

# URINARY TRACT SUPPORT

Our new Urinary Tract Support is an exciting new product based on clinical research performed on each of the active ingredients in the formula.

The female anatomy creates the opportunity for urinary tract health issues in women much more so than in men, but Urinary Tract Support is formulated to be effective for either sex. Urinary tract issues develop in most cases when unhealthy bacteria is introduced into the urinary tract through the urethra and the body's natural defense mechanisms are unable to react effectively. In such cases, the benefits provided by Urinary Tract Support act to help the body work naturally towards restoring the proper balance needed to ensure urinary tract health.

*We hope the following in-depth information on a few of the main ingredients within this product will be of help in reflecting some of the benefits provided by Urinary Tract Support:*

## PACRAN®

### Clinically Tested for Optimum Results

Pacran® is a clinically tested cranberry extract substantiated to support urinary tract health. Research indicates that the anti-adhesion activity created by the naturally-occurring phytochemicals in Pacran® work to prevent unhealthy bacteria from adhering to cell walls and allows the body to flush out the invaders! Each serving of Urinary Tract Support provides the required daily dose of 500mg of Pacran® for optimum results.

### Health Claims Status

A single 500 mg dose of Pacran® has the human clinical substantiation necessary to support a "Supports Urinary Tract Health" Structure Function Claim. That same 500 mg dose has been awarded a Health Functional Food claim from the Korean Food and Drug Administration. Pacran® is the first cranberry ingredient in the world that can freely market a government sanctioned health claim.

### Bacterial Anti-Adhesion

E. coli bacteria cause 85-95% of urinary tract infections. In order to support urinary tract health cranberries act upon and mitigate the risk of E. coli infection. Since cranberries are naturally rich in a wide variety of phytochemicals including organic acids, early theories regarding the mechanism of action of cranberry involved the acidification of urine. It was thought that cranberries create an acid environment in the urine in which E. coli bacteria cannot survive. However, science has shown that the urinary pH is not affected by consumption of cranberry.

For the last two decades, research has focused on and continues to grow in support of cranberry's unique anti-adhesion capabilities. It is widely believed that the unique blend of active phytochemicals found in cranberry provide anti-adhesion activity. E. coli bacteria gain entrance to the urinary tract, use their hair-like fimbriae to build a biofilm or protective colony and eventually form an infection. Cranberries inhibit E. coli bacterial adhesion to cell walls. By inhibiting adhesion to cell walls the bacteria are unable to form a biofilm and create an infection. Most of the research has focused on a single molecular group, Proanthocyanidins (PACs), as the phytochemical solely responsible for anti-adhesion. However, mounting published research (2011 and 2012) suggests that whole cranberry matrices out perform PAC rich fractions. The synergies of the whole fruit offer more potent anti-adhesion benefits.

### Harnessing the Power of the Whole Cranberry

Pacran® is an all-natural, 100% cranberry, whole fruit powder. Pacran® has one ingredient – cranberry – just as nature intended it. Pacran® is made exclusively with North American Vaccinium macrocarpon cranberries. Pacran® is a proprietary blend of the whole fruit. Pacran® offers it all; the juice, the flesh, the skins and the seeds. As a whole cranberry matrix, Pacran® delivers the entire spectrum of the cranberry.



## PACRAN®: The Whole Package

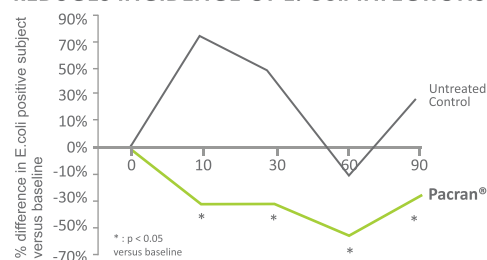
Pacran® delivers the whole berry synergies that Mother Nature intended. A single compliance friendly, cost effective, 500mg daily dose has been clinically shown to support urinary tract health with permissible health claims. Clearly, Pacran® delivers on all fronts

- Industry Leading Health Claim Status
- Most Cost Effective Efficacious Dose
- Unmatched Clinical Substantiation
- 500mg Compliance Friendly Dose
- Strongest and Broadest IP Protection
- Safe, All-Natural and GRAS

## PACRAN®: Scientific Evidence

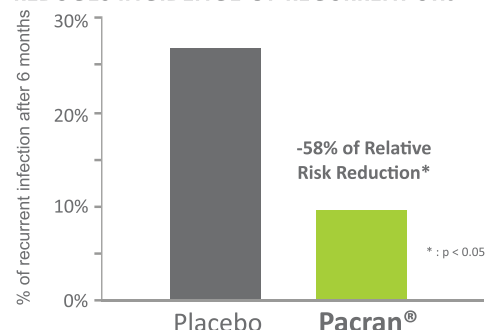
Pacran® had been the subject of a tremendous amount of research and development. Currently, Pacran® boasts two urinary tract health double blind, controlled, human clinical trials, human ex vivo cross-over studies and many ex vivo comparative cross-over studies.

