FACT SHEET: Coronary Heart Disease & Diet

How to prevent CHD with nutrition

Key Points

Diet and diet-related conditions, such as obesity, type 2 diabetes, and hypertension are globally the most significant risk factors for the development of coronary heart disease (CHD).

All international guidelines recommend dietary modifications, which reduce the risk for incident CHD and recurring cardiovascular disease (CVD) events.

An optimal CHD-preventing diet is rich in whole plant foods such as whole grains, fruits, vegetables, legumes, and nuts, and low in sodium, processed, and animal foods.

CHD is the leading cause of death globally[1]

Pathomechanisms That Are Influenced by Diet

Endothelial dysfunction and atherosclerosis

Cholesterol
increased **LDL cholesterol** is the key driver for atherosclerosis

saturated fats, trans fats, and cholesterol in the diet increase concentrations of blood lipids and cause dyslipidemia, including increased LDL

HDL cholesterol has various endothelial-protective effects[2]

Fatty acids
omega-3-mono- and polyunsaturated fatty acids (MUFA and PUFA) improve endothelial function, augment endothelial relaxation, prevent inflammation, and lower cardiovascular risk

omega-6-MUFA and -PUFA, saturated and trans fatty acids impair endothelial function[3]

Exogenous antioxidants contained in many vegetables, fruits and other plant-based foods; help reduce oxidative stress

protect LDL molecules against oxidation, preserve endothelial-dependent vasorelaxation, and limit atherosclerosis[4]

Carbohydrates
complex carbohydrates such as soluble fiber from fruits and vegetables are associated with reduced atherosclerotic progression and lower CVD risk[5,6]

simple carbohydrates are associated with a higher risk for CVD[6]

Trimethylamine N-oxide (TMAO) gut microbe-dependent metabolic by-product from carnitine and choline

TMAO activates immune and inflammatory responses, alters cholesterol metabolism, and promotes atherosclerotic thrombosis[7,8]

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The Scientific Evidence

Epidemiological Evidence

28% risk reduction for CHD incidence in prospective studies comparing highest diet adherence to a **Mediterranean diet** with the lowest category[9]

25% risk reduction for CHD incidence in prospective studies comparing highest diet adherence to a **healthy plant food diet** with the lowest category[10] (healthy plant food diet: rich in whole grains, fruits/vegetables, nuts/legumes, oils, tea/coffee and low in juices/sweetened beverages, refined grains, potatoes/fries, sweets, and animal foods)

32% lower risk of CHD development in vegetarians compared to nonvegetarians (EPIC-Oxford study)[11]

33% risk reduction for myocardial infarction in prospective studies comparing highest diet adherence to a **Mediterranean diet** with the lowest category[5]

Evidence From RCTs and Corresponding Meta-Analyses

28-31% risk reduction for major cardiovascular events when following a **Mediterranean diet** supplemented with nuts or extra virgin olive-oil compared to a fat-reduced diet[12]

72% risk reduction for cardiac death and myocardial infarction when following a **Mediterranean diet** compared to a Western diet[13]

-19 mg/dL LDL cholesterol in vegans vs. omnivores[14]

significant risk reduction of CVD through higher intake of flavonoids[15]

significant positive dose-dependent association between plasma TMAO levels, cardiovascular events, and mortality[16]

General Recommendations

Eat predominantly or entirely from a wide variety of whole plant foods:
Maximize the intake of high-quality plant foods such as vegetables, whole grains, legumes, fruits, nuts, seeds, herbs, and spices; your health will benefit from every step towards more whole plant foods.

Eliminate or limit all processed foods, refined carbohydrates, and sugar-sweetened foods and beverages.

Eliminate or limit red and processed meat products (such as burgers, sausages, bacon, ham, salami, dried meat, canned meat, and pastrami).

Eliminate or limit other animal products such as poultry, fish, eggs, cheese, and dairy.

Make sure to cover potentially critical nutrients with a wide variety of plant foods, enriched foods/drinks, or supplements (especially vitamin B12 and vitamin D); find more information in our Nutrition Library.

Disease-Specific Recommendations

Limit sodium intake – avoid processed foods (which are always high in salt), and experiment with different spices and herbs to give flavor to your food while reducing the amount of salt.

Choose healthy, whole food fat sources such as nuts, seeds, or avocados. When oil is needed, choose omega-3-rich oils (such as flaxseed, hemp, canola, and nut oils) over omega-6-rich oils (such as sunflower, safflower, and corn oil); avoid saturated fats (such as animal fats, coconut oil, and processed foods).

Always go for whole grain foods to increase your fiber intake. The fiber in whole grain bread and pasta, quinoa, oatmeal, and brown and wild rice lowers your cholesterol and blood pressure.

