



# Ultimate Probiotic

DNA-Verified • Clinically Tested • Proven Survivability

## HISTORY OF USE

Bacillus spores are a natural part of the human environment and have been consumed by humans for thousands of years as part of the normal diet. Bacillus spores were abundant in the foods consumed by our ancestors because they use the soil as a vector to travel from host to host. Grains, meats, fruits, and vegetables all contained spores, which led to a symbiotic relationship between these critical, supportive organisms and humans. However, modern food systems have sterilized food processing such that all fruits, vegetable, meats are washed and treated with strong antimicrobials, which in turn essentially eliminate our exposure to these necessary organisms. As a result, our health has suffered dramatically, and rates of opportunistic infection have steadily increased.

As more and more researchers are beginning to understand, the gut microbiome is central to the health of the entire human body. When gastrointestinal health declines, nutrient absorption decreases, gastrointestinal barriers are damaged, and low-grade inflammation begins breeding in the gut like a silent bomb. Without these spores present in our daily lives, our immune systems cannot function as effectively or control systemic inflammation. It is clear that supplementation is critical, and proper supplementation requires the most natural formulation to deliver these life-enhancing probiotics.

*Bacillus clausii*, *Bacillus coagulans*, and *Bacillus subtilis* are three of the most well-studied and widely-used spore-based probiotic strains in the world. When used together in a consortium, as they are found in nature, this probiotic blend is a triple threat, providing improved digestion, enhanced immunity, and reduced inflammation throughout the body.



## BACILLUS CLAUSII

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*Bacillus clausii* is among the most commonly used probiotic strains for bacteriotherapy in a variety of applications. *B. clausii* has over 50 years of clinical applications in the pharmaceutical industry with high efficacy and excellent tolerability. One of the first commercial probiotic products ever launched into the market was the prescription product Enterogermina® by Sanofi-Aventis, in Italy, in 1958. The product is still marketed today in Europe, Latin American and some Asian countries. Since the onset of clinical use of *B. clausii* in 1958, there have been a number of clinical studies demonstrating its efficacy and safety. Of note are clinical studies assessing the effect of *B. clausii* on modulating the immune responses in allergic children with recurrent respiratory infections.<sup>1-2</sup> After administration of the probiotic, nasal symptoms and eosinophil counts in allergic children were significantly reduced. In these studies, a Th1 (T-helper 1) bias was observed showing that ingestion of *B. clausii* could enhance the cellular immunity in allergic children who normally carry a Th2 bias. These studies have been further supported by studies that have examined the duration and rate of respiratory infections in 40 children.<sup>3</sup> After administration of *B. clausii* for 90 days, they observed a decrease in the duration of respiratory infection. Other clinical trials have examined the positive effect of *B. clausii* on the antibiotic-induced side effects of *Helicobacter pylori* and urinary tract infection treatments.<sup>4</sup> Additionally, a 2005 study revealed in vivo gene expression and down regulation that indicates a potent immunomodulatory effect of *B. clausii* probiotic therapy.<sup>5</sup>

## BACILLUS SUBTILIS

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*Bacillus subtilis* has been extensively studied on a genetic and functional level for its ability to produce targeted antibiotics, improve heart health, and modulate the immune system. Interestingly, *B. subtilis* can produce nearly 12 strong antibiotics that are potent fighters of opportunistic and harmful bacteria.<sup>6</sup> This allows for effective reconditioning of the gut microbiome without the decimating effects of broad-spectrum antibiotics. In addition, *B. subtilis* produces a serine protease called nattokinase. Nattokinase is a key compound found in the Japanese food natto that uses *B. subtilis* for the fermentation of soy beans. Nattokinase is secreted from vegetative cells of *B. subtilis* and has been shown to improve heart health by reducing blood pressure, cholesterol and excessive clotting through fibrinolysis.<sup>7</sup>

Furthermore, *Bacillus subtilis* HU58, in particular, has been shown to be an extremely potent immune stimulator.<sup>8</sup> *Bacillus subtilis* HU58 has the function of germinating in the small intestines to some degree, and this offers the effect of broad-spectrum immune stimulation. A recent clinical trial discovered that 8 weeks of supplementation with *B. subtilis* HU58 at 2 billion CFU/day resulted in a 45% reduction of pro-inflammatory IL-6 and a 55% reduction of TNF- $\alpha$ .<sup>9</sup>

Continual synthesis of IL-6 has been shown to play a pathological role in chronic inflammation and autoimmunity.<sup>10</sup> Additionally, studies have found that TNF- $\alpha$  is one of the main effectors of intestinal inflammation in inflammatory bowel diseases, depression, acute pancreatitis, and more through the modulation of tight junction proteins.<sup>11-14</sup> An overabundance of TNF- $\alpha$  can cause tight junctions to loosen up between enterocytes, creating a more permeable intestinal lining that allows unwanted toxins to enter circulation and breed systemic inflammation.

