Inflammation, Not High Cholesterol, May Cause Heart Disease

A combination of yoga, meditation, and a diet rich in good fats and antioxidants can help prevent it. From yoga International FEBRUARY 26, 2014 BY JAMES KEOUGH

By and large, yoga practitioners are a heart-healthy group. Yoga provides us with regular exercise for our bodies and stress-reducing techniques for our minds. Few of us smoke or use tobacco, and those of us who imbibe tend to do so moderately. And for the most part, our diets follow Michael Pollan's straightforward advice in his book *In Defense of Food:* "Eat food. Not too much. Mostly plants."

So why should we concern ourselves with heart disease? Well, first off, no one is immune from health issues, and heart disease *is* the leading cause of death in the United States. Second, we all know at least one person whose annual checkup ended with warnings about high cholesterol and a prescription for statin drugs. And, finally, we need to know that cholesterol might not even be the primary cause of heart disease (that dubious distinction, researchers now say, belongs to inflammation), which means we've had our eye on the wrong ball for a long time.

This focus on cholesterol began almost 60 years ago, when the American Heart Association declared that the cause of coronary heart disease was "butter, lard, beef, and eggs." Mainstream medicine quickly bought into the idea that the high levels of saturated fat in those foods raised cholesterol levels in the blood, and the excess cholesterol clogged the arteries. And now, after half a century of low-fat diets and the staggering proliferation of cholesterol-lowering medications ($35 billion in sales last year), the notion is firmly entrenched in the minds of most health practitioners and consumers.

Maybe it's time to reconsider. As nutritionist Jonny Bowden, PhD, coauthor (with Stephen Sinatra, MD) of *The Great Cholesterol Myth: Why Lowering Your Cholesterol Won't Prevent Heart Disease—and the Statin-Free Plan That Will* (Fair Winds Press, 2012) says, "Trying to prevent heart disease by lowering cholesterol is like trying to cut calories from a McDonald's supersized meal by removing the pickle." For men over 65 and for women of any age, cholesterol levels are practically useless in assessing coronary heart disease risk. And, oddly

enough, if you step back and look at the big picture, low cholesterol may actually cause more health problems than it prevents.

Getting to Know the Enemy

What doctors rarely admit is that people with high cholesterol actually live *longer;* and at least six studies found that the lower the cholesterol, the higher the mortality. In fact, if you look at all the causes of death in this country, people with higher levels of cholesterol have less cancer, a lower risk of dying from gastrointestinal and respiratory disease, and fewer automobile accidents and suicides. Surprisingly, the protective role of cholesterol extends even to people with serious heart disease. Studies in the United States and Europe found that heart disease patients with high cholesterol levels live much longer than those with low levels.

Our bodies need cholesterol because, among other things, it plays a critical role in the production of brain cells, and studies have linked too low a level (below 160) to depression, aggression, cerebral hemorrhages, and cognitive problems—all of which may explain those higher death rates from accidents and suicides.

How Cholesterol Got a Bad Rap

Any discussion about cholesterol should begin by acknowledging that the liver makes roughly 800 to 1,000 mg of it a day—all that the body needs to maintain good health. But if you get additional cholesterol from the foods you eat (all foods from animal sources contain cholesterol), your body scales back production until it can deal with the surplus. Furthermore, the body needs this soft, waxy sterol to help digest fats, strengthen and repair cell membranes, insulate nerves, manufacture vitamin D, and make hormones, including those that govern our sex lives.

Because it's a fatlike substance, cholesterol can't dissolve in our water-based blood and flow directly to the cells. Instead, it has to hitch a ride on special carriers called lipoproteins. By now we're all probably familiar with two of those: low-density lipoproteins (LDL) and high-density lipoproteins (HDL). The LDLs, scientists discovered, deliver cholesterol to the cells on an as-needed basis, and the heavier HDLs act as scavengers, picking up any excess—even scraping it off artery walls—and transporting it back to the liver for processing and elimination.

