

Nutrigenetic Report



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www.eva-precisionnutrition.com

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EVA NUTRITION is pleased to provide you with your Personalized Nutrition Report based on your individual genetic profile. Your recommendations are based on the most current evidence-based scientific research that has been published in peer-reviewed journals and reviewed by our team of world-renowned experts in the field of nutrigenomics.

We analyzed your genetic code from your saliva sample to determine how your genes can influence recommendations related to Type 2 diabetes predisposition, weight management, body composition, nutrient metabolism and requirements, cardiometabolic health, food intolerances, eating behaviour, sweet taste, best diet type. Based on these results, we developed a series of nutrition and performance-related recommendations that are aligned with your genetic profile.

Remember: EVA NUTRITION is not in the business of mining data. Your results are yours and only yours. EVA NUTRITION never will sell or share your data with anyone else.

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This test was performed in a **CLIA** and **CAP** accredited laboratory.



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Genetics 101

Human genome: is a complete set of nucleic acid sequences for humans, encoded as DNA within the 23 chromosome pairs in cell nuclei and in a small DNA molecule found within individual mitochondria. These are usually treated separately as the nuclear genome, and the mitochondrial genome. Haploid human genomes, which are contained in germ cells consist of three billion DNA base pairs while diploid genomes (found in somatic cells) have twice the DNA content.

Genotype: is an organism's set of heritable genes that can be passed down from parents to offspring. The genes take part in determining the characteristics that are observable (phenotype) in an organism, such as hair color, height, etc. The collection of all genetic possibilities for a single trait are called alleles. The genotype is one of three factors that determine phenotype. The other two are the environmental (not inherited) and the epigenetics (inherited) factors.

Gene: is the basic physical and functional unit of heredity. Genes are made up of DNA. Some genes act as instructions to make molecules called proteins. However, many genes do not code for proteins. Every person has two copies of each gene, one inherited from each parent. Most genes are the same in all people, but a small number of genes (less than 1 percent of the total) are slightly different between people. Alleles are forms of the same gene with small differences in their sequence of DNA bases. These small differences contribute to each person's unique physical features.

Single-nucleotide polymorphism (SNP, pronounced snip) is a DNA sequence variation occurring when a single nucleotide adenine (A), thymine (T), cytosine (C), or guanine (G) in the genome (or other shared sequence) differs between members of a species or paired chromosome in an individual. For example, two sequenced DNA fragments from different individuals, AAGCCTA to AAGCTTA, contain a difference in a single nucleotide. In this case we say that there are two allele: C and T. Almost all common SNPs have only two alleles.

A **heterozygote** is an individual having two different alleles at a genetic locus (Bb). A homozygote is an individual having two copies of the same allele at a locus (BB, bb). The term **homozygote** is also sometimes applied to larger genetic entities, such as a whole chromosome: a homozygote is then an individual having two copies of the same chromosome.

Ins/Del Indicates the presence (In, insertion) or the absence (Del, deletion) of a nucleotide sequence. Terms used to define a genotype.

Genetic risk: a term used in the context in which the existence of one or more genetic variations or haplotype(s) is associated in the scientific literature with an increase in the chances of occurrence of a particular disease or metabolic disorder.

Genetic score: a numeric value or a positive/negative assessment, established using a specific algorithm, and associated with a specific recommendation.

Ins/Del: indicates the presence (In, insertion) or the absence (Del, deletion) of a nucleotide sequence. Terms used to define a genotype.

Section I: Optimal Nutrition

Thank you for taking the **EVA DIET PLUS** program – this section will give you your results and all you need to know about how to make useful modifications to your diet and lifestyle in order to benefit your health and wellbeing. You should read the report carefully and also discuss it with your nutritionist who will be able to help you to plan the recommended changes. If you need to lose weight, please also consult section II.

Your Results Overview

Food compounds, Intolerances	Your Risk
Lactose intolerance	ELEVATED
Celiac disease predisposition	LOW
Carbohydrates sensitivity and T2D risk score	ELEVATED
Fat sensitivity and cardiovascular risk	ELEVATED
Detoxification	LOW
Oxidative stress and antioxidants needs	ELEVATED
Inflammaging and inflammation	MODERATE
Vitamin A	LOW
Folate and homocysteine	MODERATE
Vitamin B12	MODERATE
Vitamin D and bone health	ELEVATED
Salt sensitivity and high blood pressure risk	ELEVATED
Caffeine sensitivity and cardiovascular risk	ELEVATED
Sleep and eating behaviour	INCREASED
Sugar preferences	LOW
Weight gain predisposition	ELEVATED
Iron overload	LOW
Low iron status	MODERATE

Results of Genetic Testing Food intolerances and Sensitivities

NUTRIENT	GENE	MARKERS	RESULTS	YOUR RESPONSE	ACTION
LACTOSE	LCT	rs4988235	CC	Lactose intolerance	Avoid lactose
GLUTEN (CELIAC DISEASE)	HLA	rs4713586	TT	Negative No predisposition for celiac disease	Normal for gluten
		rs4639334	GG		
		rs7454108	TT		
		rs2395182	GT		
		rs7775228	TT		
		rs2187668	GG		
FRUCTOSE	ALDOB	rs1800546	GG	Tolerant	Normal for fructose 40 g daily
		rs76917243	GG		
SALT SENSITIVITY AND HIGH BLOOD PRESSURE RISK	ACE	rs4341	DD	**	High sensitive to salt, reduce sodium intake <1,600 mg / day sodium
	AGT	rs699	CC		
	NOS3	rs 1799983	GG		
	BDKRB2	rs1799722	CC		
ALCOHOL SENSITIVITY	ADH1C	rs698	GG	Slow metabolizer	Reduce alcohol consumption.
NICKEL SENSITIVITY	GSTM1	I/D	I		Normal
	GSTT1	I/D	I		
	TNFa	rs1800629	GG		
CAFFEINE SENSITIVITY AND CARDIOVASCULAR RISK	CYP1A2	rs762551	CC	Slow metabolizer	Limit caffeine intake

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Nutrients Metabolism

BIOLOGICAL PROCESS	GENES	MARKERS	RESULT	YOUR RESPONSE	ACTION
CARBOHYDRATES: <ul style="list-style-type: none"> Metabolism Transport Energy Sensitivity to refined carbs and type 2 diabetes risk.	ACE	rs4341	DD	**	High sensitivity to refined carbohydrates. Limit intake of refined carbohydrates: glycemic load <70 / day; consume at least 30 g/day fibre
	PPARG	rs1801282	CC	**	
	TCF7L2	rs7903146	TT	**	
	ADRB2	rs1042713	AG	*	
	ADRB3	rs4994	TT	-	
	CLOCK	rs1801260	CT	*	
	PLIN	rs894160	GG		
	INSIG	rs7566605	GG		
FATS: <ul style="list-style-type: none"> Metabolism Transport Energy Cardiovascular diseases risk	APOC3	rs5128	GG		Increased sensitivity to saturated fat
	APOA5	rs662799	AA		
	APOA2	rs5082	TT		
	LPL	rs328	CC	*	Limit saturated fat intake to < 16g / day Increase unsaturated fat intake
	FABP2	rs1799883	GA	*	
	FTO	rs9939609	AT	*	MUFA 14% from total calories daily intake
	CETP	rs708272	CC	**	
	LEPR	rs1137101	AA		PUFA 10% from total daily calories intake
	MC4R	rs17782313	CT	*	
	PLIN	rs894160	GG		
	APOE	rs429358	CT	*	
			rs7412	CC	**
	LIPC	rs2070895	GG		
OXIDATIVE STRESS & DETOXIFICATION <ul style="list-style-type: none"> DNA damage Free radicals Antioxidants needs 	GSTM1	I/D	I		Standard recommendation for cruciferous: 1-2 servings per week Standard recommendation for grilled meat Increase antioxidants
	GSTT1	I/D	I		
	CYP1A2	rs762551	CC		
	EPHX1	rs1051740	CT	*	
	CAT	rs1001179	TT	**	
	GPX	rs1050450	CC		
	SOD2	rs4880	CT	*	
INFLAMMATION AND INFLAMMAGING	IL6	rs1800795	CG	*	Moderate predisposition to inflammation: 2 g Omega 3 / day. Antiinflammation diet highly recommended.
	TNF	rs1800629	GG		
	IL6R	rs222814	AC	*	
	CRP	rs1205	TT		
VITAMIN A	BCMO1	rs11645428	AA		Normal - keep to your RDA of Vitamin A

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FOLATE AND HOMOCYSTEINE	MTHFR	rs1801133	CT	*	Moderate predisposition to hiperhomocysteinemia: at least 600 µg folic acid, 10 mg Vit B6. Increase choline, 200 mg daily
		rs1801131	AA		
VITAMIN B12	FUT2	rs601338	AG	*	Since you possess the GA variant of the FUT2 gene, you have an elevated risk for vitamin B12 deficiency. It is, therefore, important for you to meet the RDA for vitamin B12 of 2.4 mcg daily.
VITAMIN C	GSTT1	Ins/Del	I		Low risk for vitamin C deficiency. Standard recommendation, 75 mg for women, 90 mg for men/daily
BONE HEALTH AND VITAMIN D METABOLISM	VDR	rs731236	CT	*	Increased risk for vitamin D deficiency Recommendation: 1000 IU / day Vitamin D Increase intake of collagen precursors
	CYP2R1	rs10741657	GG	**	
	GC	rs 2282679	AA		
	COL1A1	rs1800012	GG		
IRON OVERLOAD	SLC17A1	rs17342717	CC		Low risk for hemochromatosis
	HFE	rs1800562	GG		
		rs1799945	CC		
		rs1800730	AA		
LOW IRON	TMPRSS6	rs4820268	AG	*	You are at a moderate risk for low iron status. To minimise your risk for low iron, meet the RDA for iron and consume food sources of vitamin C with heme iron-containing foods to increase iron absorption
		rs855791	AG	*	
	TFR2	rs7385804	AC	*	
	TF	rs3811647	GG		

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Sleep, Eating Behavior and Sugar Preferences

BIOLOGICAL PROCESS	GENES	MARKERS	RESULTS	YOUR RESPONSE	ACTION
SLEEP AND EATING BEHAVIOUR	CLOCK	rs1801260	CT	*	Try to sleep well, and longer if you don't sleep much Eat breakfast earlier, and don't take late lunches or dinner. Moderately increased snacking & craving predisposition Careful with your snacking, avoid high calories snacks. Care with binge eating
	FTO	rs9939609	AT	*	
	MC4R	rs17782313	CT	*	
	LEP	rs7799039	AG	*	
	LEPR	rs1137101	AA		
	GHRL	rs696217	GG		
Sugar preferences	GLUT2	rs5400	CC		Normal

Weight Gain Predisposition And Weight Management

BIOLOGICAL PROCES	GENES	MARKERS	RESULTS	YOUR RESPONSE	ACTION
Weight gain predisposition	PPARG	rs1801282	CC	**	Increased predisposition for weight gain Because you have polymorphism on the genes FTO and UCP2 you can increase protein intake, decrease carbohydrates intake and increase exercises.
	ADRB2	rs1042713	AG	*	
	PLIN	rs894160	GG		
	CLOCK	rs1801260	CT	*	
	APOA2	rs5082	TT		
	FABP2	rs1799883	GA	*	
	MC4R	rs17782313	CT	*	
	FTO	rs9939609	AT	*	
	LEP	rs7799039	AG	*	
	LEPR	rs1137101	AA		
	GHRL	rs69621	GG		
	UCP2	rs660339	TT	**	
	rs659366	TT	**		

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Power/Endurance Algorithm

POWER/GENES			ENDURANCE /GENES		
Gene	Result	Effect	Gene	Result	Effect
ACE	DD	●●	ACE	DD	-
AGT	CC	●	ADRB2	AG	●
ACTN3	CT	●	ACTN3	CT	●
TRHR	AA	-	BDKRB2	CC	-
PPARA	CG	●	COL5A1	CT	-
VEGF	CG	-	NRF	AA	-
VDR	CT	-	PPARGC1A	AG	-
IL6	CG	-	PPARA	CG	●
			CRP	TT	●●
			VEGF	CG	-

Food Intolerances And Sensitivities

LACTOSE INTOLERANCE

Lactose Intolerant



Lactose is digested by an enzyme called lactase – in many parts of the world the presence of this enzyme decreases significantly after the first few years of life resulting in reduced ability to digest lactose. In Europe a genetic variation results in lactose persistence, i.e. the continuing ability throughout life to digest lactose however in Italy the prevalence of lactose intolerance is common.

GENES ANALYZED

MARKERS

RISK VARIANT

YOUR RESULT

LCT

rs4988235

CC

CC

CONCLUSION: You are Lactose intolerant. Reduce or avoid lactose

Your Result, CC, means that you, like the majority of the world population, do not possess the variant that causes lactase persistence therefore it is strongly recommended that you avoid all lactose.

Symptoms of lactose intolerance

- diarrhea,
- abdominal pain
- flatulence,
- bloating

Most patients with lactose intolerance can consume small amounts of lactose (<12 g lactose, representing about 240 ml of milk) without major symptoms.

Lactose can be present in many foods, such as:

- Milk and dairy products including ice cream
- Bread and other pastries
- Processed breakfast cereals
- Instant potatoes, soups
- Margarine, butter
- Processed meat
- Salad sauces
- Candies and other snacks
- Mixtures for cakes, biscuits and cakes

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Nutrition Considerations with a Lactose-Free Diet

Research shows that individuals who consume a lactose-free diet are at a greater risk of inadequate calcium and vitamin D intake compared to individuals who can tolerate lactose.* Calcium and vitamin D are important for building and maintaining strong bones and teeth. If you have lactose intolerance, you can still get enough calcium and vitamin D in the diet through lactose-free milk as well as fortified milk alternatives such as soy and almond beverages. Calcium and vitamin D are not added to all milk alternatives, so be sure to read the label to check that the products you are choosing have been “fortified with calcium and vitamin D.

*Koek et al. The T-13910C polymorphism in the lactase phlorizin hydrolase gene is associated with differences in serum calcium levels and calcium intake. Journal of Bone and Mineral Research. 2010;25(9):1980-7.

CELIAC DISEASE AND GLUTEN SENSITIVITY

Low Predisposition



Gluten is a general name for the proteins found in wheat (wheatberries, durum, emmer, semolina, spelt, farina, farro, graham, KAMUT® khorasan wheat and einkorn), rye, barley and triticale – a cross between wheat and rye. Gluten helps foods maintain their shape, acting as a glue that holds food together. Gluten can be found in many types of foods, even ones that would not be expected. For some people, gluten can cause severe digestive problems leading to nutrient malabsorption, anemia and many serious health problems.

