



Hold the Purell! Nurturing the microbe mix in your body may be the key to losing weight, eliminating cravings and improving overall health.

by Anne Marie O'Connor

Until recently, humans were thought to be, well, mostly human. But scientists have recently discovered that our bodies are also a huge clubhouse filled with all sorts of microbes—bacteria, yeasts, viruses, fungi and mold. Known as the human microbiome, it consists of trillions (yes, trillions!) of microorganisms living in and on the body, from the mouth and nasal passages to the skin, gastrointestinal tract (aka the gut) and urogenital tract.

Before you reach for the Lysol, take comfort in the fact that not every microbe wants to kill you. Though a few microbes are harmful, many of them are actually essential for good health.

"It wasn't that long ago that the only good bacteria was a dead bacteria," says Peter Moses, MD, a professor of medicine at the University of Vermont College of Medicine and gastroenterologist at UVM Medical Center. "Now, that whole way of thinking is changing."

MOLTO MICROORGANISMS

One sign of how important microorganisms are: There are probably more microbial than human cells in our body, says David Montgomery, PhD, a professor of earth and space sciences at the University of Washington and co-author with his wife, Anne Biklé, a biologist and environmental planner, of *The Hidden Half of Nature: The Microbial Roots of Life and Health* (W. W. Norton & Company, 2016).

"There are some arguments over the exact numbers," Dr. Montgomery says. "The best numbers we've seen is that there are 3:1 microbials to human cells in our body, though estimates have gone all the way to 10:1."

WHY MICROBES MATTER

"According to current research, it looks like the majority of our life-sustaining functions are influenced by our gut," says Jo Ann Hattner, RDN, MPH, author of *Gut Insight: Probiotics and Prebiotics for Digestive Health and*

Well-being (Hattner Nutrition, 2009), who studies Pilates at the Bay Club in San Francisco.

Not surprisingly, "our digestive system is affected by the gut," says Robin Foroutan, MS, RDN, an integrated-medicine dietitian in New York. "It can cause diarrhea, as well as digestive dysfunctions like irritable bowel syndrome, Crohn's and colitis."

A CAUSE OF INFLAMMATION

"An unhealthy gut is also a major source of inflammation," continues Foroutan, who practices Pilates with Mathilde Klein, a student of Joseph and Clara Pilates. "Once you have inflammation, every system in the body reacts," affecting your cardiovascular system, your joints, your skin and even your oral health.

"Most chronic diseases, such as Alzheimer's, asthma, cancer, cardiovascular disease, allergic diseases—which are major causes of death across the world—are initiated by [inflammation caused by] microbiota dysfunction," says Rodney Dietert, PhD, author of *The Human Superorganism: How the Microbiome Is Revolutionizing the Pursuit of a Healthy Life* (Dutton, 2016).

The gut is also important for immunity, Biklé explains. "The lion's share of our immune system—all these different types of immune cells—is located around our colon."

OBESITY: CAN WE BLAME THE BUGS?

Though it has many causes, "there's no question the microbiome is a factor in obesity, which is a pro-inflammatory condition," says Dr. Dietert, a professor in the department of microbiology and immunology at Cornell University College of Veterinary Medicine. An unhealthy balance of gut microbiota is believed to contribute to excessive body fat.

Another reason your gut microbes may affect your weight is those food obsessions that derail many diets. "A proliferation of unhealthy microbes in the gut may be the cause of those intense cravings for sugar, carbs, cheese and wine" that dieters often experience, according to Foroutan. "A client once told me, 'something in me that's not me is making me eat.' Whatever microbe is dominant in the gut, it seems it is somehow influencing your eating behavior and making you crave [certain] foods."

"One of the reasons that diets sometimes don't work is because you're really fighting against the microbes in your gut, which are going to call for the food they want," says Dr. Dietert. "If they want pizza and dairy, then good luck. That's very difficult to fight."

MENTAL NOTES

Though our ancestors may not have understood the link between the gut and the brain,

expressions like "sick to my stomach" and "gut instinct" have a lot of truth to them. "Microbes produce or control a whole host of neurotransmitters, including serotonin, dopamine, GABA, all of these things that affect brain function and mood," explains Dr. Dietert.

Microrobes are also believed to be responsible for conditions ranging from autism to anxiety and impaired memory. "Scientists have found a link between obsessive-compulsive disorder and a single bacterial species in the gut," says Dr. Dietert.

SERVING AND PROTECTING

So how is the microbiome keeping you healthy? "Your microbiome is making all sorts of medicinal compounds," Biklé explains. "The thinking is that the more diverse the metabolites produced by your microbiome that you have circulating in your body, the more diverse your 'on-board medicine chest' is, and the healthier and better off you will be." For example, butyrate is a metabolite produced by microbes. "Studies have shown that a certain type of immune cell is activated by butyrate, which has an anti-inflammatory effect on us," she notes.

