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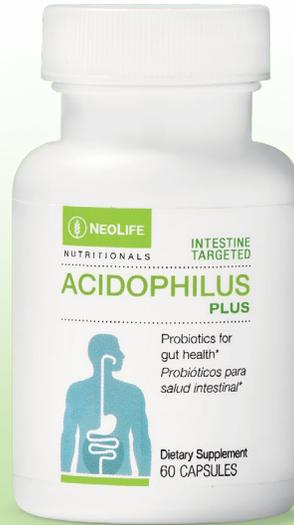
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Acidophilus Plus



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PEER REVIEWED STUDIES

Cognitive Health

Consumption of fermented milk product with probiotic modulates brain activity

ABSTRACT

Background & Aims:

Changes in gut microbiota have been reported to alter signaling mechanisms, emotional behavior, and visceral nociceptive reflexes in rodents. However, alteration of the intestinal microbiota with antibiotics or probiotics has not been shown to produce these changes in humans. We investigated whether consumption of a fermented milk product with probiotic (FMPP) for 4 weeks by healthy women altered brain intrinsic connectivity or responses to emotional attention tasks.

Methods:

Healthy women with no gastrointestinal or psychiatric symptoms were randomly assigned to groups given FMPP (n = 12), a nonfermented milk product (n = 11, controls), or no intervention (n = 13) twice daily for 4 weeks. The FMPP contained *Bifidobacterium animalis* subsp *Lactis*, *Streptococcus thermophiles*, *Lactobacillus bulgaricus*, and *Lactococcus lactis* subsp *Lactis*. Participants underwent functional magnetic resonance imaging before and after the intervention to measure brain response to an emotional faces attention task and resting brain activity. Multivariate and region of interest analyses were performed.

Results:

FMPP intake was associated with reduced task-related response of a distributed functional network (49% cross-block covariance; $P = .004$) containing affective, viscerosensory, and somatosensory cortices. Alterations in intrinsic activity of resting brain indicated that ingestion of FMPP was associated with changes in midbrain connectivity, which could explain the observed differences in activity during the task.

Conclusions:

Four-week intake of an FMPP by healthy

women affected activity of brain regions that control central processing of emotion and sensation.

Source

Tillisch K et al. Consumption of fermented milk product with probiotic modulates brain activity. Gastroenterol 144:1394-1401, 2013.

Digestive Health

Probiotics in prevention of antibiotic associated diarrhoea: meta-analysis

ABSTRACT

Objective:

To evaluate efficacy of probiotics in prevention and treatment of diarrhoea associated with the use of antibiotics.

Design:

Meta-analysis; outcome data (proportion of patients not getting diarrhoea) were analysed, pooled, and compared to determine odds ratios in treated and control groups.

Identification:

Studies identified by searching Medline between 1966 and 2000 and the Cochrane Library. Studies reviewed Nine randomised, double blind, placebo controlled trials of probiotics.

Results:

Two of the nine studies investigated the effects of probiotics in children. Four trials used a yeast (*Saccharomyces boulardii*), four used lactobacilli, and one used a strain of enterococcus that produced lactic acid. Three trials used a combination of probiotic strains of bacteria. In all nine trials, the probiotics were given in combination with antibiotics and the control groups received placebo and antibiotics. The odds ratio in favour of active treatment over placebo in preventing diarrhoea associated with antibiotics was 0.39 (95% confidence interval 0.25 to 0.62; $P < 0.001$) for the yeast and 0.34 (0.19 to 0.61; $P < 0.01$) for lactobacilli. The combined odds ratio was 0.37 (0.26 to 0.53; $P < 0.001$) in favour of active treatment over placebo.

Conclusion:

The meta-analysis suggests that probiotics can be used to prevent antibiotic associated

diarrhoea and that *S. boulardii* and lactobacilli have the potential to be used in this situation. The efficacy of probiotics in treating antibiotic associated diarrhoea remains to be proved. A further large trial in which probiotics are used as preventive agents should look at the costs of and need for routine use of these agents.

