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DNA WELLNESS TEST

EXPLORE MORE THAN 100 SELECTED DNA VARIANTS AND UNLOCK PERSONALIZED GUIDANCE FOR OPTIMIZING YOUR DIET, PHYSICAL ACTIVITY, AND OVERALL WELLNESS WITH OUR ***DNA WELLNESS TEST****!*

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WE HAVE SELECTED SEVERAL GENETIC VARIANTS THAT HAVE AN IMPACT ON:

- VITAMINS METABOLISM
- MINERALS METABOLISM
- CARBOHYDRATES METABOLISM
- LIPIDS METABOLISM
- FOOD PREFERENCES AND SUSCEPTIBILITY
- DETOXIFICATION, ANTIOXIDATION AND LONGEVITY
- PHYSICAL ACTIVITY AND CHIROPRACTIC TREATMENT

THE GOAL IS TO PROVIDE YOU WITH INFORMATION TO PERSONALIZE YOUR LIFE CHOICES TO GIVE A BOOST TO YOUR WELL-BEING.

WHAT IS THE DNA WELLNESS TEST?

- The DNA Wellness Test belongs to the second category of Low-Risk General Wellness Tests, not classified as Medical Devices by the **FDA**.
- These tests aim to support or improve functions related to overall health without specific disease references.
- This category has two subcategories:
  (I) May help reduce the risk of certain chronic diseases or conditions.
  (II) May help individuals live well with certain chronic diseases or conditions.
- These characteristics are multifactorial, influenced by factors like environment, lifestyle, and genetics.
- The DNA Wellness Test analyzes genetic variants in target regions (called SNPs or Single Nucleotide Polymorphisms), that may impact these traits.
- These genetic variants have been carefully selected based on literature data and experimentally validated in a study involving 515 subjects, conducted in collaboration with the University of Sports of Tirana (UST).

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WHY SHOULD YOU TAKE THE DNA WELLNESS TEST?

SIMPLICITY: the DNA Wellness Test is a simple and straightforward process. Our kit will arrive at your home without any additional cost. You will only need to follow the detailed instructions provided to perform a simple buccal swab.

ONE-TIME TEST: once you take the DNA Wellness Test, you have a lifetime of information. You don't need to repeat the test as your genetic makeup remains constant throughout your life.

DATA PRIVACY AND SECURITY: We prioritize data security and privacy, complying with laws to safeguard sensitive information, ensuring confidentiality. Your data may be used for research and improvement in anonymized form with your consent, and DNA samples will be destroyed after 180 days.

PERSONALIZED APPROACH: DNA Wellness Test allows you to embrace a personalized approach to your well-being: by understanding your genetic makeup, you can take a proactive stance towards your health.

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WHAT ARE THE RISKS AND LIMITATION OF THE DNA WELLNESS TEST?

While there are no direct health risks associated with genetic tests for general well-being, it is important to be aware of certain aspects. Here are some points to consider:

- **Psychological impact:** Genetic test results can have psychological implications, so it's important to be prepared for potential emotional distress or anxiety related to learning about health risks.

- **Interpretation complexity:** The interpretation is meant for healthcare experts, but it lacks universal consensus in the scientific community, and there's no universally accepted evidence on its impact on diet, lifestyle choices, or physical activity.

- **Limited predictability:** The DNA Wellness test cannot predict future health outcomes with certainty due to the complex interplay of genetic and non-genetic factors, as well as the limited number of genetic variants analyzed.

- **Limited actionability:** Genetic information is valuable, but not all variations have actionable steps; lifestyle factors are crucial for well-being. Informed decisions require realistic expectations and professional guidance.

- **Unsuitable advice:** your healthcare provider may give you suggestion unsuitable for you, based on this test. We are not assuming responsibility about this.

- **Limited Scope:** The genes and variants analyzed by us are solely interpreted for their impact within the context of the wellness test. We do not exclude the possibility that, due to a phenomenon called pleiotropy, they may have other outcomes.

- **Genetic Discrimination and Warning:** Polymorphisms can be interpreted differently, causing unintended results and potential discrimination, impacting family relationships, health conditions, ethnic associations, and more.

- **Data Security:** The data collection and processing system is secure, and the DNA sample is discarded 180 days after the analysis. We are not liable for any data breaches resulting from cyber-attacks or rare events beyond the control of our standard security measures.

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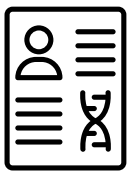
WHO IS THE DNA WELLNESS TEST FOR?

The DNA Wellness Test is designed for adult individuals who are interested in gaining insights into their genetic makeup to proactively care for their well-being. For individuals with medical conditions, the results must be carefully evaluated by their healthcare provider, and it cannot replace medical advice related to the specific condition.

WHAT WILL YOU FIND IN THE DNA WELLNESS TEST REPORT?



In your **DNA Wellness Test report**, you will discover a list of **121** observed genetic polymorphisms (SNPs) found in your DNA. Each SNP will be accompanied by a description of the pathway it is involved in and the specific effect associated in literature with that polymorphism.
Furthermore, the report will provide general information about the characteristics impacted by these genetic variations and, if you have completed the accompanying optional questionnaire, the report will also include personalized recommendations.

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HOW DOES THE DNA WELLNESS TEST WORK?

- Purchase the DNA Wellness Test on our eCommerce platform.

- Fill the customer data form with your personal data, address, email, and telephone number. This is mandatory and required to ship the kit at your home.

- Receive an email with payment confirmation, your kit number, and instructions on how to register in the reserved area.

- Register in our reserved area and fill out the necessary forms. You will find:
  (I) The informed consent, to be read, reviewed, and signed (mandatory).
  (II) An optional questionnaire for collecting data about yourself and your lifestyle. This questionnaire is optional, but by completing it, you will help us provide you with even more accurate information and contribute to scientific research.

As a thank you, you will also receive a 10% discount on the purchase of our supplements!

- Receive our kit at your home, conveniently and with no additional shipping costs.

- Perform the buccal swab to collect your biological sample by carefully following the instructions provided in the kit and below in this brochure.

- Send the collected sample as described in the instructions included in the kit. The envelope is pre-paid, so you only need to send it without any costs!

- Wait as we analyze your data, which will take approximately 4-6 weeks. Need something to read in the meantime? Take a look at our site and newsletter to explore the science behind natural molecules and the Mediterranean diet. Additionally, you will receive updates about the progress of your test via email and in your reserved area.

- Access your reserved area and download the results (report and raw data).

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HOW TO USE THE BIOLOGICAL SAMPLING KIT?

The biological sampling kit that will be delivered to your home contains:

- Two buccal swabs
- Two collection vials
- The return envelope
- Kit instructions

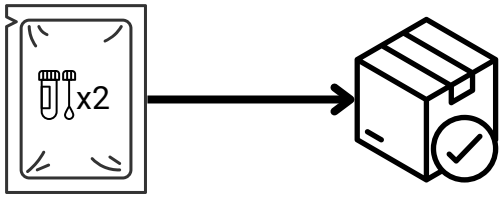
To perform the biological sampling follow this step-by-step simple procedure, detailed also in the kit instructions:

1. Place the unopened swabs and vials on clean, levels surface.
2. Remove one swab from its package and firmly scrape the inside of one cheek while rotating the swab for 45 seconds. **Note:** do not eat, drink, or chew gum for 60 minutes prior swabbing your cheeks.

3. Open one vial, insert the swab with the tip down, align the black line on the swab to the edge of the vial and snap it off with the swab tip remaining in the vial's liquid. **Note:** if the liquid from the vial is spilled, please send in you vial anyway as the sample might still be viable.

4. Use the second swab and vial to repeat the points 2 and 3 on the opposite cheek.

5. Ensure that the cap is securely fastened on both vials. Insert both into the plastic bag and then seal the bag.
   Place the sealed plastic bag in the return envelope we provided and seal the envelope.
   Send the envelope with your biological samples. The return postage is prepaid.



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WHICH CHARACTERISTICS WILL BE ANALYZED IN THE DNA WELLNESS TEST?

