NutriGENE®

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- ◎ Lactose Intolerance
- ◎ Coeliac disposition genes
- ◎ Nutrient Requirements
- ◎ Negative Substances

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Introduction

Thank you for taking the NutriGENE program – this report 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.

According to the series of tests carried out you will need to increase your intake of some key nutrients and reduce intake of some other dietary components. Your results also indicate that you may be showing some intolerance to certain foodstuffs which should be removed from your diet for a period of time.

1. Overview – actions to take

Basic Diet	Rapid stress adaptor
Increase Nutrients*	Olive oil Antioxidants Fibre Cruciferous Vitamin D / Calcium
Decrease*	Salt Caffeine Saturated Fats Refined carbohydrates / sugars Grilled meat
Lactose Intolerance	Lactose intolerant
Coeliac disposition	Possible predisposition

**To increase or decrease relative to the official RDA guidelines*

2. Results

Name	**SAM PLE**
Date of birth	

Nutritional area	**Gene Symbol**	**Variant tested**	***Results***	***Action***
Stress response	**5HTT (SLC6A4)**	44bp ins	L / L	Rapid adapater
Salt sensitivity	**ACE**	I/D	I / I	Reduce salt to <2.2g/day sodium
Alcholo sensitivity	**ADH1C**	Ile349Val	A / A	Reduced positive effect of alcohol
Olive oil use	**APOC3**	C3175G	G / C	Increase olive oil intake
Caffeine sensitivity	**CYP1A2 *1F**	–163A>C	A / C	Reduce caffeine intake to less than 2-3 cups coffee / day
	VDR	C>T (taq1)	C / T	
Grilled meat intake	**CYP1A2 *1F**	–163A>C	A / C	Reduce grilled meat intake
Cruciferous	**GSTM1**	delezione	D	Increase cruciferous vegetables and allium: 3-4 / week
Basal Inflammation	**IL6**	G -174C	G / C	Normal: 1.5g Omega 3 / day
	TNF	G-308A	G / G	
Saturated Fats	**APOC3**	C3175G	G / C	Do not exceed 16g/day saturated fats
	LPL	C1595G	C / G	
Vitamin B metabolism	**MTHFR**	C677T	C / C	Normal metabolism
Refined carbohydrates	**ACE**	I/D	I / I	Limit intake of refined carbohydrates and sugars: Aim for a glycemic load not exceeding 80 / day; recommended fibre intake: 25 g / giorno
	PPARG	ProAla (12)	ProPro	
Oxidative stress	**SOD2**	C-28T	C / C	Increase antioxidant intake
Nickel sensitivity	**GSTM1**	delezione	D	Possibile increase in nickel sensitivity
	TNF	G-308A	G / G	
Vitamin D	**VDR**	C>T (taq1)	C / T	Recommended vitamin D intake is greater than official RDA: 800 IU / giorno
Lactose intolerance	**LCT**	-13910-CT	C / C	Lactose intolerant
Gluten (Coeliac)	**DQ2/8**		DQ2	Possible gluten sensitivity

3. Details

a) Basic metabolic diet

Gene: 5HTT; result = L / L
Diet: Base diet

The gene 5HTT is involved in serotonin transporter, there are two different versions tested for, the long version and the short version. You have the genotype LL, this means that you inherited the long version from both parents. The effect of the genetic variation has been well studied and there are established links to coping and response to stresses of all types. Diet has been shown to have a major role in the stress response and an appropriate diet can help to balance responses to the stress of everyday life.

b) Lactose intolerance

Gene: LCT; result = C / C
Diet: Reduce or avoid lactose

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. 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.

c) Coeliac predisposition

Gene: DQx; result = DQ2
Effect: Possible predisposition for celiac disease

Certain genes that code for proteins involved in the immune system response to antigens (bacteria, foreign bodies, etc) are also involved in the mechanism by which Coeliac disease manifests itself. Celiac disease is a particular form of permanent intolerance to gluten, which is composed of the proteins gliadin and glutinin and is found in wheat, rye, barley and other grains. Testing for the genes involved can give an idea about the predisposition to the disease. The results of your genetic test reveal that, even though the risk is not high, it is not possible to exclude a predisposition to Celiac disease. According to the scientific literature 1 person in 35 with your genotype result will develop celiac disease while the average in Italy is 1/100.

d) Nickel sensitivity

Gene: TNF; result = G / G
Gene: GSTM1; result = D
Effect: Normal

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 (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.

e) The "NutriGENES"

Gene: ACE; result = I / I
Diet: Salt Sensitivity
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 and association between the genotypes I/D and I/I and dietary salt sentivity affecting blood pressure. Your genetic tests reveals that you have the "I/I" genotype and therefore a possible predisposition to hypertension when salt (specifically sodium) consumption is excessive. You are advised to limit your salt intake to a maximum of 5.5g/day, equivalent to about 2.2g/day sodium.