GENES ANALYZED	MARKERS	RISK VARIANT	YOUR RESULT
HLA	rs4713586	ALGORITHM	TT
	rs4639334		GG
	rs7454108		TT
	rs2395182		GT
	rs7775228		TT
	rs2187668		GG

Your Risk: Very low celiac disease risk

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Celiac Disease & Gluten Sensitivity

Celiac disease represents the most severe form of gluten intolerance and affects about 1-2% of the population. People with celiac disease require a gluten-free diet for life. Non-celiac gluten sensitivity (NCGS) is a milder form of gluten intolerance that may affect 5-6% of the population. Individuals with NCGS often experience diarrhea, abdominal pain, fatigue and headaches when they consume gluten-containing foods. However, these adverse effects of gluten in individuals who do not have celiac disease are poorly understood and NCGS remains controversial.*

HLA GENES

The HLA genes produce a group of proteins called the human leukocyte antigen (HLA) complex, which are responsible for how the immune system distinguishes between the body's own proteins and foreign, potentially harmful proteins. Research has shown that the HLA genes are the most important genetic predictor of gluten intolerance. Approximately 99% of people with celiac disease and 60% of those with non-celiac gluten sensitivity have the DQ2 or DQ8 risk version of HLA, compared to only 30% of the general population. Six variations in the HLA genes can be used to classify individuals into predefined risk groups for gluten intolerance. Risk prediction is based upon a scale of low, medium or high risk.

Consideration for a Gluten-Free Diet

Gluten-free foods include all unprocessed vegetables, fruit, dairy products, meat, fish, poultry, nuts, legumes, seeds, fats and oils. Gluten-free grains include rice, quinoa, corn, buckwheat, amaranth, and millet. For individuals who need to follow a gluten-free diet, foods to avoid include any products that are made with wheat, rye, barley or triticale. Pure oats should be consumed in moderation if tolerated, while regular oats (which contain wheat) should be avoided. For the vast majority of the population, consuming a gluten-free diet is unnecessary. Processed gluten-free products often have more calories, sodium, added sugar and fat and fewer nutrients compared to their gluten containing counterparts.

FRUCTOSE INTOLERANCE

Normal Risk



Fructose is a sugar that occurs naturally in fruits, vegetables, and honey. When a person is unable to digest or absorb fructose, they may have fructose intolerance. When a person has an intolerance to fructose, they may experience bloating, abdominal pain, and diarrhea. People with a more severe form of fructose intolerance called hereditary fructose intolerance will develop symptoms in infancy. Without treatment, they may develop life threatening complications, such as liver and kidney failure.

Fructose malabsorption

Fructose malabsorption is a type of food sensitivity that affects 40% of those in the western hemisphere. As with other food sensitivities, a combination of genetics, lifestyle factors, exposure to fructose, and overall health may play a part in causing it. People with fructose malabsorption cannot properly absorb or digest fructose.

GENE ANALYZED	MARKERS	RISK VARIANT	YOUR RESULT
ALDOB	rs1800546	C	GG
	rs76917243	T	GG

CONCLUSION: no polymorphism were identified on the ALDOB gene, the risk of hereditary intolerance being excluded. If, however, you have symptoms of fructose intolerance, the cause should be looked for elsewhere, as it may be a malabsorption of fructose due to other types of conditions such as celiac disease, excessive consumption of fruit juices, the presence of an excessively degrading microbial flora.

Foods to avoid in case of malabsorption:

- Sugar, coconut and palm sugar
- Fruits that contain large amounts of fructose: cherries, watermelon, pears, apples, mangoes
- Vegetables: asparagus, chicory, peas
- Fruit juices
- Sorbitol
- Honey
- Molasses and molasses syrup
- Jams, marmalades
- Products for diabetics
- Agave syrup and maple essence syrup

You can consume:

- low fructose fruits such as blueberries, raspberries, citrus bananas, kiwis, in small quantities
- vegetables, broccoli, cauliflower, carrots, squashes and lettuce unless you are also intolerant to other short-chain carbohydrates in the same family as fructose. If this is the case, consult a registered dietitian for help identifying these foods in your diet.

SALT SENSITIVITY AND HIGH BLOOD PRESSURE RISK

Raised Sensitivity



Sodium is an essential micronutrient that regulates blood pressure and volume. Most people consume more sodium than their body needs. The major side effect of excess sodium is high blood pressure, which can lead to cardiovascular complications. However, some individuals do not experience as much increase in blood pressure in response to excess sodium intake as others.

Research shows that the effect of sodium intake on blood pressure is influenced by variations in a gene called ACE* and other genes.

*Poch E et al. Molecular basis of salt sensitivity in human hypertension: Evaluation of renin angiotensinaldosterone system gene polymorphisms. Hypertension. 2001;38:1204-9.

GENES ANALYZED	MARKERS	RISK VARIANT	YOUR RESULT
ACE	rs4341	ALGORITHM	DD
AGT	rs699		CC
NOS3	rs1799983		GG
BDKRB2	rs1799722		CC

CONCLUSIONS: You have variations in the AGT gene, homozygous polymorphism and therefore an increased sensitivity to salt and moderately increased risk of hypertension associated with an increased intake of sodium. It is recommended to decrease sodium intake <1,600mg/day. You have a polymorphism in the BDKRB2 gene which together with ACE/D can increase water retention and the risk of hypertension independent of sodium consumption. The ACE/DD polymorphism predisposes you to cellulite.

The **ACE gene** codes for an enzyme that has a key role in cardiovascular health because it is closely involved in the regulation of the processes of vasoconstriction and vasodilation. The ACE gene contains an "Insertion/Deletion" polymorphism (allele "I" = Insertion; allele "D" = Deletion), that influences enzyme activity. Recent studies have demonstrated an association between the genotypes I/D and I/I and Dietary salt sensitivity affecting blood pressure.

The **AGT gene** provides instructions for making a protein called angiotensinogen. This protein is part of the renin-angiotensin system, which regulates blood pressure and the balance of fluids and salts in the body.

NOS3 produces nitric oxide (NO), a cell signalling molecule implicated in vascular smooth muscle relaxation and plays a key role in the regulation of vascular tone, peripheral resistance and has vasoprotection by suppressing platelet aggregation, leukocyte adhesion and smooth muscle cell proliferation.

Bradykinin is one of the peptides known as kinins. This peptide has been recognized as a significant vasodilator and may influence edema. Bradykinin is an endothelial dependent vasodilator and acts via the Bradykinin B2 receptor (BDKRB2). It is associated with vasodilation and blood pressure control. Efficiency of

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muscular contraction and cell hydration. The C allele is associated with lower receptor mRNA expression and is associated with increased thirst and fluid loss.

WHY IS SALT (SODIUM) IMPORTANT FOR YOUR HEALTH?

Salt is made up of sodium and chloride. It's the sodium content that's of most concern because it can cause high blood pressure in those genetically-susceptible. Historically, government agencies have stressed the importance of reducing sodium intake at or below 2300 milligrams (mg) per day. This amount of sodium translates as 1 teaspoon of salt per day and includes all the salt we add to our foods and the prepared foods we consume. In general, our commercial foods tend to be highly salted for flavor and it's a good idea for all of us to be aware of how much salt we ingest on a daily basis. However, for those susceptible to salt-sensitive high blood pressure, it's essential to cut back on salt and its sodium content.

- Taste your food before salting it. You may not need the extra salt!
- Know where the hidden salt in foods is. Assume most convenience foods are high in salt content.
- Consider adding herb mixes to your food to enhance the flavor of your food without adding salt.

High Sodium Food(to avoid)

Meats, Poultry, Fish, Legumes, Eggs and Nuts

- Smoked, cured, salted or canned meat, fish or poultry including bacon, cold cuts, ham, frankfurters, sausage, sardines, caviar and anchovies, salami, prosciutto, mortadella.
- Frozen breaded meats and dinners, such as burritos and pizza
- Canned entrees, such as ravioli, spam and chili
- Salted nuts
- Beans canned with salt added

Dairy Products

- Buttermilk
- Regular and processed cheese, cheese spreads and sauces
- Cottage cheese

Breads, Grains and Cereals

- Bread and rolls with salted tops
- Quick breads, self-rising flour, biscuit, pancake and waffle mixes
- Pizza, croutons and salted crackers
- Prepackaged, processed mixes for potatoes, rice, pasta and stuffing

Vegetables and Fruits

- Regular canned vegetables and vegetable juices
- Olives, pickles, sauerkraut and other pickled vegetables
- Vegetables made with ham, bacon or salted pork
- Packaged mixes, such as scalloped or au gratin potatoes, frozen hash browns and Tater Tots
- Commercially prepared pasta and tomato sauces and salsa

Soups

- Regular canned and dehydrated soup, broth and bouillon
- Cup of noodles and seasoned ramen mixes

Fats, Desserts and Sweets

- Soy sauce, seasoning salt, other sauces and marinades
- Bottled salad dressings, regular salad dressing with bacon bits
- Salted butter or margarine
- Instant pudding and cake, large portions of ketchup, mustard

ALCOHOL SENSITIVITY

Positive Response



Many people consider alcohol a good relaxing agent, social lubricant or simply enjoy the sensation it generates. Alcohol is metabolized through several processes or pathways. Alcohol dehydrogenase 1C (ADH1C) metabolises alcohol, creating acetaldehyde which is a toxic substance responsible for some of the negative effects of excessive alcohol consumption. Acetaldehyde is itself metabolised by aldehyde dehydrogenase into non-toxic substances. The ADH1C gene polymorphism screened in Eurogenetica DIET PLUS causes an amino acid change in the protein sequence which affects enzyme activity.

GENES ANALYZED

MARKERS

RISK VARIANTS

YOUR RESULT

ADH1C

rs698

AA, AG

GG

ACTION PLAN: Positive effect of alcohol on cholesterol The test results show that you are homozygous for the Val (Valine) allele (genotype G/G) which is characterised by the presence of valine at a specific position in the protein. Valine results in a lower activity enzyme which metabolises alcohol more slowly compared to the "Ile" genotype (presence of the amino acid Isoleucine) and is associated with higher levels of the "good" cholesterol, HDL in moderate drinkers (up to 1 units per day). Moderation is also advised because alcohol is metabolised more slowly.

Moderate alcohol consumption

Limits of regular alcohol consumption as defined and endorsed by medical authorities and government health departments recommend no more than 14 units of alcohol per week for men, and no more than 7 units of alcohol per week for women. Furthermore, health departments now favor a daily limit of alcohol as opposed to a weekly limit of consumption. The daily limit of alcohol consumption would be a limit of 2 units per day for men and 1 unit for women. Regular consumption of alcohol is not a standard recommended by any scientific board or governing agency for health promotion.

A unit (drink) of alcohol is defined as:

- 12 oz ordinary strength beer / lager
- 1 glass (150 ml / 5 fl oz) wine
- 1 shot-size measure of sherry / vermouth (1.5 oz)
- 1 shot-size measure of distilled spirits (1.5 oz)

Pros and cons of moderate alcohol use

- Moderate alcohol consumption may provide some health benefits, such as:
- Reducing your risk of developing and dying of heart disease

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- Possibly reducing your risk of ischemic stroke (when the arteries to your brain become narrowed or blocked, causing severely reduced blood flow)
- Possibly reducing your risk of diabetes

However, eating a healthy diet and being physically active have much greater health benefits and have been more extensively studied.

Keep in mind that even moderate alcohol use isn't risk-free. For example, even light drinkers (those who have no more than one drink a day) have a tiny, but real, increased risk of some cancers, such as esophageal cancer.

NICKEL SENSITIVITY

Normal Risk



GENES ANALYZED	MARKERS	RISK VARIANT	YOUR RESULT
TNF	rs1800629	ALGORITM	GG
GSTM1	Ins/Del		I
GSTT1	Ins/Del		I

CONCLUSION: The absence of risk alleles reduces the possibility of contact dermatitis.

One of the most common contact allergens is nickel which is present in most jewellery. Continued exposure can result in itchy rashes in sensitive people, these rashes can become extremely uncomfortable and develop into painful lesions. Your genetic test showed that the genes TNF (involved in the inflammatory response) and GSTM1 & GSTT1 (involved in toxin removal) do not carry the variations that are associated with a predisposition to skin contact allergy. These results do not raise the risk but cannot exclude the possibility of developing sensitivity to nickel

Nickel allergy is a common cause of allergic contact dermatitis — an itchy rash that appears where your skin touches a usually harmless substance. Nickel allergy is often associated with earrings and other jewelry. But nickel can be found in many everyday items, such as coins, zippers, cellphones and eyeglass frames.

Sources of nickel exposure: Jewelry for body piercings, other jewelry, including rings, bracelets, necklaces and jewelry clasps, watchbands, clothing fasteners, such as zippers, snaps and bra hooks, belt buckles, eyeglass frames, coins, metal tools, keys, military "dog-tag" ID, E-cigarettes.

CAFFEINE SENSITIVITY

Higher Sensitivity



Caffeine is the most widely consumed stimulant in the world and coffee is the most significant source of caffeine, with tea, soda and chocolate also contributing to intakes. Research has shown that caffeine can influence cardiovascular health. However, the reported effects of coffee on the cardiovascular system have been inconsistent and at times have appeared contradictory. Some studies reported a link between high coffee consumption and an elevated risk of high blood pressure and heart disease, while other studies have shown no effect or even a protective effect with moderate intake. Two landmark studies* have now shown that the effect of coffee on cardiovascular disease depends on a variation in a gene called CYP1A2.

*Cornelis et al. Coffee, CYP1A2 genotype, and risk of myocardial infarction. *Journal of the American Medical Association*. 2006;295:1135-41.

Palatini P et al. CYP1A2 genotype modifies the association between coffee intake and the risk of hypertension. *Journal of Hypertension*. 2009;27:1594-1601.

GENES ANALYZED	MARKERS	RISK VARIANTS	YOUR RESULT
CYP1A2*1F	rs762551	CA, CC	CC

ACTION PLAN: You are a slow metabolizer. Limit caffeine intake <200 mg daily

CYP1A2 GENE codes for a Cytochrome P450 enzyme that is involved in Phase I (activation) of removing toxins, such as carcinogens from food and smoke, it also metabolises caffeine. Interactions have also been reported for the vitamin D receptor (VDR) which may affect the influence of caffeine on bone mineral density.

If your genotype is AA you are a fast metabolizer, if your genotype is CC, CA you are a slow metabolizer. Slow metabolizers can reduce daily coffee intake.

HOW DOES CAFFEINE AFFECT YOUR HEALTH?

Caffeine is a mild stimulant that affects the central nervous system. Many people regularly consume caffeine in drinks, food and medications such as pain relievers and flu medicines. While a moderate amount of caffeine is usually harmless, in some people excessive caffeine intake can cause anxiety, insomnia, headaches, and stomach irritation. Excessive caffeine can be bad for bone health as caffeine can prevent the absorption of vitamins and minerals in your system, including the vitamins and minerals such as calcium that build bone.

- Take into account all of your caffeine sources including over-the-counter medications and beverages.
- To cut down on caffeine consumption, consider substituting herbal teas, hot cider, hot water with lemon, or decaffeinated drinks
- Be aware and read labels: caffeine is an ingredient in more than 1,000 over-the-counter and prescription drugs.

