Abstracts Probior

Probiotics Antimicrob Proteins. 2017 Aug 7. doi: 10.1007/s12602-017-9313-7. [Epub ahead of print]

The Effects of Synbiotic Supplementation on Pregnancy Outcomes in Gestational Diabetes.

Karamali M[1], Nasiri N[1], Taghavi Shavazi N[1], Jamilian M[2], Bahmani F[3], Tajabadi-Ebrahimi M[4], Asemi Z[5].

Synbiotics are known to exert multiple beneficial effects, including anti-inflammatory and antioxidative actions. This study was designed to evaluate the effects of synbiotic administration on biomarkers of inflammation, oxidative stress, and pregnancy outcomes among gestational diabetic (GDM) women. This randomized, double-blind, placebo-controlled clinical trial was carried out among 60 subjects with GDM who were not on oral hypoglycemic agents. Patients were randomly assigned to consume either one synbiotic capsule containing Lactobacillus acidophilus strain T16 (IBRC-M10785), L. casei strain T2 (IBRC-M10783), and Bifidobacterium bifidum strain T1 (IBRC-M10771) (2 × 10^9 CFU/g each) plus 800 mg inulin (HPX) (n = 30) or placebo (n = 30) for 6 weeks. Compared with the placebo, synbiotic supplementation significantly decreased serum high-sensitivity C-reactive protein (hs-CRP) (- 1.9 ± 4.2 vs. +1.1 ± 3.5 mg/L, P = 0.004), plasma malondialdehyde (MDA) (- 0.1 ± 0.6 vs. + 0.3 ± 0.7 μmol/L, P = 0.02), and significantly increased total antioxidant capacity (TAC) (+ 70.1 ± 130.9 vs. - 19.7 ± 124.6 mmol/L, P = 0.009) and total glutathione (GSH) levels (+ 28.7 ± 61.5 vs. - 14.9 ± 85.3 μmol/L, P = 0.02). Supplementation with synbiotic had a significant decrease in cesarean section rate (16.7 vs. 40.0%, P = 0.04), lower incidence of hyperbilirubinemic newborns (3.3 vs. 30.0%, P = 0.006), and newborns' hospitalization (3.3 vs. 30.0%, P = 0.006) compared with the placebo. Synbiotic supplementation did not affect plasma nitric oxide (NO) levels and other pregnancy outcomes. Overall, synbiotic supplementation among GDM women for 6 weeks had beneficial effects on serum hs-CRP, plasma TAC, GSH, and MDA; cesarean section; incidence of newborn's hyperbilirubinemia; and newborns' hospitalization but did not affect plasma NO levels and other pregnancy outcomes. http://www.irct.ir : www.irct.ir : IRCT201704205623N108.

KEYWORDS: Gestational diabetes; Pregnant women; Synbiotic supplementation

PLoS One. 2017 Dec 7;12(12):e0189257. doi: 10.1371/journal.pone.0189257. eCollection 2017.

Inhibition effect of Bifidobacterium longum, Lactobacillus acidophilus, Streptococcus thermophilus and Enterococcus faecalis and their related products on human colonic smooth muscle in vitro.

Gong J[1], Bai T[1], Zhang L[1], Qian W[1], Song J[1], Hou X[1].

OBJECTIVE:

To investigate the effects of four strains, generally used in clinic, including Bifidobacterium longum, Lactobacillus acidophilus, Streptococcus thermophilus and Enterococcus faecalis, and their related products on human colonic smooth muscle in vitro.

METHODS:

Human colonic circular muscle strips obtained from disease-free margins of resected segments from 25 patients with colorectal cancer were isometrically examined in a constant-temperature organ bath and exposed to different concentrations of living bacteria, sonicated cell fractions and cell-free supernatant (CFS). The area under the curve (AUC) representing the contractility of smooth muscle strips was calculated.

