

# Fiber 101

Fibers are complex carbohydrates. They move through the small intestine undigested, different from other carbohydrates, which are digested and broken down into glucose.

Fiber is fermented in the large intestine by microbes, resulting in short-chain fatty acids, which regulate the immune system and provide several other health benefits.

**Fiber and Calories:** The US Food and Drug Administration (FDA) estimates that fiber provides about two calories per gram. However, energy is needed to process fiber, so it may provide fewer than two calories per gram.

SOLUBLE	INSOLUBLE
Dissolves in water and forms a gel-like substance.	Does not dissolve in water.
Readily fermented by gut bacteria into short- chain fatty acids, such as butyrate, which may suppress inflammation, improve metabolism, and strengthen our physical and metabolic health. (1)	Is also fermented in the colon but to a much lesser degree than soluble fiber.
Has been shown to increase the rate of bile excretion, therefore reducing serum total and LDL cholesterol. (2)	Helps to increase the bulk of stools and facilitate the transit of food.
Has been shown to improve blood glucose control. (3)	The roughage of insoluble fiber has the potential to irritate the intestinal lining in individuals with significant symptoms of IBS and other gastrointestinal conditions.
Examples of types of soluble fibers that have been correlated with increased immunity and decreased inflammation and obesity include: • Beta-glucan • Pectin • Inulin (chicory root) • Arabinogalactan, and gums.	The human gut microbiome has the ability to process and benefit from insoluble fiber when the gastrointestinal tract is reasonably healthy.
<ul> <li>Examples of foods high in soluble fiber:</li> <li>Lentils</li> <li>Most roots and tubers (without peel)</li> <li>Berries, apples, and other fruits.</li> </ul>	<ul> <li>Examples of food high in insoluble fiber:</li> <li>Cellulose</li> <li>Coconut</li> <li>Rice bran</li> <li>Leafy greens and salads</li> <li>Celery</li> <li>Whole corn</li> </ul>



Food transit (the role of insoluble fiber) and fermentation (largely the role of soluble fiber) are mutually beneficial gut mechanisms.

The same food can represent different types of fiber depending on how it is prepared; for example, potato with peel is a good source of insoluble fiber, mashed potato without peel is a good source of soluble fiber, and potatoes cooked and cooled for 24 hours are a high source of resistant starch.

### PREBIOTICS

- Prebiotics by definition are food for the gut microorganisms in the colon that result in strengthening the beneficial flora and production of beneficial short-chain fatty acids.
- Most prebiotics are soluble fiber; others, to a lesser degree, are insoluble.
- Resistant starch is a good example of a prebiotic that is both soluble and insoluble.

#### **Fiber Requirements**

- 14 g of fiber per 1,000 kilocalories
- Adult men: 38 g per day
- Adult women: 25 g per day
- · Average American gets 14 to 18 g per day

#### Low-fiber intake results in increased risk of:

- · Heart disease
- · Metabolic syndrome
- Type 2 diabetes
- Diverticulosis
- Chronic constipation
- · Possibly increased risk of breast cancer

## "FUNCTIONAL" FIBER, SYNTHETIC FIBER, AND ADDED FIBER

Double-check all foods or supplements under these names to ensure they don't come from inflammatory, or anti-nutrient-rich, sources (like grains). These are most commonly insoluble fibers that are added to foods, such as rice bran or wheat bran, which are then labeled "fortified."

- They may bind to minerals and prevent absorption. (4)
- They can inhibit pancreatic enzyme activity and protein digestion. (5)

It is always best to obtain fiber, especially insoluble fiber, from whole-food plant sources.

Some may benefit from additional soluble fiber supplementation, including:

- Those with blood sugar issues
- Some with gut dysbiosis



Supplement source: Klaire Labs Biotagen and organic acacia fiber.

• Start with a low dose and build up gradually over time to allow the microbiome to adapt slowly.

A low-fiber diet is no longer recommended as a standard for dysbiosis treatment because prebiotic fibers fortify the good bacteria and maximize treatment results.

A low-fiber and low-FODMAP diet is sometimes used for a short time in the treatment of SIBO and other dysbiosis when there is a need to decrease symptoms so that the patient is able to tolerate and undergo treatment.