» Eat a diet rich in colourful vegetables and fruits, cruciferous vegetables (such as cauliflower, cabbage and broccoli), onions, and garlic.

» Include food sources of antioxidant vitamin E from olive oil, almonds, papaya, sesame seeds and parsley.

» Engage in both cardio and weight training to improve glutathione conjugation.

» If you experience symptoms of liver damage, discuss supplements like acetylcysteine, and silymarin with your health care provider.

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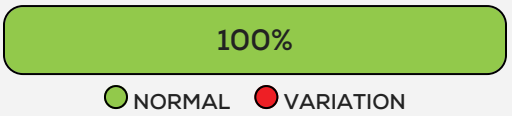

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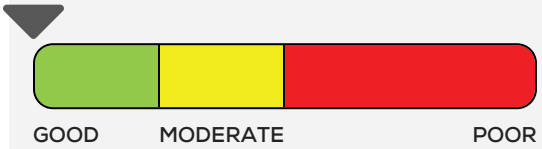

Your gene in this panel is functional, you have efficient detoxification capabilities via the GSTP1 gene. As a preventative measure, reduce your exposure to environmental toxins and carcinogens.

Detoxification Phase 2 - Acetylation

HOW EFFICIENTLY YOUR BODY CATALYZES ACETYLATION REACTIONS TO DETOXIFY HARMFUL CARCINOGENS

Phase 2 detoxification enzymes catalyze conjugation reactions, making dangerous metabolites (toxins) less reactive to your cellular components, more soluble in water, and easier to eliminate in the urine. N-Acetyltransferases (NATs) are phase 2 enzymes found in liver and other tissues. Two closely related NAT genes, NAT1 and NAT2, are present in humans.

NATs are involved in the detoxification and bioactivation of cancer-causing carcinogens via O- and N- acetylation. Variation in the NAT genes modifies both the efficacy and toxicity of numerous arylamine and hydrazine drugs (found in cigarette smoke, car exhaust fumes and in some food by-products) and increases risk towards several arylamine carcinogen-related cancers such as bladder and colon cancer.

Variations in these genes result in a slow or rapid acetylation phenotype, altering your ability to metabolize cancer causing agents. A significant interaction was found between the NAT2 slow acetylator genotype rheumatoid arthritis and bladder cancer risk particularly among cigarette smokers. If you have variation in your NAT genes you can take preventative measures to increase your quality of life.

TIPS TO TAKE POWER OVER YOUR HEALTH

If you have variations in this panel, you may want to consider the following to improve your health:

» Include cruciferous vegetables such as cauliflower, cabbage and broccoli to help with the detoxification process of acetylation.

» Cut back on fried foods and grilled meats, mutagens and carcinogens are generated during the heat processing of meat.

» Optimize your gastrointestinal health, practice excellent nutrition and hydration.

» Avoid environmental toxicants such as cigarette smoke, heavy metals, persistent organic pollutants, and electromagnetic radiation.

» Mobilize and eliminate toxins via loss of excess fat and use of saunas, chelation therapy, and exercise.

» Monitor your stress levels, get adequate sleep and relaxation.

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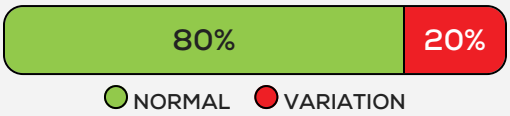

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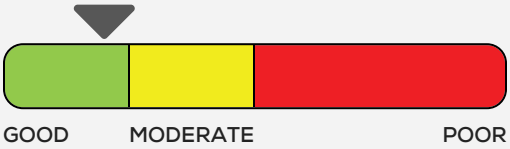


Your genes in this panel are functional. You have efficient detoxification capabilities via the NAT genes. If you are feeling symptoms of an increased toxic load it is likely due to variation in a different gene or environmental factors. As a preventative measure, reduce or eliminate exposure to heavy metals, persistent organic pollutants, and electromagnetic radiation.

Detoxification Phase 2 - Methylation

HOW EFFICIENTLY YOUR BODY METABOLIZES DOPAMINE, EPINEPHRINE (ADRENALIN), NOREPINEPHRINE (NORADRENALINE), AND ESTROGEN

Catecholamine methyl-transferase (COMT) is a phase II enzyme that catalyzes the detoxification of reactive oxygen species by O-methylation. It detoxifies polycyclic aromatic hydrocarbons, which are environmental carcinogens, as well as catechol estrogens (active natural estrogen metabolites). Estrogens are often thought of as a female hormone. However, they are also present in both sexes, but in larger amounts for women. Estrogens produced by your body can become carcinogenic via formation of catechol estrogen quinones if you have decreased COMT mediated detoxification.

The COMT enzyme modulates adrenergic, noradrenergic and dopaminergic signaling. Through these neurotransmitters the COMT gene plays a role in many neurological disorders. Variation is a possible risk factor for anxiety, depression, schizophrenia, eating disorders, attention deficit hyperactivity disorder, insomnia, bipolar disorder, panic disorder, and obsessive-compulsive disorder.

Variation in the COMT gene reduces enzyme activity. If you have a variation in the COMT gene, you may wish to talk with your healthcare provider about maximizing your health.

TIPS TO TAKE POWER OVER YOUR HEALTH

If you have a variation in this panel, you may want to consider the following to improve your health:

» Maintain adequate magnesium intake. Foods high in magnesium include pumpkin seeds, spinach and chard, avocado, banana, yogurt or kefir and dark chocolate.

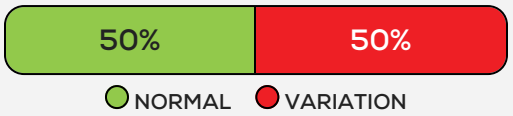
» Include vitamin C rich foods like citrus (tangerines and oranges) as well as strawberries and bell peppers.

» Have adequate intake of foods containing folate, Include dark leafy greens, mushrooms, oranges, whole grains and cereals in your diet.

» Include foods high in vitamin B12 such as lean meat, fish, eggs and dairy.

» Consider nighttime magnesium glycinate and a morning vitamin B complex containing methylcobalamin and L-5MTHF. Adequate B vitamins can help to avoid elevated homocysteine.

YOUR GENETIC COMPOSITION %



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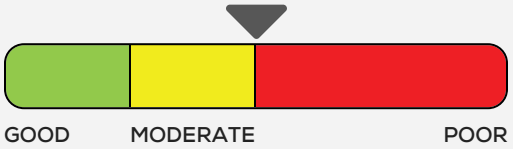


Your variation in this gene is moderate. You have methylation capabilities via the COMT gene that are less than optimal. Include food sources of magnesium, vitamin B9 (folate), B12, and C. Improve your quality of life using detoxification strategies.

» Avoid catechol drugs which utilize the COMT pathway.

» Improve quality of life through detoxification strategies of sweating, fasting, infrared sauna, and botanical liver support such as milk thistle.

» Modulate estrogen, reduce premenstrual syndrome symptoms by supplementing with indole-3-carbinol, a compound found in cruciferous vegetables which has the ability to shift the ratio of estrogen metabolites.

» Consider black cohosh, a supplement which contains triterpene glycosides, can have estrogen modulating impacts.

» Include GABA-promoting theanine and inositol, magnesium and chamomile for sleep.

Detoxification Phase 2 - Oxidative Protection

HOW EFFICIENTLY YOUR ANTIOXIDANT ENZYMES CAN PROTECT YOU AGAINST REACTIVE OXYGEN SPECIES

When your oxidant defense system is healthy, it can protect you against the toxicity of reactive oxygen species. Reactive oxygen species are reactive chemical species containing oxygen, that are formed as a natural by-product of the metabolism of oxygen and have important roles in cell signaling and homeostasis. During times of environmental stress, reactive oxygen species levels can increase dramatically. This may result in significant damage to cell structures.

