



## LIPID METABOLISM TEST

XXXXXXXXXXXX

Date of birth: XXXXXXX

Code: XXXXXX

**WHAT THE REPORT INCLUDES**

- Detailed EXPLANATION of the test performed and recommendations to be followed.
- SUMMARY TABLE presenting the metabolic areas analysed and the results from the DNA analysis, providing a quick overview of an individual's overall health status and highlighting any potential issues.
- BIBLIOGRAPHY providing scientific references for the test.

**COLOURS USED**

It indicates that the variants identified in the analysis do not unfavourably alter enzymatic activity of the proteins they encode and/or the risk associated with certain diseases.



It indicates that the variants identified in the analysis slightly unfavourably alter enzyme activity and/or the risk associated with certain disorders or diseases.



It indicates that the variants identified in the analysis alter enzyme activity in a particularly unfavourable way, resulting in an increased risk of developing certain disorders or associated diseases.

The results shown, as well as the considerations and explanations contained in the following pages of this booklet, should not be regarded as a medical diagnosis. It is important to bear in mind that the genetic information is only a part of the total information needed to gain a complete picture of a person's state of health, and the data reported here is therefore a tool available to the treating physician to formulate a correct assessment of the patient's physiological state and suggest an appropriate personalised treatment.

INTRODUCTION

Lipid metabolism plays a crucial role in regulating body weight, maintaining cardiovascular health, and supporting overall well-being. This genetic test analyses specific DNA variants linked to fat metabolism, the body's response to various types of lipids, and your risk for lipid metabolism-related conditions, such as hypercholesterolemia (high cholesterol) and dyslipidaemia (abnormal lipid levels).

By examining your genetic profile, this test provides personalized insights into how your body processes different types of fats - saturated, monounsaturated, and polyunsaturated fats—and your predisposition to elevated levels of LDL ("bad") cholesterol or triglycerides in the blood. With this information, you can optimize your diet and lifestyle to improve weight management and reduce the risk of cardiovascular disease.

Our goal is to offer you a clear, scientifically grounded interpretation of your results, empowering you to make well-informed decisions about your health. We recommend consulting with a nutritionist or healthcare provider to incorporate these insights into a tailored plan for enhancing your long-term health and well-being.

Lipid metabolism test


Genetic analysis of the **APOA1**, **APOC3**, **CETP**, and **LDLR** genes provides essential insights into lipid metabolism and the potential risk for dyslipidaemia and cardiovascular disease:


- **APOA1 (Apolipoprotein A1):** This gene plays a key role in reverse cholesterol transport and is a major component of HDL ("good" cholesterol). Genetic variants can influence HDL levels and affect cardiovascular risk.
- **APOC3 (Apolipoprotein C3):** APOC3 regulates triglyceride metabolism, influencing the likelihood of hypertriglyceridemia and related conditions such as metabolic syndrome.
- **CETP (Cholesteryl Ester Transfer Protein):** This gene governs the transfer of cholesterol between lipoproteins. Certain genetic variants can impact levels of HDL and LDL cholesterol, influencing overall cardiovascular health.
- **LDLR (Low-Density Lipoprotein Receptor):** LDLR is responsible for removing LDL ("bad" cholesterol) from the bloodstream. Mutations in this gene can elevate the risk of familial hypercholesterolemia and the development of atherosclerosis.


By analysing these key genes, we can identify individual genetic predispositions and help create personalized strategies for managing cardiovascular risk, incorporating lifestyle changes like diet and exercise, along with targeted medical interventions if necessary.

YOUR RESULT:

Lab ID	Gene	Allelic variants	Genotype		Result
LIPID METABOLISM					
GTS036	APOA1	T	T	T	FAVOURABLE
(Apolipoprotein isoform A1)		C			
WHAT YOUR GENETICS SAY					
<div><div></div></div>					
There is a FAVOURABLE genetic profile for the analyzed gene.					