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- Drip coffee has the highest concentration of caffeine (115–135 milligrams per 6 oz cup). Other common caffeine sources include espresso (100 mg per 2 oz), black teas (40-60 mg per 6 oz), certain soft drinks (35-55 mg per 12 oz), and chocolate (10-30 mg per 1.5 oz).

CAFFEINE CONTENT OF SOME PRODUCTS

NAME OF PRODUCT	CAFFEINE CONTENT (mg/100ml)
American coffee	74.7
Brewed black tea	22.5
Brewed green tea	12.5
Cappuccino	101.1
Coca Cola®	9.7
Coke Zero®	9.6
Dark chocolate, cocoa	59
Diet Coke®	9.7
Espresso coffee	194
Hot chocolate, milk chocolate	20
Mountain Dew®	15
Red Bull®	32

Nutrients Metabolism

CARBOHYDRATES SENSITIVITY AND T2DM PREDISPOSITION

High Sensitivity



Various scientific studies have looked at the relationship between genes, environment and lifestyle, from glucose absorption and metabolism to blood glucose and insulin sensitivity. The genes that emerged as important in these studies were inserted in the table below. Having an additive effect it is possible to calculate a useful genetic score for changing the levels of refined carbohydrates and fiber in your diet. The risk score obtained can also give you an idea of your predisposition to type 2 diabetes.

GENES ANALYZED	MARKERS	RISK VARIANT	YOUR RESULT
ACE	rs4341	ALGORITHM	DD
PPARG	rs1801282		CC
TCF7L2	rs7903146		TT
ADRB2	rs1042713		AG
ADRB3	rs4994		TT
CLOCK	rs1801260		CT
PLIN	rs894160		GG
INSIG	rs7566605		GG

Conclusions: You have polymorphisms in the ACE, PPARG, ADRB2, CLOCK, TCF7L2 genes and therefore an increased sensitivity 5.9/10 to refined carbohydrates and an increased risk for type 2 diabetes and metabolic syndrom. The rs7903146 polymorphism in the TCF7L2 gene confers the highest risk for type 2 diabetes. demonstrated that carriers of the T variant of the TCF7L2 gene present a defect in the body's response to the presence of food in the intestine. The risk genotype alters insulin secretion indirectly by reducing intestinal TCF7L2 activity which in turn reduces the secretion of incretins, (GIP) and (GLP-1)

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PPARG GENE, is involved in carbohydrate and fat sensitivity. The Ala form of this gene, denoted by a G allele, is associated with a reduced expression of certain genes, which is thought to reduce the risk of weight gain – as such, C allele carriers have an increased risk of weight gain, especially when dietary carbohydrates or saturated fat are high. The C allele is also associated with an increased risk of developing insulin resistance, which can lead to type-II diabetes, and also contribute to the development of metabolic syndrome.

ADRB2 GENE. Beta-adrenergic receptors are found in fat cells, liver and skeletal muscle where they are involved in fat mobilization, blood glucose levels and in vasodilation. Glu27 variant: increased sensitivity to refined carbohydrates

increased fat accumulation especially visceral fat in women

Higher BMI in women

Strong yo-yo effects

ACE GENE. D allele of the ACE gene are more insulin sensitive, whereas people who are homozygous for the I allele of the ACE gene have greater insulin resistance and potential risk for type 2 diabetes.

INSIG2 GENE. INSIG2 protein has been functionally related to lipid metabolism by the inhibition of cholesterol and fatty acid synthesis. Minor "C" allele- is associated with more subcutaneous fat. Slightly higher BMI than G allele carriers.

CLOCK GENE is involved with our internal biological clock, called the circadian rhythm, to help us adapt to the dark & light daily cycles. These can affect many physiological functions including blood sugar, metabolism, etc. It also seems to be related to time of eating and morning fatigue. CLOCK is also associated with eating behaviour. CC and CT genotype are associated with emotional eating (is the practice of consuming large quantities of food -- usually "comfort" or junk foods -- when under stress), sleeping less, eating breakfast later same with evening meal

PLIN GENE. Modulator of adipocyte lipid metabolism. The protein encoded by this gene coats lipid storage droplets in adipocytes, thereby protecting them until they can be broken down by hormone-sensitive lipase. Its absence may result in leanness. May modulate lipolysis and triglyceride levels. The allele is associated with greater obesity risk. A allele carriers are more weight loss resistant and show greater decrease in lipid oxidation rate than GG. When there is a higher intake of complex CHO, the allele is protective against obesity. Avoid all refined CHO.

TCF7L2 GENE produces a protein called transcription factor-7 like 2 (TCF7L2). This protein, in turn, affects how the body turns on or off a number of other genes. The interaction of these proteins and genes is complex, and not yet fully understood. However, the TCF7L2 gene is one of the most consistent predictors of the likelihood of developing type 2 diabetes. People who possess the high risk CT or TT variant of the gene are at greater risk of developing type 2 diabetes. Yet, recent studies have shown that consuming whole grain foods can reduce the risk of type 2 diabetes in individuals who carry the CT or TT variant of the TCF7L2 gene.

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Based on the combined genotype of all genes related to lipid metabolism we offer the following nutritional advice:

- Max 6% total calories
- Max glycemic load = 70 / day
- Fibre = 30 g / day

What is glycemic load and glycemic index?

Carbohydrates serve as one of the body's main sources of energy. How your body responds to the various carbohydrates in foods depends on the Glycemic Index (GI) of the food. Glycemic Index is a rating scale that defines carbohydrate-rich foods on a scale from 0 to 100. Foods are ranked according to how much they raise blood-glucose levels after eating. High GI foods are rapidly digested and absorbed, which may result in large swings in blood glucose levels. Low GI foods are digested and absorbed more slowly and may result in more stable levels of blood glucose. Glycemic Load (GL) is a reference that takes into account the Glycemic Index of a food and the amount of the food that you need to eat to measure the full impact on your blood glucose levels. The higher the Glycemic Load, the greater the increase in blood glucose. To maintain long term health, consider consuming foods with a lower GL to help keep blood glucose levels steady in order to promote optimal health and well-being.

- Consume whole grains. The fibrous coat of the hull or skin from grains slows down the digestion and absorption of carbohydrates.
- Choose long-grain, brown rice as a staple because this variety of rice has the lowest GI compared to other rice.
- Pasta has a low GI, but a large portion can result in a high GL.

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FAT SENSITIVITY AND CARDIOVASCULAR RISK

High Sensitivity



Many studies have demonstrated the effects of genetic variation on transport and metabolism of dietary saturated and unsaturated fats. The processes affected involve absorption through the intestine, transport in the blood, storage and conversion into energy. Research on the interactions between nutrition, lifestyle and genetics has clearly demonstrated that the effects of these genetic variants that can modify your lipid profile, raising / lowering cholesterol for example, depend on environmental factors and in particular the type and quantity of fats in your diet. The genes selected in this panel have an additive effect and a sensitivity score has been determined which can be used to modify your diet in a beneficial way.

GENES ANALYZED	MARKERS	RISK VARIANT	YOUR RESULT
APOC3	rs5128	ALGORITHM	GG
APOA5	rs662799		AA
APOA2	rs5082		TT
LPL	rs328		CC
CETP	rs708272		CC
LEPR	rs1137101		AA
MC4R	rs17782313		CT
PLIN	rs894160		GG
FABP2	rs1799883		GA
FTO	rs9939609		AT
APOE	rs429358		CT
APOE	rs7412		CC
LIPC	rs2070895		GG

Conclusions: You have variations in the genes LPL, CETP, FABP2, FTO, MC4R, LEPR, APOE which translates into an moderately increased 4.7/10 sensitivity to saturated fats resulting in a moderately increased risk of dyslipidemia.

You must limit the amount of saturated fat to 6% of the total daily caloric intake

APOC3 GENE. Some variations in this gene are associated with hypertriglyceridemia, increased cardiovascular risk, atherosclerosis, vascular calcification.

APOA5 GENE plays an important role in regulating plasma triglyceride levels, a major risk factor for coronary heart disease. Mutations in this gene have been associated with hypertriglyceridemia and type 5 hyperlipoproteinemia.

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APOA2 GENE directs the body to produce a specific protein called apolipoprotein A-II, which plays an important role in the body's ability to utilize different kinds of fat. There are different variations in the APOA2 gene present in the human population and these different versions of the gene interact with saturated fat in unique ways to influence energy balance and ultimately the risk of obesity. Those people who have the CC variant of the gene are at a higher risk of developing obesity when consuming a diet high in saturated fats than those possessing the TT or TC variant of the gene.

LPL GENE provides instructions for making an enzyme called lipoprotein lipase. This enzyme is found primarily on the surface of cells that line tiny blood vessels (capillaries) within muscles and in fatty (adipose) tissue. Lipoprotein lipase plays a critical role in breaking down fat in the form of triglycerides, which are carried from various organs to the blood by molecules called lipoproteins.

Certain variations in the LPL gene have been shown to influence the levels of fats in the bloodstream. The LPL gene variants likely result in the production of lipoprotein lipase enzymes with altered abilities to break down triglycerides. In some cases, the enzyme is impaired, resulting in increased fat levels, a condition called hyperlipidemia. Individuals with hyperlipidemia are at greater than normal risk of developing atherosclerosis and increasing the chance of having a heart attack or stroke.

CETP GENE activity is an important component in the regulation of plasma cholesterol levels. There is an inverse relationship between CETP protein levels and HDL-cholesterol levels. The polymorphism is change from guanine (G) to adenine (A) at position 279 within intron 1 of the gene (this is often referred to as the taq1 polymorphism). The A allele results in less CETP protein and raised levels of HDL. G allele carriers (B1 according to the old nomenclature) have poorer baseline lipid profiles but respond better to low saturated fats and increased exercise – restoring good levels of HDL.

LEPR GENE provides instructions for the LEPR protein. This protein is a receptor for leptin (a hormone specific to adipocytes that regulates body weight) and is involved in regulating fat metabolism. The G allele is associated with a slow metabolism and most often with a high BMI, obesity. Several studies have shown that subjects with a GG profile and an intake of saturated fatty acids ≥ 12 g / day have a 2.9 times higher risk of obesity, 3.8 times higher risk of hypercholesterolemia and 2.4 times higher risk. high risk of hypertriglyceridemia.

FTO GENE is also known as the 'fat mass and obesity-associated gene' since it can impact weight management and body composition. This gene's role in the body is related to metabolic rate, energy expenditure and energy balance. It is also expressed in regions of the brain that are involved in the regulation of energy intake. In individuals who have undergone bariatric surgery for weight loss, variation in the FTO gene can help predict their long-term weight loss success, which can have significant implications for nutrition care plans. Research shows that for individuals with the AA or TA variant, a high intake of unsaturated fat, and low intake of saturated fat in the diet can help facilitate weight loss, decrease fat stores around the abdomen and decrease the risk for obesity.

FABP2 GENE. The most intensely studied polymorphism in the FABP2 gene is p.Ala54Thr (rs1799883). The presence of the Ala54Thr polymorphism has the effect of increasing the transport of free fatty acids in intestinal cells and postprandial triglyceride synthesis, which is associated with increased BMI, abdominal fat and obesity. The studies show an association between FABP2 Ala54Thr polymorphism with obesity, dyslipidemia, insulin resistance and type 2 diabetes in different ethnic groups.

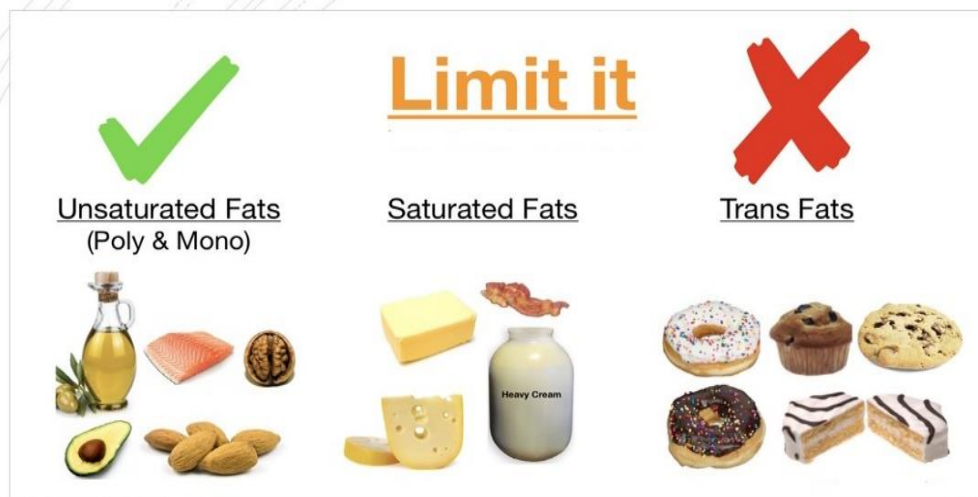
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LIPC GENE provides instructions for the production of an enzyme called hepatic lipase, which helps maintain the balance of these fat-carrying molecules by regulating the formation of LDL and the transport of HDL. In the case of allele A, physical activity is very important as well as reducing the level of saturated fats, eliminating trans fats, increasing omega3 and omega9 fats (olive oil and fish oil), reducing the intake of animal fats.

APOE GENE. There are two common polymorphisms of the APOE gene: 388 T> C (rs429358) and 526C> T (rs7412 being described three alleles ($\epsilon 2$, $\epsilon 3$ and $\epsilon 4$) that can lead to six different genotypes ($\epsilon 2 / \epsilon 2$, $\epsilon 2 / \epsilon 3$, $\epsilon 2 / \epsilon 4$, $\epsilon 3 / \epsilon 3$, $\epsilon 3 / \epsilon 4$ and $\epsilon 4 / \epsilon 4$) The three alleles encode three ApoE isoforms: E2, E3 and E4, respectively, which differ from each other by the amino acids present at positions 112 and 158. Compared to $\epsilon 2$ homozygotes, patients with the $\epsilon 2$ allele have lower levels of total circulating cholesterol (CT) and higher levels of triglycerides, while those with the $\epsilon 4$ allele appear to have higher plasma levels of CT and LDL-C. The homozygous genotype $\epsilon 2 / \epsilon 2$ is associated with type III hyperlipoproteinemia a familial dyslipidemia characterized by a combined increase in cholesterol and serum triglycerides. APOE plays an important role in lipoprotein metabolism and cholesterol homeostasis in therefore, carriers of the $\epsilon 4$ allele of the ApoE gene have a high risk of developing Alzheimer's disease.

Based on the combined genotype of all genes related to lipid metabolism we offer the following nutritional advice:

- Saturated fats = max 6% from total daily calories
- MUFA = 14% from total daily calories
- PUFA = 10% from total daily calories



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DETOXIFICATION: PHASE I

Normal Risk



CYP1A2 codes for a Cytochrome P450 enzyme that is involved in Phase I (activation) of removing toxins, such as carcinogens from food and smoke, it also metabolises caffeine.

