

iVS-1[®]

B. adolescentis

An aerial photograph of a dense, lush green forest, showing a variety of tree species and a thick canopy. The image is partially obscured by a white circular shape on the left side.

**The Missing
Microbe for
Health &
Longevity**

Experience Healthy Aging with *B. adolescentis*

Bifidobacterium play a critical role in maintaining a healthy microbiome throughout life. From breaking down complex carbohydrates in our diet—first HMOs from mother’s milk, and then later from fiber-containing foods like vegetables and whole grains—research has shown that certain species of *Bifidobacterium* serve a major role in human well-being. Collectively, they support a healthy immune system, produce vitamins, help improve mood and sleep, promote bone health, and reduce disease risk.

Importantly, most species of *Bifidobacterium* decline as we get older. However, research has shown that *B. adolescentis*, in particular, remains abundant in healthy seniors who live to 80, 90, or 100+ years old. Despite the significant presence of *B. adolescentis* in the human microbiome throughout life, most of today’s dietary supplements are missing this key microbe for health and longevity.



The most researched strain of *B. adolescentis*, iVS-1®, should be included in today’s biotic-based supplements as a foundational strain supporting gastrointestinal health, well-being, and longevity.

B. adolescentis A Foundational *Bifidobacterium* Species

Bifidobacterium Across Life Stages

At birth, babies begin to acquire microbes, transitioning from a germ-free state. This influx of bacteria, sourced from both the mother and the environment, includes a diverse range, with a significant portion belonging to the *Bifidobacterium* genus.

During infancy, *Bifidobacteria* play a crucial role in supporting the still-developing immune system. This is aided by immunoglobulins from breast milk and a healthy gut microbiota, primarily featuring *B. longum* subsp. *infantis* and *B. breve*. Human milk oligosaccharides (HMOs) in breast milk are specifically designed to nourish *B. infantis*, fostering its growth.

As infants grow and wean, the composition of *Bifidobacterium* shifts. *B. infantis* declines, replaced by *B. pseudocatenulatum*, *B. longum* subsp. *longum*, and *B. adolescentis*, supported by dietary fibers rather than HMOs. By ages 2-3, a more adult-like gut microbiota is established.

Recent studies highlight the ongoing importance of *Bifidobacteria* for healthy aging. *B. adolescentis*, prevalent in healthy older adults, including centenarians, is considered foundational to a healthy gut microbiota, potentially possessing anti-aging properties.⁵

