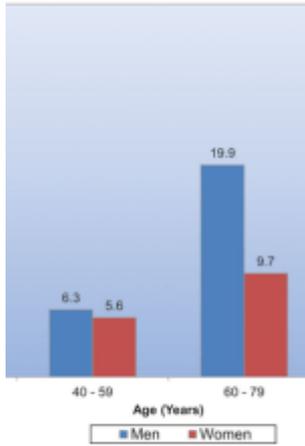


Prevalence of coronary heart disease by age and sex



Source: 2009-2012.

Mozaffarian D
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Ketones Protect Arteries

The health of arteries is vastly important for aging and prevention of chronic disease, most notably coronary artery disease, and it's also important for the health of organs such as the kidney and the brain. Ketones, which are produced by fasting or the ketogenic diet, protect arteries.

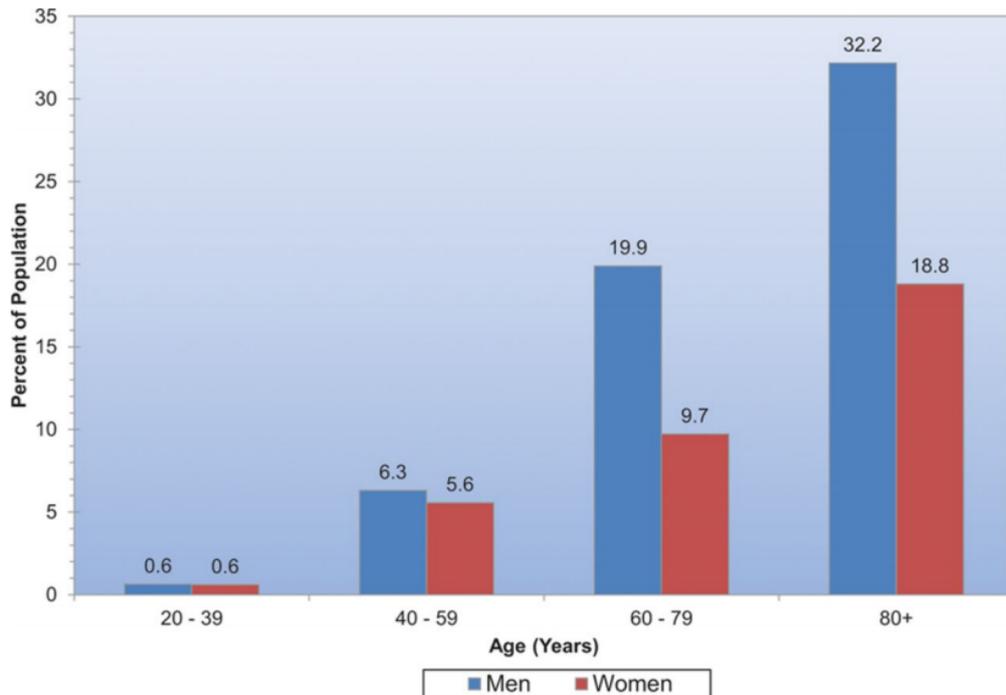
You're only as old as your arteries

Thomas Sydenham, a 17th-century English physician, famously said, "You're only as old as your arteries." ([Ref.](#))

Coronary artery disease is a major killer in the U.S., and heart disease in general is the number one cause of death.

Aging is the most important risk factor for heart disease. See chart below.

Prevalence of coronary heart disease by age and sex



National Health and Nutrition Examination Survey: 2009–2012.



Mozaffarian D et al. *Circulation*. 2015;131:e29-e322

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Ketones protect arteries

Disease of the arteries is caused by inflammation in the lining, which is composed of endothelial cells.

All cells other than stem cells age, and as they age they lose function. When they've reached the end of the road, they become senescent.

Senescent cells are major contributors to chronic inflammation and are associated with SASP, the senescence associated secretory phenotype. Essentially, senescent cells produce inflammatory chemicals (cytokines) that cause an inflammatory response for any cells in the vicinity. ([Ref.](#))

Chronic inflammation is associated with aging and plays a causative role in several age-related diseases such as cancer, atherosclerosis and osteoarthritis. The source of this chronic inflammation is often attributed to the progressive activation of immune cells over time. However, recent studies have shown that the process of cellular senescence, a tumor suppressive stress response that is also associated with aging, entails a striking increase in the secretion of pro-inflammatory proteins and might be an important additional contributor to chronic inflammation.

The new science of senolytics promises the ability to rid our bodies of senescent cells, which would negate many of the effects of aging. ([Ref.](#))

In passing, let's note that a single bout of resistance training (lifting weights) can also eliminate senescent endothelial cells. ([Ref.](#))

Preventing the endothelial cells that line arteries from becoming senescent means keeping them youthful and from becoming sources of inflammatory cytokines. This in turn helps maintain youthful arteries.

A recent study showed that ketones can prevent senescence of both endothelial cells and vascular smooth muscle cells. [β-Hydroxybutyrate Prevents Vascular Senescence.](#)

Beta hydroxybutyrate is one of three ketone bodies produced during ketosis.

So, how do you produce ketones?

One way is via a very low carbohydrate ketogenic diet. The absence of carbohydrates in the diet means that glucose in the body must be spared for important uses. Ketones are produced from fat to provide energy in place of glucose.

Another way to produce ketones is through intermittent fasting. Total absence of food, and especially absence of carbohydrates, induces ketone production.

[Ketone supplements](#) work too.

Calorie restriction, the most robust life-extension intervention we know of, also produces ketones.

Ketones and autophagy

Autophagy is the cellular self-cleansing process that rids cells of [junk molecules, which are crucial in promoting aging.](#)

Increased autophagy is essential for life extension. ([Ref.](#)) The decline in autophagy induction in aging allows the accumulation of junk molecules, and therefore cells don't function as well, leading to the aging phenotype of increased susceptibility to damage, breakdown, and disease.

Ketones promote autophagy. ([Ref.](#))

The promotion of autophagy by ketones may be another way that [fasting and ketogenic diet protect arteries.](#)

Increasing the ability to induce autophagy is one of the most promising anti-aging interventions. This can be done with calorie-restriction mimetics, such as resveratrol, rapamycin, and metformin, or of course by calorie restriction itself, as well as fasting and the ketogenic diet.

PS: If you need to lose weight and you want to save yourself years of poor results with bad information, I've put everything

in a simple guide for you. [The World's Simplest Fat-Loss Plan.](#)