VITAMINS METABOLISM

VITAMIN A

Vitamin A is essential for vision, immune support, and overall growth. It comes in different forms, with animal sources providing retinol and plants offering carotenes like beta-carotene, found in carrots.
The recommended daily intake is 900 mcg RAE (3,000 IU) for adults and 1,300 mcg RAE (4,333 IU) for pregnant and lactating women. (https://www.fda.gov/media/99069/download).

The following table summarizes the SNPs correlated to the vitamin A metabolism [1]

Gene	Gene Function	SNP	Alleles	Outcome
BCO1	Beta-Carotene Oxygenase 1. Key enzyme in beta-carotene metabolism to vitamin A. It catalyzes the cleavage of beta-carotene into two retinal molecules, an active form of vitamin A.	Locus1	G/G	Decreased beta-carotene conversion.[2]
			G/T	Decreased beta-carotene conversion.[2]
			T/T	Typical.[2]
		Locus2	T/T	Decreased beta-carotene conversion; may affect lycopene also. [3-7]
			A/T	Decreased beta-carotene conversion.[3-7]
			A/A	Typical.[3-7]
		Locus3	T/T	Decreased beta-carotene conversion; lower lutein levels; may affect lycopene.[3-8]
			C/T	Decreased beta-carotene conversion.[3-8]
			C/C	Typical.[3-8]

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VITAMIN B12

Vitamin B12 is a vital water-soluble nutrient in the B-complex group, essential for organism development, red blood cell health, and DNA/myelin synthesis. It's primarily found in animal-based foods like meat, fish, eggs, and dairy.

The recommended daily intake is 2.4 mcg for adults and 2.8 mcg for pregnant/lactating women (https://www.fda.gov/media/99069/download).

The following table summarizes the SNPs correlated to the vitamin B12 metabolism [1]

Gene	Gene Function	SNP	Alleles	Outcome
FUT2	Fucosyltransferase 2. Enzyme modifying glycoproteins and glycolipids (components of the cell membrane) which are involved in the absorption and utilization of vitamin B12.	Locus1	G/G	Greatest risk for low serum vitamin B12 levels, but only when the diet is low in bioavailable sources of vitamin B12.[9]
			G/A	Greater risk for low serum vitamin B12 levels, but only when the diet is low in bioavailable sources of vitamin B12.[9]
			A/A	Typical.[9]
		Locus2	G/G	Lower vitamin B12 levels.[10]
			G/A	Lower vitamin B12 levels.[10]
			A/A	Typical.[10]
CUBN	Cubilin. Endocytic receptor which plays a role in vitamins metabolism by facilitating their uptake.	Locus1	A/A	Lower vitamin B12 concentrations.[10-11]
			A/G	Somewhat lower vitamin B12 concentrations.[10-11]
			G/G	Typical.[10-11]
MTRR	Methionine synthase reductase. Enzyme involved in the regulation of a critical pathway for the metabolism of the amino acid methionine by providing electrons to regenerate the cofactor, vitamin B12.	Locus1	G/G	Decrease in enzyme activity with potential negative impact on vitamin B12 concentration.[10,12]
			A/G	Partial decrease in enzyme activity with potential negative impact on vitamin B12 concentration.[10,12]
			A/A	Typical.[10,12]

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VITAMIN B6

Vitamin B6, a water-soluble B-complex nutrient, serves as a crucial coenzyme in amino acid metabolism. It's abundant in foods like meat, fish, grains, legumes, and nuts. Recommended daily intake is 1.3 mcg for adults, rising to 2.0 mcg for pregnant and breastfeeding women (https://www.fda.gov/media/99069/download).

The following table summarizes the SNPs correlated to the vitamin B6 metabolism [1]

Gene	Gene Function	SNP	Alleles	Outcome
ALPL	Alkaline Phosphatase. Enzyme metabolizing various phosphate compounds and playing a key role in skeletal mineralization and adaptive thermogenesis.	Locus1	C/C	Lower vitamin B6 concentrations.[4,13]
			C/T	Slightly lower vitamin B6.[4,13]
			T/T	Typical.[4,13]
CBS	Cystathionine beta-synthase. Enzyme involved in cysteine metabolism and in detoxification reactions.	Locus1	G/G	Risk of increased homocysteine, responsive to vitamin B6.[14]
			A/G	Risk of increased homocysteine, responsive to vitamin B6.[14]
			A/A	Typical.[14]
		Locus2	A/A	Typical.[14]
			A/INS	Risk of increased homocysteine, responsive to vitamin B6.[14]
			INS/INS	Risk of increased homocysteine, responsive to vitamin B6.[14]

VITAMIN B9

Vitamin B9, also called folate or folic acid, is a vital B vitamin crucial for cell division, DNA/RNA synthesis, and red blood cell formation, especially important during pregnancy and growth phases. It can be found in liver, green leafy vegetables, milk, fruits, and cereals. Recommended daily intake is 400 mcg DFE for adults, rising to 600 mcg DFE for pregnant and lactating women (https://www.fda.gov/media/99069/download).

The following table summarizes the SNPs correlated to the vitamin B9 metabolism [1]

Gene	Gene Function	SNP	Alleles	Outcome
MTHFR	Methylenetetrahydrofolate reductase. Enzyme involved in the conversion of vitamin B9 into its biologically active form.	Locus1	A/A	Enzyme function decreased by 70-80%.[9]
			A/G	Enzyme function decreased by 40%.[9]
			G/G	Typical.[9]
		Locus2	G/G	Decreased enzyme function.[9]
			T/G	Somewhat decreased enzyme function.[9]
			T/T	Typical.[9]

VITAMIN C

Vitamin C, or ascorbic acid, plays essential roles in metabolism, electron transfer, and antioxidant functions, aiding the regeneration of other antioxidants. It also supports non-heme iron absorption in the intestine and is influenced by genetics. Foods rich in vitamin C include citrus fruits, tomatoes, potatoes, peppers, kiwifruit, broccoli, strawberries, Brussels sprouts, and cantaloupe. Recommended daily intake is 90 mg for men and 120 mg for pregnant and lactating women (https://www.fda.gov/media/99069/download).

The following table summarizes the SNPs correlated to the vitamin C metabolism [1]

Gene	Gene Function	SNP	Alleles	Outcome
SLC23A1	Sodium-dependent vitamin C transporter 1. Sodium/ascorbate cotransporter. Mediates electrogenic uptake of vitamin C.	Locus1	T/T	9%-11% lower vitamin C in plasma. [10,15-17]
			C/T	Lower vitamin C in plasma.[10,15-17]
			C/C	Typical.[10,15-17]
SLC23A2	Sodium-dependent vitamin C transporter 1. Sodium/ascorbate cotransporter. Mediates electrogenic uptake of vitamin C.	Locus1	T/T	24% higher vitamin C in plasma.[10,18]
			C/T	Typical.[10,18]
			C/C	Typical.[10,18]

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VITAMIN D

Vitamin D is vital for bone, immune, muscle, and cell health. It's fat-soluble and stored in the liver, released as needed. It comes in two forms: ergocalciferol from food sources and cholecalciferol synthesized by the body. Recommended daily intake is 800 IU (20 mcg) for adults and 600 IU (15 mcg) for pregnant and lactating women. (https://www.fda.gov/media/99069/download).

