

MSN - HEALTH

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Coffee and your arteries

Research on caffeine found that it may improve the function of arteries.

Wise lifestyle choices pay off for men, earning them enhanced vigor and longer lives. Prudent choices also pay off for stand-up comics, providing easy targets that earn loud laughs. The jokes often take advantage of the notion that anything that feels good or tastes good must be bad for you.

So it is with coffee. Its appeal is undeniable; about 150 million Americans drink coffee every day, together consuming some 400 million cups a day. Coffee is popular because it tastes good, and it makes most people feel better. Perhaps that's why it's been blamed for innumerable woes. It's true that some people experience symptoms such as nervousness, a racing heart, headaches, insomnia, heartburn, and excessive urination after just a cup or two. And it's also true that coffee can boost blood pressure, but the rise is small and short-lived, and people who drink coffee regularly are largely spared from even this modest hit.

Coffee has also taken the rap for more serious illnesses, ranging from heart attacks and strokes to cancer of the pancreas. Careful studies have debunked these fears, but lingering concerns persist, particularly regarding coffee's cardiovascular effects. That's why coffee lovers will welcome a study that makes coffee seem a bit sweeter; the research was conducted in Israel, where coffee is nearly as popular as in the U.S. To understand the experiments, though, we should first review how your arteries are built and how they work.

Your arteries: An inside look

Doctors used to think of arteries as simple passive conduits for blood, working for your body the way a garden hose works for your lawn. Wrong! In fact, arteries are complex structures with crucial regulatory functions, and they are on the front line of the battle for cardiovascular health.

Every artery has three layers in its wall (see figure). The inner layer, or intima, is composed of a thin layer of endothelial cells that are in direct contact with the bloodstream. The middle layer, or media, is composed chiefly of smooth muscle cells and elastic fibers. The outermost layer, or adventitia, is made up of supporting tissues that are dense and strong in larger arteries but nearly absent in the delicate blood vessels of the brain.

Endothelial cells have a crucial role in vascular health. If all the endothelial cells in your body were placed side by side, they would cover a football field; together, they weigh more than three pounds.

Among other things, endothelial cells produce nitric oxide. Yes, it's the same noxious gas that spews forth in acrid fumes from smokestacks and tailpipes. But although nitric oxide is a bane to the environment, the tiny amounts produced by your endothelial cells are a boon to your circulation.

This nitric oxide has two crucial functions. It keeps the arterial lining smooth and slippery, preventing white blood cells and platelets from latching on and causing damaging inflammation and artery-blocking blood clots. In addition, it relaxes the smooth muscle cells of the artery wall's middle layer, preventing spasms and keeping arteries open.

Arteries at risk

Arteries are delicate, and arterial diseases are responsible for heart attacks and strokes, the first and fourth leading causes of death in American men. In nearly all cases, the culprit is atherosclerosis, in which cholesterol-laden plaques build up in the arteries' middle layers. As inflammation adds insult to injury, the plaques enlarge, narrow the artery, and impair blood flow. Even worse, if a plaque ruptures, it triggers the formation of a blood clot that blocks the artery, killing the cells that are deprived of oxygen.

Atherosclerosis produces obvious damage to the arteries' middle layer, but long before plaques become large enough to restrict blood flow, the disease process takes a toll on endothelial function. Nitric oxide production is impaired, preventing arteries from widening properly when tissues need more oxygen-rich blood. Among many potential consequences, this may make it hard for the penis to get enough extra blood to produce an erection; it's no wonder that ED can stand for both erectile dysfunction and endothelial dysfunction. And, unfortunately, it can also stand for early death.

In the long run, exercise improves endothelial function, while hypertension, diabetes, unfavorable blood cholesterol levels, and tobacco exposure have very harmful effects — and in the short run, even a single cigarette or a high-fat meal can produce temporary endothelial dysfunction. But how about coffee?

A jolt of caffeine

Instead of testing coffee in a cup, a team of Israeli scientists evaluated its most notorious ingredient, caffeine. Their subjects were 80 volunteers with an average age of 53. Half the participants had stable coronary artery disease, while the others were free of cardiovascular disease; 83% were male. All the subjects were tested after fasting overnight and giving up all caffeine for at least 48 hours.

Each volunteer underwent two tests, performed one to two weeks apart. On each occasion, endothelial function was tested just before and again one hour after the individual swallowed a capsule containing the test substance. On one of the two tests, the capsule contained a placebo; on the other, it contained 200 milligrams of caffeine, about two and a half times the amount in a typical cup of coffee. Neither the scientists nor the subjects knew which trial administered caffeine and which used the placebo; the order of testing was determined randomly.

The healthy subjects had better endothelial function than the patients with coronary artery disease when tested before caffeine or placebo; that stands to reason, since atherosclerosis impairs endothelial function. But caffeine actually improved endothelial function as measured by a standard test called brachial artery flow-mediated dilation. The improvement was substantial in both groups, but was greater in the healthy subjects than in the patients with atherosclerosis. Caffeine did not affect the endothelial response to nitroglycerin in either group. It produced a small (4 millimeters of mercury) rise in the blood pressure of the patients with coronary artery disease, but not in the healthy people. None of the volunteers experienced an elevated heart rate or other adverse symptoms.

Drink up?

The study does not make coffee into a health food. But it does add to the brewing evidence that tells us coffee is not toxic either.

It's a happy situation. Doctors won't tell you to drink coffee or to stay away from it. Listen to your body; if it likes coffee and you enjoy it, bottoms up.