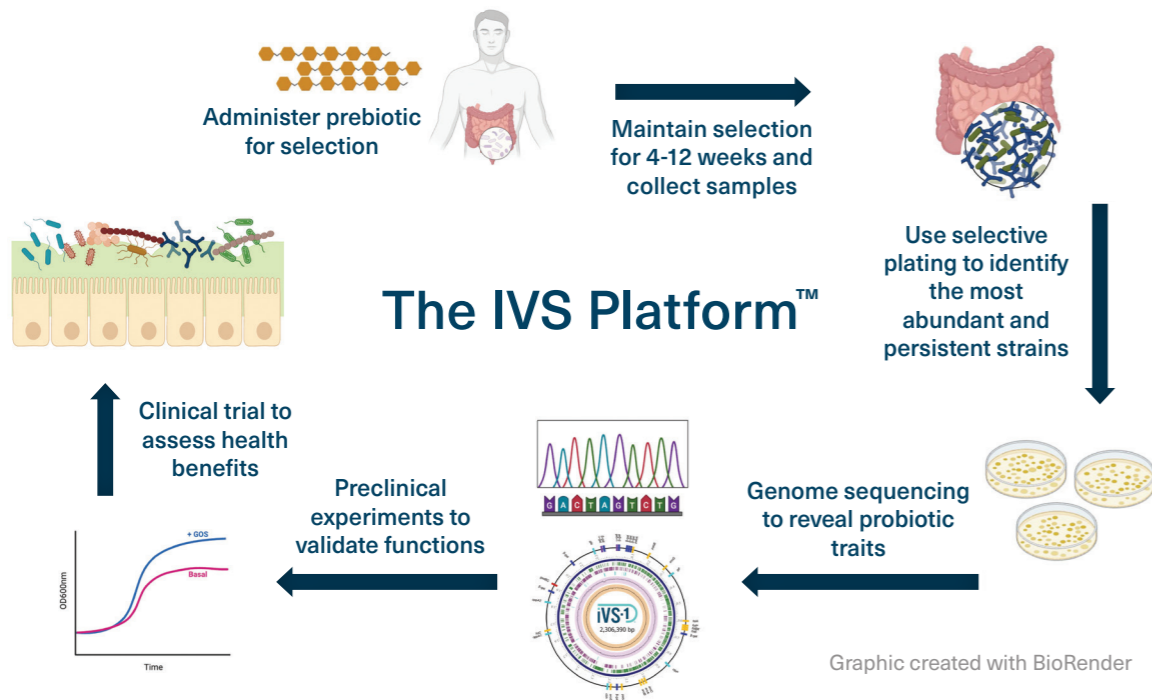
The IVS Platform™

A New Way to Discover Hero Strains

The IVS Platform™ (In Vivo Selection)

When probiotic microbes are consumed and reach the gut, they encounter a diverse and well-established microbiota. Indeed, they are usually outnumbered by a million to one. Thus, it is very challenging for a probiotic to thrive, persist, and provide health benefits in this super competitive environment. Nearly all commercial probiotics were isolated without any consideration to these ecological constraints.

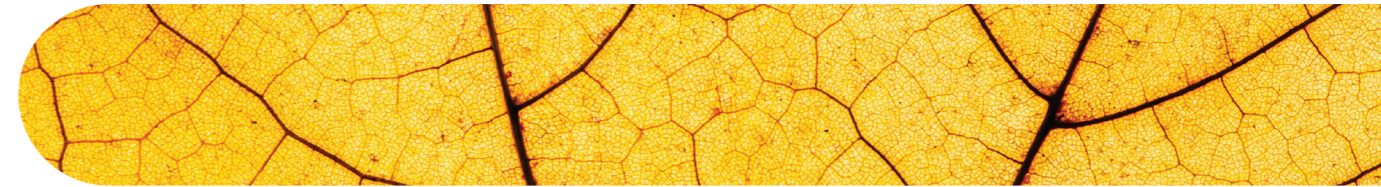
Synbiotic Health's IVS platform was designed to address this challenge by imposing selective conditions, *in vivo*, such that only the most competitive and persistent strains are isolated. **Our published pre-clinical and clinical data demonstrates that IVS probiotics have competitive advantages, delivering higher abundance, persistence, and health benefits compared to conventional strains.**



Origin of the iVS-1® Strain

The story of iVS-1® began in 2010, when researchers at the University of Nebraska Lincoln started using a revolutionary technology utilizing next-generation sequencing that could determine how the gut microbiota was affected by prebiotics. In one of the first prebiotic clinical trials to use this technology, they discovered that galactooligosaccharides (GOS) increased

Next, a second human clinical trial was conducted with collaborators at a medical school. The study showed that iVS-1® was able to reach 10-times higher abundance than another commercial probiotic strain and persisted in several study participants. But most importantly, iVS-1® significantly improved gut barrier function, a key immune and gut health benefit.³



populations of *Bifidobacteria* in the gut. They also observed that each participant responded differently, some experiencing little or no increase in *Bifidobacteria*, while others had significant enrichment.¹

This study, published in the high impact journal, *Microbiome*, was the first clinical trial to show a specific probiotic strain had a gut barrier benefit.

One individual in particular, an elite collegiate athlete, was a “super” *Bifidobacteria* responder after consuming the GOS prebiotic. The researchers subsequently isolated the most abundant strain from this individual, coming from the *B. adolescentis* species.² As this strain was discovered using the IVS platform (*In Vivo Selection*), they called it *B. adolescentis* iVS-1. They reasoned that iVS-1® was well-adapted to the human gut and could out-compete other microbes for resources, satisfying important probiotic criteria. Based on subsequent genomic analyses, animal studies, and pre-clinical data, iVS-1® was shown to be stable, safe and able to be commercially produced.

Synbiotic Health was founded in 2018 to ensure that *B. adolescentis* iVS-1 would become widely available to probiotic brand stakeholders and their consumers looking to improve lifelong health and longevity.