The following table summarizes the SNPs correlated to the vitamin D metabolism [1]

Gene	Gene Function	SNP	Alleles	Outcome
GC	Vitamin D-binding protein. Protein binding vitamin D and its plasma metabolites to transpor them to target tissues.	Locus1	A/A	Lower 25-hydroxyvitamin D (main circulating form) levels. [9-10]
			A/C	Somewhat lower 25-hydroxyvitamin D (main circulating form) levels.[9-10]
			C/C	Typical.[9-10]
		Locus2	G/G	Decreased vitamin D levels.[9-19]
			G/T	Somewhat decreased vitamin D levels.[9-19]
			T/T	Typical.[20]
		Locus3	A/A	Decreased vitamin D levels.[9-10]
			A/C	Decreased vitamin D levels.[9-10]
			C/C	Typical.[9-10]
CYP2R1	Cytochrome P450 2R1. Enzyme converting vitamin D into the active ligand for the vitamin D receptor.	Locus1	A/A	Lower vitamin D levels.[10,21-22]
			A/G	Somewhat lower vitamin D levels.[10]
			G/G	Typical.[10]
		Locus2	G/G	Possible vitamin D insufficiency or deficiency.[9,23-24]
			A/G	Possible vitamin D insufficiency or deficiency.[9,23-24]
			A/A	Typical.[9,23-24]
VDR	Vitamin D receptor. Receptor allowing the body to respond to vitamin D.	Locus1	G/G	Carrier of Fok1 variants; possibly decreased vitamin D levels.[10]
			A/G	Typical.[24-28]
			G/G	Typical.[24-28]

VITAMIN E

Vitamin E, also known as tocopherol, is a fat-soluble antioxidant that safeguards cell membranes from oxidative damage. It is vital for growth, development, and a healthy nervous and immune system. You can find vitamin E in oily fruits, plant-based oils, wheat seeds, nuts, and green leafy vegetables. The recommended daily intake is 22.4 IU (15 mg) for adults and 28.4 IU (19 mg) for pregnant and lactating women. (https://www.fda.gov/media/99069/download).

The following table summarizes the SNPs correlated to the vitamin E metabolism [1]

Gene	Gene Function	SNP	Alleles	Outcome
SCARB1	Scavenger receptor class B type 1. Receptor facilitating the selective uptake of cholesterol from High-Density Lipoprotein (HDL) in the liver.	Locus1	A/A	Lower plasma vitamin E concentration.[10,29]
			G/A	Somewhat lower plasma vitamin E concentration.[10,29]
			G/G	Typical.[10,29]
CD36	Platelet glycoprotein 4. Membrane transporter of fatty acid.	Locus1	A/A	Lower plasma vitamin E concentration.[10]
			G/A	Somewhat lower plasma vitamin E concentration.[10]
			G/G	Typical.[10]
CYP4F2	Cytochrome P450 4F2. Enzyme involved in the metabolism of fatty acids and xenobiotics.	Locus1	T/T	Lower plasma vitamin E concentration.[10]
			C/T	Somewhat lower plasma vitamin E concentration.[10]
			C/C	Typical.[10]

VITAMIN K

Vitamin K, a fat-soluble vitamin, plays a vital role in calcium binding for bone health and blood clotting. It exists in two forms: K1 in plant-based foods, especially leafy greens, and K2 produced by gut bacteria, found in meat, cheese, and fermented foods. Recommended daily intake is 120 mcg for adults and 90 mcg for pregnant and lactating women (https://www.fda.gov/media/99069/download).

The following table summarizes the SNPs correlated to the vitamin K metabolism [1]

Gene	Gene Function	SNP	Alleles	Outcome
VKORC1	Vitamin K epoxide reductase complex subunit 1. Protein involved in vitamin K metabolism. It recycles vitamin K epoxide back to its active form.	Locus1	T/T	Decreased protein activity and increased anticoagulant drugs sensitivity.[30-33]
			C/T	Decreased protein activity and increased anticoagulant drugs sensitivity.[30-33]
			C/C	Typical.[30-33]

CHOLINE

Choline, also known as vitamin J, is a crucial component of cell membranes and the neurotransmitter acetylcholine, influencing muscle, nervous system functions, learning, memory, and more. It's vital for muscle and liver health. Main dietary sources include egg yolks, meat, seafood, dairy, legumes, nuts, and seeds, as the body produces it in limited quantities. Recommended daily intake for adults is 550 mg (https://www.fda.gov/media/99069/download).

The following table summarizes the SNPs correlated to the choline metabolism [1]

Gene	Gene Function	SNP	Alleles	Outcome
PEMT	Phosphatidylethanolamine N-methyltransferase. Enzyme playing a crucial role in the biosynthesis of phosphatidylcholine, a critical component for membrane structure.	rs7946	T/T	Decreased enzyme activity.[36-38]
			C/T	Somewhat decreased enzyme activity.[36-38]
			C/C	Typical.[36-38]

CALCIUM

Calcium is an extremely important mineral for our body, essential for the good health of bones and teeth, muscle function and nerve transmission.
Foods rich in calcium include dairy products, leafy green vegetables, almonds, fortified plant-based milk, salmon and sardines.
The Recommended Daily Intake of calcium for adults is 1,300 mg per day (https://www.fda.gov/media/99069/download).

The following table summarizes the SNPs correlated to the calcium metabolism [39]

Gene	Gene Function	SNP	Alleles	Outcome
COL1A1	Collagen Type I Alpha 1 Chain. Main component of type I collagen, the fibrillar collagen found in most connective tissues, including bones, tendons, cartilage, and skin.	Locus1	A/A	Lower Bone Mineral Density.[40-42]
			A/C	Lower Bone Mineral Density.[40-42]
			C/C	Typical.[40-42]
ESR1	Estrogen Receptor Alpha. Receptor and transcription factor that binds to estrogen hormones and mediates their effect.	Locus1	C/C	Lower bone mineral density.[43]
			C/T	Lower bone mineral density.[43]
			T/T	Typical.[43]

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MINERALS METABOLISM

IRON

Iron is a vital mineral abundant in the body, crucial for hemoglobin, enzymes, hormones, and connective tissue production. Excess iron is stored as ferritin, but imbalance can pose health risks. Iron-rich foods include liver, meat, fish, legumes, cereals, nuts, and leafy greens. Recommended daily intake is 18 mg for adults and 27 mg for pregnant and lactating women(https://www.fda.gov/media/99069/download).

The following table summarizes the SNPs correlated to the iron metabolism [39]

Gene	Gene Function	SNP	Alleles	Outcome
SLC17A1	Sodium-dependent phosphate transport protein 1. Transport protein for sodium-dependent phosphate intake playing a crucial role in neurotransmission.	Locus1	T/T	Higher ferritin.[43]
			C/T	Higher ferritin.[43]
			C/C	Typical.[43]
HFE	Hemojuvelin or High Fe (iron) protein. Protein involved in the regulation of iron homeostasis in the body by controlling iron absorption from the diet and the maintenance of iron levels in the bloodstream.	Locus1	A/A	High ferritin levels.[9]
			A/G	Increased ferritin levels.[9]
			G/G	Typical.[9]
TMPRSS6	Transmembrane protease serine 6 or Matriptase-2. Protein playing a critical role in the regulation of iron homeostasis in the body.	Locus1	A/A	Lower ferritin levels.[44]
			G/A	Lower ferritin levels.[44]
			G/G	Typical.[44]
BTBD9	BTB (Broad-Complex, Tramtrack, and Bric-a-Brac) domain-containing protein 9. Protein implicated in various cellular processes and involved in neuronal signaling and synaptic function.	Locus1	G/G	Higher ferritin.[45]
			A/G	Higher ferritin.[45]
			A/A	Typical.[45]
TFR2	Transferrin receptor protein 2. Transferrin receptor, involved in iron absorption.	Locus1	C/C	Lower serum iron.[43-46]
			A/C	Lower serum iron.[43-46]
			A/A	Typical.[43-46]
TF	Transferrin. Transferrin, main iron transport protein in blood.	Locus1	A/A	Higher ferritin.[40-42]
			A/G	Higher ferritin.[40-42]
			G/G	Typical.[40-42]

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Magnesium is a vital element in the body, supporting DNA/RNA synthesis, protein synthesis, glucose metabolism, and various functions like skeletal health, muscle, and heart function, as well as immune efficiency. Foods rich in magnesium include legumes, nuts, cocoa, whole grains, spices, sweet fruits, and leafy greens. Recommended daily intake is 420 mg for adults and 400 mg for pregnant and lactating women (https://www.fda.gov/media/99069/download).

