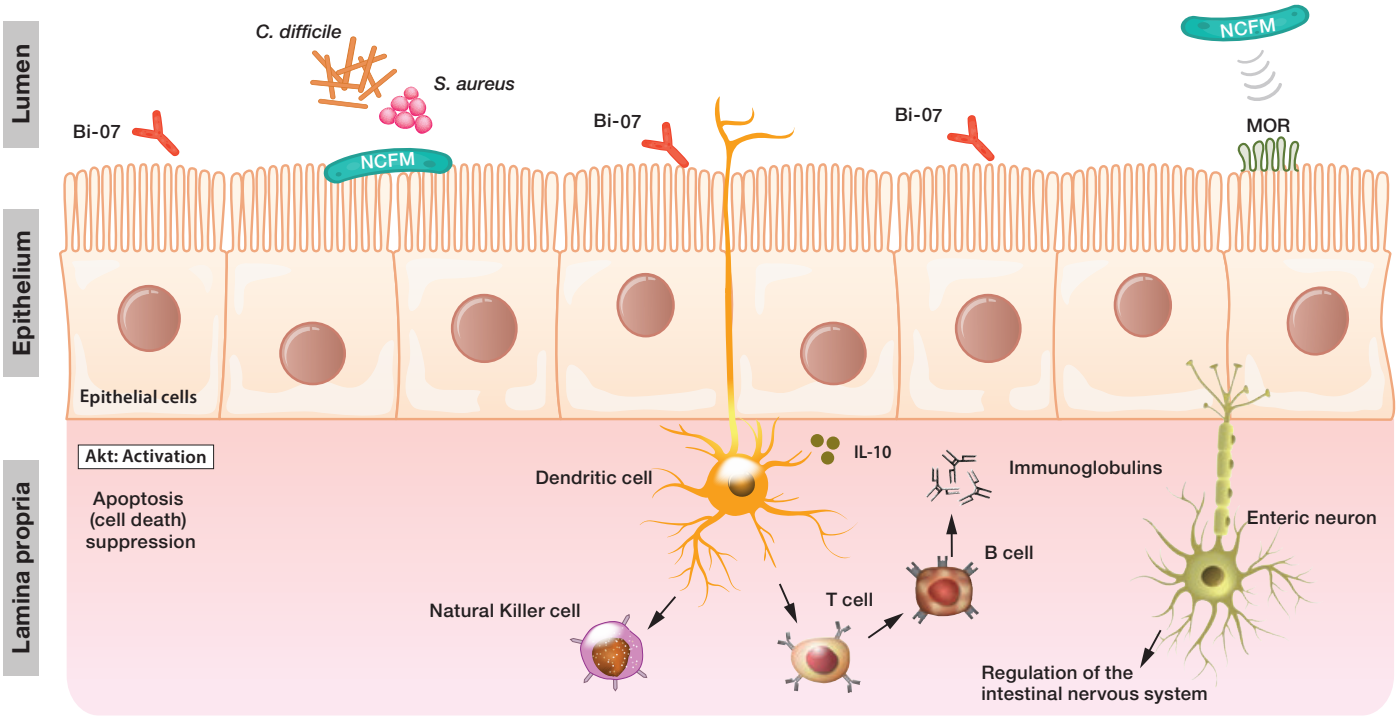
## Science Review:

# Comprehensive Benefits of Probiotic Strains on Gut Health and Immunity

Probiotics have garnered significant attention for their potential to support gastrointestinal (GI) health and enhance immune function. This review focuses on two extensively researched strains: *Lactobacillus acidophilus* NCFM® and *Bifidobacterium lactis* Bi-07. These strains have demonstrated significant benefits in clinical studies, contributing to gut health, immune modulation, and overall well-being. Moreover, studies have shown that these probiotic strains can begin to work within 30 minutes of ingestion, providing 24-hour support for gut health. This quick onset of action helps maintain a healthy balance of intestinal flora and supports digestive function throughout the day.[1,2]




**Akt:** a protein that works in the signaling pathway for cell survival

**IL-10:** Interleukin-10, an anti-inflammatory cytokine

**MOR:** μ-opioid receptor

**Figure 1.** The mechanism of action of probiotics

The early identified probiotic *L. acidophilus* NCFM has been used in foods and supplements since 1970 and has demonstrated clinical efficacy alone and even more so when combined with other strains. It is known for its beneficial effects on digestive health and immune function and has been the subject of numerous clinical trials, highlighting its role in alleviating gastrointestinal discomfort, enhancing lactose digestion, and supporting immune health. Also, *B. lactis* Bi-07 is a robust probiotic strain with a proven track record in supporting immune health and enhancing digestive function. It is known for its resilience in the GI tract and its ability to modulate the immune system.

## MOA:

**Adhesion to Intestinal Mucosa:** *L. acidophilus* NCFM adheres to the epithelial cells lining the intestine, promoting colonization and competitive exclusion of pathogenic bacteria. It also reduces intestinal cell apoptosis through the production of soluble proteins, supporting barrier integrity.[2]

**Modulation of Immune Responses:** Both strains induce the secretion of anti-inflammatory cytokines, such as IL-10, contributing to immune homeostasis. *B. Lactis* Bi-07 primarily enhances mucosal immunity by increasing secretory IgA levels in the gut, crucial for defending against pathogens at mucosal surfaces. Together, these strains support a balanced and resilient immune system, reducing the risk of infections and promoting overall immune health.[3,4]

**Enzyme Production:** *L. acidophilus* NCFM produces lactase, which aids in the digestion of lactose, thus benefiting individuals with lactose intolerance.[5]

**Inhibition of Pathogenic Microorganisms:** These strains produce substances that inhibit the growth of pathogens such as *C. difficile* and *S. aureus*.[6]

