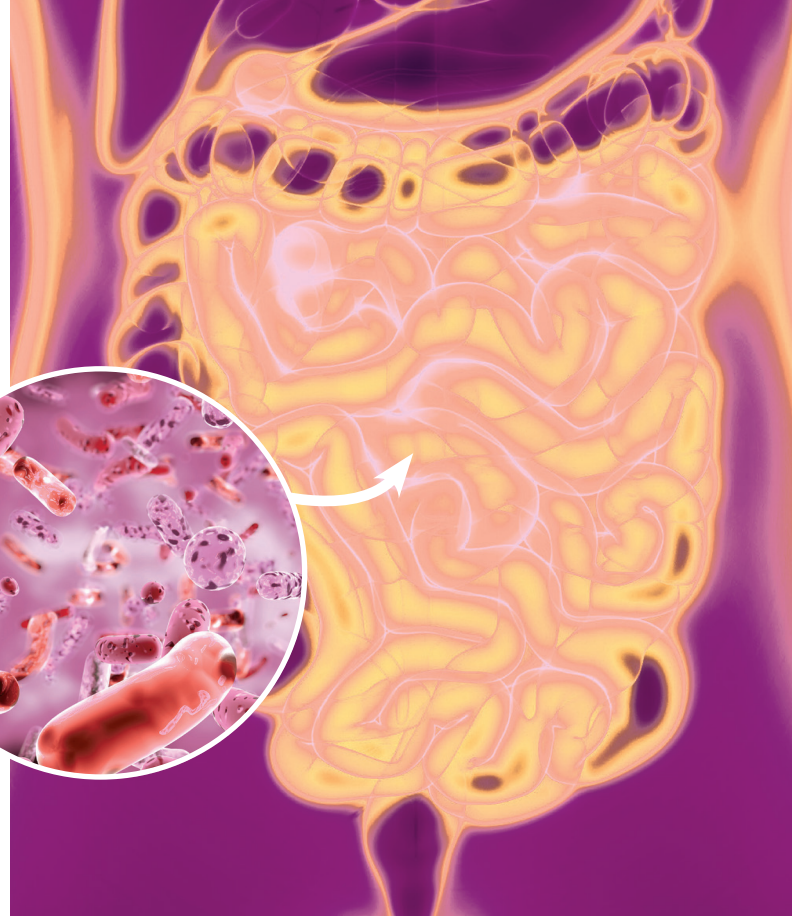
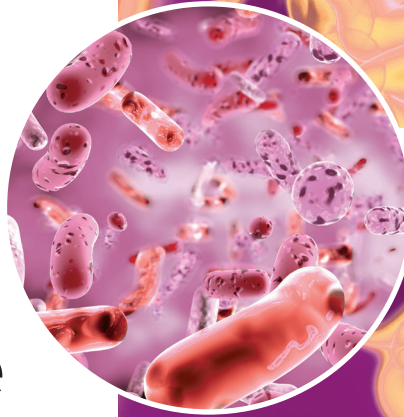


Probiotics and prebiotics: important weapons in the immunity battle

New understandings related to the microbiome have shed a light on the link between gut health and immune health.



When it comes to immunity, consumers are looking beyond antioxidant mainstays like vitamin C to understand the pivotal role that gut health can play in their overall wellness.

According to *Nutrition Business Journal* (NBJ) 2019 Supplement Business Report, sales of probiotics and prebiotics are growing every year. After sizable 7% sales jumps in 2017 and 2018, probiotics evened out in 2019, holding steady at 2% sales growth, likely because they've evolved from fad to must-have. Prebiotics, however, are still growing, reaching about 130% sales growth in 2017 and 2018, before posting an estimated growth of 122% in 2019.

At the same time, immune-focused supplements are also seeing a sales surge, reaching nearly 10% growth in 2017, 2018 and 2019. With COVID-19 on everyone's mind in 2020, NBJ estimates this category's growth may potentially reach 25% this year.

This interest in immune system function, combined with increased understanding of the role of a healthy gut microbiome for supporting immune health, indicates that now, more than ever, probiotics and prebiotics are poised for category growth.

Understanding the microbiome

In general, the microbiome refers to the trillions of microorganisms living in and on the body. The gut microbiome, one of the most studied areas of the microbiome, refers to the bacteria living in the intestines.

Commonly, gut bacteria imbalances are a factor that can lead to digestive health complaints, but bacteria in the gut do a whole lot more than aid in digestion.

