Summarised GENEWELL™ Report

Name	Female	Report Date	2022-03-22
Surname	Case Study	Date of Sample Collection	2016-05-15
Ref Number	00001014	Date Sample Received	2016-05-17
Sample Type	Buccal Swab	Referring Practitioner	Female Case Study
Gender	Female	Estimated Weight	64
Age	49	Estimated Height	1.6
Race	White/Caucasian	Estimated Waist	80
Date of Birth	1971-10-10	Blood Pressure	Normal

GENEWELL™

UNDERSTANDING THE RESULTS

The complexity of modern health care necessitates an innovative approach to manage the risk of multifactorial diseases that could be applied in a medical context where genetic test results are integrated with relevant clinical, environmental, lifestyle and pathology assessments.

Variations in DNA

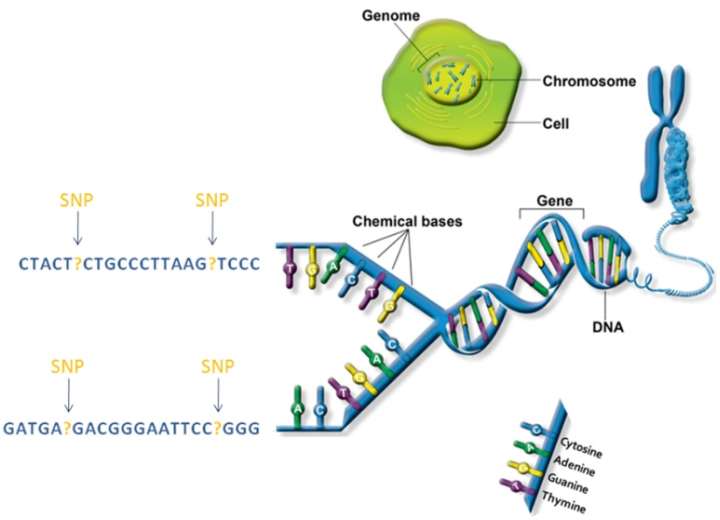
Genetic variations account for the different phenotypes and diverse responses to the environment between individuals. The detection of genetic variations are reported as Single Nucleotide Polymorphisms (SNPs) or copy-number variations (CNVs).

CNVs

CNVs comprise deletions, insertions and duplications. A CNV is present when the number of copies of a particular gene varies from one individual to the next. Thus, the genome (the entire set of 23 chromosomes in a person) experiences gains and losses of genetic material. http://www.emedmd.com

SNPs

DNA molecules consists of four different types of nucleotides that pair with each other in a very specific manner. Complementary base pairings are responsible for the double-helix structure of DNA. There are four different kinds of nucleotides that make up DNA: adenine (A), cytosine (C), guanine (G) and thymine (T). Only two kinds of base pairs are possible: GC (or CG) and AT (or TA). A variation at a single base pair is called a SNP. SNPs generate biological variation between people.
https://kaiserscience.wordpress.com/biology-the-living-environment/genetics/



Result Legend

- The red circle indicates a high impact, compared to the impact of the general population.
- The yellow circle indicates a moderate impact, compared to the impact of the general population.
- The green circle indicates a low impact, compared to the impact of the general population.
- The blue circle indicates no impact, (neutral effect) compared to the impact of the general population.

Current Status

Personal History

- Cognitive
- Diabetes
- Fatty Liver
- Thyroid
- Overweight
- PCOS
- Pregnancy Loss
- Sleep
- Allergy: Fish

Family History

- Cognitive
- Inflammatory
- Hypertension
- Fatty Liver
- PCOS
- Pregnancy Loss
- Sleep
- Anaemias
- Bone density
- Insulin Resistance

Diet

- Fat Intake - High
- Folate Intake - Moderate
- Fibre & Magnesium Intake - Moderate

Physical Activity

Casual, 1 - 2 days a week, 45 min, Very low intensity

Lifestyle

- Alcohol Consumption - Low
- Body Mass Index
- Non-Smoker

Pharmaceutical

- Vitamin B-complex
- Protein or other Shake

Priorities based on Genetic Impact

Unfavourable				Favourable
	Blood Pressure	Choline Requirements	Cardiovascular Health	Blood Clotting & Coagulation
	Estrogen & Testosterone Metabolism	Bone & Cell Membrane Health	Antioxidants Requirements	Iron Balance
	Thyroid Health	Caffeine Sensitivity		
	Salt Sensitivity	Inflammation & Immunity		
		Detoxification Phase I		
		Detoxification Phase II		
		Diabetes & Insulin Resistance		
		Brain Health & Neurotransmitters		
		Energy Regulation		
		Alcohol Sensitivity		
		Methylation Health		
		Vitamin D & Calcium Requirements		
		Oxidative Stress		
		Omega-3		
		Vitamin B9 (Folate) Requirements		
		Vitamin B12 (Cobalamin) Requirements		
		Gut Health & Digestion		

Recommendations and Comments

Biomarkers & Clinical

5-HIAA: serotonin metabolite (urine)

Bone Mineral Density Scan

Fasting Insulin, Glucose, HbA1c

Females with PCOS: test adrenal function: cortisol & ACTH (Adrenocorticotropic Hormone)

Full Thyroid Profile: TSH, Free T4, Free T3 and Thyroid antibodies (Optimal T3:T4 ratio is 2.4 to 2.7) Conversion calculator of units of blood tests: https://www.amamanualofstyle.com/page/si-conversion-calculator

Heavy metal screening (Lancet code Y934, Ampath MPCB)

High sensitivity C-Reactive Protein (hs-CRP) (Ideal: <1 - 1.5mg/L)

Homocysteine (Ideal: 4.5 - 6 umol/l)

HVA: dopamine metabolite (urine)

Hydroxy-2-deoxyguanosine (8-OHdG) to measure oxidative stress

Lipogram (total cholesterol, LDL, HDL, TG)

Oxidative Stress (indirect measure): Ferritin, hsCRP, Platelets, Red Blood Cells, Lymphocytes, Globulin, Uric acid & Bilirubin

Sex hormones eg estrogen, testosterone & progesterone

Uric acid

Vitamin D3 (Ideal 50 - 85ng/ml)

VMA: nor/adrenaline (urine)

Diet

Anti-inflammatory diet eg Okinawan & Mediterranean diets high in Omega-3

Avoid charred food (eg the 'black bits' on grilled foods)

Avoid cooking food at high temperatures on a regular basis

Avoid nitrites (food preservatives that give meat products a pink/red colour)