Lab ID	Gene	Allelic variants	Genotype		Result
LIPID METABOLISM					
GTS037	APOC3	C	C	C	FAVOURABLE
(Apolipoprotein isoform C3)		G			
WHAT YOUR GENETICS SAY					
					
There is a FAVOURABLE genetic profile for the analyzed gene.					

Lab ID	Gene	Allelic variants	Genotype		Result
LIPID METABOLISM					
GTS038	CETP	A	A	A	FAVOURABLE
(Cholesterol ester transfer protein)		G			
WHAT YOUR GENETICS SAY					
					
There is a FAVOURABLE genetic profile for the analyzed gene.					

Lab ID	Gene	Allelic variants	Genotype		Result
LIPID METABOLISM					
GTS039	LDLR	G	G	G	FAVOURABLE
(Low-Density Lipoprotein Receptor)		T			
WHAT YOUR GENETICS SAY					
					
There is a FAVOURABLE genetic profile for the analyzed gene.					

### EFFECTS OF UNFAVORABLE VARIANTS IN THE APOA1, APOC3, CETP, AND LDLR GENES

Genetic variations in the **APOA1**, **APOC3**, **CETP**, and **LDLR** genes can impact lipid metabolism, potentially increasing the risk of cardiovascular disease. Understanding these genetic factors allows for proactive measures to improve heart health. Below are the effects of unfavourable variants in each gene:

- APOA1 (Apolipoprotein A1)
  - **Effect of Unfavourable Variants:** Some genetic variants reduce the production or functionality of apolipoprotein A1, leading to lower levels of HDL cholesterol ("good" cholesterol).
  - **Potential Consequences:** Increased risk of atherosclerosis and cardiovascular disease due to a reduced ability to clear excess cholesterol from tissues.



- APOC3 (Apolipoprotein C3)
  - **Effect of Unfavourable Variants:** Certain genetic mutations inhibit the breakdown of triglycerides, causing their accumulation in the bloodstream.
  - **Potential Consequences:** Higher risk of **hypertriglyceridemia**, fatty liver disease, insulin resistance, and an increased likelihood of cardiovascular disease.
- CETP (Cholesteryl Ester Transfer Protein)
  - **Effect of Unfavourable Variants:** Increased CETP activity promotes the transfer of cholesterol from HDL to LDL, lowering "good" HDL levels while raising "bad" LDL cholesterol.
  - **Potential Consequences:** An unfavourable lipid profile, characterized by lower protective HDL cholesterol and higher LDL cholesterol, increasing the risk of cardiovascular diseases.
- LDLR (Low-Density Lipoprotein Receptor)
  - **Effect of Unfavourable Variants:** Mutations in the **LDLR** gene impair the liver's ability to remove LDL cholesterol from the blood efficiently.
  - **Potential Consequences:** Increased LDL cholesterol levels from an early age, leading to **familial hypercholesterolemia**, a significantly higher risk of **atherosclerosis**, and early onset coronary artery disease.

By identifying these genetic predispositions, individuals can take targeted preventive actions through **dietary adjustments, lifestyle changes, and, if necessary, medical interventions** to mitigate cardiovascular risks.

### RECOMMENDED SOLUTIONS:

If you have unfavourable genetic variants in the **APOA1, APOC3, CETP, or LDLR** genes, adopting targeted strategies can significantly lower your risk of metabolic and cardiovascular disorders. Below are specific recommendations based on each gene:

#### APOA1 (Low HDL Levels – "Good" Cholesterol Deficiency)

##### 1. Dietary Adjustments:

- Increase consumption of **monounsaturated and polyunsaturated fats** (e.g., olive oil, avocados, nuts, and fatty fish).
- Avoid **trans fats** (found in processed foods) and limit **saturated fats**, which can further lower HDL levels.
- Eat **fibre-rich foods** (e.g., whole grains, legumes, fruits, and vegetables) to support lipid metabolism.

##### 2. Lifestyle Modifications:

- Engage in **aerobic exercise** (e.g., running, swimming, and cycling) to naturally boost HDL cholesterol.
- Avoid **smoking and excessive alcohol consumption**, both of which lower HDL levels.