Gene: ADH1C; result = AA - Ile / Ile
Diet: Reduced positive effect of alcohol
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 metaobised by aldehyde dehydrogenase into non-toxic substances. The ADH1C gene polymorphism screened in NutriGENE causes an amino acid change in the protein sequence which affects enzyme activity. The test results show that you are homozygous for the Ile (isoleucine) allele (genotype AA) which is characterised by the presence of isoleucine at a specific position in the protein. This results in a higher activity enzyme which metaobolises alcohol more rapidly compared to the "Val" genotype (presence of the amino acid valine). Alcohol can have positive benefits on lipid levels, especially on HDL cholesterol, when consumed in moderate quantities. Moderation is particularly advised because the alcohol is rapidly metabolised to the toxic intermediate acetaldehyde which is also associated with hangover symptoms.

Gene: APOC3; result = G / C
Gene: LPL; result = C / G
Diet: Saturated fats; cholesterol
Both of these genes are involved in the metabolism and processing of lipids and work together. APOC3 reduces the clearance of triglycerides by inhibiting the activity of Lipoprotein Lipase (LPL). This is an enzyme which breaks down triglycerides into free fatty acids. The genetic variation in APOC3 affects TG levels and your version, CG, has been associated with higher levels of triglycerides. Your LPL result (CG) also contributes to modified lipid profiles, and has not been linked to a predisposition to lower HDL levels or raised TG levels. You are advised to reduce saturated fats in the diet to below the official guideline limits and to consume <16g / day, you should also eliminate trans fat and replace these these fats with olive oil.

Gene: CYP1A2 *1F; result = A / C
Diet: Grilled meat; coffee
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 (A/C) mean that you have one copy of the gene which codes for the slow version of the enzyme and one copy for the rapid version. The rapid version activates more rapidly potentially toxic substances present in meat cooked at high temperatures and you are advised to keep grilled meat consumption down to about once/twice per week. Regarding caffeine, you have the intermediate genotype and should limit caffeine consumption as well.

Gene: GSTM1; result = D
Diet: Cruciferous vegetables
GSTM1 (glutathione S-transferase) is in involved in phase II of the detoxification process by which toxins are removed from the body (via the conjugation of toxic molecules with glutathione, facilitating their elimination). According to genetic variation the enzyme activity is either present (Insertion or "I") or absent (Deletion or "D") – in your case you have the D (deleted) version which means it is not present and no GSTM1 enzyme is produced. You can compensate by adding extra portions of cruciferous vegetables and consume on average at least 3-4 portions per week. It is also recommended that you add frequent consumption of allium vegetables (garlic, onions, etc) to your diet.

Gene: IL6; result = G / C
Gene: TNF; result = G / G
Diet: Omega 3
Both IL6 and TNF are cytokines involved in the inflammatory process as part of the body's normal immune response and genetic in these genes variation (IL-6-174 G/C and TNF-308 G/A) affects the amounts of cytokines produced. Your results show that you have normal expression for TNF but are heterozygous for IL6 (G/C) which can lead to increased cytokine levels. Your recommended intake of Omega 3 is greater than the official guidelines at 2 g per day from food and a good quality supplement.

Gene: MTHFR; result = C / C
Diet: Folic acid, vitamin B_6 & vitamin B_{12}
The gene MTHFR codes for an enzyme that is involved in the metabolism and utilization of folic acid and the vitamins B6 and B12. The enzyme is central to key biochemical pathways that lead to DNA synthesis and DNA methylation. You have the 677C/C version of the MTHFR gene which produces an enzyme with normal activity. Your diet should contain sufficient amounts of folic acid and the other B-group vitamins to ensure that you at least reach the official recommended daily intake.

Gene: PPARG; result = ProPro
Gene: ACE; result = I / I
Diet: salt sensitivity; refined carbohydrates
PPARG is a transcription factor which influences glucose and insulin levels. The polymorphism Pro12Ala changes an amino acid and affects expression of the gene (the amount of protein produced). Possession of at least one copy of the Ala version has been shown to have beneficial effects on glucose and insulin. According to your genetic results you have two copies of the Pro allele and you are also homozygous I/I for the ACE gene. Your aim regarding carbohydrate consumption should be to keep your daily glycemic load to below 80. This means a low intake of refined carbohydrates and sugars and increased low glycemic index (GI) foods such as wholegrain cereals. You should also ensure a good daily supply of fibre in the diet.