### REDUCES INCIDENCE OF E. coli INFECTIONS



Study 2. Randomized, double-blind, clinical trial (Sengupta, 2011)

### REDUCES INCIDENCE OF RECURRENT UTIs



Study 2. Randomized, double-blind, placebo controlled, dose dependent clinical trial (Vostalova, pending)

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12. Bacterial Anti-adhesion Activity of Human Urine: Pacran® Capsule vs. TheraCran®
13. Assessment of bacterial anti-adhesion activity of Pacran® in human urine against P-type uropathogenic Escherichia coli. A randomized, placebo-controlled, ex vivo, double-blind, crossover trial.

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



GMP Certified Facility

## PREFORPRO®

### A Probiotic-Enhancing Prebiotic

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

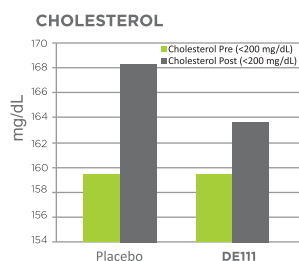
### Prebiotics & Probiotics Defined

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."<sup>1</sup> The FDA defines a probiotic as "a living microorganism which, when administered in adequate amounts, confer health benefits to the host."<sup>2</sup> These microorganisms are usually bacteria and are sometimes referred to as "healthy", "friendly", "good" or "beneficial" bacteria.

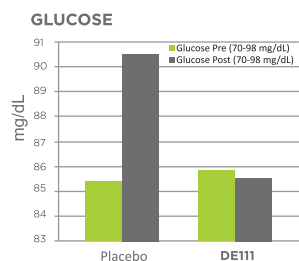
Probiotics are microorganisms similar to those that naturally exist in the gut.<sup>3</sup> The idea is that in order to stay healthy, we must maintain a delicate balance of microflora (i.e. a mix of different bacteria) in the gastrointestinal tract. That balance can easily be upset if unwanted bacterial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

### PREFORPRO® in Action

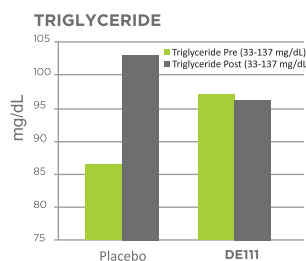
PreforPro® has been shown under both physiological conditions *in-vitro* and *in-vivo* to preferentially promote the growth of beneficial *Lactobacillus*, *Bifidobacterium* and *Bacillus subtilis* strains when competing with undesirable bacterial strains. The effects are achieved at small doses within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



**Figure 4.** Subjects taking the placebo experienced a larger increase in cholesterol levels than those taking DE111®.



**Figure 5.** Subjects taking the placebo experienced an increase in glucose levels, while the levels of subjects taking DE111® were maintained.



**Figure 6.** Subjects taking the placebo experienced an increase in triglyceride levels, while the levels of subjects taking DE111® were maintained.

## 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<sup>4</sup>:

- 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.<sup>5</sup>

## 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<sup>6</sup>, 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*, DE111, a very stable probiotic spore that works as a complement to many of the non-spore strains on the market today. DE111 helps crowd out unhealthy bacteria while helping to increase the levels of beneficial bacteria.

### 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<sup>7,8</sup>. 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 restore 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.

### PROBIOTIC STRAINS: Spore & Non-Spore Formers

The majority of probiotics currently available are bacteria which are non-spore formers, such as *Lactobacilli* and *Bifidobacteria*. 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 humans<sup>9</sup>.

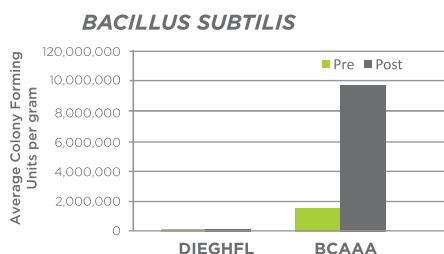
*Bacillus subtilis* has the ability to form spores that protect the microbes from harsh conditions until they enter an environment ripe for germination, such as the GI tract. Because of this spore-forming ability, *Bacillus subtilis* offers additional benefits as a probiotic:

- 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<sup>10,11</sup>.
- Crowds out bacterial pathogens and maintains healthy gut flora<sup>12,13</sup>.
- Communicates with intestinal cells to maintain gut barrier function.

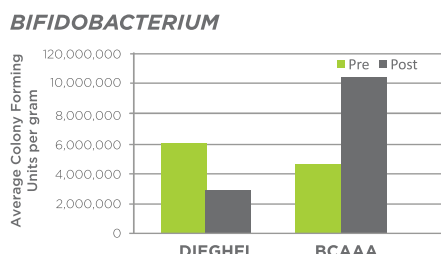
Each type and strain of probiotic, spore and non-spore forming, performs a different role with particular benefits in terms of digestive and immune systems' health, as well as where in the GI tract they act. Multistrain probiotic supplements provide a broad spectrum of benefits.

### Controls Microbial Populations

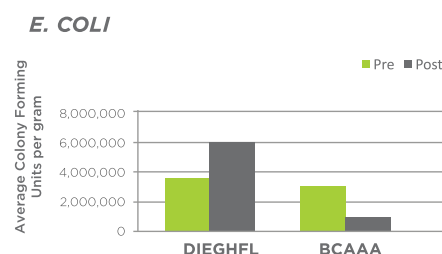
DE111® is a classic *Bacillus subtilis* strain that supports the normal proliferation of beneficial bacteria and crowds out other bacteria.



**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.



**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.



**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.

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