The following table summarizes the SNPs correlated to the magnesium metabolism [39]

Gene	Gene Function	SNP	Alleles	Outcome
TRPM6	Transient receptor potential cation channel subfamily M member 6. Ion receptor protein with crucial role in maintaining the magnesium homeostasis.	Locus1	T/T	Lower serum magnesium levels; increased risk of hypomagnesia with proton pump inhibitors.[47-49]
			C/T	Lower serum magnesium levels; increased risk of hypomagnesia with proton pump inhibitors.[47-49]
			C/C	Typical.[47-49]
		Locus2	A/A	Lower serum magnesium levels; increased risk of hypomagnesia with proton pump inhibitors.[47-49]
			T/A	Lower serum magnesium levels; increased risk of hypomagnesia with proton pump inhibitors.[47-49]
			T/T	Typical.[47-49]
CNNM2	Cyclin M2 or Cyclin and CBS domain divalent metal cation transport mediator 2. Protein involved in magnesium transport and metabolism.	Locus1	C/C	Higher levels of 25-hydroxyvitamin D (main circulating form of vitamin D).[50-52]
			C/T	Higher levels of 25-hydroxyvitamin D (main circulating form of vitamin D).[50-52]
			T/T	Typical.[50-52]

SELENIUM

Selenium is a vital mineral with antioxidant properties, supporting reproduction, infection defense, and overall well-being. It's crucial for thyroid, muscle, and reproductive system function, as well as bone, hair, and nail health. Selenium-rich foods include fish, shellfish, red meat, poultry, dairy, and cereals. Recommended daily intake is 55 mcg for adults and 70 mcg for pregnant and lactating women (https://www.fda.gov/media/99069/download).

The following table summarizes the SNPs correlated to the selenium metabolism [39]

Gene	Gene Function	SNP	Alleles	Outcome
SELENOP	Selenoprotein. Protein that plays a crucial role in the transport and metabolism of selenium.	Locus1	T/T	Lower serum selenium levels.[53-54]
			C/T	Lower serum selenium levels.[53-54]
			C/C	Typical.[53-54]
SELENOF	Selenoprotein F. Protein that plays a crucial role in the transport and metabolism of selenium.	Locus2	T/T	Lower serum selenium levels.[53]
			C/T	Lower serum selenium levels.[53]
			C/C	Typical.[53]

ZINC

Zinc is a vital mineral involved in enzyme complexes and hormone function, including insulin, growth hormone, and sex hormones. It's found in foods like fish, meat, grains, legumes, nuts, and seeds. Recommended daily intake is 11 mg for men and 13 mg for pregnant and lactating women (https://www.fda.gov/media/99069/download).

The following table summarizes the SNPs correlated to the zinc metabolism [39]

Gene	Gene Function	SNP	Alleles	Outcome
SLC30A8	Zinc transporter 8. Protein playing a crucial role in the regulation of zinc homeostasis within insulin-secreting pancreatic cells.	Locus1	C/C	Lower zinc level, increased glucose levels in blood.[44,55]
			C/T	Lower zinc level, increased glucose levels in blood.[44,55]
			T/T	Typical.[44,55]

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CARBOHYDRATES METABOLISM

Carbohydrate metabolism is crucial for health, as carbohydrates are broken down into sugars and used for energy in organs like the brain and muscles. Insulin, produced by the pancreas, regulates this process, impacting blood glucose levels and overall well-being. Carbohydrate sources include grains, fruits, vegetables, legumes, dairy, sugar, and sweets.

The following table summarizes the SNPs correlated to the carbohydrates metabolism [56]

Gene	Gene Function	SNP	Alleles	Outcome
ADIPOQ	Adiponectin. Hormone playing a role in insulin sensitivity and glucose metabolism	Locus1	G/G	Diminished hormone levels.[36]
			C/G	Diminished hormone levels.[36]
			C/C	Typical.[36]
LEP	Leptin. Hormone produced by adipose tissue and involved in the regulation of energy balance and body weight.	Locus1	A/A	Risk of high BMI and insulin resistance.[36]
			G/A	Risk of high BMI and insulin resistance.[36]
			G/G	Typical.[36]
LEPR	Leptin receptor. It binds leptin and, in concert with it, regulates energy metabolism and body weight.	Locus1	A/A	Increased risk of high BMI.[57-58]
			A/G	Increased risk of high BMI.[57-58]
			G/G	Typical.[57-58]
KCNJ11	Potassium Voltage-Gated Channel Subfamily J Member 11. It plays a critical role in glucose-induced insulin secretion in pancreatic cells.	Locus1	T/T	Impaired glucose-induced insulin secretion with high BMI; greater impairment of insulin release.[59-60]
			C/T	Impaired glucose-induced insulin secretion with high BMI.[59-60]
			C/C	Typical.[59-60]

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The following table summarizes the SNPs correlated to the carbohydrates metabolism [56]

Gene	Gene Function	SNP	Alleles	Outcome
AMY1A	Alpha-Amylase 1A. Protein involved in the first steps of digestion of carbohydrates in saliva.	Locus1	A/A	Lower amylase activity. Bad at breaking down carbs.[61]
			A/G	Intermediate amylase activity. Still good at breaking down carbs.[61]
			G/G	Typical.[61]
UCP2	Uncoupling Protein 2. Protein present in the mitochondria and involved in energy equilibrium.	Locus1	T/T	Increased risk of higher BMI.[61]
			C/T	Increased risk of higher BMI.[62-66]
			C/C	Typical.[61]
UCP3	Uncoupling Protein 3. Protein present in the mitochondria and involved in energy equilibrium.	Locus1	A/A	Lower glucose levels, better weight loss on high protein/low carb diet.[67]
			A/G	Less weight loss, no decrease in glucose or insulin levels on high protein/low carb diet.[67]
			G/G	Typical.[67]
PPARG	Peroxisome Proliferator-Activated Receptor Gamma. Receptor that regulates fatty acid deposition and glucose metabolism.	Locus1	G/G	Increased risk of insulin resistance.[68-69]
			C/G	Increased risk of insulin resistance.[68-69]
			C/C	Typical.[68-69]
PYGM	Glycogen Phosphorylase (muscle form). Enzyme involved in glycogen metabolism, a macromolecule that serves as storage for glucose.	Locus1	A/A	Absence of the enzyme.[68-69]
			G/A	Deficiency of the enzyme.[68-69]
			G/G	Typical.[68-69]
		Locus2	G/G	Absence of the enzyme.[68-69]
			G/A	Deficiency of the enzyme.[68-69]
			A/A	Typical.[68-69]

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LIPIDS METABOLISM

Lipids serve as energy reserves, regulate body temperature, form cell membranes, and act as chemical messengers. Maintaining balanced lipid levels is crucial for health, as excess lipids can lead to health risks. Sources of lipids include oils, nuts, seeds, fatty fish, poultry, meat, eggs, dairy products, and avocados.

The following table summarizes the SNPs correlated to the lipids metabolism [56]

Gene	Gene Function	SNP	Alleles	Outcome
FADS1	Fatty acid desaturase 1. Enzyme involved in the desaturation of polyunsaturated fats.	Locus1	C/C	Decreased fatty acid desaturase enzyme activity.[36]
			T/C	Decreased fatty acid desaturase enzyme activity.[36]
			T/T	Typical.[36]
FTO	Fat mass and obesity-associated protein. Protein involved in the control of body weight and energy metabolism.	Locus1	A/A	Risk for high BMI, but not associated with problems related to obesity; better response to high-protein diets.[9,70-71]
			A/T	Somewhat increased risk for high BMI.[9,70-71]
			T/T	Typical.[9,70-71]
APOA2	Apolipoprotein A-II. Component of lipoproteins, present in the blood and playing a crucial role in lipid transport in the body.	Locus1	G/G	Increased risk of high BMI, particularly with diets rich in saturated fats.[4,72-73]
			A/G	Typical.[4,72-73]
			A/A	Typical.[4,72-73]
APOA5	Apolipoprotein A-V. Component of lipoproteins, present in the blood and playing a crucial role in lipid transport in the body.	Locus1	G/G	32% increase in triglyceride levels.[4,74-77]
			A/G	16% increase in triglyceride levels.[77]
			A/A	Typical.[77]
APOC3	Apolipoprotein C-III. Component of lipoproteins, present in the blood and playing a crucial role in lipid transport in the body.	Locus1	G/G	Higher fasting plasma levels of APOC3, TG, TC and LDL-C.[4,78]
			C/G	Higher fasting plasma levels of APOC3, TG, TC and LDL-C.[4,78]
			C/C	Typical.[4,78]

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The following table summarizes the SNPs correlated to the lipids metabolism [56]

