Preventing Broken Hearts: The Science Behind Cardiovascular Disease

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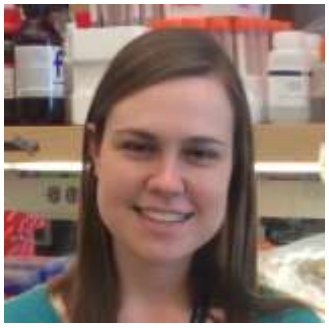
Introduction

Cardiovascular disease (CVD) is the leading cause of death worldwide, accounting for 31% of deaths. Statin drugs, which reduce LDL cholesterol in the blood, are among the most prescribed medicines. Why do so many people die from CVD? In this talk, we'll dispel cholesterol myths and look more closely at how CVD develops. We'll also discuss current and future CVD therapies, including predicted future blockbuster therapies called PCSK9 inhibitors.

Speaker



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Glossary of Important Terms

Atherosclerosis: the root cause of the majority of cardiovascular disease; the development of cholesterol- and cell-rich plaques in the arteries

Cardiovascular disease (CVD): a collection of diseases involving the heart and/or blood vessels

Cholesterol: a waxy substance essential for cell membranes and sex hormone synthesis; major component of LDL

Complex disease: a disease whose development is influenced both by genetics and environment

Familial hypercholesterolemia: inherited high cholesterol that increases a person's risk of CVD

Framingham risk score: percent odds of having a heart attack within ten years, calculated according to results from the Framingham Heart Study

High-density lipoprotein (HDL): particles commonly known as good cholesterol. HDL removes cholesterol from LDL, macrophages, and plaques, and brings it back to the liver.

Low-density lipoprotein (LDL): particles commonly known as bad cholesterol. LDL can stick in arteries and lead to plaque formation.

LDL receptor: protein on the surface of liver cells that takes LDL out of the blood

PCSK9: a protein that increases breakdown of the LDL receptor; drugs called PCSK9 inhibitors block this process to lower LDL levels in the blood

Saturated fat: fat that is solid at food temperature, commonly found in processed foods and animal products. Saturated fat has more hydrogens than unsaturated fat.

Statin: class of drugs that inhibit cholesterol synthesis in the liver and promote increased LDL uptake through the LDL receptor. Brand names include Zocor, Lipitor, and Crestor.

Trans fat: An unsaturated fat that has been partially hydrogenated to closely resemble saturated fat. Trans fats increase the risk of CVD in multiple ways.

Unsaturated fat: fat that is liquid at room temperature, commonly found in fish, nuts, and vegetable oils. Unsaturated fats are associated with a lower risk of CVD.

Very low-density lipoprotein (VLDL): cholesterol- and fat-rich particles released by the liver to bring these molecules to other organs of the body. After fat is removed from VLDL, these particles become LDL.

Resources to learn more

A potential new weapon against heart disease: PCSK9 inhibitors. http://sitn.hms.harvard.edu/flash/2015/a-potential-new-weapon-against-heart-disease-pcsk9-inhibitors/ (more detailed description of PCSK9 biology/PCSK9 inhibitors)
Fat vs sugar: who will break your heart? http://sitn.hms.harvard.edu/flash/2014/fat-vs-sugar-who-will-break-your-heart/ (introduction to nutrition and its role in CVD prevention)