

LACTOBACILLUS ACIDOPHILUS = Not good, and for many people, very bad.

References showing that Lactobacillus acidophilus is:

- at best, better than nothing
- inferior to other probiotics
- vastly inferior to synbiotic supplementation
- potentially harmful, particularly to children and immuno-compromised patients who most need restoration of normal intestinal flora
- potentially harmful to anyone with inflammatory bowel conditions (ironically, the very reason many people supplement with *L. acidophilus*)
- potentially harmful to individuals unable to lose weight

Lactobacilli, contrary to long-held beliefs of both legitimate researchers and health food industry fanatics, are not a significant component of the human microbiota. Lactobacilli are now known to not be the numerically dominant organisms of the human gut even though they are still listed as such in many microbiology textbooks. Lactobacilli form a very small proportion of the human microbiota and account for only about 0.01% (1 in 10,000) of the total cultivable counts. Lactobacilli are not detectable at all in about 25% of human fecal samples, and the lactobacilli that do exist are largely just passing through, not colonizers. The only lactobacillus known to colonize the human gut is *L. reuteri*. There are absolutely no *L. acidophilus* nor any other lactobacillus species in healthy adult human microbiota.

L. acidophilus is found in significant quantities in the colon of human infants, but by age 2 the healthy gut shows no acidophilus colonization. The only place where *L. acidophilus* does colonize is in the human oral cavity, where *L. acidophilus* is one of the predominant species. In fact, the few *L. acidophilus* that are occasionally detected in healthy human feces are just passing through, having originated in the mouth.

When taken in large quantities as a probiotic supplement, *Lactobacillus acidophilus* will colonize the human gut, at least temporarily. In doing so, however, it crowds out other health-promoting bacteria that have more beneficial immune-modulating effects. It also crowds out the species that produce greater quantities of the all-important short-chain fatty acids that feed the lining of the gut, and favorably influence both immune function and metabolic efficiency (including control of cholesterol and triglycerides).

L. acidophilus has pro-inflammatory effects, which are largely harmful, especially to those with inflammatory bowel diseases such as Crohn's disease, ulcerative colitis, or celiac disease. Some individuals do actually benefit from the *L. acidophilus* stimulation of the inflammatory cytokines TNF-alpha, Interferon-gamma, and Interleukin-12. These are the patients whose immune systems are unable to mount adequate defense against microbial pathogens,

and those with certain allergic conditions, atopic dermatitis, and chronic candidiasis. But, these benefits of activating Th1 cytokines are achieved just as well with other probiotics, and with prebiotics, without all the other negative effects of *L. acidophilus*.

L. acidophilus is far inferior to other probiotics in supporting Immunoglobulin A --- the primary mucosal defense system of the body. Researchers looked at immune system strengthening by measuring the number of IgA cells in the bronchial mucosa in response to probiotic supplementation. Oral supplementation with *L. rhamnosus*, *casei*, *delbrueckii*, and *bulgaricus* all enhanced IgA cells at the bronchial level, but *L. acidophilus* did not.

Many studies have looked at the potential for bacterial infection as the result of probiotic supplementation --- especially in infants and children. Most studies find that the incidence of bacteraemia cases caused by lactobacilli was associated only with *L. acidophilus* and not at all with *L. paracasei*, nor *L. rhamnosus*.

L. acidophilus blocks the two-way communication line along what researchers now refer to as “The Gut-Adipose Axis.” Consequently, supplementation with *L. acidophilus* sabotages any efforts at weight loss. All the manifestations of insulin resistance (Metabolic Syndrome) are exacerbated by *L. acidophilus* --- including weight gain (especially abdominal weight gain), high triglycerides and cholesterol, cardiovascular disease, and diabetes. --- Yes --- the most popular of all probiotic supplements makes people fat, sick, and old. Of all the probiotics tested, only *L. acidophilus* increases the expression of CB2 --- the obesity-generating messenger in the Gut-Adipose Axis.

1. Larson, et al. Predominant genera of fecal microbiota in children with atopic dermatitis are not altered by intake of probiotic *Lactobacillus acidophilus* and *bifidobacterium animalis*. FEMS Microbiol Ecol, March 2011.