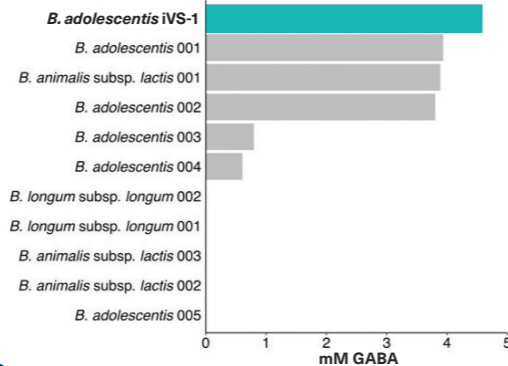
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Pre-Clinical Science

B. adolescentis iVS-1®

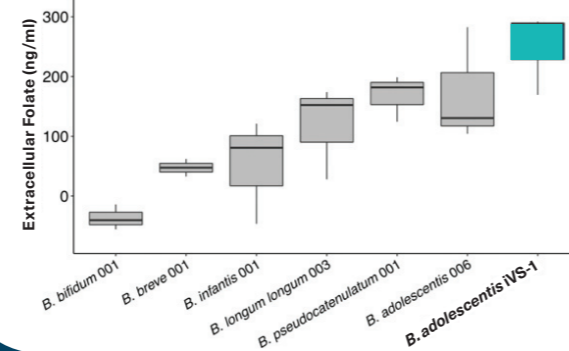
GABA Production

iVS-1® excels in GABA production, which can provide a range of health benefits related to cognitive function, pain management, sleep quality and gut health. These benefits arise from GABA's role as a key neurotransmitter in both the central nervous system and the gut, underscoring the importance of this compound in overall human health.



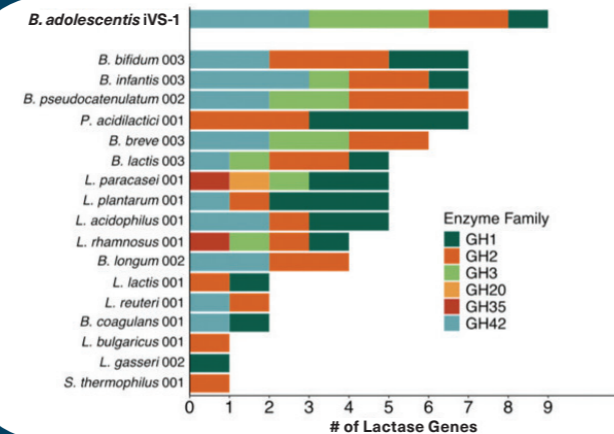
Folate Production

iVS-1® is a robust producer of folate, which can help improve DNA synthesis, red blood cell formation, cardiovascular health, cognitive function and immune support, amongst other benefits offered by this crucial nutrient.



Lactose Digestion

As a formidable digester of lactose due to the high number of lactase genes present in its genome, iVS-1® can enhance overall digestive comfort and nutritional status for those who struggle with lactose intolerance.



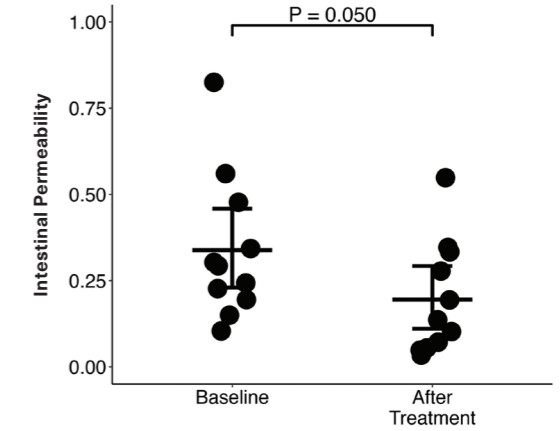
Reference for all of the above:
Synbiotic Health, pending publication, 2024.