Avoid or limit gluten intake

Dietary iron intake may need modification (correlate blood tests eg ferritin)

Ensure high dietary fiber intake (>25g per day)

Ensure sufficient dietary folate intake to support functioning SHMT gene

Give preference to organic produce

High requirements for antioxidants-rich foods

Increase nitric oxide foods: beets, rocket, pomegranates, celery & watermelon

Likely to tolerate lactose

Limit intake of grilled (‘braai’) or smoked meats to 1 serving per week (or less)

Monitor and manage sodium intake (1500-2000mg/day) and follow a diet rich in potassium

Supplements / Nutrients

5-HTP (5-hydroxytryptophan)

Antioxidant supplementation eg GENEWAY™ Antioxidant: 2-4 caps/d

Avoid tryptophan supplements, unless specified by your healthcare practitioner

Butyrate / butyric acid: 300-1,500 mg/d

Calcium-D-Glucarate: 100mg/kg prior to exposure to PAHs

Collagen 7.5-15g/day e.g. GENEWAY™ Collagen 1-2 scoops/day

Curcumin: 500-1500mg/day

DAO-enzyme eg HistoDAO™

DIM eg GENEWAY™ DIM 1/day

Fiber: 4-6g/day, mostly soluble

Glucose & Insulin metabolism e.g. GENEWAY™ Carb Support: 1-4 capsules/day

Glutathione Antioxidant (dosage as per practitioner)

Heavy metal detoxification supplement, if needed

Magnesium 500-1500mg/d e.g. GENEWAY™ Magnesium: 1-4 capsules/day

Mushroom extract e.g. AHCC

Myo-inositol (for high thyroid antibodies)

N-acetyl cysteine (NAC) eg ACC200: 600 to 1200mg/day (glutathione precursor)

Nattokinase 100mg/d (avoid with blood thinning agents)

NEM - Natural Eggshell Membrane eg Flexofend (osteoarthritis)

Nitric Oxide (Arginine: 700 to 2,100 mg/d; Citrulline & glycine propionyl-L-carnitine (GPLC): 500 to 1,500 mg/twice daily)

Omega-3 (DHA/EHA)

Probiotics e.g. GENEWAY™ Probiotic

Pycnogenol (PQQ): 100mg/day - slows the breakdown of nitric oxide

Supreme Wellness Multivitamin: 2-4 tablets/d

Vitamin Bs (as recommended by healthcare practitioner)

Physical Activity

For weight loss, a target of at least 20 - 25 METs (Metabolic Equivalent for Task) per week, consisting of moderate to high intensity activities (3-6 METs), is recommended. A MET is a unit that estimates the amount of energy used by the body during physical activity, as compared to resting metabolism. The MET unit is standardised so it can apply to people of varying body weight and compare different activities. Resting energy expenditure (sitting) is defined as 1 MET. The MET values can be found here: https://sites.google.com/site/compendiumofphysicalactivities/compendia

Lifestyle

Alcohol avoidance is recommemded

Avoid asbestos

Avoid carcinogens (substances and exposures that can lead to cancer) https://www.cancer.org/

Avoid cigarette smoke, including secondary smoke

Avoid environmental pollutants

Avoid exposure to BPA (Bisphenol A) - found in many plastics, thermal printed receipts, pantyhose; water bottles with recycling codes 3 & 7 (may contain BPA)

Avoid xenoestrogens (type of xenohormone that imitates estrogen)

Ensure sufficient amount of sleep daily (7-9 hours) for better handling oxidative stress

Impaired ability to detoxify environmental toxins (air pollution, smoke) as well as pesticides, herbicides, and polycyclic aromatic hydrocarbons (PAHs) found in grilled meat

Stress management

Use water only from a filtration system that removed chemicals such as fluoride, ammonia

Pharmaceutical

A combo of T3/T4 is recommended if hypothyroidism is present

Bupropion (Wellbutrin) is very effective for smoking cessation in the ANKK1 (GG) genotype

Fluoxetine & BNDF: Patients with the CC genotype and major depressive disorder who are treated with fluoxetine may have a higher likelihood of side effects as compared to patients with the TT genotype.

Likely to respond to standard dosages of opioids eg Alfentanil, Hydrocodone, Hydromorphone, Morphine, Fentanyl

Long-term estrogen-based replacement therapy is not recommended

Low-dose diuretic treatment

Minimize the amount and duration of estrogen-based hormone therapy

More likely to have a decreased response to lithium treatment for bipolar disorder

Poor response to naltrexone (alcohol dependence)

Requirements folate increase with commonly used medications (MTHFR C677T - see details in rest of the report)

The use of estrogen may not be protective against breast cancer

Unlikely to respond to Ramipril

Other

Deep breathing exercises (eg Pranayama or the Buteyko breathing techniques) are the most important factor to support eNOS

High risk for developing osteoarthritis

Highly sensitive to chlorinated water and by-products

Moderate exercise can decrease inflammation, however, intense exercise may increase inflammation

Mutations in the methylation pathway can lead to either over- or undermethylation

Tendency to have high dopamine levels

Visit https://learn.genetics.utah.edu/content/epigenetics to learn more about genetics

Overall Interpretation Summary

Gut Health & Digestion

Based on the selected genes tested only, you have an increased risk of impaired gut health. Gut function is inseparably linked to overall health. The gut's primary function is the digestion and absorption of nutrients. However, it has a major influence on the immune system and brain health, eg 90% of serotonin is produced in the gut.

Blood Pressure

You have an increased genetic risk for developing hypertension (high blood pressure). Most people with high blood pressure have no signs or symptoms. Fortunately, high blood pressure can be easily detected and treated.

Blood Clotting & Coagulation

You have a low genetic risk for excessive blood clotting disorders. Blood clots are beneficial when they form in response to an injury or a cut that stops bleeding. The body will naturally dissolve the blood clot after the injury has healed.

Cardiovascular Health

Slight increased genetic risk for heart disease and an abnormal cholesterol profile. Cardiovascular disease generally refers to conditions that involve narrowed or blocked blood vessels that can lead to a heart attack and high cholesterol levels. Cholesterol is an essential constituent of cell membranes and precursors of hormones such as testosterone and oestrogen. Non-genetic risk factors for heart disease include lack of exercise and smoking.

Brain Health & Neurotransmitters

Brain health refers to the balancing of neurotransmitters (brain chemicals) within the neuroendocrine systems that are involved in complex processes such as stress tolerance, ADHD, mood disorders, social functioning, addictive tendencies and cognitive wellness (eg memory). Based on the genetic score, you have a moderate predisposition to neuro-imbalances. Implementing certain lifestyle measures can optimise your brain health.

