

**DNA LIFESTYLE OPTIMIZER TEST FOR LIPEDEMA  
REPORT**

Dear John,

Thank you for choosing to take the *MAGISNAT DNA Lifestyle Optimizer Test for Lipedema*.

Below, you will find the report that we have prepared for you. We trust that the insights on your genetic makeup provided in there will be a powerful tool to better live with lipedema and improve your overall well-being, making the most out of your individuality.

We encourage you to take the time to review this report thoroughly and discuss the findings with your healthcare provider.

Thank you for entrusting us with your genetic information, and we hope that this report will be valuable in guiding your journey towards a healthier and happier life.

Sincerely,

## Personal Information

SUBJECT INFORMATION	
First name	Last name
Date of Birth	Place of birth
ZIP Code	City
Mailing address	State
Telephone	E-mail

## Summary

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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.
- **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.

## How to read this report

In this report, you will find insights about the characteristic under analysis, followed by a table listing the genes and polymorphisms considered for that characteristic. After this introductory session, you will find your results in tabular form. Here, the color code uses the same rationale as above: in **green** we report polymorphism with a beneficial outcome (*e.g.*, increased enzyme function), in **orange** when the outcome is a slight increase in the risk (*e.g.*, reduced enzyme function), in **red** when the outcome is a higher increase in the risk (*e.g.*, enzyme loss of function). Finally, you will find the section recommendations, in which the outcome of the polymorphism is treated in more details. In any case, remember that this information is intended to be discussed with your healthcare provider.

**Please note: in this sample report genomic coordinates are not reported. These will be available in the actual report.**

## Fat Distribution

Abnormal fat distribution primarily affecting lower limbs (including the hips, thighs, and legs) is a distinctive pattern in lipedema. Another key aspect that distinguishes lipedema from other conditions is the subcutaneous nature of the fat accumulation, which can become disproportionate and painful, leading to discomfort, tenderness, and swelling.

Measuring circumferences can provide insights into fat distribution patterns. In lipedema, while overall body weight may not be significantly elevated, the disproportionate subcutaneous fat accumulation, particularly in the lower body, is evident through measurements (hip, thigh, and legs circumferences).

### Analyzed Genes and Polymorphisms:

Gene	Gene Function	SNP
AKR1C1	<b>Aldo-keto reductase family 1 member C1.</b> Enzyme involved in the metabolism of various endogenous and exogenous compounds, including steroids and prostaglandins.	Locus1
AKR1C2	<b>Aldo-keto reductase family 1 member C2.</b> Enzyme involved in the metabolism of various endogenous and exogenous compounds, including steroids and prostaglandins.	Locus1
SRD5A3	<b>Steroid 5-alpha-reductase 3.</b> Enzyme involved in the conversion of certain steroid molecules, changing their function. It has a critical role in sexual development.	Locus1
FTO	<b>Fat mass and obesity-associated protein.</b> Protein involved in the control of body weight and energy metabolism.	Locus1
		Locus2
		Locus3
ATXN1	<b>Ataxin-1.</b> Protein with a function not fully understood but correlated to some neurodegenerative disorders.	Locus1
FOXP1	<b>Forkhead box protein P1.</b> Transcription factor regulating various cellular processes, such as the development of the nervous system and immune cells.	Locus1
NR3C2	<b>Nuclear receptor subfamily 3 group C member 2.</b> Receptor protein binding aldosterone, a hormone crucial for the regulation of fluid balance, electrolyte homeostasis, and blood pressure.	Locus1
RORA	<b>RAR-related orphan receptor A.</b> Transcription factor involved in the regulation of several cellular processes, such as circadian rhythm and immune responses.	Locus1



SMAD6	<b>SMAD family member 6.</b> Protein part of the transforming growth factor-beta (TGF- $\beta$ ) signaling pathway, which regulates cell growth, differentiation, apoptosis, and immune responses.	Locus1
PTPRD	<b>Protein tyrosine phosphatase receptor type D.</b> Receptor protein involved in the regulation of several cellular functions.	Locus1

### Your Results:

SNP	Alleles	Outcome
Locus1	G/G	Typical.
Locus1	T/T	Typical.
Locus1	C/C	Typical.
Locus1	G/G	Typical.
Locus2	A/A	Typical.
Locus3	A/A	Typical.
Locus1	G/G	Typical.
Locus1	A/A	Typical.
Locus1	A/A	More subcutaneous adipose tissue in women. <sup>1</sup>
Locus1	G/G	Typical.
Locus1	C/C	Typical.
Locus1	C/C	Typical.

### Recommendations:

The NR3C2 gene encodes the Nuclear Receptor Subfamily 3 group C member 2, which binds aldosterone and mediates its function, namely the regulation of fluid balance, electrolyte homeostasis, and blood pressure. The presence of the Locus1 polymorphism in two copies (homozygosity) has been associated with a higher deposition of subcutaneous adipose tissue, that is the fat found below the skin. In general, subcutaneous fat is considered less harmful than visceral fat, but in lipedema conditions it causes most of the symptoms of the disease.

Based on these results, your healthcare provider may recommend you embrace a healthy lifestyle with physical activity and controlled diet and dietary supplementation (*e.g.*, carnitine, capsanthin), to contrast fat deposition.

<sup>1</sup> Fox C S et al., Genome-wide association for abdominal subcutaneous and visceral adipose reveals a novel locus for visceral fat in women. PLoS genetics (2012).