**Suppression of Intestinal Hyperpermeability:** Mitigation of bacterial translocation, intestinal permeability increases, and inflammatory biomarker increase by *B. lactis* Bi-07.[7]

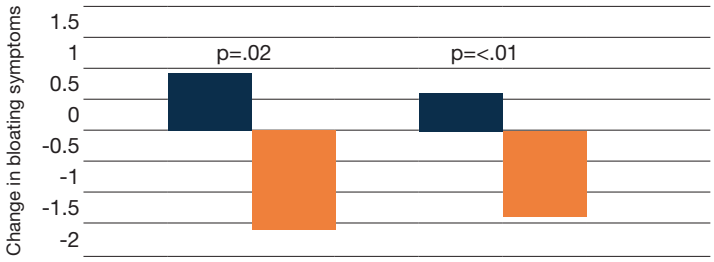
## Clinical Evidence for Combined Benefits

### Study Highlight

The pivotal study by Ringel-Kulka et al.[1] is a cornerstone in understanding the combined effects of *L. acidophilus* NCFM and *B. lactis* Bi-07. This randomized, double-blind, placebo-controlled trial (RCT) evaluated the impact of these two strains on gastrointestinal and immune health. The study involved 60 individuals with moderate GI discomfort. Subjects received a daily dose of a probiotic supplement containing both *L. acidophilus* NCFM and *B. lactis* Bi-07 twice a day ($2x10^{11}$CFU/d) or placebo for 8 weeks. Primary outcomes included changes in GI symptoms, stool frequency, and immune markers.

At four weeks, patients receiving the probiotic blend of *L. acidophilus* NCFM and *B. lactis* Bi-07 reported significantly lower bloating severity scores (4.10 ± 3) compared to the placebo group (6.17 ± 3, p = 0.009). By eight weeks, the probiotic group continued to show reduced bloating severity (4.26 ± 3) compared to placebo (5.84 ± 3), with a near-significant trend (p = 0.06). The reduction in bloating severity from baseline was greater in the probiotic group at both four weeks (–1.58 vs. 0.95, p = 0.02) and eight weeks (–1.4 vs. 0.6, p < 0.01). In the irritable bowel syndrome (IBS) subgroup, the probiotic group showed lower bloating severity at four weeks (4.24 ± 3 vs. 6.73 ± 3, p = 0.03) and a similar trend at eight weeks. Both groups experienced significant reductions in abdominal pain, with no significant differences between them. Microbiological analysis confirmed that the probiotic strains were present in the feces of the active group, with significant increases in concentration compared to placebo. No significant adverse events or inflammatory responses were observed between the groups.

### *L. acidophilus* NCFM and *B. lactis* Bi-07 reduced bloating




| | 4 weeks | 8 weeks |
|---|---|---|
| Placebo | 0.95 | 0.6 |
| Probiotic | -1.58 | -1.4 |

Study ran 8 weeks at 200 billion CFU/day, with 60 subjects.

**Figure 2.** Change in bloating severity from baseline to 4 weeks and from baseline to 8 weeks of intervention.

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## Other Clinical Studies:

### Lactose Intolerance:

In a small study of 20 lactose-maldigesting children, nine out of ten subjects who were symptomatic following ingestion of uninoculated milk experienced a reduction in symptoms following ingestion of milk which had been inoculated with *L. acidophilus* NCFM, compared to when they consumed un-inoculated milk.[5] The mean scores were significantly lower (0.9 ± 0.43 vs. 4.6 ± 0.73, p<0.001).

### Gastrointestinal Health:

A double-blind randomized controlled clinical trial involving 26 participants with IBS who took *L. acidophilus* NCFM for 4-6 weeks showed 73% had improvement in bloating, 62% had improvement in pain and cramps, 62% had decrease in diarrhea and 54% had improvement in constipation.[8]

### Immune Function:

A clinical trial involving 326 children aged 3-5 showed a significant reduction in cold symptoms and antibiotic use in those taking *L. acidophilus* NCFM combined with *B. lactis* Bi-07 compared to the placebo group. Specifically, the incidence of fever, cough, and rhinorrhea decreased by 53% and antibiotic use by 84%.[9]

A randomized double-blind placebo-controlled trial in 465 healthy active adults found that the combination of *L. acidophilus* NCFM and *B. lactis* Bi-07 also reduced the risk of a cold by 19% compared to placebo.[10]

A study evaluated the changes in immunoglobulins, various proteins that act as antibodies in the immune system response, in blood as well as in saliva in response to one of seven probiotic strains (20 billion CFU each) or a placebo. In this eight-arm RCT involving 83 healthy volunteers using probiotic consumption over three weeks during two vaccinations, *B. lactis* Bi-07 was one of two strains that showed to induce an increase in serum IgG (p=0.09).[3]

### Antibiotic Therapy:

In a large triple-blind RCT involving 503 patients, *L. acidophilus* NCFM and *B. lactis* Bi-07, included in both a high and low dose probiotic blend, demonstrated that the high dose blend significantly reduced antibiotic-associated symptoms, resulting in over a 50% decrease in days with diarrhea and more than an 80% reduction in bloating and abdominal pain. *Clostridium difficile*-associated diarrhea was significantly lower (p=0.02) in the high dose probiotic group compared to placebo. The capsule was taken two hours following both the antibiotic and breakfast. Probiotic usage continued one week after the antibiotic course was completed.[11]

## Conclusion:

The combination of *L. acidophilus* NCFM and *B. lactis* Bi-07 offers synergistic benefits, enhancing both gastrointestinal health and immune function. For practitioners, this underscores the value of incorporating this specific probiotic combination into patient care plans, which could lead to improved overall patient outcomes, particularly in areas related to gut and immune health.[11]


**References**

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