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CardioMetabolic 2.0 [C]

Client

Demo Client

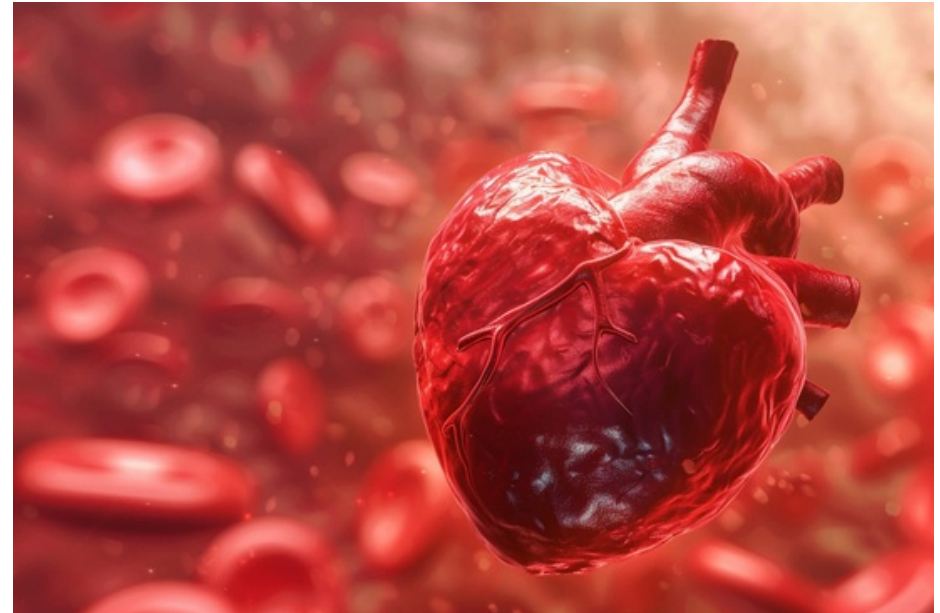
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Lipid Impairment

Lipid impairment, often referred to as dyslipidemia, involves abnormal levels of lipids (fats) in the blood, such as cholesterol and triglycerides. This condition is a significant risk factor for cardiovascular diseases, including heart attack and stroke. Lipid levels in the blood are influenced by both genetic and lifestyle factors. Understanding the genetic basis of lipid impairment can help identify individuals at higher risk and guide personalized approaches to prevention and treatment.

Several genes are involved in the regulation of lipid metabolism, including LDLR, APOB, and PCSK9. The LDLR gene encodes the low-density lipoprotein receptor, which plays a crucial role in removing LDL cholesterol (often called "bad" cholesterol) from the bloodstream. Variations in this gene can lead to reduced receptor function, resulting in higher LDL cholesterol levels. The APOB gene encodes apolipoprotein B, a primary component of LDL particles, and mutations can affect cholesterol transport and clearance. The PCSK9 gene encodes a protein that regulates the degradation of LDL receptors, and certain variants can lead to higher LDL cholesterol levels by reducing receptor availability. By analyzing these genetic variations, it is possible to assess an individual's risk for lipid impairment and cardiovascular disease.

Genetic insights into lipid impairment can inform personalized health strategies. For individuals with genetic variations that predispose them to higher cholesterol or triglyceride levels, lifestyle changes such as adopting a heart-healthy diet, increasing physical activity, and maintaining a healthy weight are essential. In some cases, medications like statins, which lower LDL cholesterol, or other lipid-lowering therapies may be recommended. For those with specific genetic mutations, newer treatments targeting the PCSK9 pathway might be particularly effective. Regular monitoring of lipid levels and personalized intervention plans can help manage lipid impairment and reduce the risk of cardiovascular complications. By leveraging genetic information, healthcare providers can develop targeted and effective strategies to improve lipid profiles and overall cardiovascular health.