Source

D'Souza AL, et al. Probiotics in prevention of antibiotic associated diarrhoea: meta-analysis. BMJ. 2002;324:1361

Probiotics—Compensation for Lactase Insufficiency

ABSTRACT

Yogurt and other conventional starter cultures and probiotic bacteria in fermented and unfermented milk products improve lactose digestion and eliminate symptoms of intolerance in lactose maldigesters. These beneficial effects are due to microbial beta-galactosidase in the (fermented) milk product, delayed gastrointestinal transit, positive effects on intestinal functions and colonic microflora, and reduced sensitivity to symptoms. Intact bacterial cell walls, which act as a mechanical protection of lactase during gastric transit, and the release of the enzyme into the small intestine are determinants of efficiency. There is a poor correlation between lactose maldigestion and intolerance; in some studies, low hydrogen exhalation without significant improvement of clinical symptoms was observed. Probiotic bacteria, which by definition target the colon, normally promote lactose digestion in the small intestine less efficiently than do yogurt cultures. They may, however, alleviate clinical symptoms brought about by undigested lactose or other reasons.

Source

deVrese M, et al. Probiotics—Compensation for Lactase Insufficiency. Am J Clin Nutr. 2001;421S-429S

“Probiotic” remedies are not what they seem

ABSTRACT

Objective:

To assess whether commercially prepared probiotic products contain viable organisms, as claimed by their manufacturers, particularly whether products labeled as containing *Lactobacillus* did so. To identify and quantify as many species as feasible and to compare them with the contents listed on labels.

Design:

Randomized, double-blind trial.

Identification:

Community hospital in Chilliwack, BC.

Main Outcome Measures:

Trial of 10 randomly chosen brands of probiotic preparations bought over-the-counter in British Columbia’s lower mainland. Only products claiming to contain *Lactobacillus* were included in this study. Viable organisms in each probiotic brand and quantities of *Lactobacillus* in each product.

Results:

None of the 10 products tested matched their labeled microbiologic specifications. Two brands grew nothing aerobically or anaerobically. No *Lactobacillus* grew in five brands, although their labels stated that this was the main species. Eight brands contained viable cells, but only 10% of the number stated by their manufacturers.

Conclusion:

Most product labels did not adequately identify or quantify microbes. Use of probiotics should not be recommended at this time.

Source

Hamilton-Miller JM, Shah S, and Smith CT. “Probiotic” remedies are not what they seem. BMJ. 1996 January 6; 312(7022): 55–56

Effect of lactic acid bacteria on the intestinal production of lactate and short-chain fatty acids, and the absorption of lactose

ABSTRACT

The characteristic fermentation pattern seen with specific saccharides in incubations with pure cultures of *Lactobacillus acidophilus* and *Bifidobacterium bifidum* disappeared when incubated in 16.7% fecal homogenate. The productions of lactate and short-chain fatty acids in mixed bacterial-fecal incubations were similar to productions in fecal homogenates without *L. acidophilus* and *B. bifidum* and were mainly associated with the specific mono-, di-, and polysaccharides added to the incubate. *B. bifidum* was cultured from ileostomic contents in eight of nine ileostomists after oral administration (2.4×10^{10} cells), but did not influence the concentrations and productions of DL-lactate and short-chain fatty acids in the ileostomic outputs and incubates. Large amounts of ingested lactic acid bacteria (4.2×10^{10} cells) did not ameliorate lactose malabsorption measured by the breath-hydrogen test in 12 lactose malabsorbers. This study shows that ingested lactic acid bacteria are indeed present in the colon, but it does not support the theory that they change the pattern of colonic fermentation or the degree of intestinal lactose malabsorption.