Clinical Science

B. adolescentis iVS-1®

Effects on the Gut Barrier

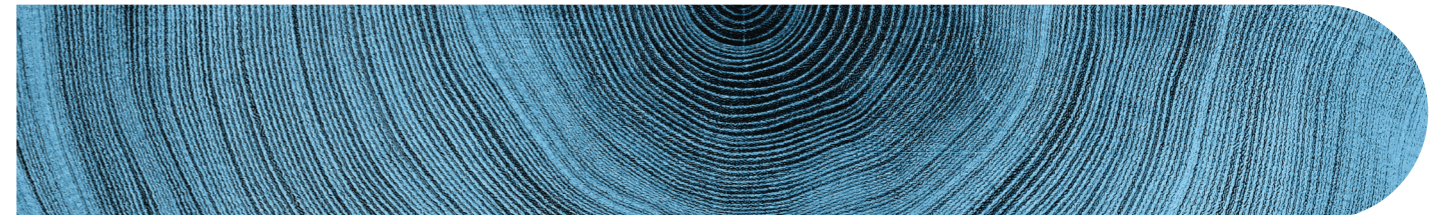
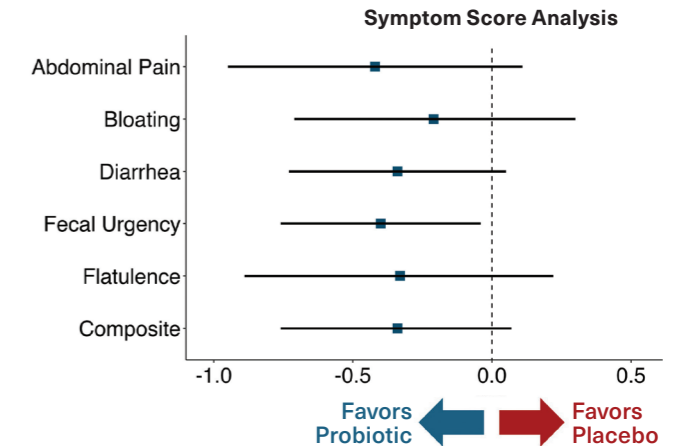
In a human trial, iVS-1® reduced intestinal permeability after three weeks of daily supplementation. The probiotic strengthens gut barrier integrity by upregulating tight junction proteins, reducing gut inflammation, promoting a healthy gut microbiota balance, and stimulating mucin production to protect the gut lining.³



Symptom Reduction

A probiotic strain that efficiently digests lactose can alleviate lactose intolerance symptoms, improve calcium absorption, maintain gut bacteria balance, enhance gut health, and support long-term lactose digestion for a varied diet.

iVS-1® supplementation reduces lactose mal-digestion symptoms from dairy sources through direct lactase production, enhancing gut enzymatic activity, and supporting the gut barrier by reducing inflammation and harmful substance translocation.⁴



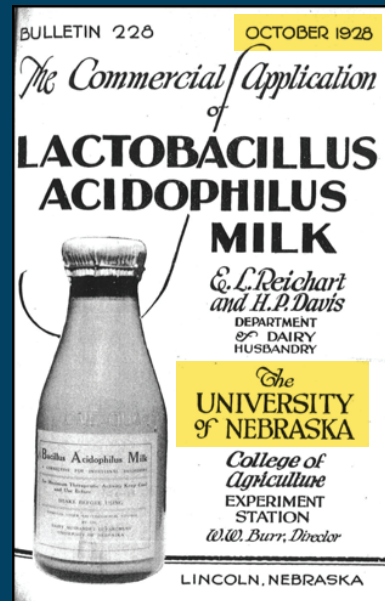


Synbiotic Health was formed in 2018 by four academic researchers at the University of Nebraska with a combined century of experience in microbiome research, Dr. Bob Hutkins, Dr. Andy Benson, Dr. Jens Walter, and Dr. Tom Burkey. In 2019, Tim Brummels became the Chief Executive Officer. Synbiotic Health's flagship probiotic strain, iVS-1[®], was discovered in the UNL research labs and was exclusively licensed to Synbiotic Health. The founders of Synbiotic Health are committed to developing critical probiotic cultures that will improve quality of life, healthy aging and human well-being.

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A Century of Probiotic Research at the University of Nebraska

The University of Nebraska is celebrating over a century of probiotic research and the discovery of beneficial microbes. From this research came *Lactobacillus acidophilus* DDS-1, which today is still one of the most widely consumed probiotic strains in the world. By the time the Nebraska Food for Health Center was formed in 2018, more than 50 faculty, staff, and trainees were engaged in gut health research. That same year a new facility was built which featured a 5,000 square foot gut biology laboratory, a clinical research facility and analytical lab, and other specialized laboratories.



References

- ¹Davis LM et al. A dose dependent impact of prebiotic galactooligosaccharides on the intestinal microbiota of healthy adults. *Int J Food Microbiol.* 2010 Dec 15;144(2):285-92.
- ²Krumbeck JA et al. In vivo selection to identify bacterial strains with enhanced ecological performance in synbiotic applications. *Appl Environ Microbiol.* 2015 Apr;81(7):2455-65.
- ³Krumbeck JA et al. Probiotic Bifidobacterium strains and galactooligosaccharides improve intestinal barrier function in obese adults but show no synergism when used together as synbiotics. *Microbiome.* 2018 Jun 28;6(1):121.
- ⁴Pilot study, Purdue University and Synbiotic Health, pending publication, 2024.
- ⁵Leser T et al. Bifidobacterium adolescentis - a beneficial microbe. *Beneficial Microbes.* 2023 Nov 27;14(6):525-551.