CHD Benefit from Lower LDL



Increased

Understanding what this may mean

This suggests a higher than average likelihood of experiencing significant cardiovascular benefits from reduced LDL levels. Focusing on strategies to lower LDL, such as dietary changes, physical activity, and possibly medications, can be particularly beneficial for cardiovascular health.

Lipid Impairment Propensity



Increased

Understanding what this may mean

This suggests a higher than average likelihood of experiencing issues with lipid metabolism, such as elevated cholesterol or triglyceride levels. Monitoring lipid levels regularly and adopting lifestyle modifications, including a healthy diet and physical activity, can help manage and mitigate potential lipid-related health risks.

LP(a) Risk



Neutral

Understanding what this may mean

Normal Function. No additional risk

Genetic Summary 17

SNP	Marker	Genotype
HMGCR T*372C	rs12916	TT
LDLR C81T	rs2228671	CC
SORT1 (C>T)	rs646776	TT
SORT1 (G>A)	rs599839	AA
ABCG8 G166-718T	rs4299376	TG
IL6/IL6-AS1 (G>C)	rs1800795	CC
TNF G-308A	rs1800629	GG
GCKR T1423-418C	rs780094	TC
ApoB A7545G	rs693	AA

SNP	Marker	Genotype
PCSK9 (T>C)	rs11206510	TC
PCSK9 G137T	rs11591147	TG
LDLR G67+2015T	rs6511720	GG
APOC1 A*459G	rs4420638	AA
LPL C1019-1582T	rs285	TC
LPL C1421G	rs328	CC
CETP g.C4402A	rs1800775	CC
LIPC C-40-517T	rs1800588	TC

Cardiovascular Genetics

Cardiovascular genetics focuses on understanding how genetic variations influence the risk, progression, and treatment responses of cardiovascular diseases (CVD), including heart disease, stroke, hypertension, and arrhythmias. This section explores the critical role of genetics in cardiovascular health, offering insights into the identification, prevention, and management of genetic predispositions to cardiovascular conditions. Several genes have been identified as playing pivotal roles in cardiovascular health.

Variations in genes related to lipid metabolism, blood pressure regulation, coagulation pathways, and inflammation can significantly impact an individual's risk of developing CVD. For example, variations in the APOE gene can influence cholesterol metabolism and CVD risk.

Advancements in cardiovascular genetics are paving the way for innovative therapies, including gene editing and gene therapy approaches targeting the root genetic causes of some cardiovascular diseases. These cutting-edge treatments offer hope for conditions previously deemed challenging to manage, providing a glimpse into the future of personalized cardiovascular care.



CAD Propensity



Neutral

Understanding what this may mean

Those with a neutral risk for coronary artery disease exhibit genetic markers that reflect the average population's likelihood of developing CAD. This indicates a standard level of risk, with lifestyle and environmental factors playing a significant role in the actual development of heart disease. Individuals with a neutral risk are advised to adopt heart-healthy habits, including eating a diet rich in fruits, vegetables, and whole grains, exercising regularly, avoiding tobacco use, and monitoring blood pressure and cholesterol levels to support overall cardiovascular well-being.

APOe Status



APOe 4/4 status

Understanding what this may mean

Individuals with this APOe status have two copies of the APOe4 allele. This genetic variation is associated with the highest risk of developing certain age-related conditions such as plaque buildup and cognitive decline. Individuals with this APOe status should prioritize brain health by adopting healthy lifestyle habits, including regular physical and mental exercise, limiting saturated fat and alcohol, avoiding smoking, and supporting effective metabolic health.

Atrial Fibrillation



Understanding what this may mean

Individuals with a neutral risk have an average genetic likelihood of developing atrial fibrillation, aligning with the general population's risk level. This suggests a standard susceptibility to atrial fibrillation.