Estrogen & Testosterone Metabolism

The combination of gene variants identified in this analysis indicates you have an impaired oestrogen and androgen (testosterone and DHEA) metabolism. This puts you in the moderate-to-high risk category. Non-genetic causes of hormonal imbalances that may increase the risk further include obesity, liver disease. hormone therapy, certain antibiotics and some herbal remedies.

Diabetes & Insulin Resistance

Based on the genes tested in this analysis, you have a moderately increased risk for type 2 diabetes and insulin resistance. Other factors that increase this risk further include obesity, stress and chronic steroid use. Insulin resistance typically precedes the development of type 2 diabetes. Preventative lifestyle measures are recommended.

Inflammation & Immunity

Moderately increased risk for chronic, low-grade inflammation. Inflammation is a vital part of the immune system's response to injury and infection. It is the body's way of signaling the immune system to heal and repair damaged tissue, as well as defend itself against viruses and bacteria. Chronic inflammation, however, is linked to certain diseases such as heart disease and arthritis. Additional support is recommended.

Bone & Cell Membrane Health

Moderately increased risk for impaired bone health (eg osteopenia), reduced cell membrane integrity and risk for osteoarthritis. Bone health is crucial for providing structure, anchoring muscles and storing calcium. The cell membrane protects each cell in the body from environmental substances (eg toxins) and regulates the entry of substances (eg nutrients) in and out of cells. Sub-optimal cell membrane integrity makes you vulnerable to many diseases. Additional nutritional support is recommended.

Detoxification Phase I

Genetic variants in Phase I liver detoxification were detected. Overall, your Phase I liver detoxification is considered moderately impaired. Phase I genes are triggered by specific chemicals, causing a mechanism of protection that safeguards against many different kinds of toxins. Avoidance of these toxins and nutritional support can lower the risk significantly.

Detoxification Phase II

Based on the genetic profile, Phase II detoxification in the liver is impaired. This can be managed by lifestyle interventions and nutritional support. During Phase II, toxins are made water soluble, allowing for easy excretion and removal from the body. If a sluggish Phase II is unable to keep up with the demand of Phase I, toxins will accumulate.

Oxidative Stress

Moderately reduced 'natural' anti-oxidative protection. Additional nutritional support is important to overcome this. When oxygen molecules split they become unstable, free radicals causing oxidative stress. Oxidative stress can damage DNA and the body's cells, leading to a range of diseases. Anti-oxidants bind to free radicals to ensure it is no longer available to cause damage.

Thyroid Health

Your genetic profile confers a high risk of thyroid dysfunction. It can relate to either over- or underactive thyroid function. The thyroid gland's primary function is to regulate the body's metabolism - how fast you burn energy. Adequate iodine intake is especially important.

Methylation Health

Based on the genetic analysis, your methylation pathway is moderately impaired. Methylation is essential for the optimal function of almost all the body systems. It occurs billions of times every second. It helps to repair DNA, helps keep inflammation in check, it replenishes the compounds needed for detoxification and helps maintain a stable mood.

Energy Regulation

Humans derive food energy from carbohydrates, fats and proteins. There are many genes that control how the body converts nutrients into energy. Based on the results of some of the important genes tested, you have overall an impaired energy conversion. This increases your risk of becoming overweight but could easily be controlled with the right diet.

Nutrients and Other Compounds

Antioxidants Requirements

Antioxidants are compounds produced in the body and found in foods. Antioxidants protect cells from oxidative stress that can cause damage by harmful molecules known as free radicals formed during oxygen use. Based on your genetic results your natural antioxidative ability is slightly compromised and therefore your nutritional antioxidant requirements are a bit higher than the recommendations to the general population. While we like to think we can get all the nutrients we need from our food supply, due to modern agricultural practices this is becoming less likely. You may benefit from an antioxidant supplement especially if you are physically very active or exposed to pollution. The best dietary sources are colourful foods. Vitamins A, C and E are examples of antioxidants.

Iron Balance

Iron deficiency is the most common nutrient deficiency in the world. It is associated with fatigue, dizziness, cold hands and feet. Iron overload, on the other hand, is equally detrimental affecting the liver. The DNA tests assessed the balance between the iron deficiency (anemia) and iron overload (haemochromatosis) genes. Your overall genetic profile is associated with normal iron homeostasis. Even so, if you follow a diet very low in iron, e.g. vegan, is a professional athlete or have a bleeding ulcer, you are still at risk for an iron deficiency. Similarly, overuse of iron supplements can cause iron overload. The best dietary source of iron is liver.

Omega-3

Omega-3's are essential nutrients (your body can not produce it). It is important for heart and brain function and has an anti-inflammatory function. There are 3 types Omega-3's: EPA (eicosapentaenoic acid), DHA (docosahexaenoic acid) and ALA (alpha -linolenic acid) and they have different roles in the body. For healthy individuals with a genetic profile like yours, 1,000mg of combined DHA and EPA are recommended daily, in a ratio of EPA:DHA of 3:1. Read labels of supplements to see how much actual EPA and DHA are in it. The total Omega -3 content does not reflect EPA and DHA content. The best food source of Omega-3 fats is fatty fish: 75g of salmon contains 1.6g DHA/EPA. Good plant food sources include flaxseed and walnuts, but you have to eat a lot to gain the same benefits as you do from fish.

Salt Sensitivity

Your genetic profile shows that you have an increased risk of hypertension if you have a high sodium consumption. Sodium is an essential mineral in the body, that plays a role in nerve signal transmission, muscle contraction and the maintenance of fluid balance. Keep your consumption of ready-made, processed and restaurant meals minimal. A good strategy for reducing sodium intake and counteracting the negative health effects that excessive intake might cause is to increase your potassium intake. Potassium in the body has the opposite effects of sodium. (ACE, AGT genes)

Vitamin B9 (Folate) Requirements

Folate (Vitamin B9) is required for numerous processes: DNA maintenance, detoxification and hormone production to mention just a few. Your test result is associated with an increased need for folate, to overcome the genetic deficiencies. Folic Acid is the synthetic, inactive form of folate and should be avoided. Methyl folate is the active form and 400mcg is a common starting point for adults. Folinic acid is an alternative to methylfolate. Folate is found naturally in uncooked leafy green vegetables, but you may not be able to meet your folate requirements via dietary intake due to the volumes required.