*Bacillus subtilis HU58* has been shown to ferment dietary starches into short-chain fatty acids (SCFA) such as butyrate, acetate, and propionate which have anti-inflammatory effects in the gut.<sup>15</sup> Butyrate is the major energy source for colonocytes and has been studied for its role in nourishing the colonic mucosa. Studies indicate that butyrate may play a significant role in the prevention of colon cancer and amelioration of intestinal inflammation.<sup>16</sup> As previously stated, damage to the intestinal barriers can weaken the immune system and allow unwanted toxins to enter circulation and trigger an inflammatory response.<sup>17</sup> One of the most pervasive toxins is an endotoxin known as lipopolysaccharide (LPS), a component of the cell membranes of Gram-negative bacteria in the gut. When these Gram-negative bacteria die, they release LPS into the intestines. If the intestinal barriers are damaged, LPS can easily enter circulation and trigger the release of inflammatory cytokines, like TNF- $\alpha$ , IL-6, IL-8, and IL-1.

Short-chain fatty acids (SCFAs), like butyrate, are normally responsible for regulating the production of inflammatory cytokines in the intestines. Butyrate can regulate the production of TNF- $\alpha$  by reducing the activity of histone deacetylase (HDAC), an enzyme that promotes its expression.<sup>18</sup> In this way, butyrate has a strong anti-inflammatory effect in the intestines. Therefore, a greater increase in SCFA production, specifically butyrate, in the distal colon may have a protective effect on the digestive tract.

## BACILLUS COAGULANS

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*Bacillus coagulans* is very unique in that it possesses characteristics of both *Bacillus* and *Lactobacillus* species. It functions as a lactic-acid producing bacterium with the protection and survivability of a *Bacillus* spore. Lactic acid bacteria have been extensively investigated for their role in the gut microbiome, and they appear to play an important role in maintaining a healthy digestive tract. *Bacillus coagulans* has a long history of use for its health benefits in humans. In a SHIME gut model study, the combination of *B. coagulans* SC-208 and *B. subtilis* HU58 (as MegaDuo) was shown to significantly improve intestinal epithelial barrier function and enhance immune modulation.<sup>19</sup> After antibiotic treatment with clindamycin, the MegaDuo blend was shown to reduce TNF- $\alpha$  levels and increase anti-inflammatory IL-10 levels – a cytokine that plays an essential role in preventing inflammatory and autoimmune pathologies. Insufficient levels of IL-10 can lead to the development of inflammatory bowel conditions and a number of autoimmune diseases.<sup>20</sup>

## LEAKY GUT SOLUTION

*Bacillus clausii* SC-109, *Bacillus subtilis* HU58, and *Bacillus coagulans* SC-208 were used in a human leaky gut study, where they were found to reduce serum LPS levels by 60% in as little as 30 days without any additional dietary interventions.<sup>21</sup> Given the progressive and damaging nature of LPS, these monumental findings were among the first to demonstrate that *Bacillus* spores alone can heal leaky gut in humans. Leaky gut, or metabolic endotoxemia, is associated with so many different disease conditions that it is now believed to be ground zero for all chronic diseases plaguing the population.

## WORLD'S MOST POWERFUL PROBIOTICS

*Bacillus clausii* SC-109, *Bacillus subtilis* HU58, and *Bacillus coagulans* SC-208 are three incredibly potent spore-based probiotic strains with no pathogenic powers. When used in combination, these probiotic spores provide a comprehensive solution for optimum digestion, enhanced immunity, and a healthy inflammatory response. Together, they provide enhanced digestion and gut motility, improved B vitamin status, superior gut pathogen protection, heart-healthy fibrinolytic enzymes, anti-inflammatory butyrate production, significant immune modulation, effective leaky gut protection, and comprehensive amelioration of systemic inflammation. *Bacillus* probiotics are the only true probiotics that survive digestion, colonize in the human gut, and effectively protect the human host. *Bacillus clausii* SC-109, *Bacillus subtilis* HU58, and *Bacillus coagulans* SC-208 are truly the world's most powerful probiotics.



### DIRECTIONS:

Adults and children above the age of 10:  
Start with 1 capsule per day for the first week.  
Take 2 capsules daily following the first week.  
Recommended to be taken with a meal.

### Supplement Facts

**Servings Size: 2 Capsules**

Servings per container: 30

| Amount Per Serving   | % DV <sup>†</sup>  |
|--|--------------------|
| <b>Proprietary Probiotic Blend</b>   | 760mg <sup>†</sup> |
| Saccharomyces boulardii; <i>Bacillus subtilis</i> HU58™;<br><i>Bacillus coagulans</i> (SC-208); <i>Bacillus clausii</i> (SC-109),<br><i>Pediococcus acidilactici</i> |                    |

<sup>†</sup> Daily values not established

### Other Ingredients:

Cellulose prebiotic, vegetable capsule shell (cellulose).

Does Not Contain: Dairy, Wheat, Corn, Rice, Sugar, Salt, Soy, Artificial Colors, Binders, Fillers, Flow Agents, or Artificial Flavors.

\* Sun Genomics Lab Tested for DNA verification of strains and Survivability.

## References

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