This study highlighted several aspects of how inappropriate and useless *Lactobacillus acidophilus* supplementation is. This study looked at children (not infants) with atopic dermatitis. The first thing that was found is that the small core population of the *Lactobacillus* group in these children’s intestinal flora included mainly *Lactobacillus gasseri*, *fermentum*, *oris*, and *mesenteroides*, with no significant amount of *Lactobacillus acidophilus*. Here we have confirmation of our comment that *Lactobacillus acidophilus* is only an appropriate component of the intestinal flora of infants. Once the age of two years is reached, there should be no *Lactobacillus acidophilus* in the gut.

After supplementation with *L. acidophilus*, the *L. acidophilus* population in the colon of these children increased significantly, indicating survival of the

ingested bacteria. But here is the real blockbuster headline from the study --- as the *Lactobacillus acidophilus* population increased, the atopic eczema severity worsened in perfect correlation with the probiotic intake. We can conclude from this study that atopic eczema involves an immune system activation that is associated to some degree with the 75% of the immune system in the gut wall, and that such immune reactivity is influenced by intestinal flora (and the production of SCFA by that intestinal flora), and that however good or bad the intestinal/immune milieu was in these children, it was made worse by *Lactobacillus acidophilus*.

[There are studies showing benefits from *Lactobacillus acidophilus* supplementation in children with atopic dermatitis, but most of these studies were done on children who were taking steroid medication --- which adversely affects intestinal flora, particularly increasing growth of yeast and fungi. In those cases, the *Lactobacillus* would be a case of “better than nothing” since it would reverse the excess alkalinity of the colon and at least give some suppression of the excess mycotic overgrowth.]

2. Perez, et al. Effect of probiotic supplementation on immunoglobulins, isoagglutinins, and antibody response in children of low socioeconomic status. Eur J Nutr, April 2010.

This study supplemented children at risk for recurrent bacterial and viral infection with *Lactobacillus acidophilus*, and found no beneficial immune effects whatsoever.

3. Copp, et al. Probiotics and prevention of allergic disease. Curr Opin Clin Nutr Metab Care, May 2009.

This study refuted the earlier studies claiming benefits from *Lactobacillus acidophilus* supplementation in allergic disease. The two major findings in this study were a) *Lactobacillus acidophilus* provided absolutely no decrease in the development of atopic dermatitis in neonates, and b) there was an unexpected increase in respiratory side effects shown by many studies of children who received *Lactobacillus acidophilus* supplementation.

4. Taylor, et al. Probiotic supplementation for the first six months of life fails to reduce the risk of atopic dermatitis, yet increases the risk of allergen sensitization in high-risk children: a randomized controlled trial. J Allergy Clin Immunol, January 2007.

As the title of this study indicates, children supplemented with *Lactobacillus acidophilus* in the first six months of life not only were not protected against the development of allergies, but actually showed an increased incidence of allergies at 12 months of age. The development of an

allergy to cow's milk was particularly correlated with the presence of *Lactobacillus acidophilus* in the colon at age six months.

5. Reuman, et al. Lack of effect of *Lactobacillus acidophilus* on gastrointestinal bacterial colonization in premature infants. *Pediatr Infect Dis*, November 1986.

Studies were carried out on premature infants to determine the effect of feeding *L. acidophilus* in an attempt to prevent gram-negative infections in these immunodeficient premature infants. Administration of *L. acidophilus* had no beneficial effects in decreasing either the number of gram-negative enteric organisms, nor in the number of antibiotic resistant bacteria.

[You have just read 5 studies highlighting the uselessness and even the potential harm from *Lactobacillus acidophilus* supplementation in infants and very young children. Studies with young children are significant because the first year or so of life is the only time when species of *Lactobacillus* make up a small but significant percentage of the normal intestinal flora, and the only time any *Lactobacillus acidophilus* should be found. --- If *L. acidophilus* supplementation is ill-advised in infants when it is an acceptable part of natural flora, then no case can be made for *L. Acidophilus* supplementation for adults since their healthy flora includes no *L. acidophilus*.]

6. Perdigon, et al. Influence of the oral administration of lactic acid bacteria on IgA-producing cells associated with bronchial disease. *Int J Immunopathol Pharmacol*, May-Aug 1999.