Seen in this context, both HDL and LDL can be called "good" cholesterol, because each performs a critical function in the day-to-day operation of the body. In the early rounds of the cholesterol-causes-heart-disease discussion, however, only HDL received that distinction, because it reduced the level of cholesterol in the blood. LDL, on the other hand, was labeled "bad," because researchers in the Framingham Heart Study deemed it a "marginal risk factor" for heart disease.

It's hard to imagine that the body would make a mission-critical substance that could also cause death, but that's what the label "bad" cholesterol implies, and it spawned an all-out medical war on LDL cholesterol, the intention of which is to drive LDL levels as low as possible. This premise not only overlooks the body's critical need for low-density lipoproteins—without them the cells can't get the cholesterol they need—it misses an important fact. LDL turns "bad" only when free radicals *oxidize* it (essentially, destabilize it) by stealing one of its electrons. It can then stick to an artery wall and start an inflammatory cascade that leads to heart-attack-causing blood clots.

Maybe There's Something Else

Perhaps the most telling disconnect about the high cholesterol theory (called the lipid

hypothesis) is the inconvenient truth that fully half of all heart attacks occur in people who have normal cholesterol levels. Most people would look at that number—50 percent—and wonder if something other than cholesterol might account for this apparent contradiction.

It turns out that the lipid hypothesis has seriously oversimplified heart disease, according to numerous studies, and has completely discounted the role that antioxidants play in preventing heart problems. Case in point: The Lyon Diet Heart Study, which occurred during the 1990s, placed one group of heart attack survivors on the low-fat, high-carb, anti-cholesterol diet then endorsed by the American Heart Association, and a second group on what's called the Mediterranean diet, which consists primarily of vegetables, fruits, nuts, fish, and olive oil. At the end of the study, both groups had roughly the same cholesterol levels, but subjects on the Mediterranean diet had a much lower number of second heart attacks and experienced far less chest pain (unstable angina) and heart disease. Why? Researchers believe it had something to do with the antioxidants found in fruits and vegetables and the anti-inflammatory omega-3 fatty acids found in fish.

And then there's the French paradox, the puzzling fact that France has one of the lowest incidences of heart disease in the developed world, even though its citizens eat rich, high-cholesterol foods with seemingly reckless abandon and have an average total cholesterol level that hovers around 250. Researchers studying this paradox also point to the consumption of fresh vegetables and fruit and to the powerful antioxidants in red wine, particularly resveratrol.

So what role do antioxidants play in the body? They reduce inflammation. And those two studies, along with more recent ones, seem to confirm that inflammation plays an important role in the development of heart disease and the onset of heart attacks. How? Let's take a look at what happens inside the arteries. Something—high blood pressure, blood sugar spikes from a high-glycemic diet, or toxins from smoking, pollution, or pesticides—injures the endothelium, the delicate one-cell-thick lining of the arteries. LDL cholesterol lodges in the injury—perhaps in an effort to repair the damaged cells—and then becomes oxidized by free radicals in the blood. The immune system rushes in to repair the wound and in the process inflames it further—think of the redness surrounding a cut on your finger. In an effort to contain this growing "infection," the body covers it with a tough, fibrous cap, creating what's called arterial plaque. Sometimes the plaque is stable, meaning the inflammation calms down, the cap holds, and the only harm the plaque does is contribute to narrowing the artery. Unstable plaque, on the other hand, can burst and cause blood clots that in turn can block a narrowed artery and cause a heart attack.

To find out if you have inflammation-related heart problems, your doctor relies on a number of blood tests. These inexpensive tests play a critical role in detecting heart disease even before symptoms occur.

So, should you march down to the lab and get tested? Probably not, unless you have a number of heart disease risk factors—especially a high-stress lifestyle, excess body weight, or high blood sugar. In short, any lifestyle choice that promotes inflammation. But you should turn the page to see what you can do and what you can eat to keep your heart healthy.

