

APPLICATION BRIEF



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LGG[®] For *C. Difficile* Diarrhea*

Lactobacillus rhamnosus GG (LGG[®]) is the most extensively studied probiotic strain since its identification in 1985. Numerous human clinical trials have shown that supplementation with LGG[®] offers a variety of gastrointestinal benefits. Clinical data demonstrates that LGG[®] reduces diarrhea resulting from travel to foreign countries,^{1,2} side effects of antibiotics,³⁻⁸ and dysbiosis due to viral and bacterial intestinal infections, including *C. difficile* infection.^{9,10}

LGG[®] supplementation is a safe and effective antibiotic adjuvant for *C. difficile* colitis. LGG[®] protects against *C. difficile* by competing with pathogens for resources and binding sites on the intestinal mucosa, forming a protective intestinal barrier, and producing an antibacterial substance that protects against pathogens.^{*9,10}

***C. difficile* Colitis: A Severe Form of Antibiotic Associated Diarrhea**

Antibiotic therapy targets pathogens as well as the host's commensal bacteria and disturbs the balance of the gut microbiota, impeding the function of beneficial microorganisms and allowing certain pathogenic bacteria to become overactive.^{7,8}

A very serious type of antibiotic-associated diarrhea, *C. difficile*-associated colitis, refers to a wide spectrum of diarrheal illnesses due to toxins produced by this organism. Antibiotic therapy for *C. difficile* colitis is typically successful after the primary infection, however the frequency of relapse is 15-20%, regardless of the drug used. Multiple relapses, involving diarrhea and reappearance of the organism, with its cytotoxin in the stool, can occur and have devastating consequences on overall health. LGG[®] has been shown to reduce the relapse rate of *C. difficile* in two clinical trials.^{*9,10}

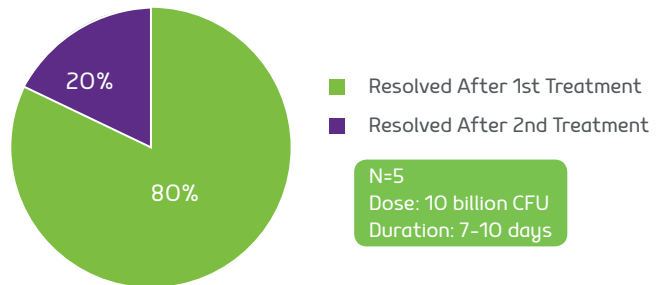
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LGG® The Proven Professional Probiotic

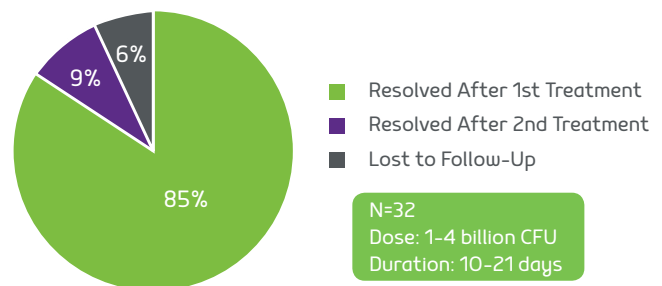


LGG® Helps Resolve Recurrent *C. difficile* Infection*

Resolution of recurrent *C. difficile*-associated diarrhea has been demonstrated by Gorbach and colleagues through LGG® supplementation at a dose of 10 billion CFU/day.⁹ Five patients, with 2-5 relapses over a ten month period, were given LGG® in skim milk for 7 to 10 days. Four of the patients experienced the resolution of diarrhea immediately, with no additional relapses, and negative or low toxin titers in their stool. The fifth patient had initial improvement with LGG®, but experienced an additional relapse, during which metronidazole was prescribed followed by LGG®, and subsequently experienced no additional relapses.



Bennet and associates confirmed this finding using lower doses.¹⁰ 32 patients with relapsing *C. difficile* diarrhea were supplemented with LGG® with doses ranging between one and four billion CFU/day for 10-21 days. 100% of the patient's symptoms improved after the first treatment and 85% of the patients' infections were resolved after a single treatment with no subsequent relapses.



References

- Hilton, E., et al., Efficacy of Lactobacillus GG as a diarrheal preventive in travelers. *Journal of Travel Medicine*, 1997. 4[1]: p. 41-43
- Oksanen, P.J., et al., Prevention of travellers' diarrhoea by Lactobacillus GG. *Annals of Medicine*, 1990. 22[1]: p. 53-56.
- Armuzzi, A., et al., The effect of oral administration of Lactobacillus GG on antibiotic-associated gastrointestinal side-effects during *Helicobacter pylori* eradication therapy. *Alimentary Pharmacology & Therapeutics*, 2001. 15[2]: p. 163-169.
- Armuzzi, A., et al., Effect of Lactobacillus GG supplementation on antibiotic-associated gastrointestinal side effects during *Helicobacter pylori* eradication therapy: a pilot study. *Digestion*, 2001. 63[1]: p. 1-7.
- Cremonini, F., et al., Effect of different probiotic preparations on anti-*Helicobacter pylori* therapy-related side effects: A parallel group, triple blind, placebo-controlled study. *American Journal of Gastroenterology*, 2002. 97[11]: p. 2744-2749.
- Siltanen, S., et al., Effect of Lactobacillus GG yoghurt in prevention of antibiotic associated diarrhoea. *Annals of Medicine*, 1990. 22[1]: p. 57-59.
- Vidlock, E.J. and F. Cremonini, Meta-analysis: probiotics in antibiotic-associated diarrhoea. *Alimentary Pharmacology & Therapeutics*, 2012. 35[12]: p. 1355-1369.
- Rodgers, B., K. Kirley, and A. Mounsey, PURLs: prescribing an antibiotic? Pair it with probiotics. *The Journal of family practice*, 2013. 62[3]: p. 148-150.
- Gorbach, S.L., T.W. Chang, and B. Goldin, Successful treatment of relapsing *Clostridium difficile* colitis with Lactobacillus GG. *Lancet*, 1987. 2[8574]: p. 1519.
- Bennett, R., et al., Treatment of relapsing *Clostridium difficile* diarrhea with Lactobacillus GG. *Nutrition Today Supplement*, 1996. 31[6]: p. 355.
- Mack, D.R., et al., Extracellular MUC3 mucin secretion follows adherence of Lactobacillus strains to intestinal epithelial cells in vitro. *Gut*, 2003. 52[6]: p. 827-833.
- Mack, D.R., et al., Probiotics inhibit enteropathogenic *E. coli* adherence in vitro by inducing intestinal mucin gene expression. *American Journal of Physiology - Gastrointestinal and Liver Physiology*, 1999. 276[4]: p. G941-G950.

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*THESE STATEMENTS HAVE NOT BEEN EVALUATED BY THE FOOD AND DRUG ADMINISTRATION. THIS PRODUCT IS NOT INTENDED TO DIAGNOSE, TREAT, CURE OR PREVENT ANY DISEASE.