

Low HDL Cholesterol: Understanding the Impact on Health and Strategies for Improvement

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Abstract

Low HDL cholesterol levels have significant implications for cardiovascular health and overall well-being. In this article, we explore the factors contributing to low HDL cholesterol, its role in cardiovascular disease, and strategies for raising HDL cholesterol levels naturally. Lifestyle modifications, including regular exercise, adopting a healthy diet, weight management, smoking cessation, and managing chronic conditions, play a key role in improving HDL cholesterol levels. Additionally, medications may be prescribed in some cases. We also discuss emerging therapies, specific considerations for certain populations, and the importance of a holistic approach to cardiovascular health. By addressing low HDL cholesterol levels and optimizing cardiovascular well-being, individuals can reduce the risk of heart disease and lead healthier lives.

Keywords: Cardiovascular health • Dyslipidemia • Low good cholesterol • Low-density lipoprotein

Introduction

Cholesterol is a waxy substance found in the body that plays a crucial role in various physiological processes. High-density Lipoprotein (HDL) cholesterol, often referred to as "good cholesterol", is a type of cholesterol that helps remove Low-density Lipoprotein (LDL) cholesterol, commonly known as "bad cholesterol", from the arteries. Low levels of HDL cholesterol can have a significant impact on cardiovascular health and overall well-being. This article aims to explore the implications of low HDL cholesterol levels on health and provide strategies for improving HDL cholesterol levels naturally. HDL cholesterol is produced in the liver and intestines and acts as a scavenger, collecting excess cholesterol from the bloodstream and transporting it back to the liver for processing and elimination. HDL cholesterol also possesses antioxidant and anti-inflammatory properties, which help protect against the development of atherosclerosis, a condition characterized by the buildup of plaque in the arteries. Optimal levels of HDL cholesterol are associated with a lower risk of cardiovascular disease. HDL cholesterol helps prevent the accumulation of LDL cholesterol in the arteries, reducing the risk of arterial blockages and the subsequent development of conditions such as heart attacks and strokes. HDL cholesterol also aids in the removal of triglycerides, another type of blood fat that contributes to heart disease when elevated [1].

Genetic variations can influence HDL cholesterol production and metabolism, predisposing individuals to lower levels of HDL cholesterol. Lack of physical activity is a significant contributor to low HDL cholesterol levels. Regular exercise increases HDL cholesterol production and improves its transport function. Diets high in saturated fats, trans fats and refined carbohydrates can negatively impact HDL cholesterol levels. These dietary factors contribute to an imbalance in lipid profiles, favouring lower HDL cholesterol and higher LDL cholesterol levels. Excess body weight, especially abdominal fat, is associated with decreased HDL cholesterol levels. Obesity alters lipid metabolism and impairs HDL cholesterol production and function.

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Smoking not only damages blood vessels but also lowers HDL cholesterol levels. Smoking cessation is crucial for improving HDL cholesterol levels and overall cardiovascular health. Low levels of HDL cholesterol are associated with an increased risk of cardiovascular disease, including heart attacks and strokes. Furthermore, low HDL cholesterol levels are often accompanied by an elevation in LDL cholesterol and triglyceride levels, creating a lipid profile that is highly atherogenic. Studies have also linked low HDL cholesterol to other health conditions such as type 2 diabetes, metabolic syndrome, and even certain types of cancer [2].

Emphasize a diet rich in whole grains, fruits, vegetables, and lean proteins. Reduce the intake of saturated and trans fats, opting for healthier fats such as monounsaturated and polyunsaturated fats found in avocados, nuts, and fatty fish. Incorporate foods rich in omega-3 fatty acids, such as salmon and chia seeds, which have been shown to raise HDL cholesterol levels. Aim for at least 150 minutes of moderate-intensity aerobic exercise per week, such as brisk walking, cycling, or swimming. A regular exercise helps increase HDL cholesterol production and improves its transport function. Achieve and maintain a healthy body weight through a combination of healthy eating and regular physical activity. Weight loss has been shown to increase HDL cholesterol levels. Smoking cessation is essential for improving HDL cholesterol levels. Within months of quitting smoking, HDL cholesterol levels can begin to rise. Moderate alcohol consumption may have a slight positive effect on HDL cholesterol levels. However, excessive alcohol intake can have detrimental health effects and should be avoided. Control chronic conditions such as diabetes, hypertension, and high triglyceride levels through appropriate medical management and lifestyle modifications. These conditions can negatively impact HDL cholesterol levels [3].

Literature Review

In some cases, lifestyle modifications may not be sufficient to raise HDL cholesterol levels. A healthcare professional may prescribe medications, such as statins or fibrates, to help increase HDL cholesterol levels. These medications should only be used under medical supervision. Researchers are studying the effectiveness of infusing purified HDL cholesterol directly into the bloodstream. This approach aims to increase HDL cholesterol levels and potentially improve cardiovascular outcomes. However, further research is needed to determine its long-term safety and efficacy. Cholesteryl Ester Transfer Protein (CETP) inhibitors are a class of medications that inhibit the action of CETP, a protein involved in the transfer of cholesterol between lipoproteins. By inhibiting CETP, these medications can increase HDL cholesterol levels. Several CETP inhibitors have been tested in clinical trials, although their efficacy and safety profile are still under investigation [4].

