

Science Review:

Comprehensive Benefits of Probiotic Strains on Women's Gut, Immunity, Mind, Urogenital and Overall Health

Women face a myriad of health challenges throughout their lives, ranging from urogenital issues such as bacterial vaginosis (BV) and urinary tract infections (UTIs) to gastrointestinal disorders, stress, and immune function concerns. Addressing these conditions requires a holistic approach that not only targets specific symptomology but also supports overall well-being. Probiotics have emerged as a promising solution in this regard.

Initially, probiotics focusing on women's health prominently featured *Lactobacillus rhamnosus* GR-1® and *Lactobacillus reuteri* RC-14®. These two strains have demonstrated significant clinical benefits in promoting urogenital health.¹ Recognizing the need for a more comprehensive approach, recent advancements have expanded probiotic formulations to include three additional strains: *Lactobacillus acidophilus* DDS-1®, *Bifidobacterium animalis* subsp. *lactis* BB-12®, and *Lactiplantibacillus plantarum* Lpla33. This new 5-strain combination is designed to provide extensive support not only for urogenital health but also for gut health, immune function, mental well-being, and overall health. This review provides a detailed analysis of the scientific evidence supporting the efficacy of these strains in promoting various aspects of women's health.

Probiotic Strains and Their Functions

Lactobacillus rhamnosus GR-1 and *Lactobacillus reuteri* RC-14

These strains have been extensively studied for their benefits in maintaining urogenital health. They are known to colonize the vaginal and urinary tracts, producing substances that inhibit the growth of pathogenic bacteria and yeast.

Clinical Studies:

Study on BV: A randomized study of 64 women diagnosed with BV evaluated the efficacy of combining tinidazole with GR-1/RC-14. Participants received a single 2 g dose of tinidazole and GR-1/RC-14 (1 billion CFU each) or a placebo from day one to 28. Results showed a significantly lower prevalence of BV in the probiotic group (12.5%) compared to the placebo group (46.9%) (Figure 1). Additionally, the probiotic group had a 75% resolution rate, markedly higher than the 34.4% seen in the placebo group.²

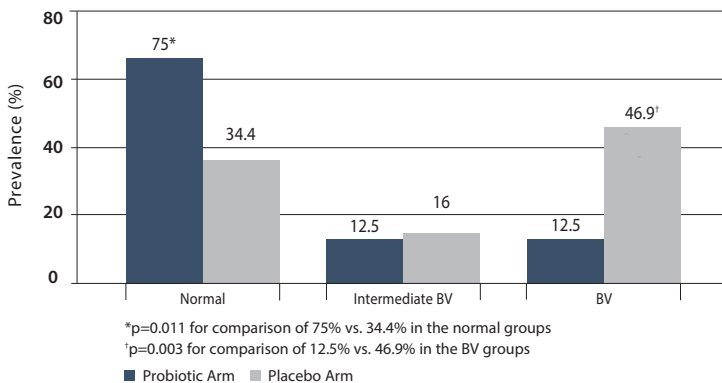


Figure 1. Prevalence of Women Assessed with Normal, Intermediate, or BV Microbiota

During a multi-center, six-week study of 544 adult women, ages 18 to 58 with vaginal infection, participants received 1 billion CFU each GR-1/RC-14 or two placebo capsules daily. At the study conclusion, 61.5% in the probiotic arm experienced restitution of balanced vaginal microbiota, compared with 26.9% in the placebo arm (Figure 2).³ Additionally, at six weeks post-trial, normal vaginal microbiota was still present in 51.1% in the probiotic arm, but only 20.8% in the placebo arm.³