SOD2 is one of the major antioxidant enzymes and constitutes the first-line of defense against reactive oxygen species. The SOD2 gene maintains normal levels of reactive oxygen species in your body. Genetic variations in SOD2 can lead to an imbalance in oxidative stress. Variations may change the enzyme antioxidant capacity and subsequently lead to synergic effects induced by oxidative stress.

Cell damage induced by reactive oxygen species is involved in several pathological processes. Defects in antioxidant pathways are connected to diseases including diabetes, age-related disease, chronic obstructive pulmonary disease, and cancer.

TIPS TO TAKE POWER OVER YOUR HEALTH

If you have a variation in this panel, you may want to consider the following to improve your health:

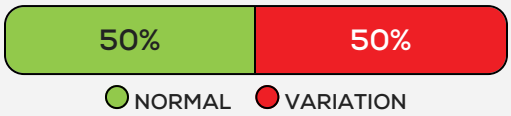
» Protect against oxidative stress by consuming foods rich in antioxidants such as colorful vegetables and fruits. Foods including brocolli, spinach, artichokes, berries, pecans, and turmeric are high in antioxidants.

» Include dietary sources of manganese, a cofactor for SOD2, found in chickpea, spinach, sweat potatoe and brown rice.

» Consider supplements such as coenzyme Q10, alpha-lipoic acid, n-acetyl cysteine, zeaxanthin, lutein and glutathione, selenium and zinc to support antioxidant function.

» Reduced exposure to carcinogenic toxins and environmental pollutants, including alcohol, tobacco smoke, cured meats and self-care products with phthalates.

YOUR GENETIC COMPOSITION %



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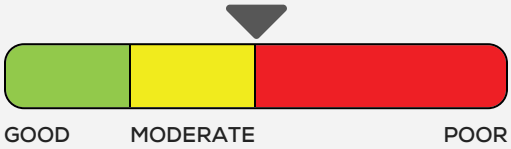


Your variations in these genes are moderate. Your antioxidant capabilities via the SOD2 gene are less than optimal. Your variations in these genes are high. Your antioxidant capabilities are less than optimal via the SOD2 gene. Include food sources of antioxidants and manganese.

HORMONE HEALTH

This report provides information about how your body biosynthesizes, metabolizes and eliminates estrogens. Estrogen is one of two main sex hormones that women have (the other is progesterone). Men have estrogen too but in smaller amounts. Estrogen is important for many reasons as it facilitates growth, development and sexual maturity. For women, it helps to control the menstrual cycle and is an important factor in childbearing.

While necessary for normative growth and development, lifetime exposure to estrogens, and their metabolites, is a well-established and significant risk factor in developing hormone related diseases in women. Excessive estrogen can also cause menstrual problems, fibroids, weight issues and mood changes. Men can experience sexual difficulties, infertility and bodily changes such as enlarged breasts. Both our lifestyle choices and surrounding environment contribute to our levels of estrogen.

The production, metabolism and elimination of estrogens are controlled via a complex network of tightly regulated enzymatic steps. The genes responsible for the bio-synthesis, metabolism and elimination of estrogens are well studied. Use this report as a tool to uncovering imbalances in the female sex hormones in your body.

Biosynthesis of Androgens and Estrogens

HOW EFFECTIVELY YOUR BODY REGULATES SEX STEROIDS, ANDROGEN AND ESTROGEN

The production of sex steroids, steroidogenesis, stems from cholesterol. Through the multi-step metabolism of cholesterol, progesterones, androgens and estrogens are sequentially synthesized (and androgens are metabolised).

Estrogen makes cells grow, develops the uterus, breasts, periods, pregnancy and the egg within the ovary. However, in excess it becomes toxic to the body. Too much estrogen causes cells to multiply out of control. A prolonged imbalance of estrogen to progesterone increases your cancer risk.

The following key genes, and their encoded enzymes, play critical roles in this multi-step biosynthesis and metabolism of androgen and estrogen.

TIPS TO TAKE POWER OVER YOUR HEALTH

If you have variations in this panel, you may want to consider the following to improve your health:

» Choose hormone-free, meat, dairy and wild fish.

» Avoid produce that has been sprayed with herbicides or pesticides.

» Use glass rather than plastic containers for food. Be sure not to heat or microwave food in plastic bags or containers.

» Avoid bleached paper such as coffee filters, tissue paper, napkins.

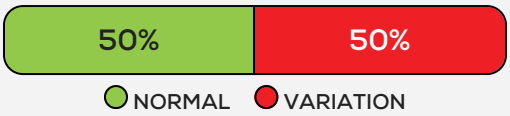
» Avoid the use of household chlorine containing bleach or use disposable gloves and open all the windows if working with chemicals.

» Reduce use of solvents found in nail polish and nail polish remover.

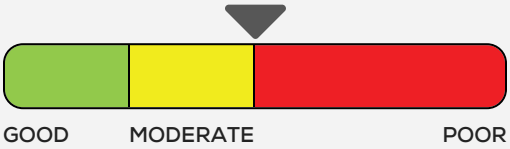
» Undergo lifestyle improvements in nutrition, exercise and stress management.

» Follow your health care professional's schedule for checkups related to early detection of hormone related cancers.

YOUR GENETIC COMPOSITION %



YOUR GENE FUNCTION



Your variations in these genes are moderate. This can lead to an imbalance of sex steroids, associated with an increased risk of hormone related diseases.

Phase 1 - Metabolism of Estrogens

YOUR BODY'S ABILITY TO METABOLIZE ESTROGEN

Multiple enzymatic pathways work to metabolize estrogens into less biologically active substrates. The metabolism of estrogens is an excellent example of the bi-phasic detoxification system of the body. In this panel we examine variations in your key genes for phase 1 in the metabolism of estrogens. During phase 1 catechol estrogens are formed through cytochrome P450 metabolism.

Variations in these genes can lead to an imbalance in your sex hormones which can increase your risk of various hormone related cancers. If you have variation in this panel you can proactively manage your health by discussing early screening and preventative measures with your health care provider.

TIPS TO TAKE POWER OVER YOUR HEALTH

If you have variations in this panel, you may want to consider the following to improve your health:

» Include high-quality, absorbable protein in your diet. It is an important source of amino acids for the production of the phase 1 CYP enzymes. Good sources of protein include eggs and whey protein.

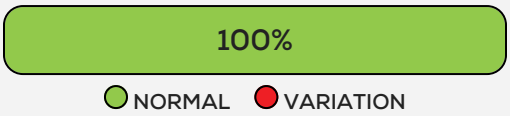
» Eat non-starchy vegetables, including Brassica (a plant in the mustard family), they provide a wide variety of phytochemicals that impact detoxification and biotransformation. They directly impact many of the phase 1 CYP pathways in the metabolism of estrogens. Examples of Brassica vegetables are rutabaga, turnips, kohlrabi, cabbage, collard greens, kale, cauliflower, broccoli, brussels sprouts, and mustard seed.

» Decrease exposure to xenobiotics (a drug, pesticide, or carcinogen) and xenoestrogens (chemical compounds which imitate estrogen).

» Be cautious with long-term hormone replacement therapy, avoid the equine estrogens.

» Eat a diet rich in antioxidants.

YOUR GENETIC COMPOSITION %



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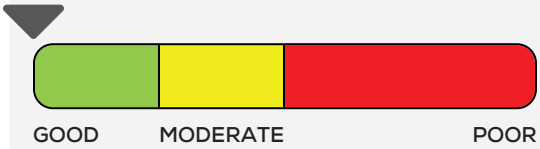


Your genes in this panel are normal or beneficial. You are likely to have a healthy balance of sex steroids, not associated with hormone related diseases.

