

Earlier this week, I spoke at NYU Langone Medical Center as part of their [Heart Health Lecture Series](#). The subject was “Fostering a Healthy Microbiome for Cardiovascular Health.” Along with Dr. Lea Ann Chen, a gastroenterologist who is doing research on the microbiome, we explored an area often overlooked in medicine: How the balance of organisms that populate our intestinal tracts can impact heart disease risk.

Thanks to the many who showed up, but for those who couldn't attend, here's a brief synopsis:



The bacteria that reside in our intestines outnumber human cells in our bodies by about 20 to 1. Research is now revealing that they exert major influences on our health. I reviewed some of these relationships in [a recent article](#). We're coming to rediscover what the ancient Greek “Father of Medicine,” Hippocrates, declared twenty-five hundred years ago: “All disease begins in the gut.”

How have we been messing up our microbiome in the last century? We have been quaffing antibiotics at an unprecedented rate, both from deliberate use as well as via the antibiotics that we pump into conventional livestock and poultry; We drink chlorinated and fluoridated water; We overuse powerful acid-blocking medications; We increasingly birth our babies via C-section, which bypasses vaginal “seeding” with beneficial bacteria; Mothers eschew breast-feeding which primes the baby's gut for a healthy microbial population; We disinfect everything with powerful antiseptics, even in our toothpastes and mouthwashes; We eat chemicalized food—commonly used emulsifiers are particularly disruptive to normal bacterial populations; We consume lots of refined carbohydrates, which feed pathogenic bugs; When not gorging on sugar, we use artificial sweeteners which have been shown to devastate the microbiome and promote obesity; Even stress, coupled with our sedentary lifestyles, adversely affects the balance of microbes in our guts.

So how do the bugs in our intestines affect heart health? There are a variety of ways.

1. **Inflammation:** We know that one of the risk factors for cardiovascular disease is inflammation; we have only to look at the relationship between highly sensitive C-reactive protein, a measure of inflammation, and the risk of heart attack or stroke. “Bad” microbes in our GI tracts secrete inflammatory substances, or alternatively, trigger “alarms” in our immune systems that turn up the volume on inflammation throughout the body.
2. **Coagulation:** The wrong bugs can literally thicken our blood, resulting in a higher propensity to blood clots
3. **Nitric oxide (NO):** NO is the molecule responsible for dilating blood vessels—erectile dysfunction drugs harness its effects. A remarkable fact is that users of mouthwash have been found to have higher

blood pressure—the result of the destruction of oral bacteria that bio-transform dietary nitrates from foods like beets and spinach into nitric oxide!

4. **Insulin-signaling:** Certain fibers, but not all, act as probiotics, fostering the growth of healthy microbes. In [a recent experiment](#), when inulin, a fermentable fiber, was fed to mice, it resulted in improvement of insulin sensitivity. Insulin resistance is the cause of cardiometabolic syndrome, considered a major path way to obesity, diabetes, hypertension, and heart disease. Non-fermentable fibers, like what you find in psyllium, don't do the trick.
5. **Hypertension:** Alterations in the microbiome [may be responsible, in part, for high blood pressure](#).
6. **Satiety:** We think we're in control, but in some ways we're at the mercy of our microbiome. The balance of bugs in our intestines [may influence craving, satiety and appetite](#) via signals to the brain. This is something that I and many followers of [the Whole 30 Diet](#) have experienced. We lost weight, not merely because we curtailed our caloric consumption, but rather, because something about the diet attenuated our food cravings.
7. **Obesity:** Being overweight is an acknowledged major risk factor for heart disease. Obesity rates have soared in the U.S. over the last 50 years. There may be many reasons: Fast food, refined carbs, sedentary lifestyle, the introduction of high fructose corn syrup and trans-fats—the theories abound. But a salient factor is the introduction of antibiotics into our livestock—they make animals grow fatter, stoking profits of agribusiness. Could it be that the low-level continuous exposure of humans to antibiotics in food has prompted them to become fatter? Some surveys [show an astonishing correlation between antibiotic exposure and being overweight!](#)
8. **TMAO:** TMAO stands for trimethylamine oxidase. According to some, it may be the new LDL cholesterol, an indicator of heart risk. Carnitine from meat, and choline from dairy products, eggs, and fish are said to be precursors to TMAO; Vegans who avoid these foods have very low TMAO. The problem is, many studies *do not* demonstrate that consumption of meat, eggs or even full-fat dairy hike the risk of heart disease; And fish consumption is associated with protection from heart disease. So what gives? It's suspected that whether or not you make TMAO is dependent on bacteria in your GI tract. Some have suggested giving antibiotics to people with high TMAO to lower it, but that's only a temporary solution, and besides antibiotics have other harmful side effects. Lately, it's been revealed that [resveratrol is very good inhibitor of TMAO synthesis](#); alternatively, [a substance called DMB effectively lowers TMAO](#), and is a component of healthy Mediterranean Diet foods, especially red wine and extra virgin olive oil. Until the science around TMAO becomes more settled with additional research, I'm not inclined to make a big fuss over it, although [I can obtain a special blood test for patients](#).
9. **Nutrients:** Bacteria in our intestinal tracts actually help us synthesize vitamins like folate and antioxidants like [glutathione](#), which have been shown to be heart-healthy.
10. **Medication disposition:** It's not so much you are what you eat; rather, you are what you *absorb*. And that goes doubly for medications. Doctors adopt a one-size-fits-all approach to dosing heart drugs, but it turns out [their potency may be affected by the composition of the GI tract](#).
11. **Cholesterol:** Bacteria in the gut can act like "Pac-Men," engulfing cholesterol and sweeping it out of the GI tract. A company called Optibiotix has rolled out a probiotic called LP LDL® which purports to lower total cholesterol by up to a whopping 37%, LDL by 14%, while raising HDL by 6.5%. I haven't had the opportunity to try it yet because it's just being rolled out in the U.S., but it sounds promising.

## Is the way to a (wo)man's heart through his(her) stomach?

So what's the take-home message for preventing heart disease by fostering a healthy gut? Notwithstanding the encouraging news about LP LDL®, I wish there was a sure-fire cardio-protective probiotic, but until the advent of such a miracle breakthrough, here are some general tips:

Eat a low-carb diet rich in plant fiber and beneficial polyphenols; Avoid chemicalized food, artificial sweeteners, and GMOs, which can disturb the microbial balance; Seek antibiotic-free meat, poultry, and eggs; Avoid taking antibiotics and acid-blocking medication unless absolutely necessary; Exercise frequently, which has been shown to improve microbial diversity; Manage your stress, a known risk factor for microbial disruption; and [take a high-quality probiotic](#) along with unpasteurized fermented foods like kimchi, sauerkraut, or coconut yogurt.