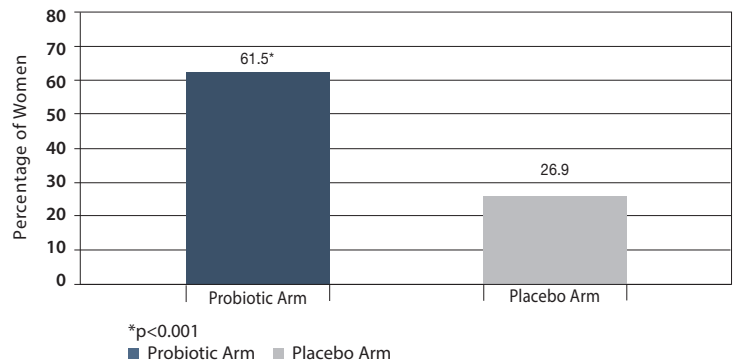


Figure 2. Restitution to Balanced Vaginal Microbiota at 6 weeks

Prevention of UTIs: In a double-blind, non-inferiority study involving 252 postmenopausal women with recurrent UTIs, participants were randomized to receive either GR-1/RC-14 or trimethoprim-sulfamethoxazole (TMP-SMX). The GR-1/RC-14 group exhibited a significantly lower prevalence of *E. coli* harboring antibiotic-resistant genes compared to the antibiotic group (Figure 3). This study highlighted the potential of GR-1/RC-14 to reduce antibiotic resistance while effectively preventing UTIs.⁴

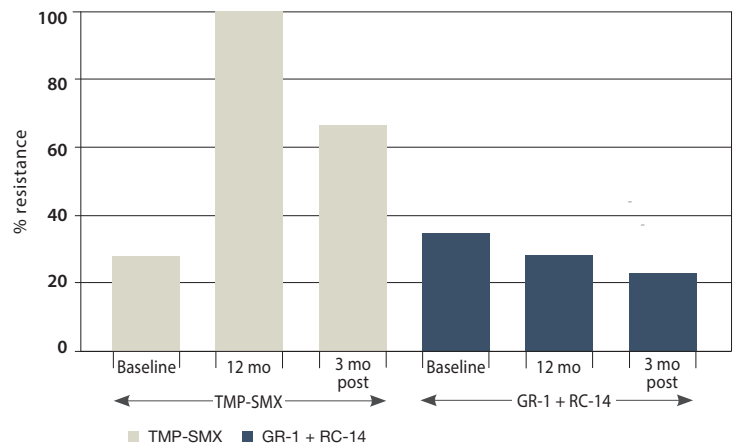


Figure 3. *E. coli* Resistance to TMP-SMX in Urine From Women with Asymptomatic Bacteriuria

Vulvovaginal Candidiasis (VVC): A randomized clinical study of 55 women aged 16 to 46 with diagnosed VVC found that those who received GR-1/RC-14 alongside a single 150 mg dose of fluconazole showed significantly less vaginal discharge (10.3%) compared to the placebo group (34.6%) and a lower presence of Candida (10.3% vs. 38.5%) (Figure 4).⁵

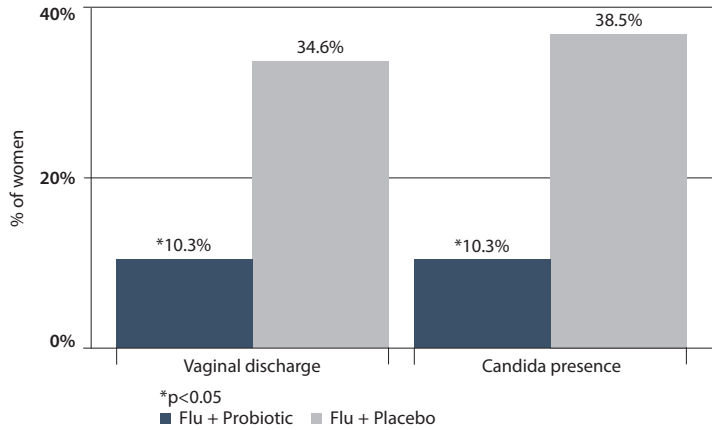


Figure 4. WC Status of the Women After Treatment

Lactobacillus acidophilus DDS-1

This strain is renowned for its ability to support gut health and modulate the gut-brain and gut-immune axes.

Clinical Studies:

IBS Symptoms: A multi-center randomized controlled trial (RCT) involving 330 adults with IBS evaluated the efficacy of DDS-1. Participants were randomized to receive DDS-1 (10 billion CFU/day), an unrelated probiotic, or a placebo for six weeks. The primary outcome, abdominal pain severity (APS-NRS), significantly improved at days 21 and 42 in the DDS-1 group compared to placebo (Figure 5). Specifically, 52.3% of the DDS-1 group experienced more than a 30% reduction in APS-NRS compared to 15.6% in the placebo group.⁶ Significant improvements were also observed in the IBS Symptom Severity Score (IBS-SSS) at days 21 and 42. Significant improvements were observed in all five domains: abdominal pain severity (48%), abdominal pain duration (48%), abdominal distension (45%), bowel habits (36%), and quality of life (37%). The study also noted a normalization in stool consistency and a lower percentage of subjects with too hard stools at day 42 (8% in the DDS-1 group vs. 26% in the placebo group).