Gene: SOD2; result = C / C
Diet: Antioxidants (vitamins A, C & E)
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. According to your genetic results you are homozygous for this enzyme; your genotype is -28CC and with this version it is advisable to consume higher levels of antioxidants than those recommended by official guidelines. Dietary anti-oxidants are also 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.

Gene: VDR; il result = C / T
Diet: Vitamin D, Calcium, Caffeine
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. You are heterozygous for this gene (C/T) which has been shown to affect calcium absorption and bone structure. You are advised to increase consumption, above the standard guidelines, to obtain at least 800 IU Vitamin D and 1300 mg Calcium.

4. Nutrient goal and limits

a) <u>Your</u> RDA

Nutrients	RDA†	Your goal	
Vit B1 (thiamine)	1.5 mg	1.5 mg	
Vit B3 (niacin)	18 mg	18 mg	
Vit B5 (pantothenic acid)	6 mg	6 mg	
Vit B6 (pyridoxine)	1.5 mg	2 mg	
Vit B7 (biotin)	150 µg	150 µg	
Vit B9 (folc acid)	200 µg	400 µg	
Vit B10 (PABA)	25 mg	25 mg	
Vit B12 (cobalamin)	2 µg	2 µg	
Vit A	2,700 IU	5,000 IU	*
Vit C	60 mg	250 mg	*
Vit D	200 IU	800 IU	*
Vit E	15 IU	200 IU	*
Vit K	100 µg	100 µg	
Inositol	30 mg	30 mg	
Choline (Vit J)	200 mg	200 mg	
Fibre	18 g	25 g	*
Omega3	1.6 g	1.6 g	
Chromium	30 µg	30 µg	
Calcium	800 mg	1,300 mg	*
Selenium	75 µg	75 µg	
Phosphorous	800 mg	800 mg	
Iodine	150 µg	150 µg	
Iron	14 mg	14 mg	
Magnesium	300 mg	300 mg	
Potassium	3,500 mg	3,500 mg	
Sodium	2.4 g	2.2 g	*
Copper	1.2 mg	1.2 mg	
Zinc	15 mg	15 mg	
Physical activity		45 min / die	*
Others		**Do not exceed**	
Caffeine	300 mg	200 mg	*
Saturated fats	22 g	16 g	*
Glycemic Load	100	80	*
Nickel		Reduce contact	

†RDA: Recommended daily allowance according to official guidelines

b) Nutrients to increase – content in foods

Antioxidants (quantity / 100g)

Vitamin A	**µg RE***		
Egg (whole)	140	Liver Beef	4968
Egg yolk	381	Fegato Pork	6502
Milk whole	28	Fegato Lamb	7391
Milk, semi-skimmed	17	Fegato Chicken	11078
Milk, skimmed	2	Cod liver oil	30000
		Carrots	835
Cheese:		Pumpkin	369
Brie	174	Sweet potato	709
Mozzarella	179	Melon	169
Parmigiano	108	Pink grapefruit	13
Provolone	236	Apricot	96
Ricotta	120	Broccoli	31
Emmental	220	Spinach	469
Panna	411	Olives	20
* retinolo equivalenti (RE).			

Vitamin C	**mg/100g**		**mg/100g**
Oranges	60	Spinach	28
Lemons	53	Broccoli	89
Mandarins	52	Rape	120
Clementine	49	Peas	40
Kiwi	93	Carrots	6
Peperoni	80	Hazelnuts	6
Tomatoes	13		

Vitamin E	**mg/100g**		**mg/100g**
Sunflower seeds	33	Asparagus	1
Flaxseed oil	18	Olive	4
Rapeseed oil	60	Egg yolk	4
Corn oil	60		
Olive oil	14		
Sunflower seed oil	41		
Eggs	1		
Walnuts	20		
Hazelnuts	15		
Almonds	23		
Spinach	2		
Broccoli	1		

Vitamin D

	IU/100g		*IU/100g*
Milk, whole	40	Liver	50
Butter	40	Eel	5000
Emmental	44	Salmon	650
Parmigiano	28	Sardines	300
Egg, whole	35	Mackerel	50
Egg yolk	110	Cod liver oil	8500
Mushrooms	200		

Calcium

	mg/100g		*mg/100g*
Broccoli	47	Milk, whole	113
Rape	135	Milk, semi-skimmed	143
Asparagus	24	Milk, skimmed	123
Cannelini beans	240	Brie	184
Lentils	56	Mozzarella	505
Orange	43	Parmigiano	1184
Carrots	33	Provolone	756
Walnuts	98	Ricotta	207
Hazelnuts	114	Emmental	791
Sunflower seeds	78	Double cream	96
Almonds	264		

