

[IMAGE]

## All Fiber Is Not Created Equal

By Peter Swann, MD, FAAFP, FACOEM

Sometimes the best place to start is at the end. So, the conclusion of this article is that all fiber is good ... but some fiber is better. Let's break it down.

There are two main types of fiber: soluble fiber and insoluble fiber.<sup>1</sup> Most people think fiber is just the insoluble fiber (aka, bulk fiber). Insoluble fiber can be thought of as a transport mechanism, kind of like a gondola that helps move your digesting food through the alimentary canal. It provides stool bulk, slows gastric emptying and can blunt the rise in blood glucose after a glucose load.

The other fiber, soluble fiber (aka, *prebiotics*), is food components that feed the beneficial bacteria in your gut, helping them outcompete colonic pathogens. They are mostly indigestible by humans and thus survive the digestive processes of the upper gastrointestinal tract, arriving at the colon relatively intact, serving as substrates for fermentative bacteria.<sup>2</sup>

Healthful bacteria ferment the prebiotic soluble fiber, yielding short-chain fatty acids (SCFA) such as butyrate, acetate and propionate that are the primary energy source for cells of the colonic epithelium.<sup>3-4</sup> Colon cells fed in this manner increase their production of intermediary molecules like GLP-1, PYY and others that lead to numerous health benefits, including decreased appetite, regulation of cholesterol, improved mineral absorption, and regulation of inflammation and immune function.<sup>5</sup>

However, when healthful bacteria are not provided enough prebiotic soluble fiber, they will eat (ferment) the oligosaccharides that make up the mucus lining of the gut to survive.<sup>6-7</sup> When that happens, the body's primary protection from harmful bacterial and viruses is compromised, increasing the chances of infection. At the same time, these "chinks in the gut's armor" lead to what is called "leaky gut syndrome," a primary source of systemic inflammation.<sup>8</sup>

This cascade of events helps explain the direct correlation between low-fiber diets, general ill health and the myriad chronic diseases we see in Western society, such as obesity, heart disease, diabetes, allergy and cancer.

## Nourishing Our Gut Bacteria

Only soluble fiber serves as food for the beneficial bacteria in the gut. There are two primary dietary sources:

1. Root-type vegetables such as chicory, Jerusalem artichoke, garlic, leaks and onion. Cooking reduces their prebiotic fiber content, so it's best to eat these raw if possible.
2. Fermented foods such as sauerkraut, kimchi and traditionally fermented whole-grain sourdough breads.

So, when we refer to the health benefits of "fiber," we're really talking about soluble fiber. And given the modern food supply prevalent in Western society, getting enough of it through dietary sources is possible, although challenging. (How many of us eat multiple servings of root vegetables and fermented foods every day?)

As such, this is one area in which dietary supplementation is usually required. A good prebiotic supplement can go a long way toward filling the needs of your healthful colonic bacterial partners. Many prebiotic supplements (e.g., FOS, oligofructose or inulin) can cause gas, bloating and intestinal discomfort,<sup>9-10</sup> so it is important to select one that does not cause digestive problems.

Prebiotic soluble fiber produced through natural fermentation processes has been shown to be well-tolerated<sup>11-13</sup> and is the recommended soluble fiber to start with. If you care for your beneficial bacteria, they'll care for you!

## References

1. Van den Heuvel EG, et al. Lactulose stimulates calcium absorption in postmenopausal women. *J Bone Mineral Research*, July 1999;14(7):1211-16.
2. Gibson GR, Roberfrid M. *Handbook of Prebiotics*. CRC Press, 2008.
3. *Ibid*.
4. Cummings JH, et al. Short chain fatty acids in human large intestine, portal, hepatic and venous blood. *Gut*, 1987 Oct 1;28(10): 1221-27.
5. Gibson JH, et al., *Op Cit*.
6. Sonnenburg JL, et al. Glycan foraging in vivo by an intestine-adapted bacterial symbiont. *Science*, 2005 Mar 25;307(5717):1955-59.

7. Lynch JB, Sonnenburg JL. Prioritization of a plant polysaccharide over a mucus carbohydrate is enforced by a bacteroides hybrid two-component system. *Molecular Microbiol*, 2012 Aug;85(3): 478-91.
  8. Sonnenburg ED, Sonnenburg JL. Starving our microbial self: the deleterious consequences of a diet deficient in microbiota-accessible carbohydrates. *Cell Metabolism*, 2014 Nov 4;20(5):779-86.
  9. Biesiekierski JR, Rosella O, et al. Quantification of fructans, galacto-oligosaccharides and other short-chain carbohydrates in processed grains and cereals. *J Hum Nutr Diet*, 2011;24:154-176.
  10. Gibson PR, Newnham E, et al. Review article: fructose malabsorption and the bigger picture. *Aliment Pharmacol Ther*, 2007 Feb;25:349-363.
  11. Rycroft CE, et al. A comparative in vitro evaluation of the fermentation properties of prebiotic oligosaccharides. *J Applied Microbiol*, 2001 Nov;91(5):878-87.
  12. Chen HL, et al. Effects of isomalto-oligosaccharides on bowel functions and indicators of nutritional status in constipated elderly men. *J Am College Nutr*, 2001 Feb;20(1): 44-49.
  13. Swann P. Clinical and side effect profile of a maltosyl-isomaltooligosaccharide prebiotic made through fermentation: pilot dose ranging clinical trial. San Francisco, Calif., 2014.
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**Peter Swann, MD, FAAFP, FACOEM**, is a board-certified family physician with a focus on patient health, wellness and prevention. A graduate of Dartmouth College and Tufts University School of Medicine, Dr. Swann is also a fellow of the American Academy of Family Physicians and the American College of Occupational and Environmental Medicine. He received his clinical research training through the NIH; is a member of the Board of Trustees at the University of California, Merced; and serves as chief medical officer for ISOThrive, LLC ([www.iso thrive .com](http://www.iso thrive .com)).

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