Gene	Gene Function	SNP	Alleles	Outcome
LIPC	Hepatic lipase. Enzyme breaking down triglycerides and phospholipids present in high-density lipoproteins (HDL).	Locus1	G/G	Significantly higher HDL-C level.[79-80]
			G/A	Significantly higher levels of FPG, TC, TG.[79-80]
			A/A	Significantly higher levels of FPG, TC, TG.[79-80]
TFAP2B	Transcription factor AP-2 beta. Transcription factor regulating genes that control cell growtht, differentiation, apoptosis (programmed cell death).	Locus1	A/A	Better response to high-protein diets for weight management.[80-81]
			A/G	Typical.[80-81]
			G/G	Typical.[80-81]
		Locus2	A/A	Risk for high BMI.[80-81]
			A/G	Risk for high BMI.[80-81]
			G/G	Typical.[80-81]
PCSK9	Proprotein convertase subtilisin/kexin type 9. Enzyme playing a critical role in the regulation of cholesterol levels in the bloodstream.	Locus1	T/T	Decreased LDL-cholesterol.[82-83]
			G/T	Decreased LDL-cholesterol.[82-83]
			G/G	Typical.[82-83]
		Locus2	T/T	Decreased LDL.[84]
			C/T	Decreased LDL.[84]
			C/C	Typical.[84]
		Locus3	G/G	Increased LDL.[85-87]
			A/G	Increased LDL.[85-87]
			A/A	Typical.[85-87]
LPL	Lipoprotein lipase. Enzyme playing a crucial role in the breakdown of triglycerides present in circulating lipoproteins.	Locus1	G/G	Lower triglycerides.[88-89]
			C/G	Lower triglycerides.[88-89]
			C/C	Typical.[88-89]
		Locus2	G/G	Higher triglycerides.[90]
			A/G	Higher triglycerides.[90]
			A/A	Typical.[90]

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The following table summarizes the SNPs correlated to the lipids metabolism [56]

Gene	Gene Function	SNP	Alleles	Outcome
UCP1	Uncoupling protein 1. Protein playing a significant role in thermogenesis, a process by which the body generates heat in response to cold environments or other stimuli.	Locus1	C/C	Weak protein activity; probable increase of abdominal fat and high BMI.[91]
			C/T	Probably typical risk for high BMI.[91]
			T/T	Typical.[91]
		Locus2	C/C	Risk for insulin resistance and higher triglycerides levels.[91]
			C/T	Typical.[91]
			T/T	Typical.[91]
ELOVL2	Fatty acid elongase 2. Protein involved in the synthesis of very long polyunsaturated fatty acids (VLC-PUFAs), which have several critical roles in our body.	Locus1	C/C	Decreased conversion of EPA to DHA.[92]
			C/T	Decreased conversion of EPA to DHA.[92]
			T/T	Typical.[92]
CPT2	Carnitine palmitoyltransferase II. Enzyme is involved in the transportation of fatty acids into mitochondria, where they undergo beta-oxidation to produce energy.	Locus1	A/A	Increased risk for insulin resistance.[171]
			G/A	Increased risk for insulin resistance.[171]
			G/G	Typical.[171]
		Locus2	G/G	Enzyme deficiency.[171]
			G/A	Enzyme deficiency.[171]
			A/A	Typical.[171]

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FOOD PREFERENCES AND SUSCEPTIBILITY

FOOD ALLERGIES AND INTOLERANCES

Food allergies result from the immune system's response to specific proteins in food, ranging from mild symptoms like hives to severe, life-threatening reactions called anaphylaxis. Food sensitivities and intolerances, more common than allergies, are unrelated to the immune system and involve difficulties digesting or metabolizing certain foods. They can lead to various symptoms such as gastrointestinal problems, headaches, skin issues, fatigue, joint pain, and mood changes.

The following table summarizes the SNPs correlated to food susceptibility [93]

Gene	Gene Function	SNP	Alleles	Outcome
LCT	Lactase. Enzyme which breaking down lactose, the main sugar in mammalian milk.	Locus1	G/G	Stops producing lactase in adulthood.[94-95]
			A/G	Reduced production of lactase in adulthood.[94-95]
			A/A	Production of lactase also in adulthood.[94-95]
MCM6	Minichromosome Maintenance Complex Component 6. Protein Minichromosome Maintenance (MCM) complex, which is involved in the regulation of DNA replication.	Locus1	T/T	Stops producing lactase in adulthood.[95]
			T/C	Reduced production of lactase in adulthood.[95]
			C/C	Production of lactase also in adulthood.[95]
ADH1B	Alcohol Dehydrogenase 1B. Enzyme metabolizing alcohol (ethanol) in the liver and producing acetaldehyde.	Locus1	A/A	Faster metabolism of alcohol with possibleacetaldehyde accumulation (more common in African populations).[4,96-99]
			A/G	Faster metabolism of alcohol with possible acetaldehyde accumulation (more common in African populations).[4,96-99]
			G/G	Typical.[4,96-99]
ALDH2	Aldehyde Dehydrogenase 2. Enzyme required for clearance of cellular acetaldehyde, a toxic byproduct of alcohol metabolism, and formaldehyde, a toxic byproduct of some metabolic process and environmental pollutant and environmental pollutant.	Locus1	A/A	Slower clearance of acetaldehyde; alcohol flush reaction; decrease in alcohol consumption.[98,100-103]
			A/G	Alcohol flush reaction; slower clearance of acetaldehyde.[98,100-103]
			G/G	Typical.[98,100-103]
FLG	Filaggrin. Essential structural protein found in the outermost layer of the skin, called the stratum corneum. It plays a crucial role in maintaining the skin's barrier function and hydration.	Locus1	A/A	Increased risk of allergies and nickel sensitivity. 5-fold increasedrisk of peanut allergy. Increased risk of grass pollen allergy.[104-108]
			A/G	Increased risk of allergies and nickel sensitivity. 5-fold increased risk of peanut allergy. Increased risk of grass pollen allergy.[104-108]
			G/G	Typical.[104-108]

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The following table summarizes the SNPs correlated to food susceptibility [93]

Gene	Gene Function	SNP	Alleles	Outcome
HNMT	Histamine N-methyltransferase. Enzyme responsible of degrading histamine and in regulating the airway response to histamine.	Locus1	T/T	Reduced histamine degradation.[109-112]
			C/T	Somewhat reduced histamine degradation.[109-112]
			C/C	Typical.[109-112]
HLA-DQA1	Human Leukocyte Antigen-DQA1. Part of a cell surface protein playing a crucial role in the immune system, by presenting antigens to helper T cells.	Locus1	C/C	Typical.[113]
			C/T	Gluten intolerance is possible.[113]
			T/T	Gluten intolerance is possible.[113]
		Locus1	C/C	Higher risk of wheat allergy.[113-115]
			C/T	Typical.[113-115]
			T/T	Typical.[113-115]
HLA-DQB1	Human Leukocyte Antigen-DQB1. Part of a cell surface protein playing a crucial role in the immune system, by presenting antigens to helper T cells.	Locus1	C/C	3-fold increase of the relative risk of peanut allergy in Caucasians.[116-117]
			C/T	1.7-fold increase of the relative risk of peanut allergy in Caucasians.[116-117]
			T/T	Typical.[116-117]
IL-13	Interleukin 13. Signaling protein playing a key role in the immune system and part of the interleukin family of cytokines. It is involved in regulating various immune responses, particularly those related to allergic and inflammatory reactions.	Locus1	A/A	Higher IgE levels; higher risk of allergies, allergic rhinitis; increased risk of dust mite and shrimp allergies.[118-123]
			A/G	Higher IgE levels; higher risk of allergies, allergic rhinitis; increased risk of dust mite and shrimp allergies.[118-123]
			G/G	Typical.[118-123]
		Locus2	C/T	Increase IgE levels; typical risk of shrimp allergy.[118-123]
			T/T	Increase IgE levels; increased risk of shrimp allergy.[118-123]
			C/C	Typical.[118-123]
		Locus3	C/T	Increased risk of food allergies; elevated plasma IgE.[118,120,125]
			T/T	Increased risk of food allergies; elevated plasma IgE.[118,120,125]
			C/C	Typical.[118,120,125]
IL-18	Interleukin 18. Signaling protein playing a key role in the immune system and part of the interleukin family of cytokines. It is involved in epithelial barrier repair and immune responses.	Locus1	T/T	Slightly increased relative risk of gluten intolerance.[126-127]
			C/T	Slightly increased relative risk of gluten intolerance.[126-127]
			C/C	Typical.[126-127]
IL-4	Interleukin 4. Signaling protein playing a key role in the immune system and part of the interleukin family of cytokines. It is involved in regulating antibody production, hematopoiesis and inflammation, and immune responses.	Locus1	C/C	Increased risk of food allergies in conjunction with vitamin D deficiency (most common genotype in Caucasians).[128-130]
			C/T	Increased risk of food allergies in conjunction with vitamin D deficiency.[128-130]
			T/T	Food allergy risk not dependent on vitamin D levels (most common genotype in Asian and African populations).[128-130]