Your genetic result for this gene (C/C) mean that you have two copies of the gene which codes for the version of the enzyme which functions well in the detoxification process but in any case it is advisable not to consume grilled or smoked meat more than 2-3 times per week.

Epoxide hydrolase plays an important role in both the activation and detoxification of exogenous chemicals such as polycyclic aromatic hydrocarbons. EPHX1 has an important role in metabolism of procarcinogens. The 'T' version of the EPHX1 gene codes for the fast activity enzyme.

Your genetic results put you at a normal risk of DNA damage from eating smoked or chargrilled animal protein. It is advisable in any case to not exceed 2-3 servings per week of grilled or smoked meat.

GENES ANALYZED	MARKERS	RISK VARIANT	YOUR RESULT
CYP1A2	rs762551	AC, CC	CC
EPHX	rs1051740	CT, TT	CT

Conclusion: Standard recommendation 2-3 servings per week of grilled or smoked meat.

How do smoked and char-grilled meats affect your health?

Cooking certain meats at high temperatures creates the formation of chemicals that are not naturally present in uncooked meat. Examples of these compounds are the heterocyclic amines (HCA's) and polycyclic aromatic hydrocarbons (PAH's). Heterocyclic amines and polycyclic aromatic hydrocarbons are regarded as toxic compounds that can damage DNA and protein in your cells.

HCA and PAH compounds are formed when cooking muscle meats such as beef, lamb, pork, fowl and fish. These compounds form when amino acids and creatine react at high cooking temperatures. Foods cooked for a long time i.e. well done or very well done by all methods will form more HCA's.

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DETOXIFICATION: PHASE II

Normal Needs



In phase II of detoxification one of the main reactions is the conjugation with glutathione operated by the enzymes Glutathione-S-Transferase and which leads to the formation of very soluble compounds called mercaptans.

The **GSTM1** and **GSTT1** genes encode glutathione S-transferase a family of detoxifying isoenzymes that catalyze the conjugation of various toxic molecules with glutathione making them less reactive and easier to remove from the body. Through this reaction, numerous carcinogenic compounds, drugs, food toxins, etc. are eliminated. Null mutations in these genes have been linked with an increase in a number of cancers, likely due to an increased susceptibility to environmental toxins and carcinogens. In carriers of genotype I the risk is lower while in carriers of genotype D the risk is higher. Increasing consumption of cruciferous vegetables can offset the effect of the null mutation. A supplementation with I3C could be useful too.

GENES ANALYZED	MARKERS	RISK VARIANT	YOUR RESULT
GSTM1	Ins/Del	D	I
GSTT1	Ins/Del	D	I

Action Plan: Non risk alleles. Standard recommendation for cruciferous: 1-2 servings per week

Cruciferous vegetables offer health benefits that may include reducing the risk of various types of cancer in humans. Glucosinolates are sulfur-containing compounds found in cruciferous vegetables. When you eat cruciferous vegetables like broccoli, the glucosinolates contained in them are broken down into compounds called metabolites. Metabolites are the naturally occurring substances that affect the pace of metabolism and trigger specific enzymatic reactions to help protect your cells from damage—including the damage that leads to cancer. Among the scientific evidences, a 2009 analysis coordinated by the National Cancer Institute reviewed 31 epidemiological studies into the association between cruciferous vegetable intake and lung cancer risk and concluded that high intake may decrease the risk by anywhere from 17 percent to 23 percent.

Lam TK, Gallicchio L, Lindsley K, et al. Cruciferous vegetable consumption and lung cancer risk: a systematic review. *Cancer Epidemiol Biomarkers Prev.* 2009;18(1):184–195. doi:10.1158/1055-9965.EPI-08-0710

Many believe that the compound indole-3-carbinol, which is released into the system when glucosinolate-containing foods are eaten, may be key to this effect. Glucosinolates found in cruciferous vegetables have an antibiotic-like effect and help ward off bacterial, viral, and fungal infection in the intestines and other parts of the body. A number of recent studies have also suggested that a diet rich in cruciferous vegetables may lower your risk of certain cancers.

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If you suffer from diseases of the thyroid gland, hypothyroidism and according to the genetic test you need to increase the consumption of cruciferous veggies, you need to pay special attention. Certain glucosinolates are readily converted into goitrogenic species, we refer here to the consumption of raw crucifers. Studies have shown that if some crucifers, Brussels sprouts, white cabbage, cauliflower, are eaten cooked (steamed best) and in quantities of up to 150 g per day do not adversely affect the thyroid

McMillan M, Spinks EA, Fenwick GR. Preliminary observations on the effect of dietary brussels sprouts on thyroid function. Hum Toxicol. 1986; 5 (1): 15-19. (PubMed).

Cruciferous veggies



Broccoli



Brussels Sprouts



Radishes



Cauliflower



Watercress



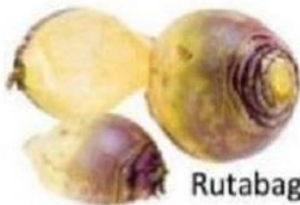
Turnips



Kale



Cabbage



Rutabaga



Arugula



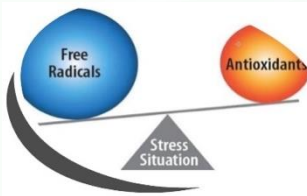
Kohlrabi



Collard Greens

OXIDATIVE STRESS AND ANTIOXIDANTS NEED

Higher Needs



Constant exposure to environmental factors (such as pollution, radiation) and chemical compounds (such as cigarette smoke, pesticides, toxins, some drugs, food additives and other industrial chemicals) results in chemically unstable molecules, also called free radicals. Reactive molecules cause significant destruction at the cellular level by affecting cell membranes, altering DNA structures and altering structural proteins and lipids.

Antioxidants are molecules that can donate an electron to a free radical without making themselves unstable. This causes the free radical to stabilize and become less reactive. When there are more free radicals present than can be kept in balance by antioxidants, the free radicals can start doing damage to fatty tissue, DNA, and proteins in your body. Proteins, lipids, and DNA make up a large part of your body, so that damage can lead to a vast number of diseases over time. These include: diabetes, atherosclerosis, high blood pressure, heart disease, neurodegenerative diseases such Parkinson's and Alzheimer's, cancer. Oxidative stress also contributes to aging. Oxidative stress is an imbalance between free radicals and antioxidants in your body.

The gene **SOD2** codes for an enzyme called manganese superoxide dismutase. This enzyme is important in protecting the cell environment from internally generated oxidative free radicals, especially those generated during energy production. Each cell in the body during normal metabolism generates large quantities of free radicals; these are highly reactive species which can damage cell components such as lipid membranes, proteins and DNA. However they are rapidly removed by the several protective mechanisms, one of which involves SOD2. Together with catalase (CAT) and glutathione peroxidase (GPX, a selenoprotein), these enzymes constitute a primary defense against oxidative stress.

CAT is an enzyme that neutralizes hydrogen peroxide H_2O_2 in water H_2O and O_2

GPX1 GENE. The protein encoded by this gene belongs to the glutathione peroxidase family, members of which catalyze the reduction of organic hydroperoxides and hydrogen peroxide (H_2O_2) by glutathione, and thereby protect cells against oxidative damage. Gpx1 is an antioxidant enzyme that protects cells by removing hydrogen and lipid peroxides. GPX is a selenium-dependent enzyme. It is irreplaceable in the antioxidant arsenal, especially in mitochondria. An insignificant selenium deficiency affects the activity of the enzyme and causes peroxidation of the membranes and increases their permeability. Decreased GPX1 activity in erythrocytes has been associated with an increased risk of cardiovascular events and the appearance of atherosclerotic plaques. These studies suggest that GPX1 is the key enzyme for the protection of vessels against oxidative stress and atherogenesis. ROS, even though they have been designated by evolution to participate in cellular homeostasis, are toxic molecules that can induce damage at the cellular level and are often responsible for the appearance of various pathologies and aging.

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GENES ANALYZED	MARKERS	RISK VARIANT	YOUR RESULT
SOD	rs4880	CC, CT	CT
CAT	rs1001179	CT, TT	TT
GPX1	rs1050450	CT,TT	CC

Conclusions: You have variations in the CAT, SOD2 genes and therefore a low endogenous antioxidant capacity. Increase antioxidants intake up to, 6500 Orac daily

Your genetic test results indicate the possibility of a moderately reduced capacity to neutralize free radicals. Dietary anti-oxidants are very important sources of protection from free radicals and other types of oxidative stress. In order to support your body's own protection mechanism, it is important for you to ensure that you reach your goals for vitamins A, C and E and selenium.

An antioxidant and anti-radical diet is especially useful. To quantify the antioxidant power of food there is a scale called ORAC (Oxygen Radical Absorbance Capacity), which measures the ability of free radicals to be absorbed by a single food. A healthy diet proposes between 4500-5000 ORAC daily.

In your case we recommend 6,500 ORAC daily.

Top-Scoring Fruits&Vegetables ORAC units per 100 grams (about 3 ½ ounces)

Fruits		Vegetables	
Prunes	5770	Kale	1770
Raisins	2830	Spinach	1260
Blueberries	2400	Brussels sprouts	980
Blackberries	2036	Alfalfa sprouts	930
Strawberries	1540	Broccoli flowers	890
Raspberries	1220	Beets	840
Plums	949	Red bell pepper	710
Oranges	750	Onion	450
Red grapes	739	Corn	400
Cherries	670	Eggplant	390
Kiwi fruit	602		
Grapefruit, pink	483		

INFLAMMATION AND INFLAMMAGING

Higher Needs



The inflammatory response is the coordinate activation of signaling pathways that regulate inflammatory mediator levels in resident tissue cells and inflammatory cells recruited from the blood. Inflammation is a common pathogenesis of many chronic diseases, including cardiovascular and bowel diseases, diabetes, arthritis, and cancer.

At the same time, the substances produced by our own body, such as bile acids, urea, ammonia, glucose, may be responsible for initiating the inflammatory response.

Inflammaging is a term used to describe aging induced by chronic, persistent inflammation that eventually leads to the exhaustion of the skin's defense systems, with the degradation of collagen and elastin and the reduction of the skin's barrier function. In this case, the most important thing is to control inflammation and maintain normal parameters.



IL6 GENE. This gene encodes a cytokine that functions in inflammation and the maturation of B cells. In addition, the encoded protein has been shown to be an endogenous pyrogen capable of inducing fever in people with autoimmune diseases or infections. The protein is primarily produced at sites of acute and chronic inflammation, where it is secreted into the serum and induces a transcriptional inflammatory response through interleukin 6 receptor, alpha. The functioning of this gene is implicated in a wide variety of inflammation-associated disease states, including susceptibility to diabetes mellitus and systemic juvenile rheumatoid arthritis. Elevated levels of the encoded protein have been found in virus infections, including COVID-19 (disease caused by SARS-CoV-2).

CRP GENE. The protein encoded by this gene It is involved in several host defense related functions based on its ability to recognize foreign pathogens and damaged cells of the host and to initiate their elimination by interacting with humoral and cellular effector systems in the blood. Consequently, the level of this protein in plasma increases greatly during acute phase response to tissue injury, infection, or other inflammatory stimuli. CRP is used as a marker for inflammation. Several studies suggest that high levels of CRP increase the risk of diabetes (type 2), hypertension and cardiovascular disease. Levels can be increased by high intakes of trans fats. There is an SNP at position 219 in the gene (219 G> A) that affects CRP levels, the G allele is associated with significantly higher CRP levels.

IL6R GENE. This gene encodes a subunit of the interleukin 6 (IL6) receptor complex. Dysregulated production of IL6 and this receptor are implicated in the pathogenesis of many diseases, such as multiple myeloma, autoimmune diseases and prostate cancer.

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TNF GENE. This gene encodes a multifunctional proinflammatory cytokine that belongs to the tumor necrosis factor (TNF) superfamily. This cytokine is involved in the regulation of a wide spectrum of biological processes including cell proliferation, differentiation, apoptosis, lipid metabolism, and coagulation. This cytokine has been implicated in a variety of diseases, including autoimmune diseases, insulin resistance, psoriasis, rheumatoid arthritis, ankylosing spondylitis and cancer. Knockout studies in mice also suggested the neuroprotective function of this cytokine. Assessment of tumor necrosis factor (TNF- α) gene polymorphisms in many populations showed a possible association with Crohn's disease.

GENES ANALYZED	MARKERS	RISK VARIANT	YOUR RESULT
IL6	rs1800795	CC, CG	CG
IL6R	rs222814	CA, CC	AC
TNF	rs1800629	GA, AA	GG
CRP	rs1205	CC	TT

ACTION PLAN: You have variations in the genes IL6, IL6R and a moderate predisposition to chronic inflammation. Increase omega 3 intake, 2 g daily. Antiinflammation diet highly recommended.

One of the most powerful tools to combat inflammation comes not from the pharmacy, but from the grocery store. Many experimental studies have shown that components of foods or beverages may have anti-inflammatory effects. Choose the right anti-inflammatory foods, and you may be able to reduce your risk of illness. Consistently pick the wrong ones, and you could accelerate the inflammatory disease process.

Foods that cause inflammation	Anti-inflammatory foods
<ul style="list-style-type: none"> • refined carbohydrates, such as white bread and pastries • French fries and other fried foods • soda and other sugar-sweetened beverages • red meat (burgers, steaks) and processed meat (hot dogs, sausage) • margarine, shortening, and lard 	<ul style="list-style-type: none"> • tomatoes • olive oil • green leafy vegetables, such as spinach, kale, and collards • nuts like almonds and walnuts • fatty fish like salmon, mackerel, tuna, and sardines • fruits such as strawberries, blueberries, cherries, and oranges

Omega 3 can fight inflammation.

omega-3 fatty acids can reduce the production of molecules and substances linked to inflammation, such as inflammatory eicosanoids and cytokines. Studies have consistently observed a connection between higher omega-3 intake and reduced inflammation.

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Vitamin A

Normal Needs



Vitamin A is the generic term for a group of fat-soluble compounds highly important for human health. They're essential for many processes in your body, including maintaining healthy vision, ensuring the normal function of your immune system and organs and aiding the proper growth and development of babies in the womb.

Vitamin A compounds are found in both animal and plant foods and come in two different forms: preformed vitamin A and provitamin A.

Preformed vitamin A is known as the active form of the vitamin, which your body can use just as it is. It's found in animal products including meat, chicken, fish and dairy and includes the compounds retinol, retinal and retinoic acid.

Provitamin A carotenoids — alpha-carotene, beta-carotene and beta-cryptoxanthin — are the inactive form of the vitamin found in plants.

These compounds are converted to the active form in your body. For example, beta-carotene is converted to retinol (an active form of vitamin A) in your small intestine. Research shows that individuals with certain variations (GG) of the BCMO1 gene are ineffective in converting beta-carotene to preformed active vitamin A *. These individuals are considered to have a low response to beta-carotene in their diet, which is why they must consume enough active vitamin A to help ensure circulating levels of active vitamin A to support vision, immunity, skin health and reproduction.