Source

Hove H, Nordgaard-Andersen I, and Mortensen PB. Effect of lactic acid bacteria on the intestinal production of lactate and short-chain fatty acids, and the absorption of lactose. Am J Clin Nutr. 1994;59: 74-79

Review article: The use of biotherapeutic agents in the prevention and treatment of gastrointestinal disease

ABSTRACT

There is presently a lack of well conducted clinical trials demonstrating any significant benefits of probiotics in humans. With the exception of diarrhoea due to rotavirus infection in children there is little evidence from randomized, double-blind,

placebo-controlled studies that bacterial probiotics have a significant beneficial action in preventing diarrhoea of any cause. The yeast *Saccharomyces boulardii* has been shown to be of benefit in the prevention of antibiotic-associated diarrhoea but not in preventing infection with *Clostridium difficile*. *S. boulardii* may also be of benefit in preventing relapse of *C. difficile* infection. Because of the simplicity of in vitro systems and some animal models, beneficial characteristics of probiotics such as the ability of bacteria to bind to epithelial surfaces are not always transferable to humans. Thus any postulated benefit from consumption of probiotic bacteria should only be accepted as fact after testing in clinical studies. This review outlines our present knowledge of the mode of action of probiotics and presents the data from clinical trials on their use.

Source

Lewis SJ and Freedman AR. Review article: The use of biotherapeutic agents in the prevention and treatment of gastrointestinal disease. Aliment Pharmacol Ther. 1998 Sep;12(9):807-22.

Lactobacilli in relation to human ecology and antimicrobial therapy

ABSTRACT

The establishment of lactobacilli in the gastrointestinal tract is believed to contribute to the stabilization of the microflora of healthy subjects and to exert beneficial effects on the host. Because of these proposed healthful properties, several *Lactobacillus* species have been used especially to prevent gastrointestinal disturbances. Though there have been several studies of the possible beneficial effects of lactobacilli in humans, there is still no conclusive evidence for the therapeutic value of these microorganisms.

Source

Lidbeck A and Nord C E. Lactobacilli in relation to human ecology and antimicrobial therapy. Intl J Tissue Reac. 1991;13(2):115-22.

Oral supplementation with lactic acid bacteria during intake of clindamycin

ABSTRACT

Objective:

To study the effect of administration of clindamycin with or without supplementation of the intestinal microflora with *Bifidobacterium bifidum* and *Lactobacillus acidophilus*.

Methods:

Twenty-three healthy subjects received clindamycin by mouth for 7 days. Eleven of the subjects also received capsules containing lyophilized *L. acidophilus* and *B. bifidum* for 14 days. The other 12 subjects received placebo.

Results:

There was a marked decrease in total numbers of anaerobic bacteria during the administration of clindamycin. In the lactic acid bacteria-supplemented group, a tendency towards delayed reduction and earlier increase in bifidobacteria was observed, and two of 11 subjects (18%) were colonized with *Clostridium difficile*, in comparison with five of 12 (41%) in the placebo group. The total number of microorganisms was significantly higher in the lactic acid bacteria-supplemented group than in the placebo group ($p=0.02$) 4 days after the end of clindamycin administration. The difference was mainly due to higher counts of *Escherichia coli* and enterococci. Mean levels of other enterobacteria increased less in the lactic acid bacteria-supplemented group than in the placebo group between days 0 and 14.

Conclusion:

The recolonization with aerobic and anaerobic microorganisms was faster in the lactic acid bacteria-supplemented group than in the placebo group. This may be of importance in preventing colonization with *C. difficile*.

Source

Nord CE, et al. Oral supplementation with lactic acid bacteria during intake of clindamycin. *Clin Microbiol & Infect.* 1997;3(1): 124-132

Hydrogen excretion upon ingestion of dairy products in lactose-intolerant male subjects: importance of the live flora

ABSTRACT

Objective:

To assess the effects of the ingestion of milk, yoghurt (10(8) bacteria/ml), heat-treated yoghurt (<15 bacteria/ml) and two products obtained by dilution of yoghurt with heat-treated product (10(6) and 10(5) bacteria/ml) on hydrogen production and symptoms of lactose intolerance in lactose malabsorbers.

Design:

Double-blind, randomised cross-over design.

Setting:

The study was performed in the phase 1 clinical unit of OPTIMED, Nancy, France.

Subjects:

Twenty-four male lactose malabsorbers were selected for the study.

Interventions:

Hydrogen production and adverse events were followed during 8 h after ingestion of the products.

Results:

The results clearly demonstrate that ingestion of yoghurt with 10(8) bacteria/ml leads to lower H₂ excretion and complaints than the other products. Results observed with the products containing a reduced population of live flora remain better than those observed with milk.