LP(a) Risk



Understanding what this may mean

Normal Function. No additional risk

Genetic Summary ¹³

SNP	Marker	Genotype
APOE C388T	rs429358	CC
APOE C526T	rs7412	CC
LP(a) A3947+467G	rs10455872	AA
LP(a) T5673C	rs3798220	TT

SNP	Marker	Genotype
IL6/IL6-AS1 (G>C)	rs1800795	CC
APOC4 (T>C)	rs10413089	TC
ICAM1 A1405G	rs5498	AA
IL37 A124G	rs3811047	GG

4q25-1	rs2200733	CC
4q25-2	rs10033464	GG
CETP G1264A	rs5882	AA

APOA2 (G>T)	rs3813627	GG
CDKN2A (A>G) / 9p21	rs10757278	GA

Thrombosis

Thrombosis, the formation of a blood clot within a blood vessel, poses significant health risks, including stroke, deep vein thrombosis (DVT), and pulmonary embolism (PE). This section delves into the genetic factors influencing thrombosis susceptibility and outlines approaches to mitigate these risks through targeted interventions.

Several genetic variations have been identified as increasing the risk of thrombosis. Notably, mutations in the Factor V gene (such as Factor V Leiden) and the prothrombin gene (F2) significantly elevate the risk of developing blood clots. These genetic markers affect the blood's clotting mechanisms, leading to a hyper-coagulable state where clots are more likely to form.

While genetic predispositions play a critical role in thrombosis risk, lifestyle and environmental factors also significantly impact clot formation. Smoking, oral contraceptive use, prolonged immobility, and obesity are known risk factors that can exacerbate genetic risks. Addressing these modifiable factors is essential for comprehensive thrombosis prevention, particularly for those with genetic vulnerabilities.



Ischemic Stroke Propensity



Neutral

Understanding what this may mean

Individuals with a neutral genetic risk level have an average likelihood of experiencing an ischemic stroke, mirroring the general population. This indicates a standard risk for stroke, which is caused by an obstruction within a blood vessel supplying blood to the brain, necessitating usual preventive measures and lifestyle considerations.

Venous Thrombosis Propensity



High Risk

Understanding what this may mean

Those with a high risk for thrombosis carry genetic predispositions that significantly amplify their likelihood of developing blood clots, indicating a risk more than 2.5 times higher than the average. This heightened risk underscores the necessity of vigilant prevention strategies, including regular medical check-ups, adopting a lifestyle that minimizes thrombosis risk factors, and potentially using medication or wearing compression garments as recommended by healthcare providers. Awareness and early action are critical to managing this elevated risk effectively

Genetic Summary ¹¹

SNP	Marker	Genotype
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SNP	Marker	Genotype
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F5 C1601T	rs6025	CC
F2 G*97A	rs1799963	GG
4q25-1	rs2200733	CC
4q25-2	rs10033464	GG
GP6 G665A	rs1613662	AG
ABO T921G	rs495828	TT

ABO (insC)	rs8176719	II
COMT G472A	rs4680	AG
F11 C1481-188T	rs2289252	CC
PROCR A655G	rs867186	AA
PTGS2 C872G	rs20417	CC

Metabolic Syndrome

Metabolic Syndrome is a cluster of conditions that occur together, increasing the risk of heart disease, stroke, and type 2 diabetes. These conditions include high blood pressure, high blood sugar, excess body fat around the waist, and abnormal cholesterol or triglyceride levels. While lifestyle factors such as diet, exercise, and stress management play a significant role in the development of Metabolic Syndrome, genetic factors also contribute to an individual's susceptibility. Understanding these genetic influences can help in creating personalized strategies for prevention and management.

Genetic variations can affect key aspects of metabolism, influencing how the body processes sugars, fats, and other nutrients. For example, variations in genes related to insulin signaling, such as TCF7L2, can impact blood sugar regulation, increasing the risk of insulin resistance and type 2 diabetes. Other genetic factors can influence lipid metabolism, leading to abnormal cholesterol and triglyceride levels. Additionally, genes involved in regulating blood pressure and body fat distribution, such as FTO and MC4R, can contribute to the risk of developing Metabolic Syndrome. By analyzing these genetic markers, it is possible to identify individuals who are at higher risk and tailor preventive measures accordingly.