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TYRAMINE INTOLERANCE

Tyramine, a trace amine in the body, can lead to intolerance symptoms like headaches, palpitations, blood pressure fluctuations, sweating, and digestive issues. Reduced enzyme activity in a single gene is usually not problematic with high-tyramine foods, but issues may arise with decreased activity in multiple genes. Tyramine-rich foods include aged cheeses, cured meats, fermented products, certain alcoholic beverages, and specific fruits, often fermented or close to spoiling.

The following table summarizes the SNPs correlated to tyramine intolerance [93]

Gene	Gene Function	SNP	Alleles	Outcome
MAOA	Monoamine oxidase A. Enzyme involved in the regulation of neurotransmitters (such as serotonin, norepinephrine, and dopamine), essential for maintaining normal mood, emotions, and cognitive functions.	Locus1	T/T	Reduced enzyme activity; possibly decreased tyramine metabolism.[131-134]
			T/G	Somewhat reduced enzyme activity.[131-134]
			G/G	Typical.[131-134]
FMO3	Flavin-containing monooxygenase 3. Hepatic enzyme catalyzing the oxygenation of a wide variety of nitrogen- and sulfur-containing compounds, including drugs and dietary compounds.	Locus1	A/A	Decreased enzyme function.[135-137]
			A/G	Decreased enzyme function.[135-137]
			G/G	Typical.[135-137]
		Locus2	-/-	Decreased enzyme function.[135]
			-/TG	Decreased enzyme function.[135]
			TG/TG	Typical.[135]
		Locus3	T/T	Decreased enzyme function.[135,138]
			G/T	Decreased enzyme function.[135,138]
			G/G	Typical.[135,138]
CYP2D6	Cytochrome P450 2D6. Enzyme member of the cytochrome P450 superfamily. It catalyzes many reactions involved in drug metabolism and synthesis of cholesterol, steroids and other lipids.	Locus1	T/T	Reduced enzyme function. Poor metabolizer.[139-140]
			C/T	Typical.[139-140]
			C/C	Extensive metabolizer.[139-140]
		Locus2	-/-	Enzyme deletion. Poor metabolizer.[139,141]
			-/A	Intermediate metabolizer.[139,141]
			A/A	Typical.[139,141]
		Locus3	G/G	Typical.[139,142]
			A/G	Carrier of one decreased or non-functioning allele.[139,142]
			A/A	Possibly decreased or non-functioning.[139,142]

DNA WELLNESS TEST

TASTE

Taste plays a significant role in our food choices, influenced by personal experiences, cultural factors, and health considerations. Genetics also contribute to our taste perception, affecting how we experience flavors like bitter, sour, sweet, or salty, as well as our food preferences.

The following table summarizes the SNPs correlated to the food preferences [93]

Gene	Gene Function	SNP	Alleles	Outcome
TAS2R38	Taste receptor type 2 member 38. Receptor in the perception of a wide range of bitter compounds.	Locus1	A/A	Unable to sense bitter in PROP test; likely to consider wine as sweet; can lead to consume more alcohol.[143-144]
			A/G	Able to taste some bitter.[143-144]
			G/G	Strongly sense bitter in PROP tests; likely to consider wine as bitter; can lead to consume less alcohol.[145]
		Locus2	T/T	Probably can't taste some bitter flavors.[146]
			C/T	Probably can taste bitter.[146]
			C/C	Can taste bitter in broccoli.[146]
TAS1R2	Taste receptor type 1 member 2. Receptor involved in the detection of chemical stimuli involved in sensory perception of sweet taste.	Locus1	C/C	Lower probability of drinking wine; if drink wine, likely to drink larger amounts.[147]
			C/T	Lower probability of drinking wine.[147]
			T/T	Typical.[147]

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DETOXIFICATION, ANTIOXIDATION, AND LONGEVITY

DETOXIFICATION AND ANTIOXIDATION

Detoxification involves processes to cleanse the blood from toxins and manage acute intoxication and withdrawal. The body relies on various organs like the liver, kidneys, intestines, lungs, lymphatic system, and skin for eliminating toxins. When these systems are compromised, impurities can harm the body.

Antioxidation, on the other hand, protects cells and tissues from oxidative damage caused by free radicals, which are unstable molecules from normal cellular processes or external sources like pollution and certain foods. Imbalance in this mechanism leads to oxidative stress, associated with aging and various health conditions.

The following table summarizes the SNPs correlated to detoxification and antioxidation [148]

Gene	Gene Function	SNP	Alleles	Outcome
SOD2	Superoxide Dismutase 2. Enzyme found in the mitochondria. It is an important enzyme for reducing oxidative stress in cells.	Locus1	T/T	Enzyme activity enhanced (about 33% higher).[149-151]
			C/T	Enzyme activity enhanced (about 33% higher).[149-151]
			C/C	Typical.[149-151]
AS3MT	Arsenic (+3 oxidation state) methyltransferase. Enzyme playing a crucial role in the metabolism of arsenic in the body.	Locus1	C/C	Faster and more effective arsenic detoxification.[152-153]
			C/G	Typical.[152-153]
			G/G	Typical.[152-153]
CYP1A2	Cytochrome P450 1A2. Enzyme member of the cytochrome P450 superfamily. It catalyzes many reactions involved in drug metabolism and synthesis of cholesterol, steroids and other lipids.	Locus1	A/A	Decreased activity or inactive enzyme.[9,154-155]
			A/G	Decreased enzyme activity.[9,154-155]
			G/G	Typical.[9,154-155]
		Locus2	A/A	Faster metabolism of caffeine.[9,154,156]
			A/C	Typical.[9,154,156]
			C/C	Slower metabolism of caffeine.[9,154,156]
ADORA2A	Adenosine A2a receptor. Receptor protein activated by the binding of adenosine. It determines vasodilation, anti-inflammatory effect, neurotransmitter modulation, cardiovascular protection.	Locus1	T/T	No increase in anxiety from caffeine (in average amount).[9,157-159]
			C/T	No increase in anxiety from caffeine (in average amount).[9.157-159]
			C/C	Probable increase in anxiety from caffeine.[9,157-159]

LONGEVITY

Longevity refers to an extended lifespan, typically surpassing the average for a given population or species, often linked with humans living beyond 80 years. Investigating the factors behind human longevity and healthy aging poses a substantial challenge in biology and medicine due to the intricate interaction of genetics, lifestyle, and the environment. Nonetheless, studying the genetics of exceptionally long-lived individuals offers valuable biological insights.

The following table summarizes the SNPs correlated to longevity[148]

Gene	Gene Function	SNP	Alleles	Outcome
FOXO3	Forkhead box protein O3. Transcription factor regulating apoptosis and tumor suppression. It is also involved in nutrient sensing and the response to oxidative stress.	Locus1	G/G	Increased odds of living longer (1.5-to-2.75-fold increased odds); lower blood glucose levels in women.[4,160-162]
			G/T	Somewhat increased odds of living longer.[4,160-162]
			T/T	Typical.[4,160-162]
BPIFB4	Bactericidal/permeability-increasing fold-containing family B member 4. Protein involved in host defense and immune responses.	Locus1	G/G	Variant observed in long-lived individuals. Better endothelial function. Less likely to be frail in old age.[163-165]
			A/G	Typical.[163-165]
			A/A	Typical.[163-165]

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PHYSICAL ACTIVITY AND CHIROPRACTIC TREATMENT

PHYSICAL ACTIVITY

The WHO defines physical activity as any bodily movement using skeletal muscles and includes activities like work, hobbies, walking, or cycling. Engaging in physical activity, whether moderate or vigorous, offers numerous health benefits, including weight management, improved mental health, and reduced noncommunicable disease risks. Staying active can be achieved through various methods such as walking, cycling, sports participation, and engaging in recreational activities.

