

FIBER AND PREBIOTICS SUPPORT A HEALTHY GUT MICROBIOME

A GROWING NUMBER OF PET OWNERS ACTIVELY SEARCH FOR PET FOODS WITH MICROBIOME-TARGETING INGREDIENTS, A TREND THAT MIRRORS HUMAN NUTRITION. THIS INTEREST IN PET DIGESTIVE HEALTH PROVIDES OPPORTUNITIES FOR CLIENT EDUCATION AND NUTRITION CONVERSATIONS.



Dietary fiber has been an important component of pet diets for decades. Although fiber is not an essential nutrient for dogs or cats, greater understanding of the intestinal microbiome has increased interest in it.

Defined by diversity

Dietary fiber encompasses diverse compounds, mostly derived from plants, that resist digestion in the small intestine with complete or partial fermentation in the large intestine.¹

Dietary fiber includes:

- Oligosaccharides (e.g., short-chain fructooligosaccharides)
- Polysaccharides (e.g., cellulose, hemicellulose)
- Lignin
- Analogous carbohydrates (e.g., resistant starches)
- Associated plant substances (e.g., waxes, saponins, tannins)

These different fiber types, with their different chemical structures and physical properties, exert different physiological and metabolic effects in the gastrointestinal (GI) tract.

Some fibers are classified as prebiotics

The International Scientific Association for Probiotics and Prebiotics (ISAPP) defines prebiotics as substrates selectively used by host microorganisms conferring a health benefit.²

The most common prebiotics used in pet diets are dietary fibers—but not all dietary fibers are prebiotics. Both dietary fibers and prebiotics are characteristically nondigestible carbohydrates and both are typically fermented by the microbiota. Since a dietary fiber can be a prebiotic in one species and not another, studies are necessary to confirm that health effects of prebiotics are mediated through the microbiota of the target host.²

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Prebiotic and dietary fibers benefit dog and cat digestive health

Fiber fermentation was once considered irrelevant in dogs and cats because their large intestines are relatively short, simple structures. However, the technological and scientific advances that revolutionized the study of the microbiome have shown bacterial fermentation does occur in the colon of dogs and cats.

During fermentation, saccharolytic bacteria metabolize dietary fibers that escaped digestion in the upper GI tract into component sugars and small oligomers, producing short-chain fatty acids ([SCFA]; i.e., acetate, propionate, butyrate) and gases (i.e., hydrogen, carbon dioxide).³ SCFAs are absorbed from the gut or used by the microbiota.

SCFA production is considered one of the most important physiological processes mediated by the microbiota.⁴ The unique bacterial species diversity of the microbiota is associated with individual variability in the metabolism of prebiotics and dietary fibers.⁵ Some bacteria have an extensive set of enzymes that enable fermentation of many different types of fibers; others can use only a few substrates.⁵ The variations in fiber structures and microbiota populations mean fermentation of different prebiotics and dietary fibers can result in different amounts and ratios of SCFAs and potentially different physiological effects of the same prebiotic between hosts.^{6,7}

Many benefits of prebiotics and fermentable fibers result from the effects of increased microbial-derived SCFAs.² Some beneficial functions of SCFAs include:

- Providing an energy source (i.e., butyrate) for intestinal epithelial cells, especially colonocytes whose growth and differentiation is directly affected.⁴
- Maintaining normal intestinal electrolyte and fluid balance by aiding water, sodium, chloride, and potassium absorption.
- Strengthening epithelial barrier function through induction of tight junction proteins.⁴
- Lowering intraluminal pH to provide a more supportive environment for butyrate-producing beneficial bacteria while creating an unfavorable environment for potential pathogens.⁵
- Possessing antimicrobial properties and protecting the gut from inflammation.⁸

Knowledge of SCFAs, prebiotics, dietary fibers, and their benefits to cats and dogs continues to expand. For more detailed information about prebiotics and their effects on GI and host health, visit our [website](#).

QUALITIES THAT DISTINGUISH PREBIOTICS WITH GI BENEFITS²

- Resist digestion in the host's upper GI tract
- Rely on microbial metabolism
- Are selectively used by some, but not all, live host microorganisms
- Sustain, improve, or restore target host health
- Safe for intended use

FIBER SOURCES USED IN PET FOOD

- Cellulose
- Chicory root
- Beet pulp
- Inulin
- Oatmeal
- Whole barley
- Whole brown rice
- Psyllium seed husk
- Wheat aleurone



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