Vitamin B12 (Cobalamin) Requirements

Vitamin B12 (cobalamin) is important for the production of neurotransmitters, energy and blood cells. Since the human body cannot produce vitamin B12, you need to get adequate amounts of it in the correct form through the diet or via supplementation. The type and quantity of vitamin B12 required are determined primarily by genetics and based your profile, you require methylated vitamin B12 (that is already bioactive) in dosages higher than the usual recommendations. Avoid cyanocobalamin (synthetic B12). Some of the symptoms of low vitamin B12 levels include anxiety, fatigue, memory loss and tingling feet.

Vitamin D & Calcium Requirements

Your genetic profile is associated with an increased risk of inadequate Vitamin D concentrations. Vitamin D is crucial for calcium concentrations, bone health, immune function and the reduction of inflammation. Since limited foods supply Vitamin D, supplementation in the D3 form may be required. It is recommended to measure Vitamin D stores regularly (blood tests) and based on those results, supplementation of 1,000 IU vitamin D3 daily, may be the ideal therapeutic dosing.

Caffeine Sensitivity

Your genotype is associated with being a slow metaboliser of caffeine. You may experience side-effects such as sleep disturbances due to caffeine consumption. Caffeine tolerance level: 3-4 mg/kg body mass of caffeine daily, which is about 3 cups of coffee per day. Consumption of vegetables such as broccoli and Brussels sprouts will eliminate caffeine quicker from the body.

Choline Requirements

Based on your genetic profile, you require more choline than the general recommendation. Choline is a vitamin-like essential nutrient and needed in all cell membranes, for fat transport, DNA synthesis, acetylcholine production and muscle movement. The best dietary source is eggs, however, you might need choline and/or phosphatidylcholine supplementation. The PEMT and BHMT genes play an important role in your choline requirements.

Alcohol Sensitivity

Everyone knows alcohol is toxic but your genetic profile is associated with having overall, an increased risk of developing chronic conditions such as various cancers, heart disease, depression and dementia, compared to the general population, with regular alcohol consumption. The best available current evidence shows that regular consumption of alcohol does not improve overall health. The World Health Organisation withdrew its previously "safe" guidelines for alcohol consumption.

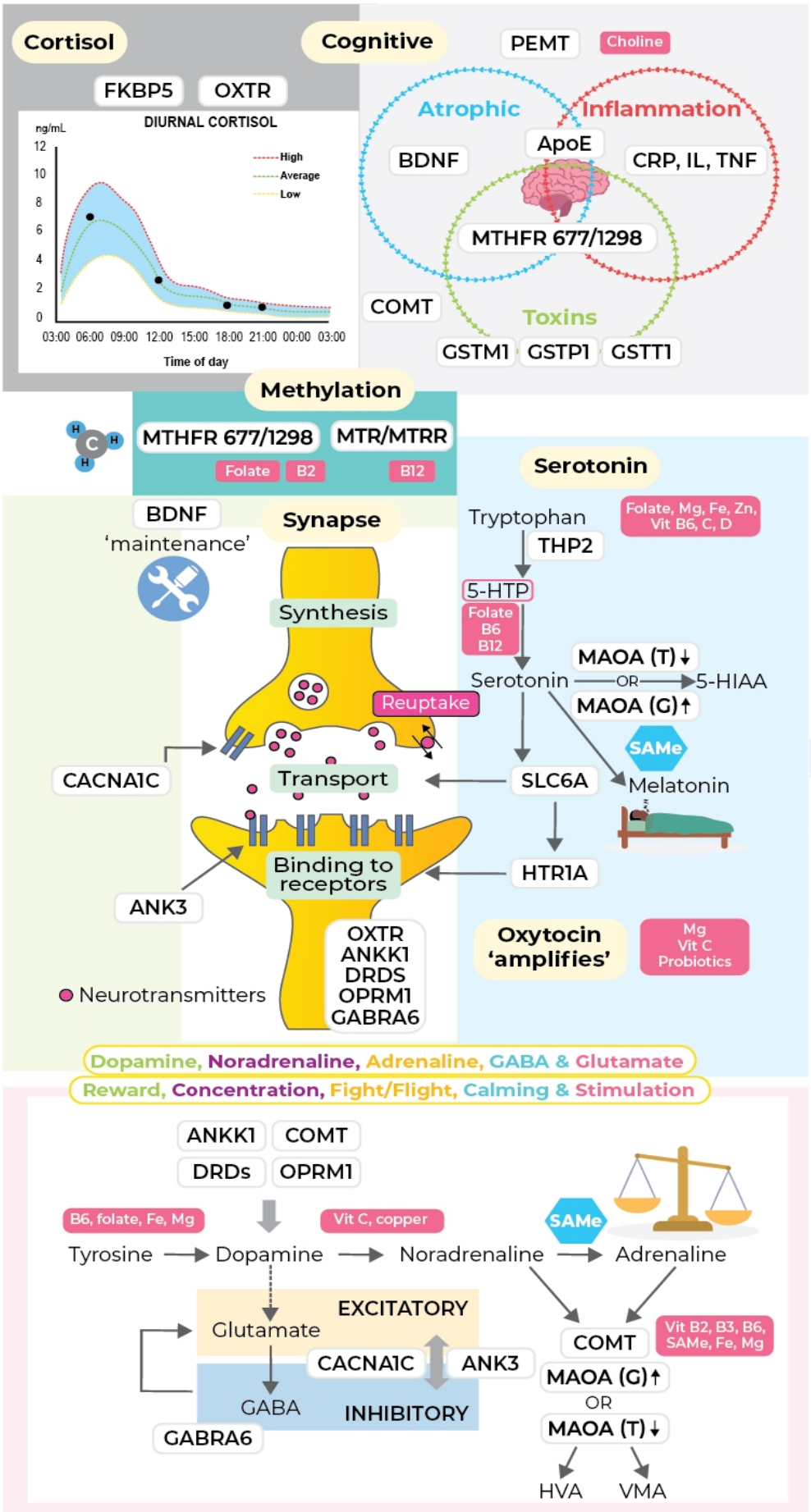
Summary of Genetic Results

Top 10 Health Genes

COMT Val158Met: 'Worrier' versus 'Warrior'. Metabolises dopamine & estrogen. Affecting mood, energy level, sleep and focus.	A/G
DAO (T16M): Response to histamine from food & bacteria, susceptibility to allergy symptoms & food intolerances.	C/T
GSTP1 (I105V): Detoxification of smoke, heavy metals, herbicides, pesticides & other xenobiotics.	A/G
MTHFR A1298C: Dopamine & serotonin balance, methylation - the mechanism used by cells to control gene expression.	G/T
MTHFR C677T: Folate metabolism, homocysteine cycle, detoxification & methylation - a key process for genetic expression.	G/A
PEMT G523A: Phosphatidylcholine production to maintain cell membranes, bile flow, muscle health, liver support & brain health.	T/C
GPX C599T: Detoxification of hydrogen peroxide (from stress response) & antioxidant requirements.	C/C
IL6 -174 G>C: Pro- & anti-inflammatory properties & regulates the immune response.	G/G
MAO-A R297R: Breaks down serotonin ("feel-good" chemical), dopamine (reward-motivation) & norepinephrine (stress hormone)	G/T