Phase 2 - Elimination of Estrogen Metabolites

YOUR BODY'S ABILITY TO ELIMINATE ESTROGEN AND ESTROGEN METABOLITES

Catechol estrogens formed through phase I cytochrome P450 metabolism, carry risks associated with accumulation. These intermediate metabolites must therefore be further processed by phase 2 conjugation enzymes. During phase 2, water-soluble substrates are conjugated to the metabolites of estrogens, thereby limiting their hormonal activity, supporting elimination, reducing toxic quinone accumulation and limiting oxidative damage.

Estrogen metabolism is accomplished by the same family of detoxification enzymes responsible for the deactivation and elimination of drugs, environmental toxins and other biologically active by-products, many of which interact with the enzymes to induce their activity and promote toxicity. Exposure to these chemicals may alter enzyme activity and potentiate the risk of hormone dysregulation and exposure to toxic intermediates.

Polymorphisms in the genes that encode these enzymes affect the efficiency of Phase 2 and ultimately contribute to the exposure of hormone sensitive tissues to biologically active estrogens and toxic estrogen metabolites.

TIPS TO TAKE POWER OVER YOUR HEALTH

If you have variations in this panel, you may want to consider the following to improve your health:

» Eat foods high in antioxidants.

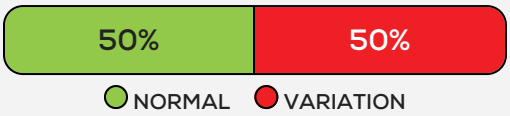
» Have adequate supplementation with trimethylglycine, vitamins B12, vitamin B6, and folate.

» Include GABA-promoting botanicals which can provide relief. Examples are theanine, inositol, magnesium, noni fruit, and chamomile.

» Consider nighttime magnesium glycinate and a morning vitamin B complex containing methylcobalamin, L-5MTHF, and pyridoxine-5-phosphate which may also be helpful.

» Avoid elevated homocysteine (amino acids found in your blood, mostly from eating meat), amphetamines (used to treat ADHD), catechol drugs, and equine estrogens.

YOUR GENETIC COMPOSITION %



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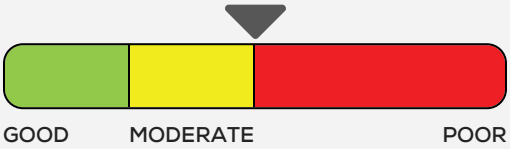

Your variations in these genes are moderate. You may have slightly higher risks with exposure to biologically active and toxic estrogen metabolites. These increase the risk for unregulated cellular proliferation and tissue damage.

» Reduce risk and improve quality of life through detoxification strategies of sweating, fasting, infrared sauna, and botanical liver support such as milk thistle.

» Modulate estrogen to reduce or eliminate premenstrual syndrome. Indole-3-carbinol, a compound found in cruciferous vegetables, has the ability to shift the ratio of estrogen metabolites. Black cohosh contains triterpene glycosides that have estrogen modulating impacts on metabolism.

» Supplement with manganese either through diet or supplement as it is the cofactor for SOD2.

» Avoid environmental pollutants, drugs, radiation, and carcinogens.

INFLAMMATION RESPONSE

Inflammation is a critical component of the immune system's defense, designed to protect the body by identifying and neutralizing harmful invaders such as bacteria, viruses, and other foreign substances. The immune system also recognizes and responds to "altered-self" cells, such as tumors or cancerous growths, initiating responses to eliminate them. The visible signs of inflammation—redness, swelling, and pain—reflect the body's attempt to repair itself. However, when the immune system becomes overactive, it can lead to autoimmune diseases, where the body mistakenly attacks its own healthy cells, or hypersensitivity reactions, such as allergies, triggered by specific allergens.

The genes analyzed in these panels play a vital role in regulating the immune system's effectiveness in managing inflammation, fighting infections, and targeting abnormal cells. While genetic predisposition contributes to immune function, lifestyle and environmental factors significantly influence its performance. Supporting your immune system involves adopting evidence-based strategies, including:

» Prioritize a diet rich in fruits, vegetables, and whole grains, while reducing intake of saturated fats to minimize chronic inflammation.

» Engage in moderate physical activity for at least 30 minutes most days to boost immune resilience and reduce systemic inflammation.

» Maintain a healthy body weight as obesity is linked to chronic inflammation and reduced immune efficiency.

» Keep blood pressure within healthy ranges, as hypertension is associated with systemic inflammation.

» Aim for 7-9 hours of quality sleep to allow the immune system to repair and regenerate.

» Wash hands frequently, especially after exposure to public spaces, to minimize the risk of infections.

» Smoking damages immune cells, heightens inflammation, and increases susceptibility to infections and diseases.

By combining insights from genetic testing with these proactive lifestyle choices, you can enhance your immune system's capacity to defend and heal effectively.

Inflammatory Immune Response

HOW EFFECTIVELY YOUR IMMUNE SYSTEM FIGHTS INFLAMMATION

Inflammation is a fundamental immune response that protects the body against something harmful or irritating. The activation of innate/ inflammatory immunity is mediated by interleukin cytokines in our body; IL1, IL6, and TNF.

The interleukin genes encode pro and anti-inflammatory cytokines involved in regulating inflammation. Cytokines regulate responses to infection, immune responses, inflammation, and trauma, they are secreted by virtually all immune cells. Some cytokines act to promote inflammation (pro-inflammatory), whereas others serve to reduce inflammation and promote healing (anti-inflammatory). If you have an excess of inflammation you may be prone to autoimmune diseases. If you do not have enough inflammation your body may not efficiently respond to cancer causing agents and abnormal cells. A balance of interleukins is crucial for optimal health.

Interleukin-1A (IL1A), interleukin-1B (IL1B), and interleukin-6 (IL6) are pro-inflammatory cytokines. Individuals who have variations in these genes may experience an imbalance in serum concentration of interleukins. This has been correlated with negative clinical prognosis in some types of cancer, systemic inflammation and diseases like arthritis, hypertension, cardiovascular disease, stroke, insulin resistance, type 2 diabetes, increased body mass index, celiac disease, and Alzheimer's disease.

When reviewing your genotype results, listed on back page, please take this into account. In Asian and African populations, IL6 Immune Response is almost always the GG genotype which is associated with increased inflammation. Further, for IL6 Osteoarthritis Susceptibility the majority of people will carry the allele that confers increased inflammation. A single increased inflammation SNP may not cause an issue. However, if you have several increased inflammation variations you may wish to contact your health care provider to set up a preventative health care plan.

TIPS TO TAKE POWER OVER YOUR HEALTH

If you have variations in this panel, you may want to consider the following to improve your health:

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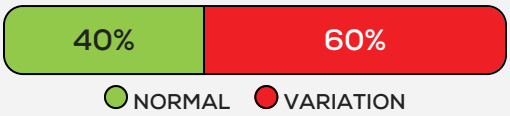

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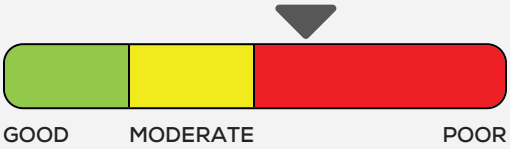


Your variations in this panel are high. Studies have linked this gene to many inflammatory conditions. If your TNFA gene variation level is also high (provided on the next page of this report), you may wish to visit your health professional to discuss risks of chronic inflammation. You may consider supplementing with therapeutic doses of omega-3.