*Lietz G et al. Single nucleotide polymorphisms upstream from the b-carotene 15,15'-monooxygenase gene influence provitamin A conversion efficiency in female volunteers. Journal of Nutrition. 2012;142:161S-5S.

GENES ANALYZED	MARKERS	RISK VARIANT	YOUR RESULT
BCMO1	rs11645428	GG	AA

CONCLUSIONS: No risk alleles. Normal - keep to your RDA of Vitamin A, 2700UI daily

BCMO1

Beta-carotene mono-oxygenase1 (BCMO1) is an enzyme that plays a key role in the conversion of beta-carotene into the active form of vitamin A. Beta-carotene is the plant form of vitamin A. Individuals who possess the GG version of the BCMO1 gene are inefficient at converting beta-carotene into the active form of vitamin A. These individuals need to ensure they are consuming adequate amounts of vitamin A, particularly preformed vitamin A.

Source of Vitamin A

Concentrations of preformed vitamin A are highest in liver and fish oils. Other sources of preformed vitamin A are milk and eggs, which also include some provitamin A. Most dietary provitamin A comes from leafy green vegetables, orange and yellow vegetables, tomato products, carrots, pumpkin, broccoli, cantaloupe, mangos, apricots, squash.

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- green beans
- salad
- cabbage
- yeast
- sprouted wheat germ
- whole grains
- oily fruits
- bananas
- melon.

Prolonged storage of meat, preservation, freezing, heat processing of vegetables and fruits destroy some of the vitamin and the light alters it.

CHOLINE FOOD SOURCES

- beef liver
- organic egg
- beef
- soybeans
- Atlantic cod
- shiitake mushrooms
- baked potato
- wheat germ
- beans

Eva Diet Plus

Vitamin B12

Higher Needs



Vitamin B12 is a water-soluble vitamin that is naturally present in some foods, added to others, and available as a dietary supplement and a prescription medication. Vitamin B12 is required for proper red blood cell formation, neurological function, and DNA synthesis. A B-12 deficiency occurs when the body does not receive enough vitamin B-12. It can result in irreversible and potentially severe damage, especially to the nervous system and brain. Even slightly lower-than-normal levels of vitamin B-12 can trigger deficiency symptoms, such as depression, confusion, memory problems, and fatigue. Insufficient vitamin B-12 can also lead to anemia. The most common symptoms of anemia are fatigue, shortness of breath, and an irregular heartbeat. Research shows that some individuals are at a greater risk than others for vitamin B12 deficiency based on the FUT2 gene.* Since animal products are the primary sources of vitamin B12, individuals following a vegetarian diet are at an even greater risk of vitamin B12 deficiency.

*Hazra A et al. Common variants of FUT2 are associated with plasma vitamin B12 levels. Nature Genetics. 2008 Oct;40(10):1160-2.

GENES ANALYZED	MARKERS	RISK VARIANT	YOUR RESULT
FUT2	rs601338	GG, GA	AG

CONCLUSIONS: Since you possess the GA variant of the FUT2 gene, you have an elevated risk for vitamin B12 deficiency. It is, therefore, important for you to meet the RDA for vitamin B12 of 2.4 mcg daily. You should focus on eating foods with a high bioavailability of vitamin B12 (foods with a form of vitamin B12 that your body uses more effectively). Meat and fish products have a higher bioavailability than eggs or plant sources of vitamin B12, including soy products or fortified plant based milks and meat alternatives. If you follow a vegetarian or vegan diet, you are at an even greater risk for vitamin B12 deficiency and depending on your food choices, a supplement may be warranted.

Gene FUT2: The enzyme fucosyltransferase 2 (FUT2) is encoded by the FUT2 gene and is involved in the absorption of vitamin B12 and transport between cells. Variants of this gene have been linked to low levels of vitamin B12 in the blood. However, for people at risk, an adequate ratio of vitamin B12 can help reduce the risk of vitamin B12 deficiency.

Good sources of vitamin B12:

Meat, fish, sea food, milk, cheese, eggs, some fortified breakfast cereals.

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Vitamin C

Normal Needs



Vitamin C is an essential nutrient and powerful antioxidant. Vitamin C also aids in the absorption of non-heme (plant) iron, and supports immune function and the formation of collagen, a protein used to make skin, connective tissue, and blood vessels, along with supporting bone and tissue repair. Low blood levels of vitamin C have been associated with an elevated risk of cardiovascular disease, type 2 diabetes and cancer. Research has shown that the amount of vitamin C absorbed into the blood can differ between people even when the same amount is consumed. Some people do not process vitamin C from the diet as efficiently as others and are at a greater risk of vitamin C deficiency. Studies have shown that the ability to process vitamin C efficiently depends on a gene called GSTT1.*

*Cahill LE et al. Functional genetic variants of glutathione S-transferase protect against serum ascorbic acid deficiency. American Journal of Clinical Nutrition. 2009;90:1411-7.

GENES ANALYZED	MARKERS	RISK VARIANT	YOUR RESULT
GSTT1	INS/DEL	DEL	I

CONCLUSIONS: Since you possess the INS variant of GSTT1, there is no increased risk of vitamin C deficiency. Therefore, following the RDA guidelines for vitamin C is sufficient for you. The RDA for vitamin C is 75 mg per day for women and 90 mg per day for men. Smokers require an additional 35 mg per day.

The GSTT1 gene produces a protein for the glutathione S-transferase enzyme family. These enzymes play a key role in the utilization of vitamin C. The GSTT1 gene can exist in one of two forms. The insertion ("Ins") form is considered functional while the deletion ("Del") form is not functional. The different versions of this gene influence the way vitamin C is utilized in the body. A deletion version of the gene results in a reduced ability to process vitamin C. This means that people who possess the deletion version (Del) will have lower blood levels of vitamin C at a given level of vitamin C intake compared to people who possess the insertion version (Ins) of the gene.

High vitamin C foods include guavas, bell peppers, kiwifruit, strawberries, oranges, papayas, broccoli, tomatoes, kale, and snow peas, Brussels sprouts, mango, Cantaloupe, potato.

Eva Diet Plus

Vitamin D and Bone Health

Higher Needs



Vitamin D (also referred to as “calciferol”) is a fat-soluble vitamin that is naturally present in a few foods, added to others, and available as a dietary supplement. It is also produced endogenously when ultraviolet (UV) rays from sunlight strike the skin and trigger vitamin D synthesis. Vitamin D obtained from sun exposure, foods, and supplements is biologically inert and must undergo two hydroxylations in the body for activation. The first hydroxylation, which occurs in the liver, converts vitamin D to 25-hydroxyvitamin D [25(OH)D], also known as “calcidiol.” The second hydroxylation occurs primarily in the kidney and forms the physiologically active 1,25-dihydroxyvitamin D [1,25(OH)2D], also known as “calcitriol”.

Vitamin D promotes calcium absorption in the gut and maintains adequate serum calcium and phosphate concentrations to enable normal bone mineralization and to prevent hypocalcemic tetany (involuntary contraction of muscles, leading to cramps and spasms). It is also needed for bone growth and bone remodeling by osteoblasts and osteoclasts. Recent studies show that vitamin D optimally lowers the risk of cancer by 77%, helping us prevent over 16 different types of cancer including pancreatic, lung, ovarian, breast, prostate and skin cancer. The link between vitamin D deficiency and cancer has been highlighted in over 200 epidemiological studies, in PubMed there are over 70,000 studies related to this vitamin and the elucidation of the physiological bases of action of vitamin D are supported by over 2,500 laboratory studies. An extremely interesting study was completed in 2007 by Joan Lappe and Robert Heaney, who considered a group of menopausal women who were given enough vitamin D to raise their serum levels to 40 ng / ml. These women had a 77% reduction in the incidence of various cancers after just four years. Note that 40 ng / ml is a relatively modest level. The latest information suggests the optimal serum level for vitamin D is 50 to 70 ng / ml. The fact that at such modest concentrations, 40ng / ml have obtained such relevant results shows how important is the role of vitamin D in the general condition. body health. In case of low levels of vitamin D, it is recommended to supplement after consulting the specialist.

GENES ANALYZED	MARKERS	RISK VARIANT	YOUR RESULT
VDR	rs731236	CT, CC	CT
CYP2R1	Rs10741657	GG, GA	GG
GC	Rs2282679	GC, CC	AA
COL1A1	rs1800012	GT, TT	GG

ACTION PLAN: You have variation in the VDR, CYP2R1 gene and therefore an increased risk of vitamin D deficiency and osteoporosis. It is recommended to increase the intake of vitamin D to at least 1000 IU per day, calcium 1300 mg per day, as well as increasing the intake of collagen precursors.

The **VDR gene** encodes the nuclear hormone receptor for vitamin D3. The vitamin D receptor binds Vitamin D and affects the production of several proteins, including some involved in calcium use. Deficiency of Vitamin D causes rickets, nowadays a rare disease, but vitamin D levels are important for bone structure. VDR gene variants seem to influence many biological endpoints, including those related to osteoporosis.

The **COL1A1 gene** provides instructions for the production of a part of a large molecule called type I collagen. Collagens are a family of proteins that strengthen and support many tissues in the body, including cartilage, bone, tendon, skin, and the white part of the eye (sclera). . Type I collagen is the most abundant form of collagen in the human body. A common variation of the COL1A1 gene (called polymorphism) appears to increase the risk of developing osteoporosis. Osteoporosis is a condition that makes bones increasingly

fragile and prone to fracture. This polymorphism, which occurs in a regulatory region of the COL1A1 gene, is likely to affect the production of type I collagen. Several studies have shown that women with this genetic modification are more likely to have signs of osteoporosis, especially low bone density and fractures. bone, than women without polymorphism. This variation is just one of many factors that can increase the risk of osteoporosis.

The CYP2R1 & GC genes

Vitamin D 25-hydroxylase is the key enzyme that activates vitamin D from its pre-formed type, which is obtained through sun exposure and the diet. This enzyme is encoded by the CYP2R1 gene and a variant of this gene has been associated with an increased risk of low circulating levels of vitamin D. The GC gene encodes the vitamin D-binding protein, which binds vitamin D and transports it to tissues. A variant in this gene has also been associated with an increased risk of low circulating levels of vitamin D.

Serum concentration of 25(OH)D is currently the main indicator of vitamin D status.

Serum 25-Hydroxyvitamin D [25(OH)D] Concentrations and Health		
nmol/L*	nmol/L*	nmol/L*
<30	<12	Associated with vitamin D deficiency, which can lead to rickets in infants and children and osteomalacia in adults
30 to <50	12 to <20	Generally considered inadequate for bone and overall health in healthy individuals
≥50	≥20	Generally considered adequate for bone and overall health in healthy individuals
>125	>50	Linked to potential adverse effects, particularly at >150 nmol/L (>60 ng/mL)

*Serum concentrations of 25(OH)D are reported in both nanomoles per liter (nmol/L) and nanograms per milliliter (ng/mL). One nmol/L = 0.4 ng/mL, and 1 ng/mL = 2.5 nmol/L.

Sources of vitamin D

Vitamin D Content of Selected Foods			
Food*	Micrograms (mcg) per serving	International Units (IU) per serving	Percent DV*
Cod liver oil, 1 tablespoon	34.0	1,360	170
Trout (rainbow), farmed, cooked, 3 ounces	16.2	645	81
Salmons (sockeye), cooked, 3 ounces	14.2	570	71
Mushrooms, white, raw, sliced, exposed to UV light, ½ cup	9.2	366	46
Milk, 2% milkfat, vitamin D fortified, 1 cup	2.9	120	15
Soy, almond, and oat milks, vitamin D fortified, various brands, 1 cup	2.5-3.6	100-144	13-18

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Ready-to-eat cereal, fortified with 10% of the DV for vitamin D, 1 serving	2.0	80	10
Sardines (Atlantic), canned in oil, drained, 2 sardines	1.2	46	6
Egg, 1 large, scrambled**	1.1	44	6
Liver, beef, braised, 3 ounces	1.0	42	5
Tuna fish (light), canned in water, drained, 3 ounces	1.0	40	5
Cheese, cheddar, 1 ounce	0.3	12	2
Mushrooms, portabella, raw, diced, ½ cup	0.1	4	1
Chicken breast, roasted, 3 ounces	0.1	4	1
Beef, ground, 90% lean, broiled, 3 ounces	0	1.7	0
Broccoli, raw, chopped, ½ cup	0	0	0
Carrots, raw, chopped, ½ cup	0	0	0
Almonds, dry roasted, 1 ounce	0	0	0
Apple, large	0	0	0
Banana, large	0	0	0
Rice, brown, long-grain, cooked, 1 cup	0	0	0
Whole wheat bread, 1 slice	0	0	0
Lentils, boiled, ½ cup	0	0	0
Sunflower seeds, roasted, ½ cup	0	0	0
Edamame, shelled, cooked, ½ cup	0	0	0

* DV = Daily Value. The FDA developed DVs to help consumers compare the nutrient contents of foods and dietary supplements within the context of a total diet. The DV for vitamin D on the new Nutrition Facts and Supplement Facts labels and used for the values in Table 3 is 20 mcg (800 IU) for adults and children aged 4 years and older [26]. The new labels must list vitamin D content in mcg per serving and have the option of also listing the amount in IUs in parentheses. FDA required manufacturers to use these new labels starting in January 2020, but companies with annual sales of less than \$10 million may continue to use the old labels that list a vitamin D DV of 400 IU until January 2021. Foods providing 20% or more of the DV are considered to be high sources of a nutrient, but foods providing lower percentages of the DV also contribute to a healthful diet.
 ** Vitamin D is in the yolk.

FOOD COLLAGEN PRECURSORS

- Bone soup
- Chicken
- Fish and seafood
- Eggs
- Citrus
- Cranberries
- Garlic
- Beans
- Cashew
- Tomatoes
- Pepper

Eat a diet rich in vegetables and fruits plus protein, either vegetable or animal. Stay away from refined carbohydrates, they can cause inflammation and collagen damage.

Other nutrients that help the collagen production process include zinc, vitamin C and copper.

IRON OVERLOAD (HEMOCHROMATOSIS)

LOW RISK



Hemochromatosis is a condition where the body absorbs too much iron (i.e. iron “overload”) and can result in liver disease, arthritis and heart conditions. If you have a high risk for iron overload it is important to monitor your iron intake and blood markers of iron status such as ferritin, hepcidin or transferrin saturation. There are two main types of dietary iron: heme and non-heme iron. Non-heme iron is found in certain plant products and is not absorbed as effectively as heme iron, but vitamin C can substantially increase the absorption of non-heme iron. Hereditary hemochromatosis is an iron overload condition that is linked to variations in the HFE or SLC17A1 genes.*

*Allen KJ et al. Iron-overload-related disease in HFE hereditary hemochromatosis. *New England Journal of Medicine*. 2008;358:221-30.
Pichler I et al. Identification of a common variant in the TFR2 gene implicated in the physiological regulation of serum iron levels. *Human Molecular Genetics*. 2011;15:1232-40.