Brain Health & Neurotransmitters

DRD4 (C-521T): Reward-seeking pathway	C/C
TPH2 (G>T): Regulation of serotonin synthesis	G/G
ANK3 (C>T): Inhibitory cell signalling (emotional "roller coaster")	C/T
CACNA1C: Emotional "roller coaster" & stress-coping behaviour	A/G
COMT (Val158Met): Dopamine & nor/adrenaline breakdown	A/G
GABRA6 (1519 T>C): Binding to GABA receptors	C/T
HTR1A (C>G): Binding to serotonin receptors, risk of depression, impulsiveness	C/G
MTHFR (1298A>C): Neurotransmitter synthesis	G/T
OXTR (G>A): Stress response via oxytocin ('love hormone'), empathy, separation anxiety	A/G
SLC6A4 (IVS9 A-90G): Transport & re-uptake of serotonin, panic & (social) anxiety disorders	C/T
ANKK1 (Taq1A): Reward response & addictive tendencies	G/G
APOE: Cognitive Function	E3/E3
BDNF (Val66Met): Growth & repair of neurons, mood disorders (anxiety) & memory	C/C
FKBP5 (C>T): Cortisol production, sensitivity and depression	C/C
MAO-A (R297R): Balancing of dopamine, nor/adrenaline & serotonin	G/T
OPRM1 (A118G): Reward & stress response	A/A



Detoxification Phase I

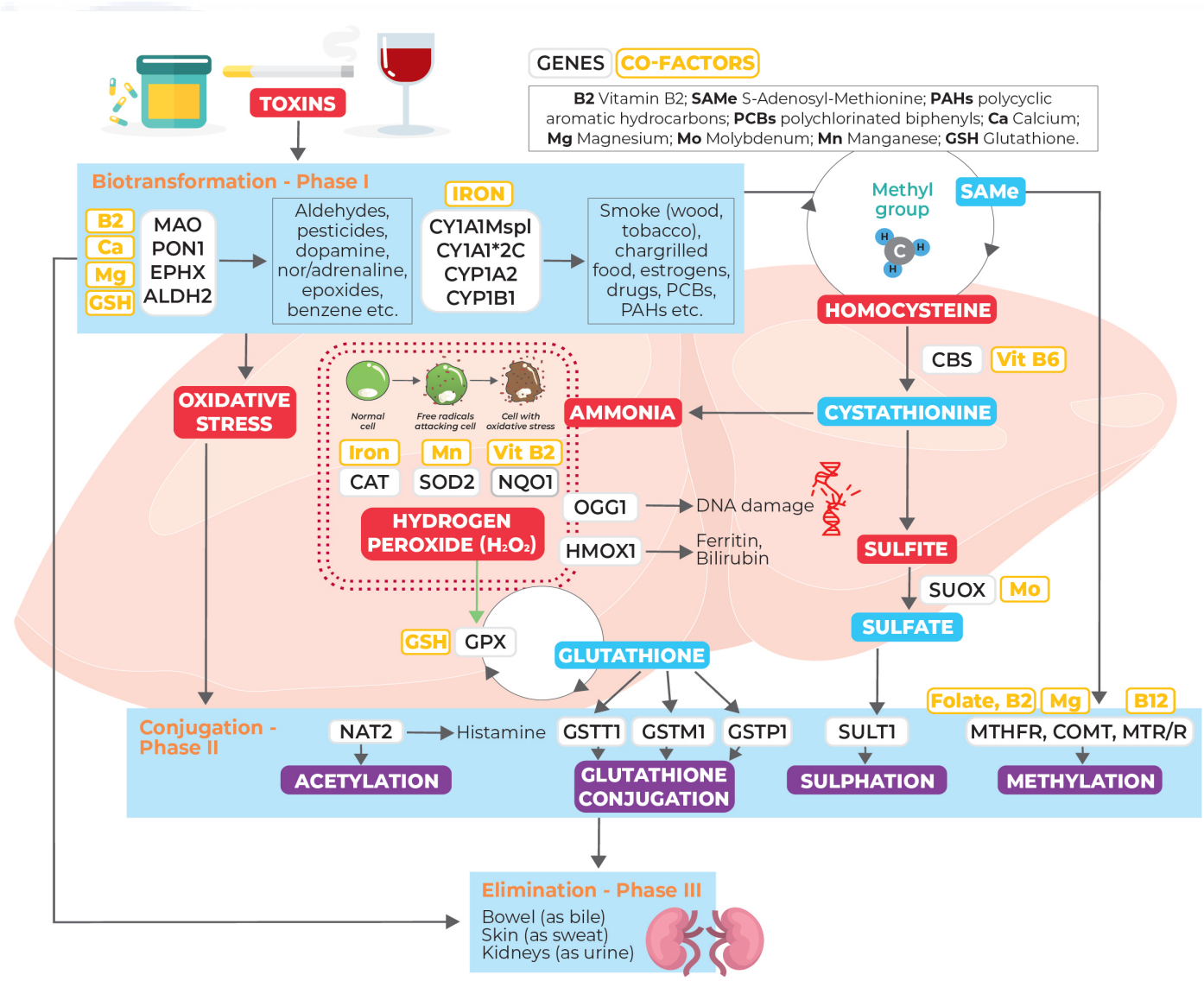
CYP1B1 (Val432Leu): Detoxification	G/G
CYP1A2*1F (-164A>C): Caffeine metabolism	C/A
CYP1A1 (Ile462Val): Estradiol & estrone metabolite degradation	T/T
CYP1A1 (MspI): Environmental carcinogens	T/T

Detoxification Phase II

GSTM1 (Lys173Gln): Glutathione conjugation	ABS
GSTP1 (Ile105Val): Glutathione conjugation	A/G
NAT2*12A: Acetylation	A/G
SULT1A1*2 (638 G>A): Sulfation	A/G
GSTT1 (Val169Ile): Glutathione conjugation	PRS
NQO1*2 (C609T): Degradation of toxins & benzene	G/G