» Consider taking immune boosters such a vitamin C, D or medicinal mushrooms (reishi, cordyceps, turkey tail).

» Consume foods that fight inflammation including pepper, ginger, turmeric, garlic, onions, olive oil, fish oil, berries, nuts, and omega-3.

» Increase your physical activity.

» Consider taking probiotics.

» Talk to your healthcare provider about statin therapy if you are at risk of cardiovascular disease.

Inflammatory Tumour Response

HOW EFFECTIVELY YOUR IMMUNE SYSTEM FIGHTS ACUTE INFLAMMATORY DISEASES

Tumor Necrosis Factor Alpha (TNFA) is a cell signaling protein which encodes a classic pro-inflammatory cytokine involved in the regulation of immune cells. Some cytokines act to make disease worse (pro-inflammatory), whereas others serve to reduce inflammation and promote healing (anti-inflammatory). The TNFA is stimulated by many external and internal agents and secreted by various cells of the innate immune system. TNFA is able to cause fever, cell death, cachexia (syndrome involving loss of muscle and weight) and inflammation. It can also inhibit tumorigenesis (formation of cancer) and the formation of biological viruses during an infection.

Variations in this gene result in dysregulation of TNFA production, including overproduction of TNFA. In particular, TNFA is shown to be associated with age-related diseases such as Alzheimer's disease, insulin resistance, type 2 diabetes, cardiovascular disease, frailty, depression, and cancer—all of which are highly prevalent during aging.

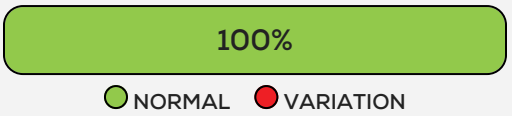
Changes in the regulation of TNFA have been linked to a number of inflammatory diseases like asthma, chronic obstructive pulmonary disease, Crohn's disease, kidney diseases, arthritis, celiac disease, and psoriasis. TNFA production is increased in oxidative stress, chronic antigenic stimulation, cytomegalovirus infection (a common virus), visceral adiposity (a component of total body fat), and insulin resistance. Thus, the regulation and control of this vital molecule may be a key to aging and age-related pathologies.

C-reactive protein (CRP) recognizes foreign pathogens and damaged cells and initiates their elimination, increasing protein level in plasma greatly during acute phase response to tissue injury, infection, or other inflammatory stimuli. Elevated levels of CRP independently predict increased risk of development of metabolic syndrome, diabetes, myocardial infarction, and stroke. CRP is a biomarker of inflammation with predictive value for cardiac events.

TIPS TO TAKE POWER OVER YOUR HEALTH

If you have a variation in this panel, you may want to consider the following to improve your health:

YOUR GENETIC COMPOSITION %



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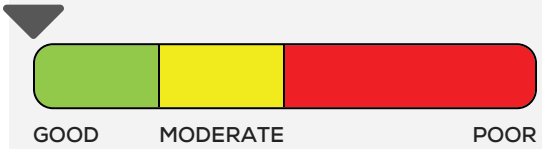


Your genes are functional. You do not have a risk for increased inflammation due to variation in TNFA or CRP.

» Select dietary options that reduce inflammation including fish, berries, leafy green vegetables, and ginger.

» Include omega-3 fatty acids and vitamin E through diet and supplements, which provide anti-inflammatory effects.

» Supplement with vitamin A. Retinoids from vitamin A have been associated with a reduction in local inflammatory response via their inhibitory action on TNF.

» Minimize pro-inflammatory dietary options, such as high-glycemic foods, processed foods and fast foods.

» Nonsteroidal anti-inflammatory drugs (NSAIDs) such as aspirin and ibuprofen can reduce inflammation, consult with your health care professional before introducing these drugs.

METHYLATION

Methylation: The Power Switch for Your Health

DNA methylation is one of the body's most essential biological processes—and it plays a powerful role in how you feel and function every day. Think of it as a **cellular switchboard**, helping to turn genes on or off as needed. When your methylation system is running well, you're more likely to feel **energetic, mentally sharp, and emotionally balanced**. But when it's not, you might feel **tired, moody, irritable, or run down**.

Methylation is involved in hundreds of important functions in the body. It helps maintain **genetic stability**, regulates gene expression, supports **healthy aging**, and helps protect against conditions like **heart disease, cancer, and neurodegeneration**. Research links methylation imbalances with **high homocysteine, chronic fatigue, low mood, diabetes, and accelerated aging**. If you have several risk factors, optimizing your methylation becomes even more important.

This section of your report evaluates key genetic variations involved in the methylation cycle—especially how your body produces and uses **SAMe (S-adenosylmethionine)**, a major methyl donor, and how it processes **homocysteine into methionine**, a reaction heavily dependent on **folate (vitamin B9)** and **vitamin B12**.

To help you understand how your genes fit into this process, your results follow the **natural flow of the methylation cycle**:

Summary of Flow:

1. **Folate activation** – Are you converting folate into its active form? *(MTHFR, SHMT1)*
2. **Main methylation reaction** – Can you efficiently convert homocysteine into methionine? *(MTR)*
3. **B12 recycling** – Are you able to regenerate active B12 to keep the cycle going? *(MTRR)*
4. **Methyl group recycling** – Can you clear byproducts to keep methylation running smoothly? *(AHCY)*
5. **B12 availability** – Are you absorbing, transporting, and maintaining B12 levels well? *(FUT2, TCN2)*

Nutrients from your food act as methylation co-factors. You can support methylation by eating a nutrient-rich diet and adding in supplementation where necessary. Important co-factors include:

» Folate (Vitamin B9) - leafy greens, legumes, fruits, eggs, nuts, meat, and grains.

» Other B vitamins (B2, B6, B12) - found in salmon, meat, eggs, dairy, and leafy greens.

» Methionine - found in brazil nuts,beans, quinoa, turkey, and beef.

» Betaine - found in beets, spinach, shellfish, and whole grains.

Understanding your unique methylation genes allows you to take precise steps to support **energy, mood, detoxification, and long-term vitality**.