Understanding genetic predispositions to Metabolic Syndrome can inform personalized health strategies. For individuals with a higher genetic risk, early intervention is crucial. Recommendations may include adopting a heart-healthy diet rich in fruits, vegetables, whole grains, and healthy fats, alongside regular physical activity to maintain a healthy weight and improve insulin sensitivity. Stress management and adequate sleep are also important, as these factors can influence blood pressure and metabolic health. Regular monitoring of blood sugar, blood pressure, and lipid levels can help detect early signs of Metabolic Syndrome and guide adjustments to lifestyle and treatment plans. By leveraging genetic information, healthcare providers can develop comprehensive and personalized strategies to prevent and manage Metabolic Syndrome, promoting long-term health and reducing the risk of associated complications.



Metabolic Syndrome Propensity



Low

Understanding what this may mean

Low genetic propensity for developing metabolic syndrome. This suggests a significantly lower than average likelihood of experiencing conditions associated with metabolic syndrome, such as high blood pressure, high blood sugar, excess body fat around the waist, and abnormal cholesterol levels. Maintaining a healthy lifestyle, including a balanced diet, regular exercise, and effective stress management, can help support overall metabolic health and reduce the risk of related conditions.

Genetic Summary ¹³

SNP	Marker	Genotype
MC4R (T>C)	rs17782313	TT
FTO T46-23525A	rs9939609	TT
APOA5 G*158A	rs662799	AA
APOA1 C-113T	rs670	CC
TCF7L2 C450+33966T	rs7903146	TC
ADIPOQ G-9+3481A	rs822396	AA

SNP	Marker	Genotype
DIO2 T274C	rs225014	TT
TCF7L2 G552+9017T	rs12255372	GG
LEP g.G2453A	rs7799039	GG
TNF G-308A	rs1800629	GG
IL6/IL6-AS1 (G>C)	rs1800795	CC
ApoC3 C*40G	rs5128	CC

PPARG C34G

rs1801282

CC

Hypertension

This section investigates the role of genetics in the development of hypertension, a major risk factor for cardiovascular diseases. It focuses on identifying genetic variants that contribute to elevated blood pressure, providing insight into individual susceptibility to this condition.

Research has identified several genes that play significant roles in blood pressure regulation, such as those involved in the renin-angiotensin-aldosterone system (RAAS) and sodium balance. Variations in these genes can affect an individual's risk of developing hypertension by influencing vascular resistance and fluid retention.

This knowledge can guide preventive measures and lifestyle adjustments aimed at mitigating this risk, such as dietary modifications and physical activity. For individuals with hypertension, genetic insights can help tailor medication choices to achieve better blood pressure control with fewer side effects



Hypertension Propensity



Neutral

Understanding what this may mean

Individuals at a neutral risk level have an average likelihood of developing hypertension, mirroring the general population's predisposition. Standard preventive strategies, including a balanced diet, regular exercise, and avoiding excessive salt intake, are key to managing this baseline risk

Genetic Summary ³¹

SNP	Marker	Genotype
ACE G2328A	rs4343	AA
ADD1 G1378T	rs4961	TG
CYP11B2 G-344A	rs1799998	AG
DIO2 T274C	rs225014	TT
NOS3 T-786C	rs2070744	TT
NOS3 G2984+15A	rs891512	GG
ADRB2 G46A	rs1042713	AG
AGTR1 A1166C	rs5186	AC

SNP	Marker	Genotype
CSK C-66+2306A	rs1378942	AC
ATXN2 C732-14033T	rs653178	TT
CABCOC01 C679-1106T	rs1530440	CC
ZNF652-AS1 (A>G)	rs16948048	GG
ATP2B1 G-221-10702A	rs17249754	GG
CACNB2 C168+36987G	rs12258967	CC
MECOM T38-1574C	rs419076	TC
H4C3 / H1-6 (A>G)	rs198846	GG