The following table summarizes the SNPs correlated to physical activity [166]

Gene	Gene Function	SNP	Alleles	Outcome
GABPB1	GA-binding protein transcription factor subunit beta-1. Transcription factor regulating various genes involved in energy metabolism, cellular respiration, and other essential cellular processes.	Locus1	G/G	Likely worse in endurance sports.[167-169]
			G/A	Intermediate phenotype.[167-169]
			A/A	Likely better in endurance sports and better aerobic capacity.[167-169]
		Locus2	T/T	Variant frequently observed in professional athletes.[169]
			C/T	Variant frequently observed in professional athletes.[169]
			C/C	Typical.[169]
		Locus3	G/G	Variant frequently observed in professional athletes.[169]
			A/G	Variant frequently observed in professional athletes.[169]
			A/A	Typical.[169]
		Locus4	A/A	Variant frequently observed in professional athletes.[169]
			C/A	Variant frequently observed in professional athletes.[169]
			C/C	Typical.[169]
PPARA	Peroxisome Proliferator-Activated Receptor Alpha. Transcription factor regulating the expression of various genes involved in lipid metabolism and energy homeostasis	Locus1	G/G	Likely better in endurance sports and better aerobic capacity.[167]
			G/C	Intermediate phenotype.[167]
			C/C	Likely better in power sports and lower aerobic capacity.[167]

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The following table summarizes the SNPs correlated to physical activity [166]

Gene	Gene Function	SNP	Alleles	Outcome
PPARGC1A	Peroxisome Proliferator-Activated Receptor Gamma Coactivator 1 Alpha. Transcriptional coactivator regulating the expression of genes involved in energy metabolism, mitochondrial biogenesis, and adaptive thermogenesis.	Locus1	A/A	Likely worse in endurance sports; lower mitochondrial biogenesis and lower increase in insulin sensitivity on aerobic training; likely lower VO2max and higher levels of lactate in blood.[167]
			A/G	Intermediate phenotype.[167]
			G/G	Likely better in endurance sports; higher mitochondrial biogenesis and higher increase in insulin sensitivity on aerobic training; likely normal VO2max and lower levels of lactate in blood.[167]
EPAS1	Endothelial PAS Domain Protein 1. Transcription factor regulating genes involved in the formation of new blood vessels, the production of red blood cells, glucose metabolism, and cell proliferation and survival.	Locus1	A/A	Variant rare in the sprint/power athletes.[167,170]
			A/G	Intermediate phenotype.[167,170]
			G/G	Typical.[167,170]
AMPD1	Adenosine Monophosphate Deaminase 1. Enzyme found in the skeletal muscles and playing a crucial role for movement, producing energy.	Locus1	A/A	Loss of enzyme function. May experience muscle soreness in exercise. Possible benefit on cardiovascular function.[171-173]
			A/G	Reduced enzyme function. May experience muscle soreness in exercise. Possible benefit on cardiovascular function.[174]
			G/G	Typical.[174]
CNR1	Cannabinoid Receptor 1. Receptor regulating various physiological processes, including pain sensation, mood, appetite, memory, and immune response.	Locus1	T/T	Likely to tolerate more high-intensity training.[175]
			C/T	Typical.[175]
			C/C	Typical.[175]
AGT	Angiotensinogen. Protein crucial for maintaining blood pressure, fluid balance, and electrolyte homeostasis.	Locus1	G/G	Risk of high blood pressure. Likely to be better in power sports.[176-177]
			A/G	Slightly higher risk of high blood pressure. Likely to be better in power sports.[178]
			A/A	Typical.[178]
ACTN3	Actinin Alpha 3. Structural protein that is expressed in fast, type II fibers, where it plays an important role in the generation of explosive and powerful muscle contractions.	Locus1	C/C	Functioning protein. More fast, type II muscle fiber. Optimal for elite power athletes.[167]
			C/T	Functioning protein. Optimal for elite power athletes.[167]
			T/T	Non-functioning protein. More likely to be an endurance athlete than power athlete.[167]
BDKRB2	Bradykinin Receptor B2. Receptor that relaxes and widens blood vessels, leading to increased blood flow and decreased blood pressure.	Locus1	T/T	Probably better endurance performance, than power performance.[167,179]
			C/T	Probably better endurance performance, than power performance.[167,179]
			C/C	Typical.[167,179]

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The following table summarizes the SNPs correlated to physical activity [166]

Gene	Gene Function	SNP	Alleles	Outcome
MSTN	Myostatin. Protein involved in the control of growth and development of muscle tissues.	Locus1	C/C	Greater muscle mass.[180-181]
			C/T	Greater muscle mass.[180-181]
			T/T	Typical muscle mass, better jumping ability.[182]
VEGFA	Vascular Endothelial Growth Factor A. Signaling protein involved in the regulation of blood vessel formation and blood vessel permeability.	Locus1	C/C	Higher protein levels. Higher improvements in VO2max seen with aerobic training.[183]
			C/G	Higher protein levels. Higher improvements in VO2max seen with aerobic training.[183]
			G/G	Lower protein levels. Lower improvements in VO2max seen with aerobic training.[183]
IGF2	Insulin-Like Growth Factor 2. Protein member of the insulin-like growth factor (IGF) family, playing a role in promoting cell proliferation and differentiation.	Locus1	C/C	Better sprint and jumping ability.[184]
			C/T	Typical.[184]
			T/T	Typical.[184]

PAIN PERCEPTION

Pain is a sensory and emotional response the body experiences in response to actual or potential tissue damage. While pain serves as a crucial protective mechanism, differences in pain perception among individuals can lead to problems and disabilities for some. Recognizing the unique ways pain manifests in individuals is vital, likely influenced by a complex interplay of genetic, environmental, and personal factors.

The following table summarizes the SNPs correlated to pain perception [166]

Gene	Gene Function	SNP	Alleles	Outcome
SCN9A	Sodium voltage-gated channel alpha subunit 9. Protein essential for the generation and propagation of electrical signals neurons and muscle cells.	Locus1	A /A	Increased perception of pain.[180,184]
			A /G	Somewhat increased perception of pain. [180,184]
			G /G	Typical.[180,184]
NTRK1	Neurotrophic receptor tyrosine kinase 1. Protein essential for the development and survival of neurons, especially those that transmit information about sensations such as pain, temperature, and touch.	Locus1	A/A	Increased pain perception during acupuncture. [180,185-186]
			A/G	Somewhat increased pain perception during acupuncture.[180,185-186]
			G/G	Typical.[180,185-186]

SLEEP AND MOOD

Sleep and mood are interconnected; insufficient sleep can lead to irritability and stress, while quality sleep can improve well-being. Additionally, mood and mental states can impact sleep. Sleep is crucial for the brain and influenced by genetics, with similarities across species. It is also affected by health and environmental factors, which should be considered when studying genetic variants related to sleep.