Conclusion:

The importance of a high population of the live flora is underlined.

Source

Pelletier X, Laure-Boussuge S, Donazzolo Y. Hydrogen excretion upon ingestion of dairy products in lactose-intolerant male subjects: importance of the live flora. *Eur J Clin Nutr.* 2001;55:509-512.

Clostridium difficile pilot study: effects of probiotic supplementation on the incidence of C. difficile diarrhoea

ABSTRACT

Colonic infection with *Clostridium difficile*, leading to pseudomembranous colitis, is a common complication of antibiotic therapy, especially in elderly patients. It has been suggested that non-pathogenic probiotic bacteria might prevent the development and recurrence of *C. difficile* infection. This double-blind, placebo-controlled study examines the role of probiotic administration in the prevention of *C. difficile*-associated diarrhoea (CDAD) in elderly patients receiving antibiotic therapy. Consecutive patients (150) receiving antibiotic therapy were randomised to receive either a probiotic containing both *Lactobacillus* and *Bifidobacterium* or placebo for 20 days. Upon admission to hospital, bowel habit was recorded and a faecal sample taken. Trial probiotic or placebo was taken within 72 h of prescription of antibiotics, and a second stool sample was taken in the event of development of diarrhoea during hospitalisation or after discharge. Of the randomised patients, 138 completed the study, 69 with probiotics in conjunction with antibiotics and 69 with antibiotics alone. On the basis of development of diarrhoea, the incidence of samples positive for *C. difficile*-associated toxins was 2.9% in the probiotic group compared with 7.25% in the placebo-control group. When samples from all patients were tested (rather than just those developing diarrhoea) 46% of probiotic patients were toxin-positive compared with 78% of the placebo group.

Source

Plummer S, et al. *Clostridium difficile* pilot study: effects of probiotic supplementation on the incidence of *C. difficile* diarrhoea. *Int Microbiol.* 2004;7:59-62.

Fermented milks, probiotic cultures, and colon cancer

ABSTRACT

Colorectal cancer (CRC) is a major cause of death from cancer in the Western world.

Approximately 70% of CRC is associated with environmental factors, probably mainly the diet. There is interest in the potential protective role of fermented milks containing probiotic cultures against CRC. This article analyzes the existing data from human, animal, and in vitro studies that explore whether consumption of milks fermented with probiotic cultures could play a role in colon cancer risk reduction. Cohort studies have failed to detect significant effects, but most case-control studies favor a protective role of fermented milks against colon cancer. Interventional studies have shown a shift of intermediate markers of CRC risk in human subjects from a high- to low-risk pattern after ingestion of fermented milks or probiotics. Animal studies consistently show a reduction in chemically induced colorectal tumor incidence and aberrant crypt formation accompanying probiotic administration. In vitro studies also provide evidence of protection, and permit a better understanding of active compounds involved, and of the mechanisms underlying their anticarcinogenic effects. Probiotics may beneficially modulate several major intestinal functions: detoxification, colonic fermentation, transit, and immune status, which may accompany the development of colon cancer. Although the evidence is not conclusive and much further research is required, the data reviewed constitute a promising body of evidence supporting the protective role of milks fermented with probiotic cultures in colon cancer risk reduction.

Source

Saikali J. *Fermented milks, probiotic cultures, and colon cancer. Nutr and Cancer. 2004; 49:14-24.*

Demonstration of safety of probiotics— a review

ABSTRACT

Probiotics are commonly defined as viable microorganisms (bacteria or yeasts) that exhibit a beneficial effect on the health of the host when they are ingested. They are used in foods, especially in fermented dairy products, but also in pharmaceutical preparations. The development of new probiotic strains aims at