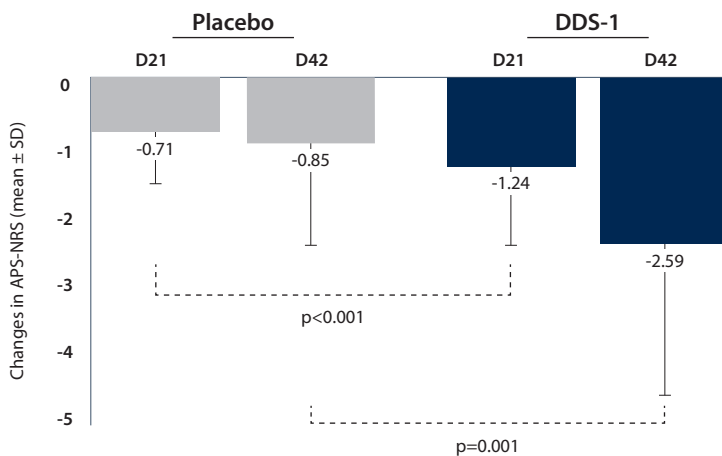


Figure 5. APS-NRS Score on Day 21 and Day 42

Stress and Immune Function: In another study, night shift workers were randomized to receive DDS-1 (10 billion CFU/day), an unrelated probiotic, or placebo for 14 days. This period included no night shifts followed by two consecutive night shifts. DDS-1 significantly mitigated stress and improved immune markers such as cortisol, pentraxin, IL-1ra, and MAdCAM-1 compared to placebo.⁷

Bifidobacterium animalis subsp. lactis BB-12

BB-12 is effective in promoting regular bowel movements and enhancing immune responses.

Clinical Studies:

Bowel Habits in Healthy Adults: A study involving 1248 healthy adults with low defecation frequency (2-4 days/week) assessed the impact of BB-12 (1 or 10 billion CFU/day) over four weeks. BB-12 increased the odds of having a defecation frequency above baseline for at least two of the four intervention weeks compared to placebo (Figure 6). Notably, both doses (1 billion and 10 billion CFU) demonstrated similar efficacy, suggesting a ceiling effect at the lower dose.⁸

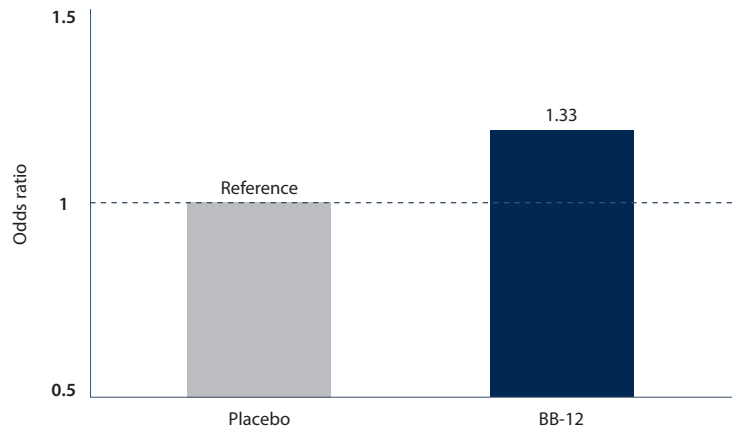


Figure 6. Odds of Having Defecation Frequency

Bowel Habits in Nursing Home Residents: A study with 209 elderly nursing home residents found that those who consumed a fermented oat drink with BB-12 had more frequent bowel movements compared to the placebo group (Figure 7).⁹