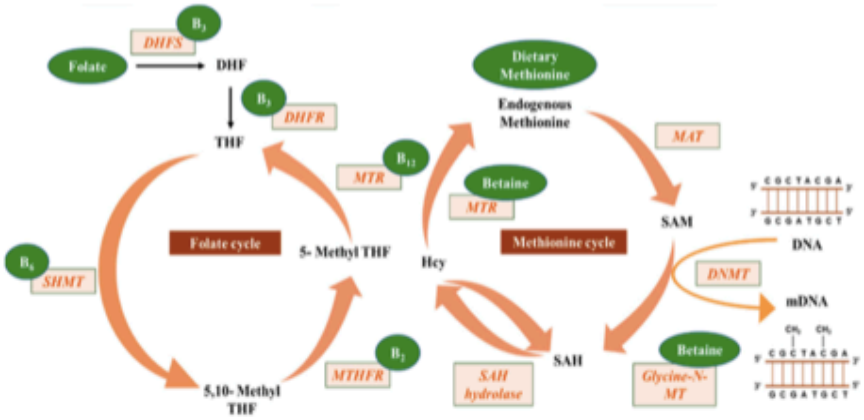


Figure 1. Micronutrient methyl donors that are involved in the one carbon metabolism and subsequently in DNA methylation. Dietary folate is converted to dihydrofolate (DHF) via the dihydrofolate synthase (DHFS) enzyme then to tetrahydrofolate (THF) by the dihydrofolate reductase (DHFR) enzyme; in both steps, vitamin B_3 (B_3) acts as a co-factor. THF is then converted to 5,10-methyl THF via the enzyme serine hydroxymethyltransferase (SHMT) that has vitamin B_6 (B_6) as a coenzyme. This reaction is followed by a reduction of 5,10-methyl THF to 5-methyl THF via the enzyme methylenetetrahydrofolate reductase (MTHFR) and the co-enzyme, vitamin B_2 (B_2). At the end of this cycle, 5-methyl THF is transformed back to THF by the enzyme 5-methyltetrahydrofolate-homocysteine methyltransferase (MTR) that utilizes vitamin B_2 as a co-enzyme. The same enzyme, MTR, converts homocysteine (Hcy) to methionine. Betaine acts as an indirect methyl donor for the latter reaction. Methionine, whether it is endogenously synthesized or diet-derived is critical for the synthesis of S-adenosylmethionine (SAM), which acts as a DNA methyltransferase (DNMT) cofactor and a universal methyl-donor for DNA methylation. The enzyme that catalyzes this reaction is methionine adenosyltransferase (MAT). Glycine N-methyltransferase (Glycine N-MT) converts SAM to s-adenosylhomocysteine (SAH), which could be reversibly converted to Hcy via the enzyme SAH hydrolase. Finally, the activated DNMT enzyme will catalyze the transfer of a methyl group to carbon 5 of cytosines in the DNA to produce methylated DNA (mDNA).

[Image source: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6471069/pdf/nutrients-11-00608.pdf]?

Methylation - MTHFR

HOW EFFECTIVELY YOU METABOLIZE FOLATE INTO ITS ACTIVE FORM

Methylenetetrahydrofolate reductase (MTHFR) is an enzyme that helps convert folate from food into its active form, 5-MTHF (5-methyltetrahydrofolate). This step is essential for both the folate cycle and the methylation process, which support things like gene expression, detoxification, hormone and neurotransmitter processes, and energy production.

Some people have genetic variations in the MTHFR gene that make it harder for their bodies to activate folate. As a result, they may have higher homocysteine levels, especially if their folate intake is low. High homocysteine and low folate are linked to increased risk for heart disease, mood disorders, diabetes, pregnancy complications, birth defects, and certain cancers.

These variations are common and can be managed with the right nutrition. If you have an MTHFR variation, you may benefit from taking folate in its active, pre-methylated form (5-MTHF). This helps bypass the enzyme and ensures your body gets the folate it needs for healthy methylation.

TIPS TO TAKE POWER OVER YOUR HEALTH

If you have a variation in this panel, you may want to consider the following to improve your health:

» Increase your intake of folate-rich foods from dark leafy green vegetables such as swiss chard, kale, watercress, spinach, dandelion, collard greens, beet greens.

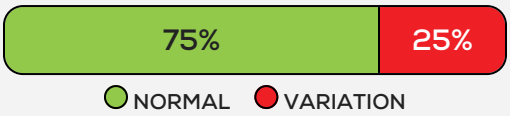
» Increase sources of folate-rich foods such as beans, peas, lentils, lemons, bananas, and melons.

» Improve folate absorption with vitamin C from fruits and vegetables including plum, rose hip, blackcurrant, bell pepper, kale and broccoli.

» Include dietary sources of methylation cofactors including vitamins B2, B3, B6 and B12. Sources include salmon, leafy greens, eggs, grass-fed beef, shell fish and legumes.

» Consider supplementing with a B vitamin complex that includes a methylated folate. Look for labels which read 5-methyltetrahydrofolate or 5-MTHF (which are pre-methylated).

YOUR GENETIC COMPOSITION %



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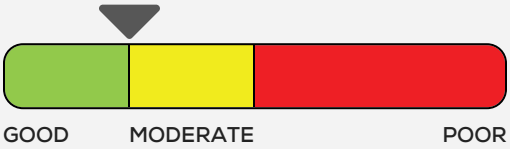


Your genes in this panel are normal. This is associated with optimal enzyme function and folate bioactivation.

Methylation - SHMT1

HOW EFFECTIVELY YOU CONVERT FOLATE AND REGULATE HOMOCYSTEINE

Serine Hydroxymethyltransferase 1 (SHMT1) is an enzyme that depends on vitamin B6. It helps convert the amino acid serine and folate (THF) into glycine and a usable form of folate needed for methylation and DNA production. This makes SHMT1 important not just for methylation, but also for building DNA and making neurotransmitters that support brain function.

Variations in the SHMT1 gene can reduce enzyme activity or cause it to build up in the cell, lowering the availability of active folate for converting homocysteine to methionine. This can lead to elevated homocysteine and low folate levels, especially when combined with other gene variants like MTHFR. Together, these variations can increase the risk of cardiovascular disease and may affect how genes are regulated, potentially influencing cancer risk.

Getting enough folate, vitamin B6, and other B vitamins through food or supplements can help support this pathway, especially if you carry variations in SHMT1 or other methylation-related genes

TIPS TO TAKE POWER OVER YOUR HEALTH

If you have variation in this panel, you may want to consider the following to improve your health:

» Increase intake of co-factor vitamin B6 rich foods including turkey, grass fed beef, bananas, chickpeas, potatoes, and pistachios.

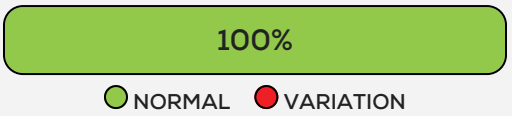
» Take care when preparing vitamin B6 rich foods as this vitamin is subject to processing loss of more that 50% in some foods during cooking and storing. Plant sources tend to lose less during processing, as they contain a more stable source than that found in animal foods.

» Increase your intake of folate-rich foods from dark leafy green vegetables such as swiss chard, kale, watercress, spinach, dandelion, collard greens, beet greens.

» Increase other sources of folate-rich foods such as beans, peas, lentils, lemons, bananas, and melons.

» Consider supplementing with a B vitamin complex that includes a methylated folate (5-methyltetrahydrofolate/5-MTHF). This version of vitamin B9 is pre-methylated which can increase bioavailability and bypass a potentially weak SHMT1.

YOUR GENETIC COMPOSITION %



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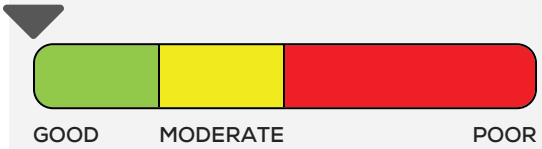


Your gene in this panel is functional. This is associated with optimal bioavailability of vitamin B9.

Methylation - MTR

HOW EFFICIENTLY YOU TRANSFORM HOMOCYSTEINE INTO METHIONINE WITH FOLATE AND B12

MTR (Methionine Synthase) is an important enzyme that helps convert homocysteine back into methionine, a key building block for producing SAMe—your body's primary methyl donor for DNA repair, detox, mood balance, and energy production. This process prevents the harmful buildup of homocysteine in the blood and supports healthy methylation.

For MTR to work properly, your body needs methylated vitamin B12 (methylcobalamin) and support from another enzyme made by the MTRR gene. Without these cofactors, your body may struggle to recycle homocysteine efficiently, which can impact methylation and overall health.

Some research has linked variations in the MTR gene to increased risk of birth defects like spina bifida, cleft palate, and cardiac defects particularly when folate and B12 levels are low. To reduce risk, ensure adequate intake of folate and other methylation co-factors.

TIPS TO TAKE POWER OVER YOUR HEALTH

If you have a variation in this panel, you may want to consider the following to improve your health:

» Eat foods rich in vitamin B12 like eggs, sardines, clams, fortified nutritional yeast, grass-fed meat and dairy.

