

PREVENT DEFENSE

Our new Prevent Defense is arguably one of the most effective Prebiotic / Probiotic formulations on the market, making use of two unique primary ingredients: PreforPro® and *Bacillus subtilis* DE111®.

Unlike conventional prebiotics, such as a type of fiber or starch, PreforPro® is a Lytic Bacteriophage cocktail formulated to support healthy levels of good bacteria as opposed to unhealthy strains such as *Escherichia coli*.

DE111® is a clinically researched probiotic strain of *Bacillus subtilis*. This spore-forming bacteria does not require refrigeration to remain active and is able to withstand heat and other adverse conditions much more so than non spore-forming strains. In addition, Prevent Defense contains a 2nd spore-forming probiotic strain, *Bacillus coagulans*, as well as *Lactobacillus acidophilus* and *Bifidobacterium lactis*.

We hope the following in-depth information on PreforPro® and DE111® will be of help in reflecting some of the benefits provided by Prevent Defense:

PreforPro®

A Probiotic-Enhancing Prebiotic

PreforPro® supports the growth of beneficial bacteria in the gut through a novel prebiotic that's not fiber or starch-based, and requires a significantly smaller dosage than typical prebiotics.

Prebiotics & Probiotics Defined

The Food and Drug Administration (FDA) defines a prebiotic as “a non-digestible food ingredient that beneficially affects the host by selectively stimulating the growth and/or activity of one or a limited number of bacteria in the colon, and thus improves host health.”¹ The FDA defines a probiotic as “a living microorganism which, when administered in adequate amounts, confer health benefits to the host.”² These microorganisms are usually bacteria and are sometimes referred to as “healthy”, “friendly”, “good” or “beneficial” bacteria.

Probiotics are microorganisms similar to those that naturally exist in the gut.³ The idea is that in order to stay healthy, we must maintain a delicate balance of microflora (i.e. a mix of different bacteria) in the gastrointestinal tract. That balance can easily be upset if unwanted bacterial populations become predominant in the GI tract.

PreforPro® in Action

PreforPro® has been shown under both physiological conditions *in-vitro* and *in-vivo* to preferentially promote the growth of beneficial *Lactobacillus*, *Bifidobacterium* and *Bacillus subtilis* strains when competing with undesirable bacterial strains. The effects are achieved at small doses within hours, in both the small and large intestine.

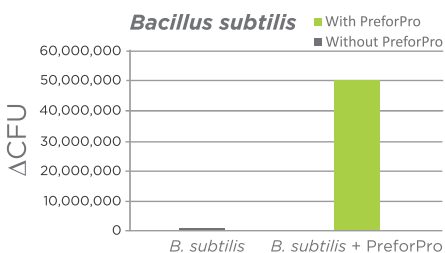


Figure 1. *B. subtilis* anaerobic growth after 5 hours under physiological conditions, competing with *Escherichia coli*.

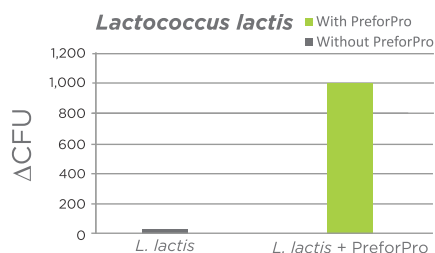


Figure 2. *Lactococcus lactis* anaerobic growth after 5 hours under physiological conditions, competing with *E. coli*.



BALANCING Bacterial Flora

A proliferation of harmful bacteria in the gut can rob your body of the essential nutrients it needs by consuming those nutrients that your body would normally absorb. Symptoms of unbalanced bacterial flora include:⁴

- Abdominal pain
- Indigestion
- Bloating
- Food allergies
- Malnutrition

In many cases, good bacteria have a difficult time displacing the unwanted bacteria and require help; this is where prebiotics come into play.⁵

PREBIOTICS: Benefits & Drawbacks

Prebiotics are generally fibers or starches (e.g., oligosaccharides) that have been shown to be beneficial; however these can have some drawbacks, including:

- Large dosages are required to be effective
- They can cause flatulence
- They are sensitive to their specific environment
- They only work in the colon

PreforPro®: A New Generation of Prebiotics

As a result of extensive research, the scientists at Deerland Enzymes have developed a novel prebiotic that supports the growth of healthy bacteria in the gut through a mechanism that is not fiber or starch-based. PreforPro® addresses the drawbacks of typical prebiotics on the market; benefits include:

- Efficacious in small doses within hours (not days)
- Functions in both the small and large intestines
- Does not cause flatulence
- Not affected by varying gut environments
- Works with a broad spectrum of probiotic species

Bacillus subtilis - DE111®

Expanding Probiotic Possibilities

Deerland Enzymes has genome sequenced and clinically tested a highly effective strain of *Bacillus subtilis*, a very stable probiotic spore that works as a complement to many of the non-spore strains on the market today.