Heart Attack Warning Signs

Some heart attacks are sudden and intense—the "movie heart attack," where no one doubts what's happening. But most heart attacks start slowly, with mild pain or discomfort. Often people affected aren't sure what's wrong and wait too long before getting help. Here are signs that can

mean a heart attack is happening:

- Chest discomfort. Most heart attacks involve discomfort in the center of the chest that lasts more than a few minutes, or that goes away and comes back. It can feel like uncomfortable pressure, squeezing, fullness, or pain.
- Discomfort in other areas of the upper body. Symptoms can include pain or discomfort in one or both arms, the back, neck, jaw, or stomach.
- Shortness of breath with or without chest discomfort.
- Other signs may include breaking out in a cold sweat, nausea, or lightheadedness. Women are somewhat more likely than men to experience shortness of breath, nausea or vomiting, and back or jaw pain.

Even More Complicated…

If you're a middle-aged man for whom high cholesterol is a significant risk factor—or if you know your LDLs are high—take note. Recently, researchers have discovered that the "bad" cholesterol comes in two flavors: Pattern A and Pattern B. The light, fluffy, and perfectly fine LDL-A poses no risk for heart disease, but the small, dense B is "nasty stuff," says heart-health expert Jonny Bowden, PhD. Pattern B is the LDL that lodges in the endothelium, gets oxidized, and leads to arterial plaque. So knowing your A and B counts will help clarify your heart disease risk and may signal a need to reduce your Pattern B LDL. Of course, you'll still need to minimize the other risk factors that lead to LDL oxidation and feed the inflammation that triggers arterial plaque formation.

What You Can Do

Doctors and researchers may never sort out the complex causes of heart disease, but that shouldn't stop you from taking action now to protect your heart. For some that might entail major changes, but most of us just need to add the following to our already healthy lifestyles.

Reduce Your Risk Factors

Like many of the chronic diseases that plague our collective health, heart disease develops because we make poor choices about diet, exercise, and questionable habits like smoking and excessive drinking. Most people will say they know this already, so the first step is to act on this knowledge and make changes in how we eat and cut back on the proven risk factors for heart disease. Then consider taking these less well-known steps to give your heart a fighting chance:

1. Cut your insulin levels. Doctors tell us to do this to prevent diabetes, but high insulin levels also contribute to heart disease by causing a biochemical chain reaction that leads to inflamed arteries. High insulin levels also encourage the formation of abdominal fat (the all-too-prevalent spare tire). To lower insulin levels, limit the sugar you eat—nutritionist Bowden calls it a "far more damaging and inflammatory substance than fat ever was"—and avoid high-glycemic carbohydrates like white bread, pasta, short-grain rice, potatoes, and instant oatmeal.

2. Practice good oral hygiene. Regular brushing and flossing will do more than protect your teeth and sweeten your breath—numerous studies have found a link between unhealthy gums and heart disease. The most serious form of gum disease, periodontitis, can increase the risk of cardiovascular disease by more than 30 percent.

3. Reduce your stress level. Chronic stress in our bodies causes our adrenal glands to release a steady stream of cortisol as part of our natural fight-or-flight syndrome. This and other related hormones cause arterial constriction, increase blood pressure, speed up our heart rate, and promote clotting in the blood. Studies have shown that meditation, prayer, yoga, biofeedback,

and other mind/body techniques can lower stress levels and reduce heart attack risk.

Take Your Supplements

You can counteract the heart-negative inflammatory foods and free-radical-inducing environmental toxins and pollutants by adding antioxidant-rich vitamins and other anti-inflammatory supplements like these to your diet.

- Vitamins C and E. These powerful antioxidants also reduce arterial stiffness and combat the formation of plaque.
- CoQ10. A fat-soluble nutrient found in virtually all your cells, Coenzyme Q10 acts as a powerful free radical scavenger and helps prevent LDL oxidation.
- NAC. Its official name is N-acetyl-L-cysteine. NAC is a well-researched form of cysteine, an amino acid that raises glutathione, one of the body's most important antioxidants.
- ALA. Besides being an antioxidant itself, alpha lipoic acid (ALA) helps recycle vitamins C and E and glutathione in the body. ALAs are also found in flax seeds and flax seed oil.
- Omega-3s. These essential fatty acids appear to reduce inflammation, prevent blood clots, and even cut down on heart attack fatalities.
- Keep Practicing Yoga

Studies at Ohio State and Georgia State universities found that yoga reduces levels of the cytokine interleukin-6 (IL-6), a marker for chronic inflammation. Numerous studies have also shown that yoga reduces blood pressure (another risk factor for heart disease) primarily by lowering cortisol and bringing the central nervous system into balance.