Respiratory mucosal surfaces are one of the most important routes of entry for microbial pathogens. This study looked at the potentiality of lactic acid bacteria enhancing not only the gut immune response, but the immune response of the respiratory tract as well. The researchers looked at immune system strengthening by measuring the number of Immunoglobulin A cells in the bronchial mucosa in response to probiotic supplementation. Oral supplementation with *Lactobacillus rhamnosis*, *casei*, and *delbrueckii*, and *bulgaricus* all enhanced IgA cells at the bronchial level, but *Lactobacillus acidophilus* did not.

7. Wheeler, et al. Immune and clinical impact of *Lactobacillus acidophilus* on asthma. *Ann Allergy Asthma Immunol*, Sep 1997.

This study investigated the hypothesized benefits of *Lactobacillus acidophilus* on allergic asthma. 15 adult patients with moderate asthma were supplemented twice daily with *Lactobacillus acidophilus*. The *L. acidophilus* supplementation yielded no significant changes in Immunoglobulin E, Interleukin-2, or Interleukin-4 (immunoglobulins and inflammatory cytokines typically elevated in asthma cases), and absolutely

no improvement in functional parameters such as mean daily peak airflow or in spirometric values.

8. Stroehlein JR, et al. Microscopic colitis. Curr Treat Options Gastroenterol, Jun 2007.

This study of the lymphocytic infiltration of the colon in microscopic colitis stated unequivocally that probiotic therapy with *Lactobacillus acidophilus* has not been shown to be effective in reducing bowel frequency in this condition.

9. Briand, et al. Absence of efficacy of nonviable *Lactobacillus acidophilus* for the prevention of traveler's diarrhea: A randomized, double-blind, controlled study. Clin Infect Dis, Nov 2006.

There was absolutely no beneficial effect of treatment with *Lactobacillus acidophilus* for the prevention of traveler's diarrhea.

10. Cukovic-cavka, et al. *Lactobacillus acidophilus* as a cause of liver abscess in a patient with Crohn's disease. Digestion, 2006.

This was a case study of a patient being treated with steroids for Crohn's disease. The immunologic incompetence due to both the immunosuppressive effects of the corticosteroid plus the INE stress of the Crohn's disease left the patient's immune system weak enough that *Lactobacillus* caused a pus-filled, life-threatening abscess in the liver, and *Lactobacillus* was found in multiple abdominal collections and in the pleura. The point is to show that in immuno-compromised individuals, even typically benign bacteria such as *L. acidophilus* can become pathogenic. There are no studies showing pathogenicity of *Lactobacillus reuteri* nor most other bacterial probiotics.

11. Chou, et al. In vitro antibiotic susceptibility of *Lactobacilli* isolated from commercial products containing active *Lactobacilli*. Acta Paediatr Taiwan, May 2004.

This study showed that *Lactobacillus acidophilus* was greatly inferior to *Lactobacillus casei* in resistance to antibiotics.

12. Sullivan, et al. Probiotic *Lactobacilli* and Bacteraemia in Stockholm. Scand J Infect Dis, 2006.

This is one of many studies looking at the potential for bacterial infection as a result of probiotic supplementation. The study found that the incidence of bacteraemia cases caused by *Lactobacilli* was associated only with

Lactobacillus acidophilus, and not at all with L. paracasei nor L. rhamnosus.

13. Gackowska, et al. Combined effect of different lactic acid bacteria strains on the mode of cytokines pattern expression in human peripheral blood mononuclear cells. J Physiol Pharmacol, November 2006.

This study showed that even outside the GI tract, L. acidophilus stimulates far more pro-inflammatory cytokines than other probiotics, including other species of Lactobacillus. L. acidophilus was a much stronger inducer of the Th1 pro-inflammatory cytokine IFN-gamma, and a several times higher IL-12 stimulator than the two other strains of Lactobacillus studied. L. acidophilus also showed its pro-inflammatory potential by inducing the inflammatory cytokine TNF-alpha. Note that IL-12 is the major inflammatory cytokine involved in almost all inflammatory bowel conditions, and TNF-alpha is the major cytokine in Crohn's disease and very often in ulcerative colitis.

14. Fink LN, et al. Dendritic cells from Peyer's patches and mesenteric lymph nodes differ from spleen dendritic cells in their response to commensal gut bacteria. Scand J Immunol, September 2008.