» Ensure adequate intake of trace mineral zinc found in shellfish, seeds and legumes such as lentils, chickpeas and beans.

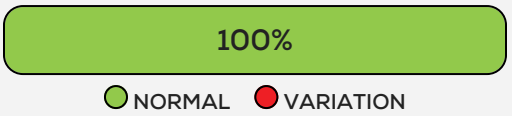
» Consider supplementing with a B vitamin complex that includes methylcobalamin. This version of vitamin B12 is pre-methylated which can increase bioavailability.

» Support digestion to improve vitamin B12 absorption.

» Speak to your healthcare provider about improving your digestion in order to maximize absorption of vitamin B12 through food, especially if you have gastrointestinal conditions like atrophic gastritis, ulcerative colitis, or Crohn's disease.

» Have your vitamin B12 and homocysteine levels tested, especially if you exhibit symptoms of vitamin B12 deficiency, such as fatigue, and are over 50 years old.

YOUR GENETIC COMPOSITION %



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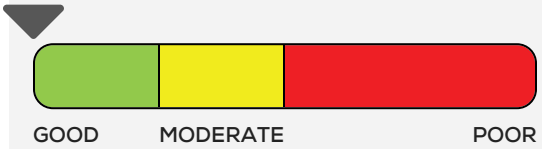


Your gene in this panel is normal. This is associated with optimal homocysteine to methionine recycling.

Methylation - MTRR

HOW EFFICIENTLY YOU REGENERATE B12 FOR METHIONINE SYNTHESIS

Methionine Synthase Reductase (MTRR) is a vital enzyme that works closely with Methionine Synthase (MTR) to keep the methylation cycle running efficiently. MTR converts homocysteine into methionine, but it depends on active vitamin B12 (methylcobalamin) to function. Over time, MTR becomes inactive, and MTRR is needed to regenerate methylcobalamin and reactivate MTR.

Without MTRR, this cycle slows down, leading to elevated homocysteine and reduced production of methionine and SAMe, which are essential for DNA repair, detoxification, neurotransmitter balance, and energy production.

People with MTRR gene variations may have reduced enzyme activity, making it harder to maintain active B12 and efficient methylation. This may raise the risk for cardiovascular disease, fatigue, neurological symptoms, and mood disorders. Supplementing with methylated B12 and other supportive nutrients can help keep the methylation cycle functioning well.

TIPS TO TAKE POWER OVER YOUR HEALTH

If you have a variation in this panel, you may want to consider the following to improve your health:

» Eat foods rich in vitamin B12 like eggs, sardines, clams, fortified nutritional yeast, grass-fed meat and dairy.

» Ensure adequate intake of trace mineral zinc found in shellfish, seeds and legumes such as lentils, chickpeas and beans.

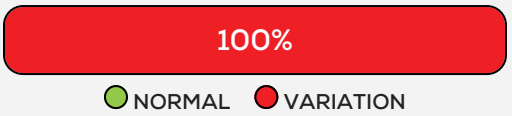
» Consider supplementing with a B vitamin complex that includes methylcobalamin. This version of vitamin B12 is pre-methylated which can increase bioavailability.

» Support digestion to improve vitamin B12 absorption.

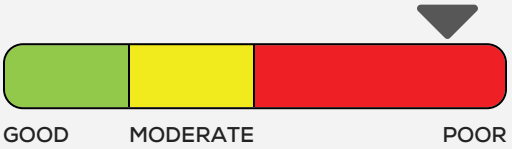
» Speak to your healthcare provider about improving your digestion in order to maximize absorption of the vitamin through food, especially if you have gastrointestinal conditions like atrophic gastritis, ulcerative colitis, or Crohn's disease.

» Have your vitamin B12 and homocysteine levels tested, especially if you exhibit symptoms of vitamin B12 deficiency, such as fatigue, and are over 50 years old.

YOUR GENETIC COMPOSITION %



YOUR GENE FUNCTION



Your variation in this gene is high. This genotype is associated with reduced methylation of cobalamin to methylcobalamin and reduced MTR activity. Ensure adequate vitamin B12 consumption to reduce risk.

Methylation – AHCY

HOW WELL YOU RECYCLE METHYL GROUPS FOR ENERGY, MOOD, AND DETOX

Adenosylhomocysteinase (AHCY) is a key enzyme in the methylation cycle. It helps break down S-adenosylhomocysteine (SAH) into homocysteine and adenosine. This step is crucial because SAH is a strong inhibitor of methylation. If SAH builds up, it can interfere with important processes like DNA, RNA, protein, and fat methylation. When AHCY is working properly, it keeps methylation running smoothly throughout the body.

A variation in the AHCY gene may reduce how well the enzyme works. This can lead to higher levels of SAH and homocysteine, slowing methylation and affecting detox, mood balance, and cardiovascular or neurological health. Reduced AHCY activity may increase sensitivity to stress, toxins, or poor nutrient intake.

AHCY affects the balance between SAM (the methyl donor) and SAH (its inhibitor). Disruption in this balance can impact energy, neurotransmitter production, and overall methylation efficiency. Knowing your AHCY status can help guide diet and lifestyle choices to support methylation and long-term wellbeing.

TIPS TO TAKE POWER OVER YOUR HEALTH

If you have variations in this panel, you may want to consider the following to improve your health:

» Support methylation with adequate intake of: choline, betaine (beets, spinach), methionine (eggs, turkey), folate (leafy greens), and methylated B vitamins.

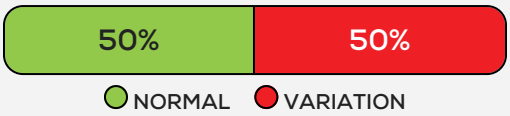
» Monitor homocysteine levels, especially if you have other methylation SNP variations (e.g. MTHFR, MTRR).

» Promote liver health with phase 2 detox nutrients: cruciferous vegetables, dandelion, and milk thistle.

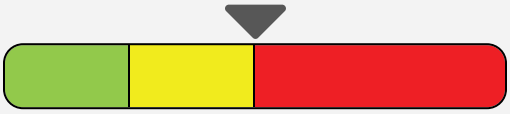
» Reduce alcohol intake and high-fat diets that increase methylation demand.

» Consider SAMe or creatine supplementation to support methylation demand if advised by a health practitioner.

YOUR GENETIC COMPOSITION %



YOUR GENE FUNCTION



Your variation in this gene is moderate. This genotype may lead to slightly reduced AHCY enzyme efficiency, potentially slowing the clearance of SAH and mildly impacting methylation reactions. While not typically high-risk on its own, it may contribute to methylation bottlenecks if combined with other SNPs (e.g. MTHFR, MTRR).

Methylation - FUT2

HOW EFFECTIVELY YOU ABSORB B12 FOR HEALTHY METHYLATION

Fucosyltransferase 2 (FUT2) is a gene that helps produce ABO blood antigens found in the lining of your digestive tract, including the stomach and salivary glands. People who are secretors (who release these antigens into saliva and the gut) generally absorb vitamin B12 more effectively than those with a FUT2 gene variation, known as non-secretors.

Vitamin B12 is essential for methylation, a process that supports gene regulation, detoxification, and energy production. It also helps convert homocysteine and methylmalonyl-CoA, which can build up and contribute to heart disease, immune dysfunction, digestive issues, and neurological symptoms if not properly processed.

Variations in the FUT2 gene may reduce B12 absorption, even with a healthy diet. B12 levels also tend to decline with age, partly due to reduced intrinsic factor, which is needed for absorption. Non-secretors may also have a different gut microbiome, impacting digestion and immune health. Fortunately, a nutrient-rich diet and good gut care can help support B12 absorption and offset these risks.