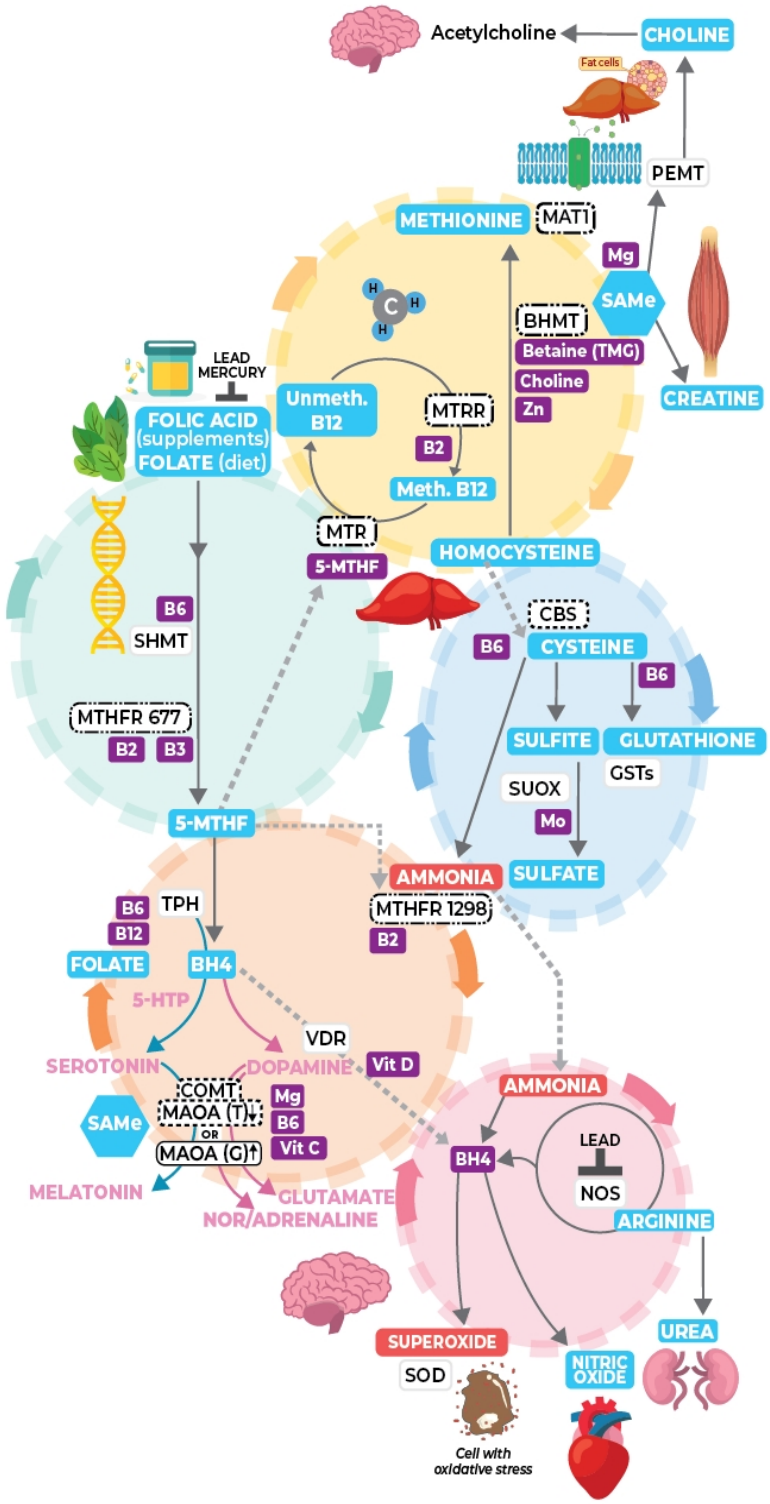
Oxidative Stress

EPHX1 (Tyr113His): Putting a 'handle' on toxins	T/T
OGG1: DNA damage repair	C/G
SOD2: Free radical cleanup in mitochondria	A/G
CAT (C-262T): Reactive oxygen species defense	C/C
GPX1: Glutathione production & selenium needs	C/C



Methylation

NOS (G894T): Ammonia detoxification	T/T
VDR Taq1: Type of Vit B_{12} for dopamine production	A/A
BHMT-02 (+52C>T): Conversion of homocysteine to methionine	C/T
CBS (C699T): 1st priority treatment: Ammonia accumulation	A/G
COMT (Val158Met): Dopamine breakdown	A/G
MTHFR (A1298C): Methylated folate requirements	G/T
MTHFR (C677T): Methylated folate requirements	G/A
MTR (A2756G): Methylated vitamin B_{12} requirements	A/G
MTRR (A66G): Methylated vitamin B_{12} requirements	A/G
PEMT (G523A): Choline requirements	T/C
MAO-A R297R: Neurotransmitter balance	G/T
MAT1A (T*1297C): Conversion of methionine to SAMe	A/A
SHMT (C1420T): 1st priority treatment: Folate availability & DNA synthesis	G/G
SUOX (S370S): Sulfur Metabolism	T/T