Of course, yoga experts believe heart disease is more than just the sum of test results; they see it as a disconnect among our physical, emotional, and spiritual bodies. And they say that to create a healthful environment for the heart, we must weave together all the elements of practice—asana, pranayama, meditation, and selfless service. Here are some ways to do that.

Commit to a consistent practice and include a variety of poses that will put your body through its full range of motion. Backbends open the rib cage to improve heart and lung function; standing poses strengthen your legs and stretch your whole body; forward bends allow you to feel safe and nurtured and help quiet your sympathetic nervous system; and twists massage your internal organs and increase circulation throughout the body.

Examine your emotional and spiritual status. Obviously, your blood pressure didn't rise by itself. More than 20 years ago, Dean Ornish, MD, and his team of researchers proved to the world that emotional stress, isolation, hostility, and low self-esteem had as much to do with heart disease as high cholesterol, oxidized LDLs, triglyceride levels, and nicotine. And then they surprised the medical profession by demonstrating that lifestyle changes which include yoga, meditation, and group support can reverse the disease.

Incorporate *ujjayi* (victorious breath) and *nadi shodhanam* (alternate nostril breathing) pranayamas into your daily routine to reduce anxiety and agitation. If you have high blood pressure, however, do not practice *kumbhaka* (breath retention).

Practice restorative yoga, chanting, and mantra meditation, all of which contribute to relieving hypertension and calming your heart, both physically and emotionally. (See the sample restorative practice to the right.)

Heart-Healthy Restorative Practice

Include any of these five restorative poses in your daily practice to calm your nerves and restore equilibrium. Avoid headstand or other unsupported inversions if you have high blood pressure. If you have time for only one pose, choose*shavasana* (corpse pose) or *viparita karani* (legs-up-the-wall pose) for maximum benefit.

1 Support the head in *adho mukha shvanasana* (downward dog)
2 Sink into your support in *balasana* (child's pose)
3 Use plenty of props for *supta baddha konasana* (reclining bound angle pose)
4 Elevate your sacrum in *viparita karani* (legs-up-the-wall pose)

Three Ways to Get Your EFAs (essential fatty acids)

Vegetarians (or people just worried about mercury contamination and sustainability) can get the essential fatty acids they need from plants alone.

- Hemp and flax seed oils contain alpha linolenic acid (ALA), which the body converts to the essential fatty acids found in fish oil. Hemp oil tastes better than flaxseed oil, and it contains the ideal ratio of omega-6 EFAs to omega-3s: 3 to 1. A further benefit: hemp seed oil also contains gamma-linolenic acid (GLA), which reduces inflammation and improves the health of the skin. Both oils break down when heated, and they turn rancid quickly, so refrigerate them after opening and consume them in one to three months.
- In addition to omega-3s, walnuts contain heart-healthy monosaturated fats and an especially heart-friendly, non-wheat version of vitamin E. The skin covering the nut also contains key phenolic acids, tannins, and flavonoids, so eat it too, even though it's somewhat bitter tasting.
- Three ways to get your EFAs: Micro-algae contain high levels of DHA and EPA that, along with ALA, make up the three essential fatty acids in omega-3s. The fish eat the algae and store the omega-3s in their fat. Micro-algae, now available in supplement form, have the same heart-healthy benefits as fish oil, according to a study in the British *Journal of Nutrition.*

What You Should Eat

Historically, people in the Mediterranean countries of Spain, Greece, and Italy, and those who live in Asia, particularly China and Japan, have had a fraction of the heart disease found in the United States and northern Europe—and they have some of the longest life expectancies, as well. The reason? Their traditional diets. They differ in details—you won't find soy in marinara sauce or olive oil in a wok, but both diets have low levels of saturated and hydrogenated fats, high levels of healthy fats, and an emphasis on fish and vegetables. Cardiologists Stephen T. Sinatra, MD, and James C. Roberts, MD, coauthors of *Reverse Heart Disease Now* (John Wiley & Sons, 2007), propose combining the two in the Pan-Asian Mediterranean (PAM) diet, which contains these basic ingredients.