MTHFR A359+160G	rs17367504	AG
CNNM2 T*9241C	rs11191548	TT
FGF5 g.A1600T	rs16998073	TA
SLC39A8 C1171T	rs13107325	CC
NT5C2 T-25+1773C	rs11191593	TT
NPPA C94T	rs5063	CC
LTA A252G	rs909253	AA
PLEKHA7 C222-9539T	rs381815	TC

ZNF831 A-36-14922G	rs6015450	AA
LINC02227 (C>T)	rs9313772	CC
ARHGAP42 G154+34975C	rs633185	CG
ADRB1 (C>T)	rs2782980	CC
NPR3 (A>G)	rs1173771	AG
SLC4A7 (T>C)	rs13082711	TT
ULK3 / CPLX3 (A>C)	rs6495122	AC

Electrolytes

Electrolytes are essential minerals that help maintain proper fluid balance and nerve and muscle function in the body. This module provides insights into your genetic predisposition for sodium and potassium sensitivity, as well as magnesium levels, allowing you to make informed decisions about your diet and lifestyle.

Sodium is a critical electrolyte that helps regulate blood pressure and maintain proper fluid balance in the body. However, excessive sodium intake can increase the risk of high blood pressure and other cardiovascular problems. This module can help you understand your genetic predisposition for sodium sensitivity, allowing you to make informed decisions about your sodium intake.

Potassium is another important electrolyte that helps regulate blood pressure and supports proper muscle and nerve function. Low potassium levels can lead to muscle weakness, fatigue, and other health problems. This module can help you understand your genetic predisposition for potassium sensitivity, allowing you to adjust your diet and lifestyle accordingly.

Magnesium is also an important electrolyte that plays a crucial role in nerve and muscle function, as well as bone health. Low magnesium levels can lead to muscle cramps, fatigue, and other health problems. This module can help you understand your genetic predisposition for magnesium levels, allowing you to make informed decisions about your diet and supplement choices.

By understanding your genetic predisposition for sodium and potassium sensitivity, as well as magnesium levels, you can make more informed decisions about your diet and lifestyle, helping you to maintain proper fluid balance, nerve and muscle function, and overall health.



Sodium Sensitivity



Neutral

Understanding what this may mean

Individuals with this genetic result have a neutral sensitivity to sodium, which means they may need to be mindful of their sodium intake and consume it in moderation according to individual needs.

Potassium Sensitivity and Benefit



Neutral

Understanding what this may mean

Individuals with this genetic result have a neutral sensitivity to the blood pressure-lowering effects of potassium. Adequate potassium intake can help support healthy blood pressure levels in these individuals.

Magnesium Deficiency Risk



Increased

Understanding what this may mean

Individuals with this genetic result may have an increased risk of experiencing magnesium deficiency. It is particularly important for these individuals to consume a balanced diet that includes magnesium-rich foods and/or consider magnesium supplementation to prevent deficiency. 300-400mg of magnesium glycinate, magnesium threonate or magnesium citrate supplementation are ideal.

Genetic Summary ¹²

SNP	Marker	Genotype
MUC1 C66T	rs4072037	TT
ATP2B1 (A>G)	rs7965584	AG
DCDC1 (T>C)	rs3925584	TT
ADD1 G1378T	rs4961	TG
ACE G2328A	rs4343	AA
AGTR1 A1166C	rs5186	AC

SNP	Marker	Genotype
AGTR1 G-48+13974A	rs4524238	GG
NAA10 T386+394C	rs1557501	CC
RENBP G688-61A	rs2269372	AA
SHROOM3 G168-54767A	rs13146355	GG
CYP11B2 G-344A	rs1799998	AG
NR3C2 G2015-8060T	rs6810951	GG