Genes that tend to overmethylate: GENES

Genes that tend to undermethylate: GENES

GENES CO-FACTORS

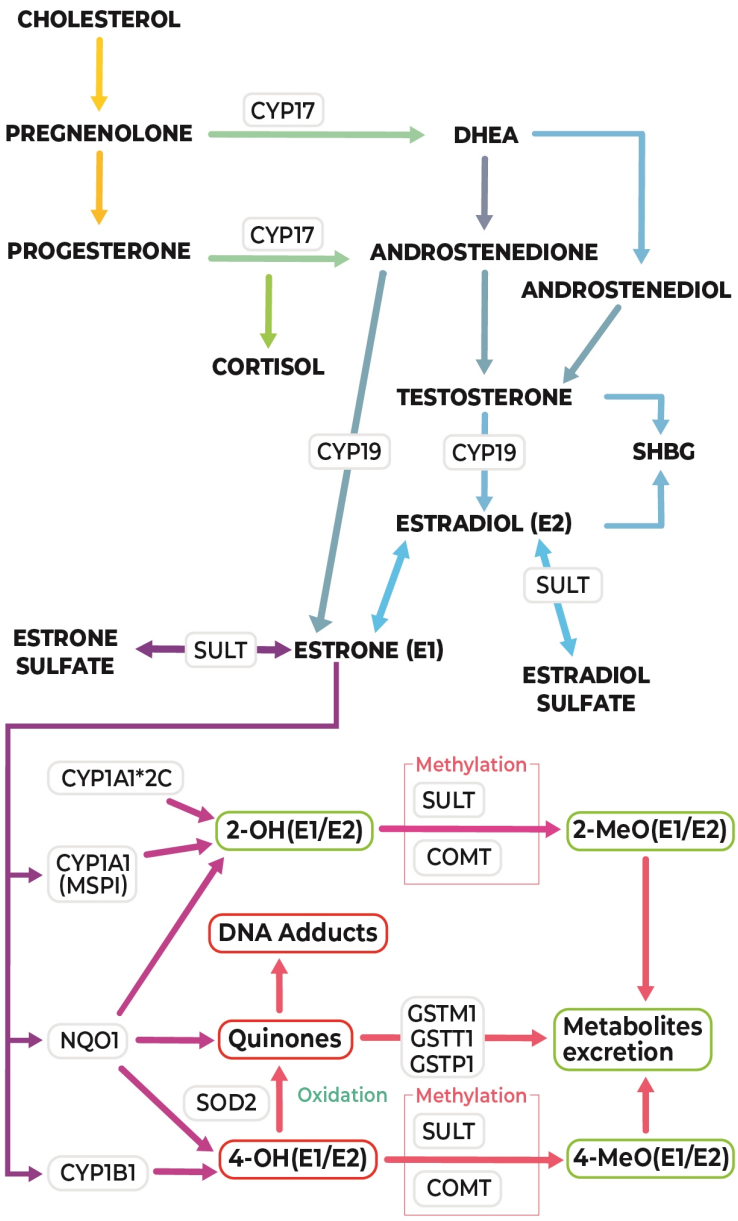
Homocysteine Cycle | Transsulphuration Cycle | Folate Cycle | Neurotransmitter Cycle | Urea Cycle

Methyl group

B2, B6, B9, B12 B-vitamins; **BH4** Tetrahydrobiopterin; **5-MTHF** Methylated folate; **Mg** Magnesium; **Mo** Molybdenum; **Zn** Zinc; **SAMe** S-Adenosyl-Methione; **5-HTP** 5-Hydroxytryptophan; **GABA** gamma-aminobutyrate; **HVA** Homovanillate **VMA** Vanilmandelate; **5-HIAA** 5-Hydroxyindoleacetate; **Meth** Methylated

Estrogen & Testosterone Metabolism

CYP1B1 (Val432Leu): Estrone conversion into 4-OH metabolites	G/G
GSTM1: Binds glutathione to estrogen metabolites	ABS
COMT (Val158Met): Breakdown of estrone metabolites	A/G
CYP17A1 (34T>C): Progesterone conversion into DHEA & testosterone	A/G
CYP19A1 (+1531 A/G): Estrogen synthesis	A/G
GSTP1: Binds glutathione to estrogen metabolites	A/G
SOD2: Antioxidant function	A/G
SULT1A1*2: Binds estrone metabolites to sulfur for excretion	A/G
CYP1A1 (Ile462Val): Estrone conversion into protective 2-OH metabolites	T/T
CYP1A1 (MspI): Estrone conversion into protective 2-OH metabolites	T/T
GSTT1: Binds glutathione to estrogen metabolites	PRS
NQO1*2: Quinone conjugation & removal	G/G



	COMT	CYP1A1	CYP1B1	CYP17	CYP19	GSTs	NQO1	SULT	SOD2
Variations cause:	↑ Procarcinogenic E1 (Estrone)	Reduce protective E1	↑ Procarcinogenic E1 (Estrone)	↓ Progesterone & ↑ testosterone	Excess E2 (Estradiol)	↓ Elimation of estrogens	↑ DNA adducts	↑ Procarcinogenic E1 (Estrone)	↑ Oxidative stress
Upregulation	B vitamins Betaine Magnesium SAMe	Berries Caffeine Crucifers DIM / I3C Flaxseed Soy	Char-grilled foods Inflammation PAHs Smoke	Alcohol ↑ Glucose ↑ Insulin Obesity PCB toxicity PCOS	Forskolin Genistein Inflammation ↑ Insulin Licorice root Obesity	Allium vegetables Antioxidants Crucifers DIM Glutathione Vit C	CoQ10 Ubiquinol	Caffeine Sulfur rich foods eg broccoli Sulfur rich supplements eg α-Lipoic Acid	Manganese Antioxidants Omega-3 Curcumin
Downregulation	Catechins (green tea) Phthalates Rhodiola rosea	Moderate alcohol consumption ↑ Omega-6 intake Pterostilbene Resveratrol ↑ Sugar intake	Chrysin Antioxidants Crucifers eg Brussel sprouts DIM Resveratrol 13C	Dioxin toxicity Ketoconazole Apigenin Polyphenols	Aromatase inhibitors Genistein Grape seed extract White button mushrooms	Heavy metals eg mercury, lead Toxins eg solvents, herbicides, fungicides PAHs	Benzene eg glues, paints, furniture wax Smoking	High intake of phenols eg resveratrol and green tea Cannabis	Sleep apnea Pregnenolone Thyroid hormones Androstenedione Growth Hormone

ABBREVIATIONS

- *DIM Di-Indolyl-Methane*
- *PAHs Polycyclic aromatic hydrocarbons*
- *I3C Indole-3-Carbinol*
- *PCBs Polychlorinated biphenyls*
- *SAMe S-Adenosyl Methionine*

Summary of Genetic Results

Gut Health & Digestion (Assimilation)

HMOX1 (A-413T): "Leaky Gut" & Inflammation in intestinal tract	T/T
TNF α (-308 G>A): Non-Celiac Gluten Sensitivity	A/A
BHMT-02 (+52C>T): "Gut brain connection"	C/T
DAO (T16M): Histamine & gluten tolerance	C/T
FUT2 (G>A): Prebiotic production and vitamin B_{12} absorption	A/G
MCM6 (-13910C/T): Lactose Tolerance	A/A
SHMT (C1420T): Gut inflammation & 'Leaky Gut'	G/G
SUOX (S370S): Sulfite detoxification	T/T

Circulatory System: Blood Pressure

ADD1 (G460W): Blood pressure control	T/T
NOS3 (G894T): Vasodilation & platelet aggregation	T/T
AGT (M235T): Blood flow regulation	A/G
ACE (G>C): Blood pressure control	C/C
ACE (I/D): Blood pressure control	I/I