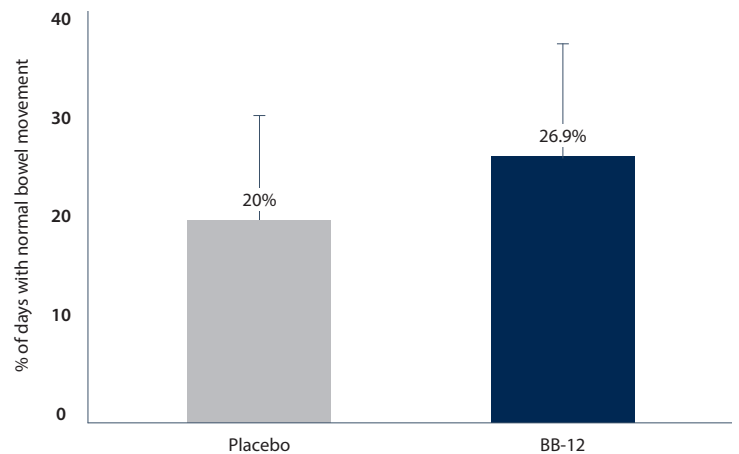


Figure 7. Percentages of Days with Normal Bowel Movement in Placebo and Intervention

Gut Microbiome Recovery: Research involving 62 healthy adults receiving antibiotics showed that BB-12 mitigated antibiotic-induced shifts in the gut microbiota and helped restore microbiota composition faster than the control group (Figure 8).¹⁰

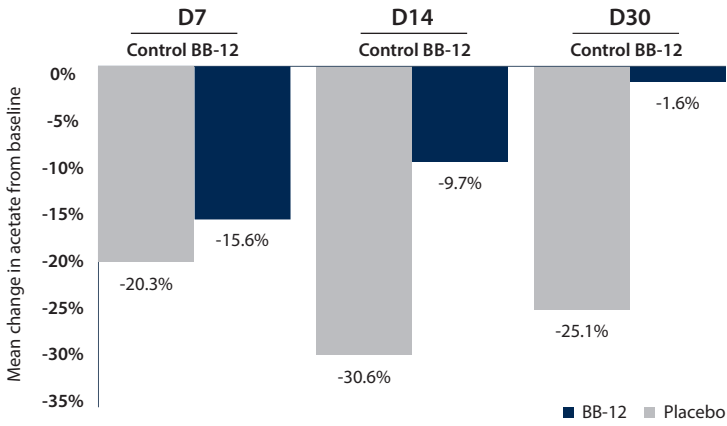


Figure 8. Antibiotic-Induced Fecal SCFA Production

Immune Response to Flu Shots: In a trial with 211 healthy adults, BB-12 or placebo was administered for six weeks, with a seasonal influenza vaccination given after two weeks. BB-12 significantly improved vaccine-specific plasma IgG and subclasses IgG1 and IgG3 levels, as well as salivary IgA levels, compared to placebo (Figure 9).¹¹

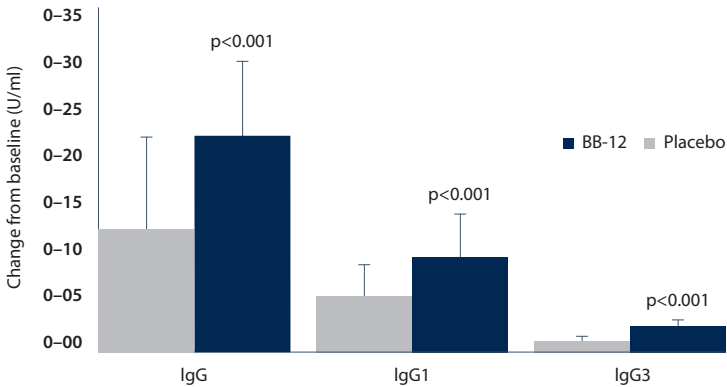


Figure 9. Change in Vaccine-Specific Plasma IgG and Subclasses

Lactiplantibacillus plantarum Lpla33

Lpla33 supports gut and brain health by influencing the gut-brain axis and improving stress and quality of life outcomes.