Cruciferous (Glucosinolates, mg/100g)

	mg/100g		*mg/100g*
Broccoli	61	Mustard greens	282
Cauliflower	44	Turnip	92
Brussel sprouts	236	Watercress	94
Cabbage	78	Kohlrabi	46
Rape	100	Cabbage, red	64
Garden cress	392	Horseradish	160

Fibre

	g/100g		*g/100g*
Banana	3	Carrots	3
Apple	3	Cannelini beans	13
Orange	2	Peas	5
Pear	3	Lentils	8
Kiwi	3	Whole cereal,	29
Strawberry	3	Wholemeal bread	7
Spinach	2	Oats	11
Broccoli	3	Wholewheat pasta	3.5
Cauliflower	3	Brown rice	2
cabbage	3	Wholemeal flour	12

c) Food content of components to reduce

Sale

	g sodio/100g		g sodio/100g
Bacon	1	Potato Chips	1
Stock cube	24	Wurstel	1.2
Cereal	1	Sausage	1
Parmigiano	1.8	Tuna, tinned	0.8
Cheese slices	1.2	Smoked salmon	1.9
Crackers	1.1	Salami	1.6
Cooked ham	1.1	Corned beef, tinned	0.7
Prosciutto crudo	2.6		

Caffeina

	mg/100g	mg/tazza
Filter coffee	40	80
Instant coffee	26	52
Espresso	212	42
Tea	20	40
Cola	8	20
Red Bull	30	77
Chocolate,dark, 60-69%	86	
Chocolate,dark, 45-59%	46	
Chocolate,milk	20	
Decaffeinated coffee	1	

Grassi Saturi

	g/100g		g/100g
Brie	17	Pork	11
Mozzarella	13	Sausage	9
Parmigiano	16	Cooked ham	6
Provolone	17	Pork	6-10
Ricotta	8	Chicken	3
Emmental	18	Chicken white meat	1
Dairy cream	23	Lard	39
Butter	51	Flaxseed	9
Wholemilk	2	Corn, canola oil	8
Semi skimmed milk	1	Olive oil	14
Ice cream	7	Sunflower oil	10
Roast chicken	11	Egg yolk	10
Chicken fat	30	Whole egg	3
Lamb fat	47	Palm oil	49
Beef fat	50	Coconut oil	
Bacon	14		

Trans fat (I grassi "trans")

All processed and pre-cooked industrially prepared food: biscuits, cakes, crisps, etc., always check the labels for the presence of trans fats

Carico glicemico / 100g

High:		***Low:***	
Sugars	70	Chick peas	10
Cornflakes	59	Beans	9
Honey	50	Banana	8
Wholegrain flour	36	Sweet potatoes	7
White bread	35	Lentils	6
Wholegrain cereal, eg. All Bran	27	Grapes	6
White rice	15	Carrots	3
		Strawberry	3
Medium:		Apple	3
Wholegrain bread	20	Melon	3
Cous cous	12	Peas	3
Wholewheat pasta	12	Watermelon	2
Brown rice	11		

Lactose

	g/100g
Milk	5
Dairy cream	4
Wholemilk yoghurt	4.5
Yoghurt light	4
Mozzarella	3
Parmigiano	3.5
Ricotta	3
Ice cream	5

Nickel

	mg/kg		**mg/kg**
Eggs	0.03	Margarine	0.2 - 4
Oysters	0.6	Broccoli	0.03
Cocoa	10	Carrots	0.04
Beans	1.4	Grapes	0.1
Peas	0.3	Wine	0.01
Liquorice	4.4	Maize	0.4
Peanuts	2.9	Wholegrain flour	0.2
Lentils	1.9	Pears	0.1
Asparagus	0.4	Tea	0.03 - 1
Lettuce	0.3	Margarine	0.2 - 4
Eggs	0.03	Broccoli	0.03
Oysters	0.6	Carrots	0.04
Cocoa	10	Grapes	0.1
Beans	1.4	Wine	0.01
Peas	0.3		

d) Recommended supplements:

According to your genetic results we recommend the following supplements to ensure that you meet your personal daily requirements:

Genevit PLUS – 1 or 2 cps per day

B_vitamins		% RDA
B_folic	300 µg	150%
B6	3 mg	150%
B12	3 µg	150%
Vit B2 (riboflavin)	2.4 mg	150%
Inositol	500 mg	na
Choline	500 mg	na

ACE (antiossidanti)		% RDA
Vit A	2000 IU / 600 mcg	75%
Vit C	180 mg	300%
Vit E	45 IU / 30 mg	300%

Detox		% RDA
Estratto di aglio	1000 mg	na
Estratto di crocifere	500 mg	na

Osso		% RDA
Vit D	300IU / 7.5 mcg	150%
Calcio	300 mg	38%

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