



Some clients have asked me for information about prebiotics. Can you provide an overview of this topic that would help me answer such inquiries?



Your clients are likely responding to media reports about the emerging science related to the role of prebiotics in promoting digestive health. A look at some frequently-asked questions about prebiotics provides an overview of this important topic.

Can eating certain foods help to promote digestive health?

There is growing interest in foods that promote health beyond providing basic nutrition. These “functional foods” include certain foods with “prebiotic” or “probiotic” components that promote digestive health. The digestive tract is home to hundreds of different types of microorganisms, totaling trillions of bacteria, both beneficial and potentially harmful. Research suggests that if a positive balance of “good” bacteria is maintained, potentially harmful bacteria are less able to cause disease and irritation (1). Eating certain foods that contain prebiotic components supports the growth and activity of these health-promoting bacteria.

How are prebiotics different from probiotics?

Because this is a relatively new area of research in nutrition science, it is helpful to clarify terms. A *probiotic* is a “live microbial food ingredient that, when ingested in sufficient quantities, exerts health benefits on the consumer (2).” Many consumers know that certain foods contain live, “good” bacteria. Some yogurt, buttermilk, miso or kefir products are examples of foods that may provide probiotics for digestive health.

Prebiotics are “nondigestible substances that provide a beneficial physiological effect on the host by *selectively* stimulating the favorable growth or activity of a limited number of indigenous bacteria (e.g., *Bifidobacteria* and *Lactobacilli*) (3).” Simply put, *specific* prebiotics provide food for *specific* “good” bacteria in the digestive tract to help to ensure that the body has optimal numbers of active microorganisms needed for a *specific* benefit. For example, eating foods that contain prebiotic fibers can help to naturally regulate the digestive system.

In short, the goal of both probiotics and prebiotics is to promote health through a positive change in the intestinal microflora; however, each works by a different mechanism (4).

Probiotics and prebiotics combined in the same product are known as *synbiotics*. A *synbiotic* is “a mixture of probiotics plus prebiotics with the aim to increase survival of health-promoting bacteria, with the ultimate goal of modifying the gut flora and its metabolism (2).” In other words, *synbiotics* may increase survival of probiotic bacteria, stimulating their growth in the intestinal tract and improving the balance of health-promoting bacteria (5).

How do prebiotics promote health?

Prebiotics promote health by altering the balance of bacteria present in the colon, with the purpose of providing the food needed for “beneficial” bacteria to thrive. They also may help restore beneficial bacteria in the gut due to imbalance caused by some diseases or the use of certain medications (e.g., antibiotics) (6). Potential health benefits are linked to the types of bacteria stimulated by prebiotics, primarily *Bifidobacteria* and *Lactobacilli*, and may include strengthening the immune system, improving resistance against infection and inhibiting the growth of harmful bacteria in the intestine (7, 8). It is thought that the presence of these beneficial bacteria may alleviate some symptoms of or help to prevent or reduce risk for various health problems (e.g., diarrhea, lactose intolerance, some types of allergies, irritable bowel disease) (1, 9).

While more studies are needed to confirm long-term effects in a range of populations, prebiotics may enhance absorption of certain minerals (e.g., calcium and magnesium, which are important for bone mineralization) (10, 11). In addition, some prebiotics may act as a type of soluble fiber in the intestines, which can aid digestion and laxation. Emerging evidence also suggests that prebiotics may have a role in reducing risk for colon cancer (12, 13). Although some preliminary studies suggest a positive effect of prebiotics on glucose and lipid levels, more research is needed to evaluate their impact on risk for cardiovascular disease or type 2 diabetes (14-16).

What are some different types of prebiotics?

To be classified as a prebiotic, a food ingredient must largely escape digestion and absorption and selectively stimulate the growth and activity of bacteria associated with health (17, 18). Unlike probiotics, which need to be alive when ingested, prebiotics may offer an advantage because survival through the

intestinal tract is not a prerequisite for efficacy.

Most substances currently identified as prebiotics are carbohydrates, including non-digestible oligosaccharides (NDO) and resistant starch. Common prebiotics such as inulin and oligofructose may be found naturally in or can be extracted from various plant foods. Inulin and oligofructose also may be added to foods for purposes other than their prebiotic functions; for example, to increase dietary fiber content, improve texture or serve as fat and sugar replacers (19). In the US, an expert panel conducted a generally recognized as safe (GRAS) Self-Affirmation Evaluation for use of inulin and oligofructose as food ingredients in 1992, and concluded that these can be used as ingredients in foods (19, 20). Similarly, most other countries view inulin and oligofructose as acceptable food ingredients (19).

What are some sources of prebiotics?