Antioxident-Rich Fruits and Veggies. These compounds combat the free radicals that oxidize LDL cholesterol molecules and cause inflammation throughout the body. The trick here is to eat your colors.

- What to eat: Brightly hued fruits like blueberries, blackberries, cherries, red grapes, and strawberries; rich green veggies like kale, spinach, brussels sprouts, and broccoli; and vibrant red veggies like beets and red bell peppers pack the highest concentrations of antioxidants. Onions, too, boast a specific flavonoid, quercetin, which blocks the oxidation of LDL. Looking for an antioxidant beverage? Try red wine in moderation (it contains resveratrol) or green tea, which blocks an enzyme involved in inflammation.

Nuts and Seeds. Rich in good essential fatty acids, protein, and fiber, these staples of our hunter-gatherer past also contain phytosterols (plant fats), which help cut back on the dietary cholesterol we absorb.

- What to eat: Raw almonds, walnuts, pecans, Brazil nuts, and sunflower seeds.

Low-Glycemic Grains. Because these foods contain more fiber than their high-glycemic cousins, they take longer to digest and, therefore, help maintain steady blood sugar levels, reducing the need for dramatic increases in insulin. The added fiber also helps cleanse the digestive system and sops up excess cholesterol. In fact, studies report that a 10 g increase in daily fiber intake produces a 29 percent reduction in heart disease risk.

- What to eat: Pumpernickel or spelt bread; bulgar; brown or wild rice; pearl barley, steel-cut oats, quinoa, millet, and buckwheat.

Omega-3 Fatty Acids. Processed food made with corn, safflower, and sunflower oils contains excessive amounts of inflammation-causing omega-6 fatty acids, and, as a result of our fondness for these products, the ratio of omega-6s to omega-3s in our bodies is way out of whack. Estimates put it at as much as 20 to 1 instead of a healthier 3 to 1. Avoid omega-6-rich polyunsaturated vegetable oils and processed foods, and ramp up your omega-3s.

- What to eat: Cold-water fish (salmon, mackerel, sardines), hemp and flax seeds, soybeans, and sea vegetables.

Little If, Any Beer and Dairy. Despite their central roles in the standard American diet, these two foods contain too much saturated fat for daily consumption. They're also high in methionine, a precursor to homocysteine, which promotes damage to the arteries.

- What to eat: Substituting fish gives you lean protein and a dose of anti-inflammatory omega-3s, and avoiding animal foods altogether eliminates the problem.

Garlic. Prominent in both Mediterranean and Asian cuisine, garlic has a long medicinal pedigree. Among other phytonutrients, it contains allicin, which boosts good cholesterol levels while lowering LDL. And it lowers blood pressure and reduces blood platelet stickiness.

- How to use: Cut up raw garlic and let it sit for 15 minutes to release its healthy compounds. You need to eat the equivalent of about five cloves of garlic a day to gain the most benefit.

Lots of Olive Oil. The ancient Greeks thought the olive tree had great healing power, and studies suggest that the monounsaturated oil—high in omega-9 fatty acids—from its fruit can reduce heart attack risk and lower blood pressure.

- What to use: Opt for extra-virgin olive oil, which is minimally processed, unrefined, and low in acidity.

Soy. In its many shapes and forms, soy helps raise HDL and lower LDL and blood pressure.

- What to eat: Use whole or fermented soy, such as edamame (soybeans), tempeh, tamari (wheat-free soy sauce), soy milk, and soy-milk yogurt.