The following table summarizes the SNPs correlated to sleep and mood [166]

Gene	Gene Function	SNP	Alleles	Outcome
GSK3B	Glycogen Synthase Kinase 3 Beta. Enzyme involved in glycogen metabolism, cellular division, proliferation, motility and survival.	Locus1	G/G	Increased risk for severe insomnia.[187-188]
			A/G	Increased risk for severe insomnia.[187-188]
			A/A	Typical.[187-188]
ADA	Adenosine Deaminase. Enzyme that prevents the accumulation of adenosine, that can interfere with normal cellular functions.	Locus1	T/T	Reduced clearance of adenosine. May lead to more deep sleep, but sleepiness when waking up.[189-190]
			C/T	Reduced clearance of adenosine. May lead to more deep sleep, but sleepiness when waking up.[189-190]
			C/C	Typical.[189-190]
NGF	Nerve Growth Factor. Important protein involved in the development and survival of nerve cells (neurons), especially those that transmit pain, temperature, and touch sensations.	Locus1	C/C	More anxiety in females, less anxiety males.[180,191]
			T/C	Typical.[180,191]
			T/T	More anxiety in males, less anxiety females.[180,191]
NGFR	Nerve Growth Factor Receptor. Receptor playing a crucial role in the development and maintenance of the nervous system.	Locus1	G/G	Increased stress levels, possible worsening of sleep.[192]
			C/G	Somewhat increased stress levels, possible worsening of sleep.[192]
			C/C	Typical.[192]
COMT	Catechol-O-methyltransferase. Enzyme playing a role in the breakdown of catecholamines, such as dopamine, epinephrine, and norepinephrine, in the brain and other tissues.	Locus1	A/A	Better memory and attention.[193]
			G/A	Intermediate dopamine levels.[193]
			G/G	Higher pain tolerance and better stress resiliency.[193]

CHIROPRACTIC TREATMENT

Chiropractic is a discipline based on precise and controlled adjustments or manipulations aiming at treating mechanical disorders of the musculoskeletal system, particularly the spine. In fact, the central concept of chiropractic treatment is that proper alignment of the spine is crucial for overall health and well-being.

The following table summarizes the SNPs correlated to the response to chiropractic treatment [166]

Gene	Gene Function	SNP	Alleles	Outcome
CNTF	Ciliary Neurotrophic Factor. Hormone promoting neurotransmitter synthesis and neurite outgrowth in certain neuronal populations.	Locus1	A/A	Typical.[180,192]
			A/G	Typical.[180,192]
			G/G	Better response to chiropractic treatment.[180,192]

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SCIENTIFIC GLOSSARY

When discussing genetics, it's often necessary to use many technical terms, and there's no way to avoid it if we want to maintain accuracy in explanations. That's why we have compiled a scientific glossary - to enable everyone to understand without getting overwhelmed.
Anyway, it is important to emphasize that our scientific glossary does not aim to be exhaustive and is not intended to replace the advice provided by your healthcare provider. Professional medical support is essential for a proper interpretation of genetic data and for developing a personalized health and wellness plan.

- **Allele:** An allele is one of the different forms of a specific gene. The differences among alleles arise from small changes in the DNA sequence and can lead to changes in the characteristic controlled by the gene itself.
- **Chromosome:** The chromosome is the structure in which the DNA is organized in the nucleus of the cells. Humans have 23 pairs of chromosomes, with one copy coming from the mother and one copy from the father.
- **Dietary supplement:** A dietary supplement is a product that contains one or more dietary ingredients, such as vitamins, minerals, herbs, amino acids, enzymes, or other substances, intended to supplement the diet. These supplements are available in various forms, including pills, capsules, tablets, powders, or liquids.
- **DNA:** DNA stands for Deoxyribonucleic Acid. It is the macromolecule containing the information to build the organism. It is made up of 4 different nucleotides (Adenine, Cytosine, Guanine and Thymine). The human DNA have 3 billion nucleotide base pairs.
- **Gene:** A gene is a segment of a chromosome that occupies a given locus on it and codes for a protein, each one with a specific function: some build the structure of our cells, some respond to signaling molecules, some catalyze reactions (these are called enzymes), and so on.
- **Genomics:** Genomics is a field of biology that focuses on the study of an organism's entire genome, which is the complete set of its genetic material. It involves the comprehensive analysis of genes, their functions, interactions, and variations within and between populations.
- **Genotype:** The genotype is the genetic makeup of an organism, then the combination of alleles present in an individual's DNA at a particular locus on a chromosome. The genotype represents the specific genetic information that an organism inherits from its parents.

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- **Heterozygosity:** Heterozygosity refers to having two different alleles at a specific genetic locus. If an individual has one copy of the "A" allele and one copy of the "B" allele for a certain gene (AB genotype), they are said to be heterozygous for that gene.
- **Homozygosity:** Homozygosity refers to having two identical alleles at a specific genetic locus. If an individual has two copies of the "A" allele for a certain gene (AA genotype), they are said to be homozygous for that gene.
- Macronutrient: Macronutrients are essential nutrients that are required by the body in large quantities to maintain proper functioning, growth, and overall health. These nutrients provide the necessary energy and building blocks needed for various physiological processes. The three primary macronutrients are: carbohydrates, lipids (fat), and proteins.
- **Micronutrient:** Micronutrients are essential nutrients required by the body in smaller quantities but are equally important for maintaining overall health and supporting various physiological functions. Micronutrients include two main groups: vitamins and minerals.
- **Mutation:** A mutation is a change or alteration in the DNA sequence of a gene. The main mutation types include base substitutions, deletions, or insertions.
- **Nutritional deficiency:** Nutritional deficiency, also known as malnutrition, refers to a condition in which the body does not receive enough macronutrients or micronutrients, which are needed to support proper growth, development, and overall health.
- **Phenotype:** The phenotype is any observable trait arising from a complex interplay between a given genotype and environmental factors. Examples of phenotypes are height, eye color and blood type.
- **rsID number:** rsID numbers are identifiers used by researchers to name different SNPs.
- **SNPs (Single Nucleotide Polymorphism):** A SNP, or single nucleotide polymorphism, is a mutation in one of the nucleotide bases composing DNA and found in more than 1% of the population.

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DNA WELLNESS TEST

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- The final results obtained by the Low-Risk General Wellness Test have not been evaluated by the Food and Drug Administration, and they are not intended to diagnose, treat, cure, or prevent any disease.
- All information regarding the DNA Wellness Test is provided in good faith. While we have made every attempt to ensure that the information contained in this DNA Wellness Test is accurate to the best of our knowledge, we are not responsible for any errors or omissions or for the results obtained from the use of this information.
- Before taking any action based on the information provided by the DNA Wellness Test, we urge you to consult with appropriate professionals as it is not a substitute for professional medical advice. In any case, we are not liable if you receive inadequate or even dangerous advice or recommendations for your health from third parties.
- Genetic test results can have psychological implications, so it's important to be prepared for potential emotional distress or anxiety related to learning about health risks.
- The use, any losses and/or damages incurred because of the use of the DNA Wellness Test, and the reliance of any information contained in this DNA Wellness Test are solely the responsibility of the user.
- Any testimonials regarding the DNA Wellness Test are personal and are not representative of all users. We do not claim, and you should not assume that all users have the same experiences.
- We make every effort to ensure the highest standards, the analysis for the DNA Wellness Test is performed in a CLIA (Clinical Laboratory Improvement Amendments)-certified laboratory and have validated the process to the best of our abilities. The sensitivity and specificity of the DNA Wellness Test are computed and may be consulted at this link. As a result, different tests may yield partially different results, also due to technical details. We do not assume any responsibility if such events were to occur.
- Polymorphisms, due to a phenomenon known as pleiotropy, can be associated with multiple characteristics. For the purposes of the DNA Wellness Test, the considered polymorphisms are analyzed solely from the perspective of general well-being and are never associated with diseases or clinical conditions. The absence of this information should not be considered an omission but rather a specific directive. Similarly, the interpreted significance of these analyzed polymorphisms may vary in other contexts, potentially leading to unsought results and/or genetic discrimination. This could affect aspects like determining family relationships, potential health conditions, ethnic associations, and more. We are not responsible for any improper use of the information provided by the DNA Wellness Test.
- The data collection and processing system is secure, and the DNA sample is discarded 180 days after the analysis. We are not liable for any data breaches resulting from cyber-attacks or rare events beyond the control of our standard security measures. If consent has been provided, the collected data, both genetic and non-genetic, may be used solely for the purpose of improving our test and conducting scientific research approved by the ethics committee. The information may be shared, in an anonymous and aggregated form, exclusively through publications in scientific journals or books, communications in medical courses/congresses, and theses as part of university and post-graduate training courses.
- We make no warranty of any kind, expressed or implied, as to the accuracy, adequacy, validity, reliability, or completeness of the information regarding the DNA Wellness Test.