Fight chronic inflammation – a very important puzzle piece in the development of CHD – with powerful antioxidants in berries, cruciferous vegetables (like broccoli), dark green leafy vegetables, and beans.

Regularly include some of the following foods as they are proven to be especially effective against hypertension, a main risk factor for CHD: beetroots (beetroot juice), leafy green vegetables (broccoli, kale, brussels sprouts, bok choy, etc.), garlic, oats, green tea, hibiscus tea, and dark chocolate.

For more details on how to implement a whole food, plant-based diet, have a look at **our brochure .**

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[1] Mortality From Ischemic Heart Disease | Circulation: Cardiovascular Quality and Outcomes. https://ahajournals.org/doi/10.1161/CIRCOUTCOMES.118.005375. Accessed September 27, 2019.
[2] Bardagjy, A.S. and F.M. Steinberg, Relationship Between HDL Functional Characteristics and Cardiovascular Health and Potential Impact of Dietary Patterns: A Narrative Review. Nutrients, 2019. 11(6).
[3] Gonzalez-Becerra, K., et al., Fatty acids, epigenetic mechanisms and chronic diseases: a systematic review. Lipids Health Dis, 2019. 18(1): p. 178.
[4] Malekmohammad, K., R.D.E. Sewell, and M. Rafieian-Kopaei, Antioxidants and Atherosclerosis: Mechanistic Aspects. Biomolecules, 2019. 9(8).
[5] Wu H, Dwyer KM, Fan Z, Shircore A, Fan J, Dwyer JH. Dietary fiber and progression of atherosclerosis: The Los Angeles Atherosclerosis Study. Am J Clin Nutr. 2003;78(6):1085-1091. doi:10.1093/ajcn/78.6.1085
[6] Pallazola, V.A., et al., A Clinician's Guide to Healthy Eating for Cardiovascular Disease Prevention. Mayo Clin Proc Innov Qual Outcomes, 2019. 3(3): p. 251-267.
[7] Yang, S., et al., Gut Microbiota-Dependent Marker TMAO in Promoting Cardiovascular Disease: Inflammation Mechanism, Clinical Prognostic, and Potential as a Therapeutic Target. Front Pharmacol, 2019. 10: p. 1360.
[8] Najjar, R.S. and R.G. Feresin, Plant-Based Diets in the Reduction of Body Fat: Physiological Effects and Biochemical Insights. Nutrients, 2019. 11(11).
[9] Grosso G, Marventano S, Yang J, et al. A comprehensive meta-analysis on evidence of Mediterranean diet and cardiovascular disease: Are individual components equal? Critical Reviews in Food Science and Nutrition. 2017;57(15):3218-3232. doi:10.1080/10408398.2015.1107021
[10] Satija A, Bhupathiraju SN, Spiegelman D, et al. Healthful and Unhealthful Plant-Based Diets and the Risk of Coronary Heart Disease in U.S. Adults. J Am Coll Cardiol. 2017;70(4):411-422. doi:10.1016/j.jacc.2017.05.047
[11] Crowe, F.L., et al., Risk of hospitalization or death from ischemic heart disease among British vegetarians and nonvegetarians: results from the EPIC-Oxford cohort study. Am J Clin Nutr, 2013. 97(3): p. 597-603.
[12] Estruch R, Ros E, Salas-Salvadó J, et al. Primary Prevention of Cardiovascular Disease with a Mediterranean Diet Supplemented with Extra-Virgin Olive Oil or Nuts. N Engl J Med. 2018;378(25):e34. doi:10.1056/NEJMoa1800389
[13] de Lorgeril M, Salen P, Martin JL, Monjaud I, Delaye J, Mamelle N. Mediterranean diet, traditional risk factors, and the rate of cardiovascular complications after myocardial infarction: Final report of the Lyon Diet Heart Study. Circulation. 1999;99(6):779-785. doi:10.1161/01.cir.99.6.779
[14] Benatar, J.R. and R.A.H. Stewart, Cardiometabolic risk factors in vegans; A meta-analysis of observational studies. PLoS One, 2018. 13(12): p. e0209086.
[15] Wang X, Ouyang YY, Liu J, Zhao G. Flavonoid intake and risk of CVD: a systematic review and meta-analysis of prospective cohort studies. Br J Nutr. 2014 Jan 14;111(1):1-11. doi: 10.1017/S000711451300278X.
[16] Schiattarella, G.G., et al., Gut microbe-generated metabolite trimethylamine-N-oxide as cardiovascular risk biomarker: a systematic review and dose-response meta-analysis. Eur Heart J, 2017. 38(39): p. 2948-2956.