As it turns out, gut microbes also stimulate the immune system to get into gear when needed, confirming an inextricable link between gut health and immune health.¹ But with diet, lifestyle, stress and other signals clouding the messaging, the immune system may misread when to respond. We can get sick if “bad” bacteria outnumber the “good,” or experience inflammation when the immune system over-responds to perceived threats in the gut (think food sensitivities). That's why, increasingly, consumers and brands alike are turning to probiotics and prebiotics to optimize gut health for overall immune health.

The gut-immunity connection

The gut and immune system have a strong and symbiotic relationship. When the digestive system is functioning properly, it serves as a barrier to bacteria, viruses and pathogens. When the digestive system is compromised, though, the body and immune system are deprived of nutrients – and their defenses.

Generally, the body relies on a balance of “good” bacteria in the gut. When harmful bacteria overwhelm the good,

- They rob the body of essential nutrients by consuming those the body would otherwise absorb
- Symptoms like abdominal pain, indigestion, bloating, food sensitivities and more can result

The solution?

PROBIOTICS: Friendly bacteria to supplement the body's supply

PREBIOTICS: Nutritive components that support probiotic growth

SUPPORT A HEALTHY GUT WITH **PROBIOTICS**

PROBIOTICS: live bacteria with whole-body benefits

Probiotics improve gut health by maintaining or restoring "good" intestinal microbiota.³ A healthy gastrointestinal tract contains 500 to 1,000 different microbial species, which all carry out vital functions. Equilibrium is essential.

Probiotics...⁴

- Inhibit growth of undesirable microorganisms
- Produce antimicrobial substances
- Increase antibody production
- Increase immune cell activity

The science says

Probiotics improve digestive health⁵

One 20-day, double-blind, randomized, placebo- controlled human study on *Bacillus subtilis* DE111 determined that not only is the probiotic safe for daily consumption, it can also increase beneficial gut microbes and crowd out pathogenic ones.



And boost immunity for...

ATHLETES:⁶ A new study examined the effects of *Bacillus subtilis* DE111 on the immunity of collegiate male athletes. This double-blind, placebo-controlled, randomized study assigned participants to either the probiotic or placebo during 12 weeks of offseason training and examined their markers of immune and hormonal status via blood and salivary samples at the outset and conclusion

of training.

The bottom line: After three months of advanced training in both groups, researchers found that TNF- α concentrations (a marker of inflammation triggered by immune reaction) were significantly lower in the DE111 group, indicating that probiotic supplementation may regulate healthy immune response.

ADULTS: The latest Deerland research on DE111 shows a decrease in the basal levels of several immune cell populations in adults ages 18 to 65, indicating an ability to improve the body's immune response by eliciting a quicker and more effective response to an inflammatory stimulus.

CHILDREN: Recently completed Deerland research shows that supplementing with DE111 may significantly decrease the duration of symptoms associated with illness, and also promote better stool consistency in children. Overall, DE111 reduced the incidence and duration of overall gastrointestinal upset and bloating by more than 50%, and is well tolerated and safe to use in children ages 2 to 6 years old.

DID YOU KNOW?

The human body contains more bacteria than human cells.

A GUT FEELING²

Probiotics go mainstream

20%

of Americans say immune health is their top reason for taking supplements

13%

of Americans take probiotics

19%

of supplement users ages 35 to 54 take probiotics

² <https://www.crnusa.org/2019survey/Topline-Infographic#more>

³ <https://www.ncbi.nlm.nih.gov/pubmed/25895093>

⁴ Gareau MG, Sherman PM, Walker WA. Probiotics and the gut microbiota in intestinal health and disease. *Nat Rev Gastroenterol Hepatol*. 2010;7(9):503-514. DOI:10.1038/nrgastro.2010.117

⁵ Labellarte G, and Maher M. (2019) "Tolerance and Effect of a Probiotic Supplement Delivered in Capsule Form." *Food and Nutrition Sciences*. 2019; 10:626-634.

⁶ Townsend JR et al. "Effects of Probiotic (*Bacillus subtilis* DE111) Supplementation on Immune Function, Hormonal Status, and Physical Performance in Division I Baseball Players." *Sports*. 2018; 6(3):70.