GENE ANALYZATE	MARKERI	VARIANTE DE RISC	REZULTATUL DVS.
SLC17A1	rs17342717	ALGORITM	CC
HFE C282Y	rs1800562		GG
HFE H63D	rs1799945		CC
HFE S65C	rs1800730		AA

Conclusion: the genetic result shows that you have a LOW risk of iron overload, We recommend that you follow the instructions carefully, providing your daily iron intake.

The HFE gene provides instructions for producing a protein that is located on the surface of cells, primarily liver and intestinal cells. The HFE protein is also found on some immune system cells. The HFE protein interacts with other proteins on the cell surface to detect the amount of iron in the body. When the HFE protein is attached (bound) to a protein called transferrin receptor 1, the receptor cannot bind to a protein called transferrin. When transferrin receptor 1 is bound to transferrin, iron enters liver cells. So, it is likely that the HFE protein regulates iron levels in liver cells by preventing transferrin from binding to transferrin receptor 1. The HFE protein regulates the production of a protein called hepcidin. Hepcidin is produced by the liver, and it determines how much iron is absorbed from the diet and released from storage sites in the body. When the HFE protein is not bound to transferrin receptor 1, it binds to a group of other proteins that includes hepcidin. The formation of this protein complex triggers the production of hepcidin. So, when the HFE protein is bound to transferrin receptor 1, hepcidin production is turned off and when the HFE protein is not bound to transferrin receptor 1, hepcidin production is turned on.

When the proteins involved in iron sensing and absorption are functioning properly, iron absorption is tightly regulated. On average, the body absorbs about 10 percent of the iron obtained from the diet.

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Researchers have identified more than 100 mutations in the HFE gene that cause type 1 hemochromatosis, a form of hereditary hemochromatosis that begins during adulthood. Hereditary hemochromatosis is a disorder that causes the body to absorb too much iron from the diet. The excess iron accumulates in, and eventually damages, the body's tissues and organs.

The SLC17A1 gene is located near the HFE gene and variations in SLC17A1 have also been linked to iron overload.

THIS TEST DETECTS APPROXIMATELY 95% OF IRON OVERLOAD CASES.

IF YOU HAVE HEMOCHROMATOSIS:

Heme vs. nonheme iron. There are two types of dietary iron: heme and nonheme. Heme iron is found in meat and seafood. Nonheme is found in plants, meat, seafood, and fortified products. Heme iron is more bioavailable than nonheme iron, meaning that it's more easily absorbed by your body.

Vitamin C. Vitamin C, or ascorbic acid, enhances the bioavailability of nonheme iron. In addition, meat and seafood can also enhance the absorption of nonheme iron.

Calcium. Various forms of calcium may decrease the bioavailability of both heme and nonheme iron.

Phytate and polyphenols. Phytate, or phytic acid, is a compound found in grains and legumes that decreases the absorption of iron. Other compounds in plant foods, known as polyphenols, can also decrease iron absorption.

FOODS TO EAT WHEN YOU HAVE HEMOCHROMATOSIS

- Fruits and vegetables
- Grains and legumes
- Eggs
- Tea and coffee
- Lean protein

FOODS TO AVOID WHEN YOU HAVE HEMOCHROMATOSIS

- Excess red meat
- Foods rich in vitamins A and C
- Fortified foods
- Excess alcohol
- Supplements: you should avoid or be careful with the following supplements: iron, vitamin C, multivitamins

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LOW IRON

Increased risk



Iron is an essential mineral and important component of hemoglobin, the substance in red blood cells that carries oxygen from your lungs to transport it throughout your body. Iron supports a strong immune system and is also necessary to maintain healthy cells, skin, hair, and nails.

Low iron status is determined by measuring certain blood markers such as ferritin, hepcidin or transferrin. Low iron stores can lead to anemia, which is associated with fatigue, pale skin, weakness, shortness of breath and dizziness. Several genes can impact the risk of having low iron status including *TMPRSS6*, *TFR2**

*Pichler I et al. Identification of a common variant in the *TFR2* gene implicated in the physiological regulation of serum iron levels. Human Molecular Genetics. 2011;15:1232-40.

GENES ANALYZED	MARKERS	RISK VARIANT	YOUR RESULTS
TMPRSS6	rs4820268	ALGORITM	AG
	Rs855791		AG
TRF2	rs7385804		AC
TF	rs3811647		GG

Conclusions: You have a moderate risk of iron deficiency, due to polymorphisms in the *TMPRSS6*, *TFR2* genes. To minimize the risk of low iron, meet your RDA for iron and consume dietary sources of vitamin C with iron-free foods to increase iron absorption. Focus on foods with high bioavailability, such as animal products (heme iron) and cooked spinach.

The *TMPRSS6* gene provides instructions for making a protein called matriptase-2. This protein is part of a signaling pathway that controls the levels of another protein called hepcidin, which is a key regulator of iron balance in the body. When blood iron levels are low, this signaling pathway reduces hepcidin production, allowing more iron from the diet to be absorbed through the intestines and transported out of storage sites (particularly in the liver and spleen) into the bloodstream. Iron is an essential component of hemoglobin, which is the molecule in red blood cells that carries oxygen.

TMPRSS6 gene mutations greatly reduce the amount of functional matriptase-2, preventing it from controlling hepcidin levels. The resulting elevation in hepcidin activity blocks the absorption of iron through the intestines and the release of iron from storage. When not enough iron is available in the bloodstream, less hemoglobin is produced and red blood cells cannot carry oxygen to the body's cells and tissues effectively. The shortage of oxygen causes the signs and symptoms of anemia, which can include tiredness (fatigue), weakness, and pale skin.

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The benefits of iron in the body

- helps fight free radicals and oxidative stress
- Treat anemia
- boost hemoglobin
- Reduces fatigue
- helps the functions of the nervous system
- participates in bone metabolism
- boost immunity
- improve muscle endurance
- ensures reproductive function
- helps to tone the skin
- strengthens nails
- restores sleep .

Recommended Dietary Allowances (RDAs) for Iron

Age	Male	Female	Pregnancy	Lactation
Birth to 6 months	0.27 mg*	0.27 mg*		
7-12 months	11 mg	11 mg		
1-3 years	7 mg	7 mg		
4-8 years	10 mg	10 mg		
9-13 years	8 mg	8 mg		
14-18 years	11 mg	15 mg	27 mg	10 mg
19-50 years	8 mg	18 mg	27 mg	9 mg
51+ years	8 mg	8 mg		

Iron foods

Which foods are the best sources of iron?

- The best animal-based sources of iron include
- red meat, including pork and lamb
- fish and shellfish
- liver or liver paté – avoid during pregnancy, due to high levels of vitamin A
- eggs

The best plant-based sources of iron include:

- dried fruits, particularly figs and apricots
- dark green leafy vegetables
- nuts and seeds
- chickpeas
- beans
- fortified breakfast cereals

Sleep and Eating Behaviour

Increased risk



Eating behaviour can manifest in related processes: snacking, binge eating, constant craving, emotional eating (tendency to overeat in response to negative emotions - experts estimate that 75% of overeating is caused by emotions). Certain variants of the genes below are associated with snacking, binge eating (often emotionally related leading to “comfort” eating of junk foods). Healthier ways to view food and develop better eating habits recognize their triggers for engaging in this behaviour and develop appropriate ways to prevent and alleviate stress – also exercise is good for managing stress.

Circadian Locomotor Output Cycles Kaput (CLOCK), is involved with our internal biological clock, called the circadian rhythm, to help us adapt to the dark & light daily cycles. These can affect many physiological functions including blood sugar, metabolism, etc. It also seems to be related to time of eating and morning fatigue. CLOCK is also associated with eating behaviour as are the other genes in the table below.

GENES ANALYZED	MARKERS	RISK VARIANTS	YOUR RESULT
CLOCK	rs1801260	ALGORITHM	CT
FTO	rs9939609		AT
MC4R	rs17782313		CT
LEP	rs7799039		AG
LEPR	rs1137101		AA
GHRL	rs696217		GG

ACTION PLAN: You have variations in the CLOCK, MC4R, FTO, LEP, LEPR genes and in this sense possible problems with biological rhythm, sleep quality, memory, attention. Increased predisposition to nervous hunger, uncontrollable cravings, especially for foods with high caloric density.

Eat the 3 meals at fixed times. Don't eat dinner late at night. Avoid eating high-calorie snacks. Physical exercise is good to manage stress.

The best way of eating is according to your genotype. If you are trying to lose weight, or maintain your current weight remember that Late lunch eaters lost less weight and displayed a slower weight-loss with your genotype. When you are eating between meals, snacking or even binge eating, make sure that the food you eat is nutritious, filling & healthy. It should not be full of mainly nutrition-less calories – high fat and sugar content that are too often available in snacks. Make your snacking, like your meals, healthy: fruit & vegetables can make good and tasty snacks! Manage your stress, regular exercise is very helpful, and use the P/E algorithm in this report to make your exercise better and more comfortable.

Sugar Preferences

Normal Risk



Sugar intake is partly determined by our sweet taste preference and cravings for certain foods and beverages. There is considerable variability in individuals' preferences and cravings for sweet foods and beverages. There are many factors that may impact your preference for sugary foods including the age that you are first introduced to sweets, and psychological associations between consuming these foods and certain life experiences or emotions. In addition to 'pleasure-generating' signals in the brain given off in response to eating or drinking something sweet, there are specialized areas in the brain that regulate both food intake and glucose (sugar) levels in the body. Research has shown that your intake of sweet foods can be determined by a genetic variant that regulates blood glucose levels in your body. People who carry the variant associated with higher sugar intake are also at higher risk of dental caries (cavities).

GENES ANALYZED	MARKERS	RISK VARIANTS	YOUR RESULT
GLUT2		TC, TT	CC

Conclusions: Since you possess the CC variant of the GLUT2 gene, you are at NORMAL risk of over-consuming sugar.

GLUT2

Glucose transporter type 2 (GLUT2) is involved in regulating glucose (sugar) in the body. The expression of this gene has been found in areas of the brain that are involved in controlling food intake. Individuals who possess the TT or TC variant of this gene seem to have a greater preference for sweet foods and beverages and are more likely to overconsume sugar.* In addition, those who have the variant associated with higher sweet food intake, have also been shown to have a higher risk of dental carries.**

*Eny KM et al. Genetic variant in the glucose transporter type 2 is associated with higher intakes of sugars in two distinct populations. *Physiol Genomics*. 2008;33(3):355-60.

**Kulkarni GV et al. Association of GLUT2 and TAS1R2 genotypes with risk for dental caries. *Caries Research*. 2013; 47:219-25

Consequences of excessive sugar consumption.

The body does not respond too well to sweets, the excess blood glucose can cause several disorders: blurred vision, cognitive impairment, physical fatigue, difficulty concentrating. In few words, even if the introduction of sugars at the beginning can lead to the release of a large amount of energy, if you abuse this compound, you can get the opposite effect and a great limitation from a physical point of view.

Weight Gain Predisposition

High risk



Everyone knows some people who can eat ice cream, cake, and whatever else they want and still not gain weight. At the other extreme are people who seem to gain weight no matter how little they eat. Why? What are the causes of obesity? What allows one person to remain thin without effort but demands that another struggle to avoid gaining weight or regaining the pounds he or she has lost previously?

On a very simple level, your weight depends on the number of calories you consume, how many of those calories you store, and how many you burn up. But each of these factors is influenced by a combination of genes and environment. Both can affect your physiology (such as how fast you burn calories) as well as your behavior (the types of foods you choose to eat, for instance). The interplay between all these factors begins at the moment of your conception and continues throughout your life.

To date, more than 400 different genes have been implicated in the causes of overweight or obesity, although only a handful appear to be major players. Genes contribute to the causes of obesity in many ways, by affecting appetite, satiety (the sense of fullness), metabolism, food cravings, body-fat distribution, and the tendency to use eating as a way to cope with stress.

The strength of the genetic influence on weight disorders varies quite a bit from person to person. Research suggests that for some people, genes account for just 25% of the predisposition to be overweight, while for others the genetic influence is as high as 70% to 80%. Having a rough idea of how large a role genes play in your weight may be helpful in terms of treating your weight problems.

How much of your weight depends on your genes?

Genes are probably a significant contributor to your obesity if you have most or all of the following characteristics:

- You have been overweight for much of your life.
- One or both of your parents or several other blood relatives are significantly overweight. If both of your parents have obesity, your likelihood of developing obesity is as high as 80%.
- You can't lose weight even when you increase your physical activity and stick to a low-calorie diet for many months.

Genes are probably a lower contributor for you if you have most or all of the following characteristics:

- You are strongly influenced by the availability of food.
- You are moderately overweight, but you can lose weight when you follow a reasonable diet and exercise program.

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- You regain lost weight during the holiday season, after changing your eating or exercise habits, or at times when you experience psychological or social problems.

These circumstances suggest that you have a genetic predisposition to be heavy, but it's not so great that you can't overcome it with some effort.

At the other end of the spectrum, you can assume that your genetic predisposition to obesity is modest if your weight is normal and doesn't increase even when you regularly indulge in high-calorie foods and rarely exercise.

People with only a moderate genetic predisposition to be overweight have a good chance of losing weight on their own by eating fewer calories and getting more vigorous exercise more often. These people are more likely to be able to maintain this lower weight.

People with a strong genetic predisposition to obesity may not be able to lose weight with the usual forms of diet and exercise needing the guidance of a nutritionist.

Arkadianos et al (2007), Improved weight management using genetic information to personalize a calorie controlled diet. Nutrition Journal volume 6, Article number: 29 (2007)

Vranceanu et al (2020), A comparison of a ketogenic diet with a LowGI/nutrigenetic diet over 6 months for weight loss and 18-month follow-up. BMC Nutrition volume 6, Article number: 53 (2020)

GENES ANALYZED	MARKERS	RISK VARIANTS	YOUR RESULT
PPARG	rs1801282	ALGORITHM	CC
ADRB2	rs1042713		AG
ADRB3	rs4994		TT
INSIG2	rs7566605		GG
PLIN	rs894160		GG
CLOCK	rs1801260		CT
APOA2	rs5082		TT
FABP2	rs1799883		GA
MC4R	rs17782313		CT
FTO	rs9939609		AT
LEP	rs7799039		AG
LEPR	rs1137101		AA
GHRL	rs69621		GG
UCP2	rs660339		TT
UCP2	rs659366		TT

CONCLUSION: You have polymorphisms in the genes PPARG, ADRB2, FTO, LEP, LEPR, CETP, MC4R, UCP2 both SNPs homozygous and therefore an increased predisposition to weight gain. Variations in the PPARG, ADRB2, FABP2, CETP, UCP2 genes predispose you to the increase of abdominal adiposity. In your case, high intensity physical exercises are indicated, because the variations in the ADRB2, PPARG, FTO, UCP2 genes oppose resistance to the diet, if you want to lose weight. Variations in the PPARG and ADRB2 genes are also associated with the yo-yo effect. In subjects with the PPARG/Pro-Pro profile like yours, regular physical activity is required. Polymorphisms in UCP2 genes are associated with obesity, interfering with energy expenditure and body fat distribution. It usually causes an increase in visceral fat and waist circumference. The TT genotype of the rs660339 polymorphism of the UCP2 gene was associated with a significantly larger waist circumference in the Hortega Study. Due to the association with obesity, it can also be correlated with the risk of type 2 diabetes. The UCP2 gene is also predictive for weight loss in case of bariatric surgery interventions. If you intend to do such an intervention, consult with your nutrigeneticist or doctor beforehand.