### 3. Medical Support:

- In some cases, **niacin (vitamin B3)** or other lipid-modifying drugs may be prescribed to help raise HDL levels.

### APOC3 (Elevated Triglycerides – Risk of Hypertriglyceridemia)

#### 1. Dietary Adjustments:

- Reduce intake of **refined carbohydrates and added sugars**, which contribute to high triglyceride levels.
- Limit **alcohol consumption**, as it significantly raises blood triglycerides.
- Opt for **lean proteins and healthy fats** (e.g., omega-3 from fish, flaxseeds, and walnuts).

#### 2. Lifestyle Modifications:

- Increase **physical activity**, particularly aerobic exercises like jogging and cycling, which help lower triglycerides.
- Maintain a **healthy body weight**, as excess weight contributes to hypertriglyceridemia.

#### 3. Medical Support:

- If triglyceride levels are very high, **omega-3 supplements, fibrates, or statins** may be prescribed.

### CETP (Low HDL and High LDL – Unfavourable Cholesterol Transfer)

#### 1. Dietary Adjustments:

- Follow a **heart-healthy diet** rich in **healthy fats** (olive oil, nuts, and fatty fish).
- Increase intake of **soluble fibre** (found in oats, legumes, and apples) to help reduce LDL cholesterol absorption.
- Avoid **processed foods and fried foods**, which contribute to an unhealthy lipid profile.

#### 2. Lifestyle Modifications:

- Engage in **regular exercise** to improve cholesterol levels.
- Manage **stress levels**, as chronic stress can negatively impact cholesterol metabolism.

#### 3. Medical Support:

- Certain **CETP inhibitors** (still under study) and **statins** may be recommended to improve lipid balance.

LDLR (High LDL Cholesterol – Risk of Familial Hypercholesterolemia)

## 1. Dietary Adjustments:

- Reduce consumption of **saturated fats and dietary cholesterol** (e.g., red meat, full-fat dairy, and fried foods).
- Increase intake of **plant sterols** (found in nuts, legumes, and vegetable oils) to help block cholesterol absorption.
- Include **omega-3-rich foods** (e.g., fatty fish, flaxseeds, and walnuts) to lower inflammation and support heart health.

## 2. Lifestyle Modifications:

- Avoid **smoking and excessive alcohol consumption**, both of which impair LDL receptor function.
- Engage in **aerobic exercise**, such as brisk walking and cycling, to enhance cholesterol metabolism.

## 3. Medical Support

- If LDL cholesterol is significantly high, **statins, ezetimibe, or PCSK9 inhibitors** may be prescribed to lower cardiovascular risk.

By implementing these strategies and undergoing regular **medical monitoring**, individuals can help counteract the effects of unfavourable genetic variants and protect against cardiovascular disease.

**Lipid sources:**

Lipids come from various food sources and are classified based on their nutritional value:

## 1. Healthy Fats (Beneficial for Heart Health)

- **Monounsaturated Fats:** Found in **olive oil, avocados, nuts (almonds, walnuts, cashews), and seeds (flax, sesame, sunflower)**.
- **Polyunsaturated Fats (Omega-3 & Omega-6):**
  - **Omega-3:** Present in **fatty fish (salmon, mackerel, tuna, sardines, herring), flaxseeds, chia seeds, and walnuts**.
  - **Omega-6:** Found in **vegetable oils (sunflower, soybean, corn oil)**.

## 2. Saturated Fats (Should Be Moderated)

- Found in **red meat (beef, lamb, pork), full-fat dairy (butter, cheese, whole milk), coconut oil, palm oil, dark chocolate, and egg yolks**.

## 3. Trans Fats (Should Be Avoided Completely)

- Found in **margarine, hydrogenated vegetable oils, processed snacks (biscuits, crackers, chips), fast food, and commercial baked goods**.

**Key Takeaway:** Prioritizing unsaturated fats, limiting saturated fats, and eliminating trans fats is crucial for maintaining a healthy lipid profile and reducing cardiovascular risk.