more active beneficial organisms. In the case of novel microorganisms and modified organisms the question of their safety and the risk to benefit ratio have to be assessed. Lactic acid bacteria (LAB) in foods have a long history of safe use. Members of the genera *Lactococcus* and *Lactobacillus* are most commonly given generally-recognised-as-safe (GRAS) status whilst members of the genera *Streptococcus* and *Enterococcus* and some other genera of LAB contain some opportunistic pathogens. Lactic acid bacteria are intrinsically resistant to many antibiotics. In many cases resistances are not, however, transmissible, and the species are also sensitive to many clinically used antibiotics even in the case of a lactic acid bacteria-associated opportunistic infection. Therefore no particular safety concern is associated with intrinsic type of resistance. Plasmid-associated antibiotic resistance, which occasionally occurs, is another matter because of the possibility of the resistance spreading to other, more harmful species and genera. The transmissible enterococcal resistance against glycopeptide antibiotics (vancomycin and teicoplanin) is particularly noteworthy, as vancomycin is one of the last effective antibiotics left in the treatment of certain multidrug-resistant pathogens. New species and more specific strains of probiotic bacteria are constantly identified. Prior to incorporating new strains into products their efficacy should be carefully assessed, and a case by case evaluation as to whether they share the safety status of traditional food-grade organisms should be made. The current documentation of adverse effects in the literature is reviewed. Future recommendations for the safety of already existing and new probiotics will be given.

Source

Salminen S, et al. *Demonstration of safety of probiotics—a review. Int J Food Microbiol. 1998 Oct 20;44(1-2):93-106.*

A randomized trial of *Lactobacillus acidophilus* BG2FO4 to treat lactose intolerance

ABSTRACT

Background:

Lactose intolerance is the most common disorder of intestinal carbohydrate digestion. *Lactobacillus acidophilus* BG2FO4 is a strain of lactobacilli with properties of marked intestinal adherence and high beta-galactosidase activity.

Objective:

This study was designed to determine whether oral feeding of *Lactobacillus acidophilus* BG2FO4 leads to a lactose-tolerant state.

Design:

We studied 42 subjects with self-reported lactose intolerance and performed breath-hydrogen tests to determine whether they were lactose maldigesters. Subjects with established lactose maldigestion (n = 24) were invited to be randomly assigned to an omeprazole-treated (hypochlorhydric) group or a non-omeprazole-treated group, but 6 subjects chose not to participate. All randomly assigned subjects (n = 18) ingested *Lactobacillus acidophilus* BG2FO4 twice per day for 7 d and stool samples were collected. Breath-hydrogen tests were performed and symptom scores were recorded at baseline and after lactobacilli ingestion.

Results:

Lactose maldigestion was established in 24 of 42 subjects (57%) with self-reported lactose intolerance. In 18 lactose-maldigesting subjects, overall hydrogen production and symptom scores after ingestion of *Lactobacillus acidophilus* BG2FO4 were not significantly different from baseline values. Live *Lactobacillus acidophilus* BG2FO4 was recovered in stool samples from 7 subjects.

Conclusion:

Lactose intolerance is overreported in subjects with gastrointestinal symptoms after lactose ingestion. Treatment of lactose-maldigesting subjects with and without hypochlorhydria with *Lactobacillus acidophilus* BG2FO4 for 7 d failed to change breath-hydrogen excretion significantly after lactose ingestion.

Source

Saltzman JR, et al. *A randomized trial of Lactobacillus acidophilus BG2FO4 to treat lactose intolerance. Am J Clin Nutr. 1999;69: 140-146.*

Healthy Pregnancy

Gut microbiota composition is associated with body weight, weight gain and biochemical parameters in pregnant women

ABSTRACT

Obesity is associated with complications during pregnancy and increased health risks in the newborn. The objective of the present study was to establish possible relationships between gut microbiota, body weight, weight gain and biochemical parameters in pregnant women. Fifty pregnant women were classified according to their BMI in normal-weight (n 34) and overweight (n 16) groups. Gut microbiota composition was analysed by quantitative real-time PCR in faeces and biochemical parameters in plasma at 24 weeks of pregnancy. Reduced numbers of Bifidobacterium and Bacteroides and increased numbers of Staphylococcus, Enterobacteriaceae and Escherichia coli were detected in overweight compared with normal-weight pregnant women. E. coli numbers were higher in women with excessive weight gain than in women with normal weight gain during pregnancy, while Bifidobacterium and Akkermansia muciniphila showed an opposite trend. In the whole population, increased total bacteria and Staphylococcus numbers were related to increased plasma cholesterol levels. Increased Bacteroides numbers were related to increased HDL-cholesterol and folic acid levels, and reduced TAG levels. Increased Bifidobacterium numbers were related to increased folic acid levels. Increased Enterobacteriaceae and E. coli numbers were related to increased ferritin and reduced transferrin, while Bifidobacterium levels showed the opposite trend. Therefore, gut microbiota composition is related to body weight, weight gain and metabolic biomarkers during pregnancy, which might be of relevance to the management of the health of women and infants.