Clinical Studies:

IBS-D Symptoms: An RCT involving 307 adults with IBS-D evaluated Lpla33 (1 or 10 billion CFU/day) over eight weeks. Both doses significantly improved IBS symptom severity (IBS-SSS) and quality of life (IBS-QoL) scores compared to placebo (Figure 10). The 10 billion CFU dose showed marked improvements in abdominal pain severity (54%), duration (50%), distension (56%), bowel habits (48%), and quality of life (49%).¹² There was also significant reductions in perceived stress scores (PSS) with Lpla33 supplementation. The 10 billion CFU dose reduced PSS scores by 25% at eight weeks compared to baseline.¹²

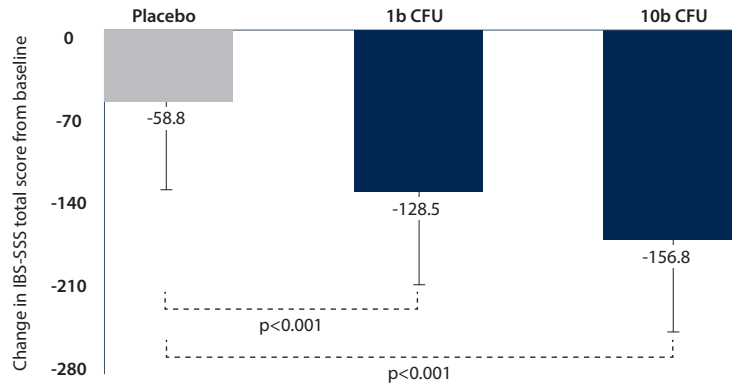


Figure 10. Change in IBS-SSS Total Scores







Mechanism of Action

The probiotic strains exert their health benefits through several mechanisms¹³:

- **Pathogen Inhibition:** Probiotic strains produce antimicrobial substances, such as bacteriocins and hydrogen peroxide, which inhibit pathogenic bacteria and yeast.
- **Immune Modulation:** Probiotics interact with gut-associated lymphoid tissue (GALT) to enhance immune responses, including the production of IgA antibodies.
- **Gut Health:** Probiotics support gut barrier function, reduce inflammation, and promote a healthy balance of gut microbiota.
- **Stress Reduction:** Through the gut-brain axis, probiotics can influence neurotransmitter production and reduce stress-related symptoms.

Conclusion

The combination of *Lactobacillus rhamnosus* GR-1, *Lactobacillus reuteri* RC-14, *Lactobacillus acidophilus* DDS-1, *Bifidobacterium animalis* subsp. *lactis* BB-12, and *Lactiplantibacillus plantarum* Lpla33 offers comprehensive support for women's vaginal, urinary tract, gut, immune and overall health. Clinical studies demonstrate the efficacy of these strains in improving urogenital health, enhancing gut function, boosting immune responses, and reducing stress. Regular supplementation with these probiotic strains can help maintain optimal health and well-being.

Clinical evidence	GR-1 & RC-14 2b CFU	DDS-1 10b CFU	BB-12 1b CFU	Lpla33 10b CFU
 Strengthens digestive system; promotes healthy regularity		✓	✓	
 Reduces GI symptoms such as bloating and abdominal distension		✓	✓	✓
 Nourishes healthy gut bacteria			✓	
 Promotes a healthy stress response and quality of life		✓		✓
 Restores vaginal ecosystem and promotes vaginal/urogenital health	✓			
 Strengthens immune system		✓	✓	

➤ For more information, visit [MetagenicsInstitute.com](https://www.MetagenicsInstitute.com)

References

1. Reid G. *Appl Environ Microbiol.* 1999;65:3763-766.
2. Martínez RC et al. *Can J Microbiol.* 2009;55(2):133-138.
3. Vujic G et al. *Eur J Obstet Gynecol Reprod Biol.* 2013;168:75-79.
4. Beerepoot M et al. *Arch Intern Med.* 2012;172:704-712.
5. Martínez RC et al. *Lett Appl Microbiol.* 2009;48(3):269-274.
6. Martoni CJ et al. *Nutrients.* 2020;12(2):363.
7. West NP et al. *Front Immunol.* 2021;11:599547.
8. Eskesen D et al. *Br J Nutr.* 2015;114(10):1638-1646.
9. Pitkala KH et al. *J Nutr Health Aging.* 2007;11(4):305-311.
10. Merenstein D et al. *Nutrients.* 2021;13(8):2814.
11. Rizzardini G et al. *Br J Nutr.* 2012;107(6):876-884.
12. Martoni CJ et al. *World J Gastroenterol.* 2023;29(28):4451-4465.
13. Latif A et al. *Front Microbiol.* 2023;14:1216674.