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Go With Your Gut: Understanding Microbiota and Prebiotics[1]

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What is our microbiota?

All of us have friendly bacteria all over our bodies. A large population of bacteria lives in our gastrointestinal tract, residing mostly in the colon (large intestine). is is known as our gut microbiota.

If we were able to count the bacteria in and on our bodies, they would add up to about 100 trillion. at's 100,000,000,000,000—about 10 times more bacterial cells than human cells making up our body![(1)] If we could weigh all the bacteria in our colon, it would amount to about 2 or 3 pounds.

What does our microbiota do for us?

Our microbiota helps defend against disease—collectively, these resident bacteria help to develop and maintain our immune system's defenses against illness introduced by less friendly, disease-causing bacteria. e bacteria of our microbiota can also make vitamins, such as vitamin K.

e bacteria in our colon break down food residue that escapes digestion in our small intestine. For example, some of the starch and protein we eat, as well as all of the dietary ber in foods, is not digested and ends up in our colon.

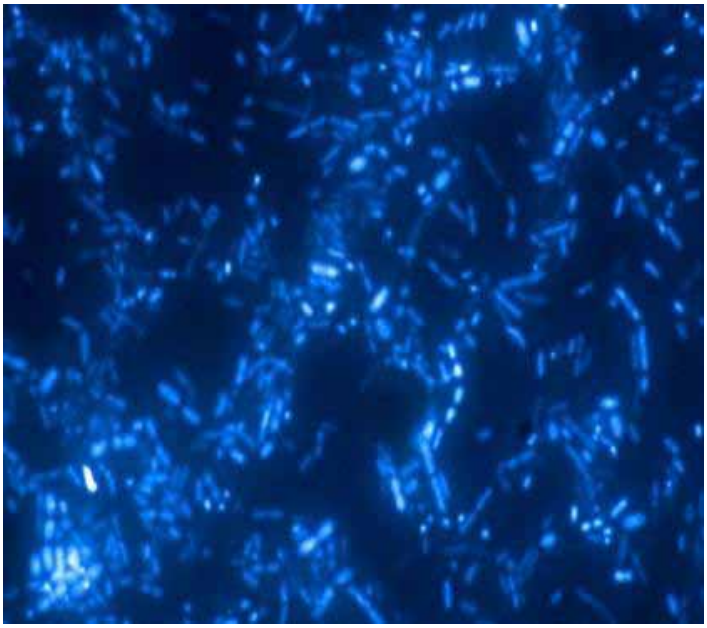

Figure 1. FISH image of gut microbiota
Credits: Courtesy of the Department of Microbiology and Cell Science and the Emerging Pathogens Institute, University of Florida.

e bacteria in the colon break down the food residue for energy and growth. is process is known as fermentation.

We bene t from the fermentation of ber and starch. Fermentation provides us with some energy (calories) and also helps to keep the colon healthy.[(2)]

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Can microbiota cause disease?

Our microbiota remains quite stable in adulthood. However, the balance of bacteria in our gastrointestinal tract may be disturbed by changes in diet, diarrhea due to contaminated food, stress, antibiotics, and aging. IBD (in ammatory bowel disease) and most forms of diarrhea are linked to changes in our gut microbiota.(1) Our gut microbiota may also be related to our health beyond the gut. Research is being carried out to explore possible connections between microbiota and allergies(3) and other conditions.

What is a prebiotic?

A prebiotic is a ber that bene ts health by stimulating the growth or activity of bene cial bacteria in the colon. Prebiotics are found in high amounts in breast milk and work to optimize the numbers of bene cial bacteria in the baby's intestine. Prebiotic bers are also found naturally in wheat, onions, chicory root, Jerusalem artichoke, and beans.(4) e most well known prebiotic ber is inulin, also known as chicory root ber. Inulin is added to many foods, including snack bars, yogurts, and beverages.

How can we keep our microbiota in balance?

One of the most important things we can do to maintain our normal microbiota is to eat a well-balanced diet. A diet high in ber from fruits, vegetables, beans, whole grains, and nuts may promote a well-balanced microbiota. Probiotics (good bacteria), taken as capsules or in supplemented foods, also may help maintain or restore microbiota.

Learn More

Related EDIS publications include the following:

- *Facts About Fiber* http://edis.ifas.u .edu/fy849
- *Go With Your Gut: Understanding Probiotics* http://edis.ifas.u .edu/fs170
- Various publications on food safety http://edis.ifas.u . edu/topic_food

Endnotes

(1) Dahl, W.J., K.E. Hagen, and T.A. Tompkins. 2009. Human microbiota and the role of probiotics. *AgroFood Industry Hi-tech 20*: 34–36.

(2) Grabitske, H.A., and J.L. Slavin. 2009. Gastrointestinal e ects of low-digestible carbohydrates. *Crit Rev Food Sci Nutr 49*: 327–360.

(3) Penders, J., E.E. Stobberingh, et al. 2007. e role of the intestinal microbiota in the development of atopic disorders. *Allergy 62*: 1223–1236.

(4) Roberfroid, M., G.R. Gibson, et al. 2010. Prebiotic e ects: Metabolic and health bene ts**.** *Br J Nutr 104 Suppl S2*: S1–63.