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The **MC4 gene** plays important roles in regulating food consumption and energy balance. The rs17782313-C allele can modulate phenotypes related to eating behavior. Genetic variations in the MC4R gene are also associated with significantly higher BMI and obesity. Carriers of the C allele eat more, have more frequent snacks and prefer foods with high caloric density and are characterized by low satiety. It is likely that the carrier of this allele is an emotional consumer often characterized by binge eating. Eating as a form of consolation as well as depression can be characteristic of this SNP.

The **FTO gene** is also known as the 'fat mass and obesity-associated gene' since it can impact weight management and body composition. This gene's role in the body is related to metabolic rate, energy expenditure and energy balance. It is also expressed in regions of the brain that are involved in the regulation of energy intake. In individuals who have undergone bariatric surgery for weight loss, variation in the FTO gene can help predict their long-term weight loss success, which can have significant implications for nutrition care plans.* Research shows that for individuals with the AA or TA variant, a high intake of unsaturated fat, and low intake of saturated fat in the diet can help facilitate weight loss, decrease fat stores around the abdomen and decrease the risk for obesity.*

*Rodrigues et al. A single FTO gene variant rs9939609 is associated with body weight evolution in a multiethnic extremely obese population that underwent bariatric surgery. Nutrition. 2015;31:1344-50.

The **ADRB3 gene**, protein encoded by this gene belongs to the family of beta-adrenergic receptors. This receptor is located mainly in adipose tissue and is involved in the regulation of lipolysis and thermogenesis. One of the most frequently investigated polymorphisms of the ADRB3 gene is rs 4994. Several studies have shown that it is associated with a lower metabolic rate at rest, abdominal obesity, weight gain and difficulties in weight loss.

The **LEPR gene** provides instructions for LEPR protein. This protein is a receptor for leptin (a hormone specific to adipocytes that regulates body weight) and is involved in regulating fat metabolism. The G allele is associated with a slow metabolism and most often with a high BMI, obesity.

The **LEP gene** it is involved in energy balance and body weight control. A allele is associated with the tendency to have frequent and sweet snacks.

The **CLOCK gene** it is involved in our internal biological clock, called the circadian rhythm, to help us adapt to the daily cycles of light and darkness. Can affect many physiological functions, including blood sugar, metabolism, etc. It also seems to be related to mealtimes and morning fatigue. CLOCK is also associated with eating behavior. Carriers of the C-allele may tend to eat a lot and consume alcohol in response to negative emotions. Experts estimate that about 75% of risk allele carriers overeat due to negative emotions. C allele carriers tend to eat junk food, skip meals, eat breakfast late, and eat late in the evening, sometimes even at night.

The **GHRL gene**. Ghrelin is a pleiotropic hormone, significantly contributing to the regulation of control over appetite and food intake, gastrointestinal motility, gastric acid secretion, endocrine and exocrine pancreatic secretions, cell proliferation, glucose and lipid metabolism. Statistical analyzes have shown that TT and TG genotypes are significantly more common in patients with eating disorders.

Physical Activity. Power/Endurance Algorithm



Exercise is important to everyone – to live longer and in better health. Many don't do enough exercise, sometimes they start with good intentions and quickly give up. There are of course many reasons for this. One important feature is the TYPE of exercise to do. The Eurogenetica DIET P/E Algorithm was developed over 10 years ago and has been constantly refined over time. It was developed mainly for sports & fitness devotees and has been shown in studies to improve training response about 3x better when exercise is fitted into your genetics*

Now it can be used for anyone – it helps you to exercise better and feel more comfortable doing so. Slight changes in your routine can lead to substantial changes especially in “not giving up”. We look at variants in genes that are associated with response to exercise - in hundreds of studies – and we combined them into a score-based algorithm to detect your genetic balance between power & endurance activities. IMPORTANT – this is NOT a measure of how well you will do in sports, it has nothing to do with talent or whether you will excel in a particular sport. It is to help you to find the right balance in whatever exercises you wish to do – so that you will feel more comfortable during and after exercising. It works!

Endurance is the ability of athletes to exert themselves for relatively long periods of time. The definition of endurance varies according to the type of physical activity the athlete is engaged in. Power athletes exert high amounts of energy in short bursts. High intensity power activities may be measured in minutes, whereas low intensity endurance activities may be measured in hours or days. Understanding your genetic background can help you determine what type of exercise regimen may be most appropriate for you. Athletes at the very top of their “game” tend to have a specific set of genetic variations that are characteristic of endurance and power activities.

*A genetic-based algorithm for personalized resistance training' by Jones N, Kiely J, Suraci B, Collins DJ, de Lorenzo D, Pickering C, Grimaldi KA. Biol Sport. 2016;33(2):117-126 <http://biolsport.com/text.php?id=101125>

Your P/E Balance

Power = 62%



Endurance = 38%

The meter gives you an indication of where you fall in the power-endurance spectrum based on your personal genetics. Exercising only for endurance can have a negative impact on the ability to exert strength unless an individual also undertakes resistance training and training solely for power activities can have a negative impact on the ability to sustain exercise for longer lengths of time, so it's important to balance these types of exercise with cross-training programs. You can use your results to find an optimal balance between resistance and endurance exercises during your training routine

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GENES ANALYZED	MARKERS	RISK VARIANTS	YOUR RESULT
ACE	rs4341	ALGORITHM	DD
AGT	rs699		CC
ACTN3	rs1815739		CT
TRHR	rs16892496		AA
PPARA	rs4253778		CG
VEGF	rs2010963		CG
VDR	rs731236		CT
IL6	rs81926678		CG
BDKRB2	rs1799722		CC
COL5A1	rs12722		CT
NRF2	rs7181866		AA
PPARGC1A	rs8192678		AG
ADRB2	rs1042713		AG

CONCLUSIONS: Your assessment has determined that your genetic profile falls more in the zone of power activities, based on variations in your genes.

Make the most of your tendency to respond well to power activities by exploring a number of power/strength exercises

Level of physical activity: increased . 30-45 mins 5 days per week, table 3 (see tables)

Exercise Physiology, Fitness and Injury Risk

Endurance / Power profile & VO2 max potential			
Gene	Variation	Result	Effect
ACE	rs4646994	DD	Power profile
ADRB2	rs1042713	AG	Intermediate VO2 max capacity
AGT	rs699	CC	Small association with Power
ACTN3	rs1815739	CT	Advantage for sprint and power profile, OK for endurance
BDKRB2	+9/-9 INDEL	CC	No measured impact
COL5A1	rs12722	CT	No measured impact on Power/Endurance
CRP	rs1205	TT	Exercise positive for VO2 max / Endurance profile
IL6	rs1800795	CG	No measured impact on Power/Endurance
NRF	rs7181866	AA	No measured impact on fitness
PPARA	rs4253778	CG	Intermediate associations with both power and endurance
PPARGC1A	rs8192678	AG	Lower VO2 max, lower endurance profile
TRHR	rs16892496	AA	No measured impact on fitness
VEGF	rs2010963	CG	Intermediate VEGF production
VDR	rs731236	CT	No measured impact on fitness

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Cardiofitness			
Gene	Variation	Result	Effect
ACE	rs4646994	DD	Monitor heart rate
AGT	rs699	CC	Monitor heart rate and blood pressure during exercise
BDKRB2	+9/-9 INDEL	CC	Monitor heart rate
PPARGC1A	rs8192678	AG	Blood flow monitoring during exercise recommended
PPARA	rs4253778	CG	Monitor heart rate & blood pressure

Post Exercise Recovery & Injury Risk			
Gene	Variation	Result	Effect
CRP	rs1205	TT	Regular exercise has positive impact on recovery
GSTM1	INDEL	I	No measured impact on fitness
GSTT1	INDEL	I	No measured impact on fitness
IL6	rs1800795	CG	Nutritional support to promote recovery, lower endurance
IL6R	rs2228145	AC	Associated with intermediate fatigue and longer recovery times
SOD2	rs4880	CT	Nutritional support for antioxidant function
TNF	rs1800629	GG	Regular exercise has positive impact on recovery
COL1A1	Rs1800012	GG	May be more prone to ligament injury
COL5A1	rs12722	CT	Associated with increased tendinopathy risk
GDF	rs143383	CC	Typical tendinopathy risk

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PHYSICAL ACTIVITY TABLE

The following tables show common types of physical activity organised according to their relative intensity – the value beside each activity is the “MET” value (Metabolic Equivalent – a measure of the intensity of the activity (and the energy consumption) compared to rest.

A comprehensive table is available from

http://prevention.sph.sc.edu/tools/docs/documents_compendium.pdf.

Low intensity, long duration-TABLE 1

- 40-60% of your maximum heart rate
- There is no noticeable change in breathing patterns
- Does not induce sweating unless it's a hot, humid day.
- You can easily have a sustained conversation and can even sing

Gym	MET	General	MET
Cyclette 50 watt	3	Walking slowly (< 3 kmh)	2
Running machine - slow	3	Stretching, Hatha yoga	2,5
Rowing machine, 50 watt	3,5	Playing guitar / piano	2,5
Ellipse - light	3,5	Walking downhill (4 kmh)	3
Acquafitness	4	Slow dance (waltz, mambo, tango)	3
Tai Chi, yoga etc	4	Medium bicycle (< 16 kmh)	4
Step aerobics - slow	4	Gardening	4
Stepper - slow	4	Playing the drums	4
Ellipse Cross - slow	4	Tai Chi	4
		Fast dancing (folk, country, polka)	4,5
		Golf	4,5

Medium intensity & duration-TABLE 2

- 70% of your maximum heart rate
- Breathing becomes deeper and more frequent.
- Will break a sweat after performing the activity for about 10 minutes
- You can carry on a conversation but not sing

Gym	MET	General	MET
Cyclette, 100 watt	5,5	Hiking	6
Weight lifting vigorous effort	6	Walking uphill (6 kmh)	6
Cyclette, 150 watt	7	Wood & grass cutting	6
Rowing machine, 100 watt	7	Bicycling 10-11.9 mph, slow, light effort	6
Aerobics	7	Jogging	7
Running machine- jogging	7	Tennis	7
Ellipse - medium	7	Ski	7

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Step aerobics - medium	7,5	swimming laps, freestyle, slow, light effort	7
Stepper - medium	7,5	Running (8 kmh)	8
Ellittica Cross - medium	7,5	Rock climbing	8
Spinning - medium	8	Fast walking (8 kmh)	8
		Basketball or volleyball matches	8
		bicycling, 12-13.9 mph, moderate effort	8
		Mountain bike	8,5

High intensity, short duration-TABLE 3

- 80-85% of your maximum heart rate
- Breathing is deep and rapid
- Will break a sweat after 3-5 minutes.
- You can only talk in short phrases.

Gym	MET	General	MET
Cyclette, 200 watt	9	Orienteering	9
Weight lifting vigorous effort	9	Running (10 kmh)	10
Cyclette, 250 watt	11	Kickboxing, judo, karate	10
Aerobica - rapid	12	Football or Rugby match	10
Rowing, 200 watt	12	Skipping	10
Running machine - running	13	swimming, crawl, fast (75 yards/minute)	10
Ellipse - rapid	13	bicycling, 14-15.9 mph, fast, vigorous effort	10
Step aerobics - fast	13,5	swimming, butterfly, general	11
Stepper - strong	14	In line skating	12
Ellipse Cross - strong	14	bicycling, 16-19 mph, racing/not drafting or >19 mph drafting, very fast, racing general	12
Spinning - strong	16	Running (13 kmh)	13,5
		bicycling, >20 mph, racing, not drafting	16

MET: The ratio of the work metabolic rate to the resting metabolic rate. One MET is defined as 1 kcal/kg/hour and is roughly equivalent to the energy cost of sitting quietly. A MET also is defined as oxygen uptake in ml/kg/min with one MET equal to the oxygen cost of sitting quietly, equivalent to 3.5 ml/kg/min. For example, 1 MET is the rate of energy expenditure while at rest. A 4 MET activity expends 4 times the energy used by the body at rest. If a person does a 4 MET activity for 30 minutes, he or she has done $4 \times 30 = 120$ MET-minutes (or 2.0 MET-hours) of physical activity. A person could also achieve 120 MET-minutes by doing an 8 MET activity for 15 minutes

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Nutrient goal and limits



Nutrients	RDA†	Your Goal		Nutrients	RDA†	Your Goal	
Vit B1 (thiamine)	1.2 mg	1.2 mg		Chromium	30 µg	30 µg	
Vit B3 (niacin)	18 mg	18 mg		Calcium	1000 mg	1,300 mg	*
Vit B5 (pantothenic acid)	5 mg	5 mg		Selenium	75 µg	75 µg	
Vit B6 (pyridoxine)	2 mg	10 mg	*	Phosphorous	700 mg	700 mg	
Vit B7 (biotin)	30 µg	30 µg		Iodine	150 µg	150 µg	
Vit B9 (folc acid)	400 µg	600 µg	*	Iron	14 mg	14 mg	
Vit B10 (PABA)	25 mg	25 mg		Magnesium	240 mg	240 mg	
Vit B12 (cobalamin)	2,4 µg	2.4 µg		Potassium	3,9 g	3,9 g	
Vit A	2,700 IU (810 µg)	2,700 IU (810 µg)		Sodium	2.4 g	1.6 g	*
Vit C	85-105 mg	85 mg		Copper	0.9 mg	0.9 mg	
Vit D	600 IU (15 µg)	1000 IU (20 µg)	*	Zinc	11 mg	11 mg	
Vit E	15 IU (13.5 mg)	200 IU (180 mg)	*	Physical activity		45 min / day	*
Vit K	140-170 µg	140-170 µg		Others		Standard	
Inositol	30 mg	30 mg		Caffeine	300 mg	200 mg	*
Choline (Vit J)	200 mg	200 mg		Saturated fats	22 g	16 g	*
Fibre	25 g	30 g	*	Glycemic load	100	70	*
Omega3	1.6 g	2 g	*	Protein	15%	30%	*

†RDA: Recommended daily allowance according to official guidelines

Section II: Diet - Weight management



Welcome to your EVA DIET DIET PLUS weight loss profile.