## Cardiovascular Function

Lipedema primarily affects subcutaneous fat, but it can have secondary effects on cardiovascular health due to the increased overall body weight and the localized swelling caused by the condition. Then, maintaining healthy cardiovascular system assume an even higher relevance in lipedema conditions, both to avoid the arising of cardiovascular disease and to relieve lipedema symptoms.

### Analyzed Genes and Polymorphisms:

Gene	Gene Function	SNP
HSD11B1	<b>11-beta-hydroxysteroid dehydrogenase type 1.</b> Enzyme playing a crucial role in the regulation of the conversion of cortisone to cortisol, a hormone involved in several physiological processes.	Locus1
		Locus1

### Your Results:

SNP	Alleles	Outcome
Locus1	A/A	Typical.
Locus2	T/T	Typical.

### Recommendations:

Your genetic makeup, in accordance with the analyzed polymorphisms, appears not to influence your cardiovascular function. However, this does not mean that your cardiovascular function is optimal: other genetic, lifestyle, or environmental factors may negatively impact it. Do not overlook situations indicating cardiovascular issues and consult your healthcare provider if needed, since a healthy cardiovascular system is crucial to live better with lipedema.

## Hormonal Balance

Hormones such as testosterone and estradiol play crucial roles in fat metabolism and distribution, and their imbalances may contribute to the development or exacerbation of lipedema.

Testosterone, often considered a male sex hormone, is also present in females in smaller quantities. Some studies have suggested that testosterone may play a role in the development of lipedema, since high levels of testosterone in women may promote the fat accumulation in lower body seen in lipedema.

Estradiol is a type of estrogen, a hormone predominantly associated with female characteristics and reproductive health. Changes in estrogen levels during different life stages, such as puberty, pregnancy, or menopause, may influence lipedema's progression or severity.

### Analyzed Genes and Polymorphisms:

Gene	Gene Function	SNP
AKR1C3	<b>Aldo-Keto Reductase family 1 member C3.</b> Enzyme involved in the metabolism of various endogenous and exogenous compounds, including steroids and prostaglandins.	Locus1
		Locus2
CYP19A1	<b>Cytochrome P450 family 19 subfamily A member 1.</b> Enzyme, also known as aromatase, involved in the biosynthesis of estrogens, hormones crucial for the regulation of the menstrual cycle, reproduction, and development.	Locus1
		Locus2

### Your Results:

SNP	Alleles	Outcome
Locus1	C/C	Typical.
Locus2	A/A	Increase in testosterone levels. <sup>2</sup>
Locus1	T/T	Typical.
Locus2	T/T	Typical.

### Recommendations:

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<sup>2</sup> Ruth K S et al., Using human genetics to understand the disease impacts of testosterone in men and women. Nature medicine (2020).

The AKR1C3 gene encodes the enzyme Aldo-Keto Reductase family 1 member C3, which is involved in the metabolism of various endogenous and exogenous compounds. Among the others, of particular interest are steroids (hormones crucial for many physiological functions) and prostaglandins (which are linked to inflammation). The presence of the Locus2 polymorphism in two copies (homozygosity) has been associated with an increase in testosterone levels.

Based on these results, your healthcare provider may recommend you evaluate and monitor your testosterone levels, since an alternation may play a role in lipedema conditions.

## Conclusions

### Main results:

Gene	SNP	Alleles	Outcome
NR3C2	Locus1	A/A	More subcutaneous adipose tissue in women.
AKR1C3	Locus2	A/A	Increase in testosterone levels.

### Your genetic makeup has been correlated to:

- A higher deposition of fat in subcutaneous adipose tissue in women, which is peculiar in lipedema. Based on these results, your healthcare provider may recommend you embrace a healthy lifestyle with physical activity and controlled diet and dietary supplementation (*e.g.*, carnitine, capsanthin), to contrast fat deposition.
- An increase in testosterone levels. Based on these results, your healthcare provider may recommend you evaluate and monitor your testosterone levels, since an alternation may play a role in lipedema conditions.

With this, our journey of discovering your genetic makeup comes to an end. It's essential to note that the genetic test does not need to be repeated since it remains constant over time. However, your healthcare provider may suggest other tests that can complement the information obtained from the *DNA Wellness Test* and the *DNA Lifestyle Optimizer Test for Lipedema* and can be repeated periodically to monitor your health and well-being. Some examples are our metabolomic and proteomic tests. For more details, please refer to our website ([www.magisnat.com](http://www.magisnat.com)).

## DISCLAIMERS

The final results obtained by the Low-Risk General Wellness Tests 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 and the DNA Lifestyle Optimizer Tests is provided in good faith. While we have made every attempt to ensure that the information contained in these tests 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 or the DNA Lifestyle Optimizer Tests, 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 Lifestyle Optimizer Tests, and the reliance of any information contained in these DNA Lifestyle Optimizer Test are solely the responsibility of the user.

Any testimonials regarding the DNA Wellness Test or the DNA Lifestyle Optimizer Tests 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 and the DNA Lifestyle Optimizer Tests 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 and the DNA Lifestyle Optimizer Tests 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 and the DNA Lifestyle Optimizer Tests, the considered polymorphisms are analyzed from the perspective of general well-being, even in the context of diseases or clinical conditions. 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 and the DNA Lifestyle Optimizer Tests.

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 tests 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 and the DNA Lifestyle Optimizer Test.

If you have any questions, concerns, or need support in understanding the test, please call our support team on +1 470-482-1800 or email [info@magisnat.com](mailto:info@magisnat.com) or visit our website [www.magisnat.com](http://www.magisnat.com).