

Feeding gut microbiota what they need could lead to happier cells and a healthier body

April 11 2023, by Christopher Damman



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Diet-related chronic diseases [have reached](#) a [critical juncture](#) in the U.S.

Nearly half the population has [prediabetes or diabetes](#). Over 40% are [overweight or obese](#). [One in nine people over the age of 65](#) has Alzheimer's disease, the development of which researchers are exploring the [potential role of diet](#). Poor diet is also linked to [poor mental health](#), [cardiovascular disease](#) and [cancer](#). It was responsible for [nearly 1 in 5 deaths in the U.S.](#) and accounted for [over US\\$140 billion](#) in U.S. health care spending in 2016.

Though American waists are getting bigger, research is showing that the gut microbiome—the bacteria living in our digestive tracts—and the energy-producing compartments of cells, the mitochondria, remain hungry for [nutrients](#) missing in the American diet.

I am a [physician scientist and gastroenterologist](#) who has spent over 20 years studying how food can affect the gut microbiome and whole body health. The ultraprocessed food that makes up an [increasing part the American diet](#) has removed vital nutrients from food. Adding those nutrients back may be important for health in part by feeding the microbiome and mitochondria that turn food into fuel.

Your health is what you eat

Research has consistently shown that the [Mediterranean diet](#) and [other whole food diets](#) are associated with better health and longer lives, and ultraprocessed foods and drinks like soda, chips and [fast food](#), among others, are linked with [poor health outcomes](#) such as diabetes, cardiovascular disease, cancer and other diseases.

But improving the diet of an individual, let alone a population, is challenging. Whole foods are sometimes [less convenient](#) and [less tasty](#) for modern lifestyles and preferences. Furthermore, [food processing](#) can be beneficial by [preventing spoilage and extending shelf life](#). [Whole grain processing](#) in particular extends shelf life by removing the germ and bran that otherwise rapidly spoil. Long-term storage of affordable calories has helped address [food insecurity](#), a primary challenge in public health.

Much of the public health conversation around diet has focused on what to avoid: added sugars and refined carbs, some fats, salt and additives. But modern food processing, while increasing the concentration of some nutrients, has removed other key nutrients, producing potential [long-term health costs](#). Equally important is [what to add back](#) into diets: fibers, phytonutrients, micronutrients, missing fats and fermented foods.

Only 5% of the U.S. population gets [sufficient fiber](#), a prebiotic nutrient linked to metabolic, immune and neurologic health. Americans are likely also deficient in [phytonutrients](#), [potassium](#) and certain [healthy fats](#) linked to lower rates of cardiovascular disease and cancer.

[Fermentation](#) is nature's version of processing, creating foods with natural preservatives, flavors and vitamins. Recent research suggests fermented foods can [improve gut microbiome diversity](#) and dampen systemic inflammation.

Figuring out which bioactive nutrients contribute to disease can help both individuals and institutions develop diets and foods that are personalized to different health conditions, economic constraints and taste preferences. It can also help maximize nutrients in a way that is convenient, affordable and familiar to the modern palate.

Of microbiomes and mitochondria

Understanding how nutrients affect the [gut microbiome](#) and mitochondria could help determine which ingredients to add to the diet and which to temper.

In your lower gut, bacteria transform undigested bioactive nutrients into [biochemical signals](#) that stimulate gut hormones to slow down digestion. These signals also regulate the [immune system](#), controlling how much of the body's energy goes toward inflammation and fighting infection, and [cognition](#), influencing appetite and [even mood](#).

The microbiome's [biochemical signals](#) also [regulate the growth and function](#) of energy-producing mitochondria across many cell types, including those in fat, muscles, heart and the brain. When these cues are [missing in ultraprocessed diets](#), mitochondria [function less well](#), and their dysregulation has been linked to [obesity](#), [diabetes](#), [Alzheimer's disease](#), [mood disorders](#) and [cancer](#). A better understanding of how diet could improve the function of the [microbiome-mitochondria axis](#) could help provide a way to reduce the burden of chronic disease.

[The Greek physician Hippocrates](#), regarded as the father of medicine, supposedly once said "Let food be thy medicine," and a [growing body research](#) suggests that, yes, food can be medicine. I believe that shining a light on the [connection between diet, health and the microbiome and mitochondria](#) could help societies reach a bright future in which unhealthy aging [isn't an inevitability](#) of growing older.

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Citation: Feeding gut microbiota what they need could lead to happier cells and a healthier body

(2023, April 11) retrieved 26 April 2024 from <https://medicalxpress.com/news/2023-04-gut-microbiota-happier-cells-healthier.html>

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