SUPPORT PROBIOTICS WITH **PREBIOTICS**

PREBIOTICS: non-living, non-digestible ingredients that support the growth of “good” microorganisms in the gut

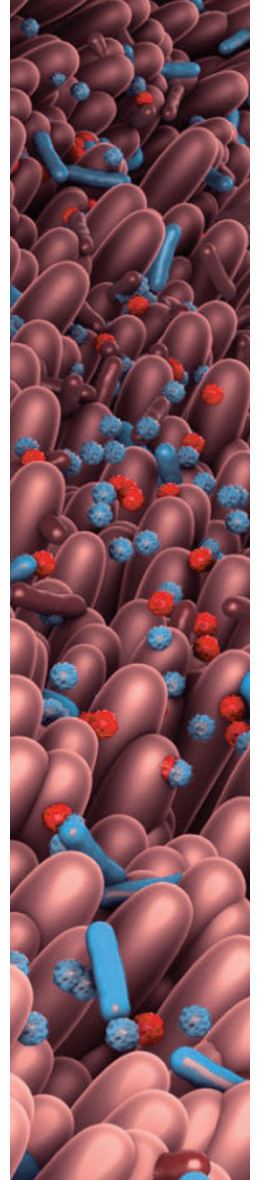
Prebiotics perform this function through a variety of mechanisms, including providing a food source for the bacteria, enhancing or blocking binding sites in the gut or modulating the viability of the bacteria.

PreforPro® is a unique prebiotic bacteriophage



blend that modulates the microbiota through bacteriophage technology. PreforPro is a dual- action prebiotic – it destabilizes the cell wall of the undesirable bacteria which then provides nutrients and space for the good bacteria to grow.

- Effective in a small dose (15 mg)
- Begins working in hours
- Won't cause digestive discomfort (doesn't ferment and produce gas like fiber-based prebiotics)
- Certified as:
 - Non-GMO Project Verified
 - Kosher
 - Self-affirmed GRAS



ALL ABOUT THE BLEND

A successful probiotic supplement formulation to support immune health will have the following components:

- Spore-forming probiotic strains
- Immunostimulants like beta-glucans
- Antioxidants known to support immunity:
 - Vitamin C
 - Zinc

Interested in a private label solution? Deerland offers a ready-to-go probiotic based formulation featuring these very ingredients. In addition, Deerland now offers the turnkey YourBrand Immuno products, available in capsules, fast melt stick packs, mixable powder stick packs and chewable tablets, formulated to include *Lactobacillus rhamnosus*, *Bifidobacterium animalis* and vitamin C.



The science says: Prebiotics promote the growth of beneficial gut bacteria.⁷

Researchers wanted to know:

- Could PreforPro influence the gut microbiota of people with self-reported gastrointestinal issues?
- Could phages impact intestinal and systemic inflammation?



After 28-days of consuming 15 mg of PreforPro daily (in one capsule) the researchers found:

- An increase in beneficial bacteria like *Bifidobacterium bifidum*, *Lactobacillus delbrueckii* and *Eubacterium* (one of the most abundant in a healthy human gut)
- A decrease in *Clostridium perfringens*
- A significant decrease in circulating interleukin-4, a pro-inflammatory marker

The bottom line

PreforPro modulates the gut microbiota, encouraging the balance of “good” bacteria over “bad” without disrupting the gut community.

PREFORPRO WORKS IN TWO WAYS:

- 1 Provides nutrients for good bacteria 
- 2 Clears space for good bacteria to grow 



SPEAK “STRAINS”

Certain probiotics, including *Lactobacillus*, *Bifidobacterium*, and *Saccharomyces*, have been extensively studied and shown to normalize cells’ functional activity, thereby promoting immune system function.⁸

***Bacillus subtilis* DE11®**

A probiotic spore that bolsters immune function and digestive stability by controlling microbial populations. It can also form spores that protect microbes from harsh conditions in the GI tract.

- Supported by more than 30 studies and three human clinical trials confirming benefits for digestive and immune health.
- Carries a variety of certifications:
 - Non-GMO Project Verified
 - Kosher
 - Health Canada approved
 - Non-Novel food status by Health Canada
 - GRAS: “No objection” letter from FDA

Bacillus clausii

Shown to stimulate production of principal antibodies.⁹ Treatment with *B. clausii* may increase the percentage of white blood cells able to activate T cells, which regulate and assist immune response.¹⁰

DID YOU KNOW?

The intestines contain more immune cells than the rest of the human body. That’s 80% of the immune system, right in the digestive tract.

8 Fang Yan and D.B. Polk, “Probiotics and immune health.” *Curr Opin Gastroenterol*. Author manuscript;2011 Oct; 27(6); 496-501. DOI 10.1097/MOG.0b013e32834baa4d. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4006993/>

9 Marseglia, Gian Luigi et al. “Efficacy of *Bacillus clausii* spores in the prevention of recurrent respiratory infections in children: a pilot study.” *Therapeutics and clinical risk management* vol. 3,1 (2007): 13-7. DOI:10.2147/tcrm.2007.3.113

10 Ciprandi, Giorgio, et al. “Cytokines Evaluation in Nasal Lavage of Allergic Children after *Bacillus Clausii* Administration: A Pilot Study.” *Pediatric Allergy and Immunology*. 2004; 2:148.