How can genetics help with weight loss and management? It is clear that genetics influences weight gain, loss and diet success – we all know examples of people who seem to be able to eat what they like without gaining weight while some of us are less fortunate. There are good evolutionary reasons why we gain weight easily and store it as fat – this was a very useful trait when food supply was scarce, erratic or both. Today where food is so abundant in much of the world this trait is less useful and we see the rise in obesity (this is called the “thrifty hypothesis”

Losing weight and keeping it of can be daunting, for a start there are so many diets – so you choose Atkins, BBB, CCC, DDD or Zone? Is there an exact type of diet that my genes can tell would be best for me? This is still a question under active research, we don't have definitive answers yet – this would be the “Holy Grail” and in the same sense, we don't even know if it exists! A thorough literature research of all the various studies on weight loss, and even more importantly, weight control, has not picked a winner but one aspect has emerged very strongly: most studies confirm that the best type of diet for both losing weight and maintaining weight loss contains low saturated fat, low glycemic load (very low in refined carbohydrates) and a reasonable amount of protein and good levels of MUFA and PUFA (e.g. from olive oil and fish – see these references).

There is no compelling published evidence though that genetics can help to choose type of diet but we can say with some confidence that different people react in different ways to fat (especially saturated fat) and refined carbohydrate content in the diet. Using this information your genetic results are a useful tool for modifying the base diet, to reduce further saturated fats or refined carbohydrates (or both) in those who are more sensitive to these components than others. The gene-diet interactions are telling us that some people are more saturated fat sensitive than average (individuals who absorb and process fat more efficiently, good for thrift, but makes you fatter) while others are more sensitive to levels of refined carbohydrates, and of course individuals with a heightened sensitivity to both.

Adherence to a personalized diet has been shown to improve the ability to lose weight and strengthen the results obtained. Body weight control does not depend only on DNA: many other environmental, psychological, factors intervene in the fight against excess weight. But genetics has been shown to play a key role in this war, and scientific research is proving it with increasingly solid and compelling evidence. In the study of Arkadianos et.al, 2007, weight maintenance after diet was 70% in the nutrigenetic group and 30% in the control group. Similar results were reached in the study Vranceanu et al (2020), study conducted at University of Medicine and Pharmacy Cluj Napoca and which compared the ketogenic diet with the diet by genotype over two years. Weight maintenance in the nutrigenetic group was 75% in the keto group 25%.



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As we said many other factors are involved, but it has by now been clearly shown that genetics plays an important part on why different people respond in different ways to different diets, and there are three particular aspects where we can gauge this variability and explain why “a calorie is a calorie” is not true:

- Refined carbohydrate sensitivity: the higher the sensitivity, the higher may be weight gain and glycemia for a given amount of carbohydrate
- Saturated fats sensitivity: genetic control of this aspect means that different people absorb and transport fat more or less efficiently than others
- Physical activity effects: genetics can affect the intensity of exercise required to achieve desired results aimed at burning fat but maintaining lean mass.

These factors are influenced in particular by genetic variation present in the genes ACE, ADRB2, ADRB3, APOA2, FABP2, FTO, PPARG, MC4R, LEP, LEPR, UCP, GHRL, CLOCK, PLIN TCF7L2. The Eurogenetica DIET PLUS weight management test analyses your variants in these genes to determine which are present and how they may affect ideal weight loss diets. Calories are important but also the type of calories matter – your intake should be composed of the correct type and proportions of fats and carbohydrates for the most effective weight control. Your sensitivity score is used to determine by how much you should reduce your intake of saturated fats, sugars and other refined carbohydrates compared to the base diet.

Based on the results the test calculates a combined score for each of the above mentioned areas and develops the optimal macronutrient proportions for weight loss and indicates the level of exercise intensity best suited for you.

Section 1.1

NUTRITION RECOMMENDATION FOR YOUR REFINED CARBOHYDRATE SENSITIVITY

NB for weight loss follow section (a) and for long term weight management refer to section (b)

The genetic analysis shows an MEDIUM-HIGH sensitivity to refined carbohydrates 5.9 / 10 which increases the risk of type 2 diabetes and metabolic syndrome.

The response to these unfavorable variations must be seen as an "alarm bell" in recovering or maintaining a healthy lifestyle and healthy eating habits. If you have not been diagnosed with type 2 diabetes, an aggressive approach to preventing type 2 diabetes is required, according to your doctor's advice. This approach includes both a healthy diet and an active lifestyle. Continuous monitoring of biochemical parameters that may indicate insulin resistance or type 2 diabetes may be required. If you have already been diagnosed with diabetes, your doctor may use this information to personalize and make more effective your antidiabetic treatment, and for adequate nutritional management.

a) For weight loss

FOODS TO MOSTLY AVOID

Foods to mostly avoid (you can have 1 day a week "holiday")

- All sugars (inc. fructose)
- Biscuits
- All grain (es. wheat, corn, oats, etc)
- Pasta
- Rice
- Potatoes
- Crisps
- Honey
- Marmalade and Jam
- Yoghurts etc with added sugar
- Anything made with refined flour
- Dried fruits
- Fruit juices with added sugar
- Anything with sugar, check the ingredients

NO RESTRICTIONS

- Fresh vegetables (prefer broccoli, cabbage, cauliflower, rocket, kale, etc...)
- Herbs & Spices
- Tea & coffee (2-3 per day if with caffeine)
- Lean white meat (chicken, turkey, rabbit etc)
- Lean red meat but not more than 1-2 per week
- Limit consumption of processed meat, maximum 100g per week
- Fish, especially fatty fish rich in Omega3, 2-3 times per week

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SOME RESTRICTIONS

Maximum of 2 foods from the list below, once per day:

- 100% whole grain bread, Ryvita etc
- Other fruit
- Baked goods made with 100% whole grain flour and no sugar
- All Bran type cereal, very rich in fibre
- Legumes

Other:

- Milk – max 100ml per day (if you have a genetic intolerance to lactose you may substitute dairy with soya or rice milk)
- Lean cheese, like Ricotta, cottage cheese etc. One day per week
- Walnuts, peanuts, etc up to 30g day
- Yoghurt without sugar
- Olive oil: 30-40 ml per day
- Red wine, 1 glass per day
- Eggs (1 per day). For those who have diabetes and/or cardiovascular disease you should limit intake to max 3 / week. Read this link: <http://www.hsph.harvard.edu/nutritionsource/eggs/>

LIMIT CONSUMPTION

Not more than once per week (on your day off):

Pasta, rice, bread and baked products made with refined flour, sugar, cakes & biscuits. Sugary drinks like Coca-Cola, Fanta, fruit juice with sugar added, Ice cream, etc

b) FOR WEIGHT MAINTENANCE

NO RESTRICTIONS

No restrictions:

- Fresh vegetables (prefer broccoli, cabbage, cauliflower, rocket, kale, etc...)
- Fresh fruit with low glycaemic index (e.g. kiwi, berries, apples, pear)
- Herbs & Spices
- Tea & coffee (2-3 per day if with caffeine)
- Lean white meat (chicken, turkey, rabbit etc)
- Lean red meat but not more than 2-3 per week
- Limit consumption of processed meat, maximum 100g per week
- Fish, especially fatty fish rich in Omega3, 2-3 times per week

SOME RESTRICTIONS

Maximum of 3-4 foods from the list below, once per day:

- Fresh fruit with medium glycaemic index (e.g. apricots, peaches, mandarins, melon, oranges)
- 100% whole grain bread
- Baked goods made with 100% wholegrain flour and no sugar
- Oat flakes
- Cereals with no sugar added



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• Legumes

Maximum 2x per week:

Wholegrain rice or pasta (especially kamut or spelt), Couscous, quinoa, cereal minestrone (with whole grains)

Other:

- Milk – max 200ml per day (if you have a genetic intolerance to lactose you may substitute dairy with soya or rice milk)
- Cheese: hard is best, e.g. cheddar, parmesan etc up to 80g / day
- Walnuts, peanuts, almonds, hazelnuts, etc up to 40g day
- Yoghurt without sugar
- Olive oil: 30-40 ml per day
- Red wine, 1 glass per day
- Eggs (1 per day) For those who have diabetes and/or cardiovascular disease you should limit intake to max 3 / week. Read this link: <http://www.hsph.harvard.edu/nutritionsource/eggs/>

Not more than twice per week:

Pasta, rice, bread and baked products made with refined flour, sugar, cakes & biscuits. Sugary drinks like Coca-Cola, Fanta, fruit juice with sugar added, Ice cream, etc

Section 1.2

NUTRITION RECOMMENDATIONS FOR YOUR SATURATED FAT SENSITIVITY

NB for weight loss follow section (a) and for long term weight management refer to section (b)

From the genetic analysis results an media sensitivity to saturated fats 4.7/10 which increases the risk of dyslipidemia and implicitly the cardiovascular risk.

The response to these unfavorable mutations must therefore be seen as an “alarm bell” in recovering or maintaining a healthy lifestyle and healthy eating habits. Follow the indications from the lipid metabolism. Continuous monitoring of biochemical parameters, such total cholesterol, triglycerides, LDLc, HDLc. It is advisable to consult a specialist (dietitian or doctor) to implement an appropriate lifestyle that minimizes the risk of high LDL cholesterol. If your LDL cholesterol is higher than normal, your doctor may use this information to personalize and improve the effectiveness of anticholesterolemic treatments and proper nutritional management.

a) FOR WEIGHT LOSS



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Foods to mostly avoid (you can have 1 day a week "holiday")

Chicken and turkey skin, pork rinds

All processed foods with saturated fats: crackers, crisps, fried foods, margarine, etc.

No restriction

- Lean white meat (e.g. chicken without skin)
- Fish, especially fatty fish rich in Omega3, 2-3 times per week
- Egg whites

Some restriction

- Olive oil 20-30ml
- Coconut oil (with moderation), other oils e.g. sesame, sunflower, safflower)
- Seed oil (flaxseed, pumpkin, etc
- Whole eggs. For those who have diabetes and/or cardiovascular disease you should limit intake to max 3 / week. Read this link: <http://www.hsph.harvard.edu/nutritionsource/eggs/>

Limit consumption

Not more than twice per week:

Red meat, cheeses, fats like lard, butter, etc. Processed meats, crisps and other high fat snacks

b) FOR WEIGHT MAINTENANCE

No restriction but be careful with the quantities

- Lean white meat (e.g. chicken without skin)
- Fish, especially fatty fish rich in Omega3, 3-4 times per week
- Egg whites

Some restriction

- Olive oil 20-30ml
- Coconut oil (with moderation), other oils e.g. sesame, sunflower, safflower)
- Seed oil (flaxseed, pumpkin, etc
- Whole eggs. For those who have diabetes and/or cardiovascular disease you should limit intake to max 3 / week. Read this link: <http://www.hsph.harvard.edu/nutritionsource/eggs/>

Limit consumption

Not more than 3x per week:

Red meat, cheeses, fats like lard, butter, etc. Processed meats, crisps and other high fat snacks

Conclusions

You have an increased predisposition to type 2 diabetes.

To prevent the disease:

cut out sugar and other refined carbohydrates from your diet

work out based on our recommendation regularly

drink water as your primary beverage

lose weight and keep it off if you are overweight or obese

quit smoking

follow a low carb diet

watch the portion size

optimize vitamin D level

minimize your intake of processed food

consider taking these natural herbs: curcumin, berberine, mango extract these herbs increase insulin sensitivity and reduce blood sugar level

You have an increased predisposition for dyslipidemia

For prevention

Watch your waistline, men are at risk if their waist measure is greater than 102 cm and female 89

Eat a healthy diet

Exercise regularly

Reduce sodium in your diet

Reduce stress

Quit smoking, reduce saturated fats and increase healthy fats in your diet

Reduce saturated fats

Special note for your APOE gene: Everyone inherits two APOE genes, one from each parent. We found that you have the genotype E3/E4. Although the evidence is not fully consistent, it has been estimated that having the E3/E4 or E4/E4 combination is associated with on average a 30-40% increased risk of heart disease relative to the common E3/E3 genotype. The negative impact of the E3/E4 or E4/E4 combination appears to be most evident in smokers, and stopping smoking would particularly benefit individuals with this genotype. **Also individuals with the E3/E4 or E4/E4 genotype appear to be particularly at Alzheimer's risk. Although estimates vary, having an E3/E4 or E2/E4 combination may increase your risk of Alzheimer's disease 3-5 fold, while an E4/E4 genotype appears to be associated with an increased risk of greater than 5 fold. In addition to increasing risk these genotype combinations also lower the average age of onset of Alzheimer's disease, possibly by as much as 15-20 years.**

Alzheimer's disease is inconclusive but recent evidence suggests that flavonoid-rich plant derived foods such as teas, red wine (in moderation), berries, cocoa and citrus fruit may be effective in reducing age-related loss of memory and cognitive function.

Due to your genotype **E3/E4 we recommend to test your relatives, siblings, mother, father and especially to talk with your doctor and contact a dietitian to adjusting your diet.**

At present there are no treatments available which will completely abolish your risk of developing heart disease or dementia in the long term. However, there is good evidence that dietary modification, stopping smoking and cholesterol-lowering reduce the risk of heart disease, and these measures are particularly important in high-risk individuals. Similar

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measures may be effective in reducing the risk of developing dementia but the evidence for this is not strong at present. However, this is an active research area, and it is likely that preventative measures will emerge in the near future, and it is clearly important that high-risk individuals take advantage of these. Keeping physically active and not being overweight are also going to help reduce everyone's risk of heart disease.

You have an increased risk to low vitamin D serum level.

Increase your vitamin D intake and food that boost your body's natural collagen production

You have a moderate risk for hyperhomocysteinemia.

Check your homocysteine serum level and increase intake of folic acid, 5-MTHF and choline.

You have an increased risk to weight gain.

A diet low carb is the best model for you. If you want to lose weight try ketogenic diet. For maintenance try 40:30:30

You are lactose intolerant

Avoid milk and reduce cheese and other products with lactose

You have a moderate risk for chronic inflammation

Increase omega 3 intake

Anti-inflammatory diet

You have a moderate predisposition for iron deficiency



Dietary supplement recommendation

Omega 3

Vitamin D

Normocis in case of high homocysteine or TMG

Berberin

Curcumin Meriva

Proline or collagen peptides



Medical Follow Up

- Check your blood glucose and glycosylated hemoglobin
- Check your lipids serum profile
- Check your 25-OH-Vit D
- Check serum iron level
- Check homocysteine level
- Talk with a cardiologist
- Talk with a dietitian to adjust your diet

This report is for informational purposes only and is not intended to be used as a medical diagnosis. The advice in this report is not intended to treat, diagnose or cure any condition or disease. It is intended for general health and wellness purposes only and is not specific to clients who require a specific care plan and special diets based on a specific disease or condition. Customers with medical conditions should not change or stop medication or medical care without first consulting their physician. If you have any questions, please ask your healthcare provider or contact us at info@eva-precisionnutrition.com.

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