This study showed that Peyer's patches (a critical immune-related area of the gut that maintains dendritic cell reactivity) responds differently to various probiotics. It was shown that dendritic cell preparations produced large amounts of IFN-gamma, Interleukin 6, TNF-alpha, and Interleukin 12 (all pro-inflammatory cytokines) in response to L. acidophilus.

15. Kim JY, et al. Probiotic modulation of dendritic cells co-cultured with intestinal epithelial cells. World J Gastroenterol, March 2012.

This study concluded that specific probiotic strains exert differential immune modulation mediated by the interaction of dendritic cells and epithelial cells in the homeostasis of the gastrointestinal tract. Specifically, L. acidophilus increased the production of inflammatory cytokines Interleukin 6 and TNF-alpha, and unlike the other probiotics tested did not increase the production of the anti-inflammatory Interleukin 10.

16. Ho YH, et al. Daily intake of probiotics with high IFN-gamma/IL-10 ratio increases the cytotoxicity of human natural killer cells: A personalized probiotic approach. J Immunol Res, December 2014.

This study showed that of all the probiotics tested L. acidophilus was the dominant inducer of the IFN-gamma (Th1 inflammatory cytokine) group, yielding a higher ratio of IFN-gamma to the anti-inflammatory IL-10 than the other 5 probiotics.

17. Begtrup LM, et al. Long-term treatment with probiotics in primary care patients with irritable bowel syndrome – a randomized, double-blind, placebo controlled trial. Scand J Gastroenterol, October 2013.

During a 6-month treatment period using *L. acidophilus* in combination with 2 other probiotics, there was absolutely no positive effect of the probiotic when compared with placebo.

18. Yoon JS, et al. Effect of multispecies probiotics on irritable bowel syndrome: a randomized, double-blind placebo controlled trial. J Gastroenterol Hepatol, January 2014.

Here we have yet another study using *Lactobacillus acidophilus* in combination with other probiotics in a controlled trial to determine any benefit for IBS. This study did show benefit to IBS patients from the probiotics, but, the multispecies probiotic used in the test group included several species known to reverse the high production of inflammatory cytokines induced by *L. acidophilus*.

[You have just read 6 studies highlighting the pro-inflammatory effects of *Lactobacillus acidophilus*. Specifically, *L. acidophilus* induces the production of the Th1 inflammatory cytokines Interleukin 12, Interleukin 6, Interferon-gamma, and TNF-alpha. That stimulus of pro-inflammatory response is evident both within the GI tract and in peripheral immune cells as well. Studies done on human test subjects and on human cell cultures demonstrates the potential aggravation of intestinal inflammatory conditions with *Lactobacillus acidophilus* supplementation.

If you do a literature search, you will find quite a number of studies that show a beneficial effect in irritable bowel syndrome from *Lactobacillus acidophilus* supplementation. However, almost all these studies fall into one of two categories. In the first category of studies, the *L. acidophilus* was combined with several other probiotics, all of which are anti-inflammatory in character, and thus oppose the pro-inflammatory effects of *L. acidophilus*. The second group of studies involved intestinal inflammation associated with overgrowth of yeast/fungal pathogens. In those cases, the induction of Th1 inflammatory cytokines by *L. acidophilus* is actually specifically therapeutic.

In general, however, *L. acidophilus* (along with *L. rhamnosus* for the same reason --- induction of pro-inflammatory cytokines) should be strictly avoided in all inflammatory intestinal conditions. There are other probiotics that are specifically anti-inflammatory and much more consistently beneficial, and which consistently show no negative reactions to supplementation.]

19. Geurts, et al. Gut microbiota controls adipose tissue expansion, gut barrier and glucose metabolism: Novel insights into molecular targets and interventions using prebiotics. Beneficial Microbes, March 2014.

This is one of many studies showing the intriguing connection between the gut and the brain, the gut and adipose tissue, the gut and the liver, the gut and the pancreas, the gut and muscle tissue. Specifically as applies to the Gut-Adipose Axis, *L. acidophilus* distorts the communication line between the gut and adipose tissue, increasing the obesity-generating messenger CB2. Indeed, not just abdominal weight gain but all pathologies associated with insulin resistance can be exacerbated by *L. acidophilus*.