Circulatory System: Blood Clotting & Coagulation

Factor II (G20210A): Blood clotting	G/G
PAI-1 (4G/5G): Blood clotting	G/G

Circulatory System: Cardiovascular

CETP (I405V): HDL-cholesterol	A/A
PON1 (Q192R): Antioxidant HDL-linked & inflammation	C/T
APOC3 (C3238G): Triglycerides	C/C
APOE: Cholesterol Metabolism, Heart Disease & Dietary Saturated Fat Tolerance	E3/E3
LIPC (250 G>A): Cholesterol metabolism	G/G
LPL (1421 C>G): Triglycerides clearance and HDL-cholesterol	C/C

Inflammation & Immunity

HMOX1 (A-413T): Anti-inflammatory & antioxidative protection	T/T
TNF-α (-308 G>A): Pro-inflammatory	A/A
CRP4 (G3872A): Low grade chronic inflammation	C/T
IL-1A (4845G>T): Inflammatory response	A/C
IL-1A (-889 C/T): Acute inflammatory response	A/G
IL-1RN (2018C>T): Active inflammatory response	C/T
IL-1β (3954C>T): Active inflammatory response	G/A
IL-1β (-511A>G): Active inflammatory response	G/A
IL6R (481A>C): Acute inflammatory response	A/A

Structural & Cellular Integrity (Bone & Cell Membrane Health)

GDF5 (+104T/C): Osteoarthritis	A/A
MMP1 (2G/2G): Collagen breakdown	I/I
DBP (Glu416Asp): Bone health and Vitamin D transport	A/C
DBP (T>G): Vitamin D transport	G/T
IL-1RN (2018 C>T): Osteoarthritis	C/T
PEMT (G523A): Cell membrane integrity	T/C
VDR Fok1: Vitamin D requirements	A/G
TIMP4 (-55C/T): Osteoarthritis	C/C
VDR BsmI: Regulation of collagen formation	G/G
VDR Taq1: Bone density	A/A

Summary of Genetic Results

Energy & Weight Management

TCF7L2 (C>T): How effective will a lower-fat diet be for weight management?	C/C
FABP2 (Ala54Thr): How effective will a lower-carbohydrate diet be for weight management?	C/T
IRS1 (T>C): How effective will a lower-fat diet be for weight management?	C/T
PPARG (Pro12Ala): Benefit of restricting certain types of fat intake for weight loss	C/C
ACE (I/D): How effective will a lower-carbohydrate diet be for weight management?	C/C
SLC2A2 (Thr110Ile): How effective will a lower-carbohydrate diet be for weight management?	G/G

Diabetes & Insulin Resistance

ADRB2 (A16G): Insulin resistance risk with refined carbohydrate intake	G/G
PPARG (Pro12Ala): Insulin resistance risk	C/C
IRS1 (T>C): Insulin resistance risk	C/T
SLC2A2 (Thr110Ile): Glucose 'carrier' in blood	G/G
TCF7L2 (C>T): Type 2 diabetes risk	C/C

Pharma & Hormone Therapy

BDNF (Val66Met): Response to Lithium treatment for Bipolar Disorder	C/C
CYP1B1 (Val432Leu): Hormone therapy, breast & prostate health	G/G
COMT (Val158Met): Methylation & Estrogen Metabolism	A/G
CYP17A1 (34 T>C): Use of estrogen containing hormone therapy	A/G
MAO-A (R297R): Monoamine oxidase inhibitors	G/T
NAT2*12A: Acetylation	A/G
SOD2 (Val16Ala): HT recommendation	A/G
SULT1A1*2 (638 G>A): Sulfation	A/G
VDR Fok1: HT and breast health	A/G
ANKK1 (Taq1A): Dopamine receptor function	G/G
APOE: Estrogen hormone replacement & HT-associated thrombosis	E3/E3
Factor II (G20210A): Use of oestrogen containing HTs	G/G
Factor V (R506Q): Use of oestrogen containing HTs	C/C
NQO1*2 (C609T): Quinones	G/G
OPRM1 (A118G): Pain management	A/A
PAI-1 (4G/5G): HT recommendation	G/G
VDR BsmI: Osteoporosis prevention with hormone therapy	G/G

Thyroid Health

TNFα (-308 G>A): Risk of autoimmune thyroid diseases	A/A
DIO2 (Thr92Ala): Hypothyroidism (T4/T3 hormone conversion)	C/T
FOXE1 (A>G): Hypothyroidism	A/G
MLH1 (-93 A>G): Mismatch repair	A/G

Iron Metabolism

HFE (C282Y): Iron overload risk	G/G
HFE (H63D): Iron overload risk	C/C
TMPRSS6 (V736A): Iron deficiency risk	G/G

Circadian Rhythms

CLOCK (3111 T>C): Circadian Rhythms e.g. blood pressure, hormone secretion, diabetes & stress	A/G

Additional Information

Methodology

SNP (Single Nucleotide Polymorphism) detection takes place using a biomedical technology called polymerase chain reaction (PCR). During this process, a few copies of a piece of DNA are amplified generating an exponential number of copies of a DNA sequence. Variations in the genes, called polymorphisms, are detected and feedback on the possible (disease) associations of these variations are provided in a report format.

Glossary

Amino acids - Organic compounds that combine to form a protein.
Carrier - An individual who carries gene variants but usually does not display that trait or show symptoms of the disease.
DNA (deoxyribonucleic acid) - The molecule that encodes genetic information.
DNA sequence - The relative order of base pairs.
Gene - The fundamental physical and functional unit of heredity.
Gene expression - The process by which a gene's coded information is converted into the structures present and operating in the cell.
Gene product - The biochemical material - either RNA or protein - resulting from the expression of a gene.
Genome - All the genetic material in the chromosomes of an organism.
Heterozygote - An individual with two different alleles at one locus (position) on the chromosome pair.
Homozygote - An individual with two identical alleles at one locus (position) on the chromosome pair.
Locus (pl. loci) - The position of a gene on a chromosome.
Mitochondrial DNA - DNA inherited only from your mother.
Mutation - Any heritable change in the DNA sequence. See also polymorphism.
Nucleotide - A subunit of DNA consisting of a base: adenine, guanine, thymine or cytosine.
Polygenic disorders - Genetic disorders resulting from the combined action of alleles of more than one gene (e.g. heart disease, obesity).
Polymorphism - A difference in DNA sequence among individuals.
Protein - A large molecule composed of amino acids in a specific order - of which the order is determined by the sequence of nucleotides in the gene coding for the protein.

GENEWAY™ Disclaimer

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Approved By

Approval Signatures

Medical Scientist / Geneticist

Dietitian

Medical Laboratory Scientist