TIPS TO TAKE POWER OVER YOUR HEALTH

If you have risk for vitamin B12 deficiency, you may want to consider the following to improve your health:

» Eat foods rich in vitamin B12 like eggs, sardines, clams, fortified nutritional yeast, grass-fed meat and dairy.

» Consider supplementing with a B vitamin complex that includes methylcobalamin. This version of vitamin B12 is pre-methylated which can increase bioavailability.

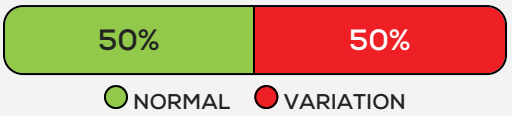
» Support digestion to improve vitamin B12 absorption.

» Fiber-rich as well as fermented and prebiotic foods can help support a diverse and healthy gut microbiome.

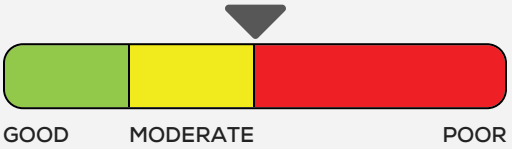
» Have your vitamin B12 and homocysteine levels tested, especially if you exhibit symptoms of vitamin B12 deficiency, such as fatigue, and are over 50 years old.

» Speak to your healthcare provider about improving your digestion in order to maximize absorption of the vitamin through food, especially if you have gastrointestinal conditions.

YOUR GENETIC COMPOSITION %



YOUR GENE FUNCTION



Your genotype is associated with an intermediate vitamin B12 level, essential for methylation.

Methylation - TCN2

HOW EFFECTIVELY YOU TRANSPORT B12 TO CELLS FOR USE IN METHYLATION

Transcobalamin 2 (TCN2) is the main protein responsible for transporting vitamin B12 from the bloodstream into your cells, where it is needed for important functions like methylation, red blood cell production, energy metabolism, and nervous system support. After B12 is absorbed from food in the digestive tract, it must bind to TCN2 to be delivered to tissues throughout the body.

Individuals with genetic variations in the TCN2 gene may have a reduced ability to transport B12 efficiently. This can lead to normal B12 levels in the blood, but insufficient B12 inside cells, where it's actually needed. This functional deficiency may contribute to elevated homocysteine, especially with age, and has been linked to an increased risk of cardiovascular disease, fatigue, and neurological symptoms.

Because B12 absorption also depends on a healthy digestive system, people over age 50—who often produce less intrinsic factor, the protein needed to absorb B12—may be especially at risk. Supporting both B12 intake and its transport into cells is key to maintaining healthy methylation and overall wellness.

TIPS TO TAKE POWER OVER YOUR HEALTH

If you have variation in this panel, you may want to consider the following to improve your health:

» Eat foods rich in vitamin B12 like eggs, sardines, clams, fortified nutritional yeast, grass-fed meat and dairy.

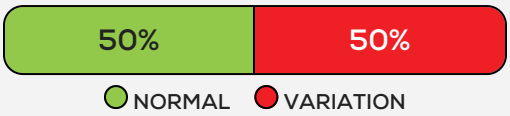
» Consider supplementing with a B vitamin complex that includes methylcobalamin. This version of vitamin B12 is pre-methylated which can increase bioavailability.

» Support digestion to improve vitamin B12 absorption.

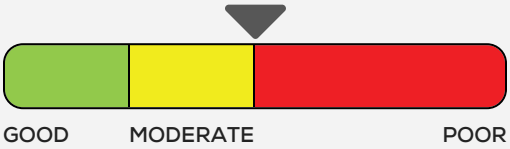
» Speak to your healthcare provider about improving your digestion in order to maximize absorption of the vitamin through food, especially if you have gastrointestinal conditions like atrophic gastritis, ulcerative colitis, or Crohn's disease.

» Have your vitamin B12 and homocysteine levels tested, especially if you exhibit symptoms of vitamin B12 deficiency, such as fatigue, and are over 50 years old.

YOUR GENETIC COMPOSITION %



YOUR GENE FUNCTION



You have a variation in this gene. You have slightly less than optimal transport of vitamin B12 to your cells.

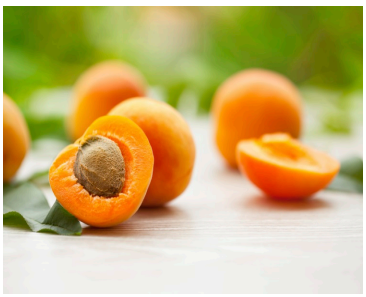
HEALTHPOWER KEY GENES INDEX

Detoxification

Detoxification Phase 1 - Activation

CYP1A1: Associated with enzyme activity, suspected production of 2-OH-estrogen metabolites, enzyme inducibility with exposure of toxins and risk of toxic intermediate exposure and reactive oxygen species accumulation. Has an effect on the metabolism of polycyclic aromatic hydrocarbons, influencing the susceptibility of individuals toward their toxicity. Polycyclic aromatic hydrocarbons are metabolically activated by phase I enzymes into electrophilic species that have the capacity of interacting with DNA.

CYP1A2: Associated with metabolism of substrates, and risk of potentially toxic intermediate accumulation. Induction of CYP1A2 by cigarette smoking has been reported. Polycyclic aromatic hydrocarbons are believed to be responsible for the induction of CYP1A1 and CYP1A2. Cigarette smoking may increase the risk of cancer by inducing the metabolic activation of carcinogens.



CYP1B1: Associated with enzyme activity towards estrogen and production of 4-OH-estrogen metabolites with risk of tissue damage associated with high 4-OHE levels in the phase 1 metabolic pathway.

CYP3A4: Associated with enzyme expression and activity. Abundant in the liver and intestines. The enzyme metabolizes approximately 50% of marketed drugs. The consumption of grapefruit juice with drugs taken orally has been reported to inhibit intestinal CYP3A4 activity, which results in a decrease in the metabolism of many drugs. Patients with deficiency of this enzyme have variability in metabolism efficacy and increased toxicity.

Detoxification Phase 2 – Conjugation

GSTP1: Catalyzes conjugation reactions to inactivate reactive metabolites or intermediates, including reactive oxygen species, and facilitates their excretion from the body.

Detoxification Phase 2 - Acetylation

NAT1: N-acetyltransferase 1 (NAT1) is expressed in human liver. It encodes a phase 2 detoxification enzyme responsible for the metabolism of arylamine compounds including pharmaceuticals and environmental carcinogens.

NAT2: The N-acetyltransferase 2 (NAT2) gene encodes phase 2 detoxification enzymes that play a central role in the metabolism of aromatic, heterocyclic amines and hydra-zines via N-acetylation and O-acetylation. Variations in NAT2, result in rapid or slow acetylation. Slow acetylation decreases enzymatic activity leading to decreased detoxification efficiency.

Detoxification Phase 2 – Methylation

COMT: Catecholamine-O-methyl transferase (COMT) degrades catecholamines such as dopamine, epinephrine, and norepinephrine.

Detoxification Phase 2 - Oxidative Protection

SOD2: As a member of the iron/manganese superoxide dismutase family, this protein transforms toxic superoxide into hydrogen peroxide and diatomic oxygen. This function allows SOD2 to clear mitochondrial reactive oxygen species and confer protection against cell death. This protein plays an antiapoptotic role against oxidative stress, ionizing radiation and inflammatory cytokines.

Hormone Health

Biosynthesis of Androgens and Estrogens

CYP17A1: Is responsible for catalyzing the sequential 17a-hydroxylase and 17,20-lyase activities. These enzymes convert cholesterol into progesterones and androgens, respectively. Variations in this gene increase enzyme activity thus a potential increase in total lifetime hormonal levels.