Source

Santacruz A, Gut microbiota composition is associated with body weight, weight gain and biochemical parameters in pregnant women. *Br J Nutr.* 2010 Jul;104(1):83-92.

Skin Health

Prospective, randomized, open-label trial comparing the safety, efficacy, and tolerability of an acne treatment regimen with and without a probiotic supplement and minocycline in subjects with mild to moderate acne

ABSTRACT

Background:

Systemic antibiotics are an effective treatment for acne vulgaris. However, intolerable side effects may invariably occur.

Objective:

To determine whether probiotics reduce the side effects imparted by systemic antibiotics while working synergistically with the latter in treating inflammatory acne.

Methods:

Forty-five 18- to 35-year-old females were randomly assigned to one of three arms in this prospective, open-label study. Group A received probiotic supplementation, whereas group B received only minocycline. Group C was treated with both probiotic and minocycline. Clinical and subjective assessments were completed at baseline and during the 2-, 4-, 8-, and 12-week follow-up visits.

Results:

All patients demonstrated a significant improvement in total lesion count 4 weeks after treatment initiation ($p < .001$), with continued improvement seen with each subsequent follow-up visit ($p < .01$). At the 8- and 12-week follow-up visits, group C had a significant decrease in total lesion count versus groups A ($p < .001$) and B ($p < .01$). Two patients (13%) from group B failed to complete the study secondary to vaginal candidiasis.

Conclusion:

Probiotics may be considered a therapeutic option or adjunct for acne vulgaris by providing a synergistic antiinflammatory effect with systemic antibiotics while also reducing potential adverse events secondary to chronic antibiotic use.

Source

Jung GW et al. Prospective, randomized, open-label trial comparing the safety,

efficacy, and tolerability of an acne treatment regimen with and without a probiotic supplement and minocycline in subjects with mild to moderate acne. *J Cutan Med Surg* 17:114-

Sports Nutrition

Reversal of fatigued athletes of a defect in interferon-gamma secretion after administration of lactobacillus acidophilus

ABSTRACT

Background:

Fatigue and impaired performance in athletes is well recognised and has been loosely linked to "overtraining". Reduced concentration of IgA in the saliva and increased shedding of Epstein Barr virus (EBV) have been associated with intense training in elite athletes.

Objective:

To determine whether athletes presenting with fatigue and impaired performance had an immune defect relevant to defective containment of EBV infection, and whether a probiotic preparation (Lactobacillus acidophilus) shown to enhance mucosal immunity in animal models could reverse any detected abnormality.

Results:

The fatigued athletes had clinical characteristics consistent with re-activation of EBV infection and significantly ($p = 0.02$) less secretion of interferon (IFN) gamma from blood CD4 positive T cells. After one month of daily capsules containing 2×10^{10} colony forming units of L acidophilus, secretion of IFN gamma from T cells had increased significantly ($p = 0.01$) to levels found in healthy control athletes. A significant ($p = 0.03$) increase in salivary IFN gamma concentrations in healthy control athletes after the one month course of L acidophilus demonstrated in man the capacity for this probiotic to enhance the mucosal IFN gamma concentration.

Conclusion:

This is the first evidence of a T cell defect in fatigued athletes, and of its reversal following probiotic therapy.



Source

Clancy, R. Reversal of fatigued athletes of a defect in interferon-gamma secretion after administration of lactobacillus acidophilus.. British Journal of Sports Medicine, 40, 351-354.