WHAT MAKES OUR MICROBIOME GO OUT OF BALANCE

Being born vaginally and being breastfed "seed" the microbiome with healthy microbes from our mother and give our microbiome a



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SO IS PILATES GOOD FOR A HEALTHY MICROBIOME?

“There is evidence that exercise is beneficial for the microbiome,” says Rodney Dietert, PhD. “If you allow mice to exercise, it helps their microbiome. Several studies have supported this finding in humans as well.”

When researchers at the European University of Madrid compared people who exercised three to five hours a week with couch potatoes, they found the active subjects had a four-fold increase in bifidobacterium, a microbe that boosts the immune system. Just another great reason to hit the mat (or Reformer or Cadillac)!

healthy start. Later on, other things—including diseases, diet and drugs—can wreak havoc on the microbiome. “Antibiotics are a major culprit, even though they’re lifesavers,” says Foroutan.

A 2015 study published in *mBio* found that even a single weeklong course of antibiotics can contribute to a detrimental shift in the microbiome for up to a year. “It’s not about never using antibiotics, it’s about using them only when they’re necessary,” says Foroutan.

A recent study at the University of Leuven in Belgium found that other common medications, including laxatives, allergy drugs, contraceptives and hormone replacement therapy, also have a negative impact on the balance of microbes in the gut.

DIET AND THE GUT

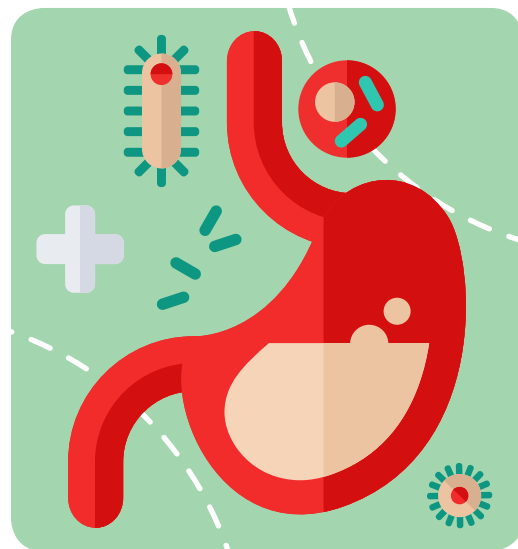
Your diet can also have a profound effect on the diversity and number of beneficial microflora in your gut. It’s a question of what you’re eating—and also what you’re not eating. Here are the keys to making sure the good guys get the upper hand.

STARVE THE BAD BACTERIA.

A recent study published in the journal *Nature* found that a typical low-fiber Western diet that’s full of processed food drives beneficial microorganisms to extinction, an effect that is compounded over generations. “Eating too much wheat, sweets, sugar, starch, fried foods, trans fats, highly processed foods, dairy in some cases, conventionally raised beef and processed meats may be disrupting the microbiome,” says Foroutan.

The reason? Heavily processed foods don’t make it to the “fermentation tank of the colon,” where the beneficial microbes are produced, Montgomery explains. (What does make it down there: fiber-rich plant foods.) But that doesn’t mean you have to go vegan. When he and Biklé switched to a microbiome-friendly diet, it wasn’t about eating “good”

YOUR DIET CAN HAVE A PROFOUND EFFECT ON THE DIVERSITY AND NUMBER OF BENEFICIAL MICROFLORA IN YOUR GUT.



foods and avoiding “bad” ones, he says. “We didn’t give up any foods, but we changed the balance of what we ate,” with a bigger emphasis on plant foods.

EAT A DIVERSE DIET.

Consuming a wide range of whole plant foods—including fruits, vegetables, whole grains as well as beans, nuts and seeds—is the smartest strategy for increasing diversity in the microbiome, says Biklé. “And the more diverse a person’s microbiome is, the better off they are.”

INCLUDE FERMENTED FOODS.

Fermented, or probiotic foods, which include yogurt, kefir, sauerkraut, kimchi, miso and kombucha, contain live microorganisms that put the good bacteria back into your gut, explains Hattner. “We should eat those every few days,” she says. They add to the population of microorganisms in the gut (at least temporarily), plus they change the gut’s pH level, which makes it difficult for pathogens to survive.

“Kefir and yogurt, which contain live active cultures, are my favorite choices,” Hattner says. She recommends buying plain versions and adding your own fruit or maple syrup. “Additives may interfere with the bacteria,” she says. (She also notes that the lactose in the milk has been fermented by bacteria, so people with lactose intolerance can often stomach yogurt and kefir.)