CYP19A1: Also known as aromatase. It is the rate-limiting step, which determines the overall rate of a metabolic pathway, in the conversion of androgens into estrogens.

SRD5A2: Also known as 5a-reductase, converts testosterone into dihydrotestosterone.

UGT2B15: Is responsible for the catabolism of androgens, androgen metabolites and catechol estrogens.

Phase 1 - Metabolism of Estrogens

CYP1A1: Catalyzes the conversion of estrogens into 2-hydroxy-estrogens (2-OHE), which are considered biologically inert and generally protective.

CYP1B1: Catalyzes the conversion of estrogens into 4-hydroxy-estrogens (4-OHE), which retain their estrogenic activity and are generally considered harmful.

CYP3A4: Catalyzes the conversion of estrogens into 16a-hydroxy-estrogens (16a-OHE), which retain their estrogenic activity and are generally considered harmful.

Phase 2 - Elimination of Estrogen Metabolites

COMT: Catalyzes the methylation of hydroxylated estrogens (also called catechol estrogens).

SOD2: Catalyzes the reduction of ROS, which are known to contribute to oxidative stress, lipid peroxidation and DNA damage.

Inflammation Response

Inflammatory Immune Response

IL1A: Plays one of the central roles in the regulation of the immune responses. Its biological effects result from their ability to modulate gene expression in their target cells.

IL1B: Increased production of IL1B causes a number of different auto-inflammatory syndromes.

IL6: Involved in regulation of inflammation and immune response in the body.

Inflammatory Tumour Response

TNFA: Stimulates the immune system in response to inflammatory factors present during infections.

CRP: Recognizes foreign pathogens and damaged cells and initiates their elimination, increasing protein level in plasma greatly during acute phase response to tissue injury, infection, or other inflammatory stimuli.

Methylation

Methylation - AHCY

AHCY: Encodes the adenosylhomocysteinase enzyme, which catalyzes the reversible breakdown of S-adenosylhomocysteine (SAH) into homocysteine and adenosine. By removing SAH, AHCY enables proper DNA, RNA, protein, neurotransmitter, and lipid methylation. Variations in AHCY can lead to SAH accumulation, impaired methylation, elevated homocysteine levels, and increased risk for cardiovascular and neurological dysfunction.

Methylation - FUT2

FUT2: Encodes a Golgi stack membrane protein that is involved in the creation of a precursor of the H antigen, which is required for the final step in the soluble A and B antigen synthesis pathway.

Methylation - TCN2

TCN2: Facilitates the absorption of cobalamin from the terminal ileum enterocytes into portal circulation and thereafter, supports proper cell delivery.

Methylation - SHMT1

SHMT1: Encodes the cytosolic form of serine hydroxymethyltransferase, a pyridoxal phosphate-containing enzyme that catalyzes the reversible conversion of serine and tetrahydrofolate to glycine and 5,10-methylene tetrahydrofolate.

Methylation - MTHFR

MTHFR: Encodes the MTHFR enzyme, catalyzing the conversion of 5,10-methylenetetrahydrofolate to active folate, 5-methylenetetrahydrofolate (5-MTHF or L-MTHF). 5-MTHF is then utilized for the conversion of homocysteine to methionine and in the production of the methyl donor S-adenosylmethionine (SAMe). In simpler terms, this gene produces an enzyme that adds a methyl group to folate to make it usable by the body. Methyl donors are vital for detoxification, DNA repair and synthesis, neurotransmitter and hormone metabolism.

Methylation - MTR

MTR: Catalyzes the conversion of homocysteine to methionine. MTR uses methylcobalamine (methyl B12) as the methyl donor in this reaction. Methionine in turn drives the production of S-adenosylmethionine (SAMe) - one of the primary methyl donors for a host of enzymatic reactions.

Methylation - MTRR

MTRR: Encodes the MTRR enzyme. A well-described SNP within this gene affects its enzymatic efficiency and in turn the efficacy with which vitamin B12 is re-methylated (to act as the methyl donor for homocysteine to methionine conversion catalyzed by methionine synthase).

YOUR GENETIC PROFILE

Your genetic profile provides you with your individual gene and SNP details. It provides further insight into your overall results. *Good* is a functional gene with two normal copies, *Moderate* is one normal copy and one variant copy, *Poor* is two variant copies.

DETOXIFICATION

TEST	GENE	DESCRIPTION	GENOTYPE	RESULT
Detoxification Phase 1 - Activation	CYP1A1	Hydrocarbon Activation 2	TT	Good
	CYP1A2	Carcinogen Activation 1	CC	Poor
	CYP1B1	Harmful Metabolite 1	CC	Good
	CYP3A4	Pharmaceutical Metabolism 1	TT	Good
Detoxification Phase 2 - Conjugation	GSTP1	Antioxidation	CC	Good
Detoxification Phase 2 - Acetylation	NAT1	Carcinogen Metabolism	GG	Good
	NAT2	Acetylation Efficiency 1	GA	Moderate
	NAT2	Acetylation Efficiency 2	AG	Moderate
	NAT2	Acetylation Efficiency 3	GG	Good
	NAT2	Acetylation Efficiency 4	CC	Good
Detoxification Phase 2 - Methylation	COMT	Methyl-transferase 2	CT	Moderate
	COMT	Detoxification of Catechol Estrogens 1	GA	Moderate
Detoxification Phase 2 - Oxidative Protection	SOD2	Oxidative Stress 1	AG	Moderate

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HORMONE HEALTH

TEST	GENE	DESCRIPTION	GENOTYPE	RESULT
Biosynthesis of Androgens and Estrogens	CYP17A1	Hormone Production	GA	Moderate
	CYP19A1	Androgen to Estrogen Conversion	GA	Moderate
	SRD5A2	Testosterone to Dihydrotestosterone	CG	Moderate
	UGT2B15	Androgen Break-Down	0	No Data
Phase 1 - Metabolism of Estrogens	CYP1A1	Beneficial Estrogen Balance 2	TT	Good
	CYP1B1	Harmful Metabolite 1	CC	Good
	CYP3A4	Deleterious Estrogen Balance 1	TT	Good
Phase 2 - Elimination of Estrogen Metabolites	COMT	Detoxification of Catechol Estrogens 1	GA	Moderate
	SOD2	Oxidative Stress 1	AG	Moderate

INFLAMMATION RESPONSE

TEST	GENE	DESCRIPTION	GENOTYPE	RESULT
Inflammatory Immune Response	IL1A	Inflammatory Disorder Susceptibility	CA	Moderate
	IL1B	Inflammatory Disorder Susceptibility 1	GG	Good
	IL1B	IL1B Production 2	AG	Moderate
	IL6	Immune Response 1	GG	Poor
	IL6	Osteoarthritis Susceptibility 2	GG	Poor
Inflammatory Tumour Response	CRP	Inflammatory	TT	Good
	TNFA	TNFA Production and Inflammation 1	GG	Good
	TNFA	Tumour Response 2	GG	Good

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METHYLATION

TEST	GENE	DESCRIPTION	GENOTYPE	RESULT
Methylation - MTHFR	MTHFR	rs1801131	TT	Good
	MTHFR	rs1801133	AG	Moderate
Methylation - SHMT1	SHMT1	rs1979277	GG	Good
Methylation - MTR	MTR	rs1805087	AA	Good
Methylation - MTRR	MTRR	rs1801394	GG	Poor
Methylation – AHCY	AHCY	rs819147	CT	Moderate
Methylation - FUT2	FUT2	rs602662	GA	Moderate
Methylation - TCN2	TCN2	rs1801198	GC	Moderate

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