Probiotics for Digestive & Immune Health

The human body carries nearly 100 trillion bacteria in the gut...that's more than 10 times the total number of human cells in the entire body. Probiotics are those "good" bacteria that help keep the intestines healthy and assist in digestion and nutrient absorption. Researchers are also finding evidence that certain bacteria in the gut influence the development of aspects of the immune system^{7,8}. In fact, the gut accounts for 25% of the immune cells in the body which provides 50% of the body's immune response.

Probiotics' main benefit is that they help support balance in the intestinal microbiota. By enhancing the intestinal flora, these microorganisms may have a larger effect in terms of keeping people in good health. Understanding the type and quantity of microorganisms in the gut has become a critical goal in the pursuit of overall wellness. Consumers today have the ability to influence their gut microbiota like never before—from supplements to food, people are seeking sources of good bacteria.



Bacillus subtilis - DE111®

Deerland Enzymes has genome sequenced and tested a highly effective strain of *Bacillus subtilis*, a probiotic spore that works as a complement to many of the non-spore strains on the market today. DE111® has been fully sequenced and uploaded to GenBank, the National Institutes of Health genetic sequence database.

Controls Microbial Populations

DE111® is a classic *Bacillus subtilis* strain that supports the normal proliferation of beneficial bacteria and crowds out other bacteria.

Bacillus subtilis

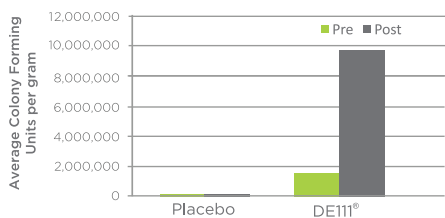


Figure 1. Subjects who were administered the placebo demonstrated a slight decrease in intestinal levels of the probiotic *Bacillus subtilis*, while those who were administered DE111® experienced a significant increase.

Bifidobacterium

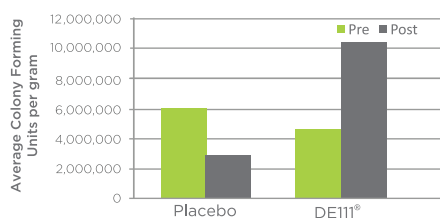


Figure 2. Subjects who were administered the placebo demonstrated a decrease in intestinal levels of the probiotic *Bifidobacterium*, while those who were administered DE111® experienced a significant increase.

Eschericia coli

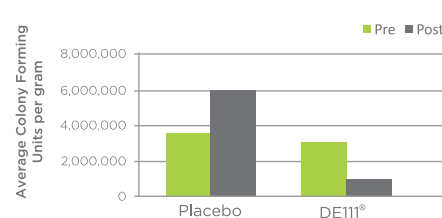


Figure 3. Subjects who were administered the placebo demonstrated an increase in levels of the pathogenic bacteria *E. coli*, while those who were administered DE111® experienced a slight decrease.

PROBIOTIC STRAINS: Spore & Non-Spore Formers

The majority of probiotics currently available are bacteria which are non-spore formers, such as *Lactobacillus* and *Bifidobacterium*. These probiotic strains have been widely studied for their health benefits and are a popular choice for use in dietary supplements or cold-processed foods, such as yogurt.

Spore forming bacteria are a diverse group of very hardy bacteria, characterized by their ability to form endospores to protect themselves when conditions are not favorable. The *Bacillus subtilis* species of microorganism has been known for more than 100 years, having first been isolated and described in the 1800s. It is considered to be a normal, albeit minor, inhabitant of the gut in animals and humans⁹.

Bacillus subtilis has the ability to form spores that protect the microbes from harsh conditions until they enter an environment ripe for germination, such as the GI tract. Because of this spore-forming ability, *Bacillus subtilis* offers additional benefits as a probiotic:

- Remains viable under a wide temperature range, doesn't require refrigeration.
- Survives passage through the acidic environment of the GI tract.
- Can persist in the GI tract, increase its numbers and then re-sporulate.
- Supports the normal immune reaction of intestinal cells^{10,11}.
- Crowds out bacterial pathogens and maintains healthy gut flora^{12,13}.
- Communicates with intestinal cells to maintain gut barrier function.

Each type and strain of probiotic, spore and non-spore forming, performs a different role with particular benefits in terms of digestive and immune systems' health, as well as where in the GI tract they act. Multistrain probiotic supplements provide a broad spectrum of benefits.

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These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure, or prevent any disease.