Foroutan favors fermented vegetables like sauerkraut and kimchi. If you can tolerate dairy, she recommends kefir, which contains more probiotics and less sugar than yogurt. She’s not a fan of kombucha, the latest “it” drink, which is fermented using yeast. “People who struggle with gut health often have too much yeast [in their system], so I don’t recommend that,” she points out.

What about wine, cheese and beer, we ask (hopefully)? They may have some probiotic effect, Foroutan admits, “but they’re also fermented with yeast, not bacteria, and again, most Americans have too much yeast in their system. But they’re okay in moderation.”

Some good news for chocolate lovers: A 2016 study at the University of Leuven found that consuming dark chocolate was associated with an increase in a type of beneficial bacteria in the gut.

FEED THE BACTERIA.

“Bacteria have to eat, too,” explains Hattner. “Prebiotics provide nourishment for bacteria.” Though it’s a good idea to consume all types of fiber-rich foods, not all fiber-rich foods are prebiotic, she points out. “Prebiotic fiber sources are foods that have been studied or analyzed, and are known to support the growth of the beneficial microflora,” explains Hattner. “They contain non-digestible, fermentable carbohydrates, for example, inulin, that are fermented by the healthy bacteria in the gut.” Hattner’s website, www.gutinsight.com, has a complete list of prebiotic foods. Some of the more common ones include: apples, bananas, berries, kiwi, onion, garlic, asparagus, leeks, tomatoes, mushrooms, greens, lentils, dry beans, peas, soybeans, whole wheat, brown rice, corn, oats, almonds, honey and green tea.

Another option is taking a prebiotic supplement. “I like ones with a vegetable fiber source like inulin,” says Dr. Moses. Look for capsules or gummies.

AVOID FOOD ADDITIVES.

Dr. Dietert reports that two common food additives used to make processed foods like ice cream and gravy smooth can affect the gut microbes and contribute to obesity. “Researchers have shown that polysorbate 80 and carboxymethyl cellulose destroy the microbes that are part of the protective system [of the gut], and that then leads to inflammation,” he says. “These additives cause obesity in mice at levels humans are consuming.”

SKIP THE SPLENDA.

A 2014 study in *Nature* found that artificial sweeteners can change the composition of gut microbiota, contributing to obesity and diabetes.

CAN I JUST TAKE A PILL?

Probiotic supplements are a handy alternative to eating fermented foods like yogurt, kimchi and sauerkraut. Should you consider taking them? Here are the pros and cons.

THEY ARE POTENTIALLY BENEFICIAL.

“Supplements might add some new bacteria to your gut,” says Jo Ann Hattner, RDN, MPH. “I’ve seen people with constipation respond to them, just by adding *Lactobacillus acidophilus* bacteria to the gut with a probiotic, but it’s very individual.”

YOU’RE BASICALLY RUNNING YOUR OWN CLINICAL TRIAL.

Rodney Dietert, PhD, agrees that there are probiotic supplements that can be effective, “but no one can go and say, buy this one product, and it will cure your depression” (or diarrhea or colitis, or help you lose weight). What works for one person may not work for you. Probiotics are “not one size fits all,” he says. “People need to vet some of these things in their own body.”

“Probiotics are not regulated by the FDA,” says Peter Moses, MD. “Some people won’t respond to them, but for other people it’s a fairly cost-effective solution to problems that affect quality of life. Also, the supplement needs to contain enough microbes, and they need to be alive, so things like how long they’ve been on the shelf make a difference”—things that can be impossible for consumers to know.

WHAT TO LOOK FOR

“In general, probiotic sources with mixtures of several different microbial species are thought to be more useful than ones with single species,” says Dr. Dietert. Check the package to see how many species a supplement contains.

Hattner advises going to the supplement’s website to look for credible scientific studies and what dose they used.

CONFIRMING CONVENTIONAL WISDOM

The advances in microbiome science support the advice experts have been giving for years, whether it’s eating more fruits and vegetables, consuming a Mediterranean diet or following Michael Pollan’s famous advice: Eat food, not too much, mostly plants. Experts believe these are the key for losing and maintaining weight, having energy and avoiding chronic illnesses like cardiovascular disease, diabetes and cancer; research into the microbiome is explaining the “why.”

“The reasons and mechanics at the scientific level for why diet does matter so much are what traditionally has been thought of as being good practices—eating a healthy, fiber-rich diet,” Dr. Montgomery says.

“Everyone can benefit from eating more vegetables, cutting sugar and excess starch from refined carbohydrates, adding fermented foods and eating onions, garlic, seeds and nuts,” says Foroutan. “This has always been true.” **PS**