Some foods naturally contain prebiotics. Examples are wheat, chicory, onions, bananas, garlic, asparagus, Jerusalem artichokes and leeks, although the amount of prebiotics in these foods varies (19, 21). Human breast milk also contains prebiotics, which are believed to play an important role in the development of a healthy immune system in infants (22, 23).

Additionally, foods can be supplemented with prebiotic ingredients that have been extracted from plants (e.g., inulin isolated from chicory root) or created synthetically (e.g., fructo-oligosaccharides synthesized from sucrose). Prebiotics are also available in or as dietary supplements.

Does prebiotic fiber count toward the daily recommended intake of dietary fiber?

To address this question, it is important to understand current definitions of fiber. The Institute of Medicine (IOM) identifies fiber in the following terms:

- “*Dietary Fiber* consists of nondigestible carbohydrates and lignin that are intrinsic and intact in plants.
- *Functional Fiber* consists of isolated nondigestible carbohydrates that have beneficial physiological effects in humans.
- *Total Fiber* is the sum of *Dietary Fiber* and *Functional Fiber* (24).”

Many, but not all, prebiotics behave as *dietary fiber* in the body, passing intact through the small intestine and undergoing fermentation in the colon (19, 20, 25). Some other prebiotics are considered to be *functional fiber*. Still others do not meet all aspects of the current IOM fiber definition. A convenient way to help consumers determine how much *dietary fiber* a serving of a food product with prebiotics contributes to their daily intake is to look at the Nutrition Facts panel and check the amount of *dietary fiber* (stated in grams), as well as the Percent Daily Value for *dietary fiber*, which is based on the Daily Value of 25 grams.

Is there a recommended effective amount of prebiotics that consumers should try to ingest?

A recommended amount of prebiotics has not yet been established, nor has an upper limit. However, experts suggest that an efficacious amount is probably in the range of 5 to 15 grams per day (3). Current estimates of average daily intake of inulin and oligofructose from plant foods range from 1 to 4 grams in the US and 3 to 11 grams in Europe (26, 27). Many foods with added inulin or oligofructose typically supply 2 to 4 grams per label serving, although some products contain higher amounts (19).

Flatulence, bloating and abdominal cramps can be a consequence of consuming prebiotics added to foods and/or supplements. While many people can ingest up to 10 grams per day without noticeable side effects, some individuals may experience discomfort after ingesting even small amounts (19). Tolerance may be influenced by individual acceptance of side effects, the type of food (solids are often better tolerated than liquids) and the type of NDO. For example, inulin is often better tolerated than oligofructose because it is more slowly fermented in the colon (19). Because tolerance can vary, an individual considering increasing intake of a prebiotic through supplements or foods with added prebiotics may wish to consult a healthcare professional familiar with these products for individualized guidance. Such advice ideally should be positioned as part of overall guidance to eat a healthful diet that includes recommended amounts of fiber and adequate fluids, achieve or maintain a healthy body weight and be physically active.

What should consumers look for on a product label when selecting a food or supplement with prebiotics?

The best way to determine if a food product or supplement contains prebiotics is to check the ingredient list. Substances currently identified as prebiotics include inulin, oligofructose,

fructooligosaccharides (FOS), galactooligosaccharides (GOS), xylooligosaccharides (XOS), lactosucrose or lactitol (3, 28). Dietary supplements and some food products may carry a label statement referring to prebiotic or “bifidogenic” benefits for digestive health. In the US, use of certain claims may necessitate including a statement that the claim has not been evaluated by the Food and Drug Administration.

Summary

Key Points to Consider:

- Research into prebiotics continues to evolve, so it is important for health professionals to monitor emerging findings in order to put scientific data into perspective for their patients and clients.
- Prebiotics work *selectively* in the colon to help increase the numbers and/or modify the metabolic activity of beneficial bacteria. Lactic acid-producing bacteria (e.g., *Bifidobacteria* and *Lactobacilli*) are the usual target organisms.
- Prebiotics occur naturally in some plant foods (e.g., onions, bananas, whole wheat), can be added to foods and are available in or as dietary supplements.
- Some prebiotic fibers count toward an individual’s *dietary fiber* intake. Check the Nutrition Facts label to determine how much *dietary fiber* is contained in a serving.
- Information about prebiotics ideally should be positioned as part of overall guidance to eat a healthful diet that includes recommended amounts of fiber and adequate fluids, achieve or maintain a healthy body weight and be physically active.
- Health professionals can help consumers appropriately integrate functional food components, such as prebiotics, into their overall healthful lifestyles.

Additional Resources:

International Food Information Council:
www.ific.org/publications/factsheets/preprobioticsfs.cfm

International Scientific Association of Probiotics and Prebiotics:
www.isapp.net/IS_pb_intro.htm

US Probiotics:
www.usprobiotics.org

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