Gene therapy holds promise for addressing genetic factors that contribute to low HDL cholesterol levels. By delivering functional copies of genes associated with HDL metabolism, researchers aim to enhance HDL cholesterol production and function. Although still in the early stages of development, gene therapy may offer a potential treatment option in the future. Certain nutraceuticals and supplements have shown promising effects on raising HDL cholesterol levels. For example, niacin (vitamin B3) has been used as a lipid-modifying agent to increase HDL cholesterol. However, it is crucial to consult with a healthcare professional before starting any supplementation to ensure safety and efficacy. It is important to note that while these therapies hold potential, more research is required to determine their long-term effectiveness, safety, and feasibility as viable treatment options for low HDL cholesterol.

Regular monitoring of cholesterol levels, including HDL cholesterol, is vital for assessing cardiovascular risk and guiding treatment strategies. A lipid profile, which includes measurements of total cholesterol, LDL cholesterol, HDL cholesterol, and triglycerides, is typically performed through a blood test. HDL cholesterol can be classified into two primary subtypes: HDL2 and HDL3. HDL2 particles are larger and more buoyant, while HDL3 particles are smaller and denser. Studies have suggested that HDL2 particles may have more pronounced antiatherogenic effects, including improved cholesterol efflux capacity and antioxidant properties. HDL particles play a critical role in the reverse cholesterol transport process, which involves the removal of cholesterol from peripheral tissues and its transport back to the liver for elimination. Cholesterol efflux capacity refers to the ability of HDL particles to remove cholesterol from cells. Low levels of HDL cholesterol, particularly HDL2, and impaired cholesterol efflux capacity have been associated with an increased risk of atherosclerosis and cardiovascular disease [5].

In addition to cholesterol efflux capacity, HDL particles exhibit other protective functions that contribute to cardiovascular health. These include antioxidant, anti-inflammatory, antithrombotic, and vasodilatory properties. Low levels of HDL cholesterol, especially HDL2, may indicate reduced functionality, compromising the cardioprotective effects of HDL. Emerging research suggests that assessing HDL subtypes and functionality may provide a more comprehensive understanding of an individual's cardiovascular risk profile. However, it is important to note that these measures are not widely available in routine clinical practice and are still under investigation. Low HDL cholesterol levels have significant implications for cardiovascular health and overall well-being. While high levels of LDL cholesterol are commonly associated with increased cardiovascular risk, low levels of HDL cholesterol can also contribute to the development of heart disease. HDL cholesterol plays a crucial role in the reverse cholesterol transport process, removing excess cholesterol from the bloodstream and protecting against the formation of arterial plaques.

Discussion

The factors contributing to low HDL cholesterol levels are diverse and multifactorial. Genetic factors can predispose individuals to lower HDL cholesterol production and metabolism, while lifestyle choices such as sedentary behavior, poor diet, obesity, and smoking can exacerbate the problem. Addressing these factors through lifestyle modifications is essential for raising HDL cholesterol levels naturally. Regular exercise is one of the most effective strategies for increasing HDL cholesterol levels. Engaging in aerobic activities such as brisk walking, jogging, or cycling can stimulate the production and functionality of HDL cholesterol. Physical activity also promotes weight loss, reduces inflammation, and improves overall cardiovascular fitness, all of which contribute to higher HDL cholesterol levels.

Dietary changes are another crucial aspect of improving HDL cholesterol levels. A diet rich in whole grains, fruits, vegetables, and lean proteins, along with healthy fats such as monounsaturated and polyunsaturated fats, can positively influence HDL cholesterol levels. Incorporating omega-3 fatty acids from sources like fatty fish, nuts, and seeds has been shown to raise HDL cholesterol levels. Smoking cessation is of paramount importance for individuals with low HDL cholesterol. Smoking not only lowers HDL cholesterol levels but also damages blood vessels and increases the risk of cardiovascular

disease. Quitting smoking can lead to an improvement in HDL cholesterol levels and reduce the overall risk of heart disease [6].

Conclusion

Maintaining optimal levels of HDL cholesterol is crucial for cardiovascular health and overall well-being. Low HDL cholesterol levels can increase the risk of heart disease and other health complications. By adopting a healthy lifestyle, including a balanced diet, regular exercise, weight management, smoking cessation, and moderation in alcohol consumption, individuals can improve their HDL cholesterol levels naturally. It is essential to consult a healthcare professional for personalized advice and guidance regarding cholesterol management, especially in cases where medication may be necessary. Taking proactive steps to improve HDL cholesterol levels can significantly contribute to a healthier and longer life.

Acknowledgement

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Conflict of Interest

None.

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