RESULTS:

(1) The four living probiotics inhibited the contractility of human colonic muscle strips only at high concentration (1010 CFUs/mL, all $P<0.05$). (2) The sonicated cell fractions from the four probiotics obviously inhibited human colonic smooth muscle strips in a dose-dependent manner ($P<0.01$). (3) The CFS from the four probiotics also inhibited colonic smooth muscle strips in a dose-dependent manner (all $P<0.05$). (4) The inhibition effect of CFS from Streptococcus thermophilus and Enterococcus faecalis decreased obviously when pretreated with NG-nitro-L-arginine (L-NNA, 10-5 mol/L) ($P<0.05$), but not the Bifidobacterium longum and Lactobacillus acidophilus ($P>0.05$).

CONCLUSION:

Four common probiotics related products, including the sonicated cell fractions and the CFS, obviously inhibited human colonic smooth muscles strips contraction in a dose-dependent manner. Only high concentration living probiotics (1010 CFUs/mL) can inhibit the colonic smooth muscles strips contraction. The NO pathway may be partly involved in the inhibitory effect of CFS from Streptococcus thermophilus and Enterococcus faecalis.

Environ Sci Pollut Res Int. 2017 Nov 7. doi: 10.1007/s11356-017-0534-9. [Epub ahead of print]

Effect of probiotics on the basis of Bacillus subtilis and Bifidobacterium longum on the biochemical parameters of the animal organism.

Kvan OV[1], Gavrish IA[2], Lebedev SV[1,3], Korotkova AM[1,3], Miroshnikova EP[1], Serdaeva VA[3], Bykov AV[1], Davydova NO[4].

For the purpose of safe modulation of the intestinal microflora, probiotics have been increasingly used in recent years. In the present work, the effect of the probiotic sporobacterin (Bacillus subtilis 534) (I group) and soybean-bifidum (Bifidobacterium longum) (II group) on male rats of the Wistar line was evaluated. In assessing nonspecific immunity in vitro, there was an increase

in the level of baseline level in the first and second groups (by 8.3 and 12.2% more control). The influence of probiotic preparations on the intestinal normoflora was assessed using PCR. Bifidumbacterin increased the normal microflora, in particular, Escherichia coli 1.55 times, Lactobacillus 1.26 times, Enterococcus 1.3 times as much control; the level of conditionally pathogenic microflora, in particular, Proteus spp. decreased by 1.3 times in comparison with the control. Sporobacterin also contributed to an increase in the amount of E. coli (1.55 times) and Lactobacillus (0.9 times). When a culture of Bifidobacterium longum was introduced, a selective reduction in the loss of chemical elements was observed against the background of the diet used. At the end of the experiment, the content of calcium in the body tissues of animals of group II exceeded this indicator in group I by 3.9%, phosphorus by 17.6%, copper by 28.5%, and zinc by 15.2%. The totality of the results obtained by us indicates that inclusion of Bifidumbacterium longum in the diet of animals makes the use of this preparation in the correction of mineral imbalance and improves the microflora of the intestines of animals by reducing the number of representatives of opportunistic microflora against the background of an increase in the number of basic representatives of normal microbiocenosis. Also, the use of probiotic drugs as additives leads to a slight increase in the level of nonspecific immunity, which increases the natural resistance of the organism.

KEYWORDS: Immunity; Intestinal microflora; Mineral correction; Probiotics; Soybean-bifidum; Sporobacterin; Wistar rats

Benef Microbes. 2017 Oct 25:1-10. doi: 10.3920/BM2017.0063. [Epub ahead of print]

Bifidobacterium longum BB536 alleviated upper respiratory illnesses and modulated gut microbiota profiles in Malaysian pre-school children.

Lau AS[1], Yanagisawa N[2], Hor YY[1], Lew LC[1], Ong JS[1], Chuah LO[1], Lee YY[3], Choi SB[1], Rashid F[3], Wahid N[4], Sugahara H[2], Xiao JZ[2], Liong MT[1].

This 10-months randomised, double-blind, parallel and placebo-controlled study evaluated the effects of Bifidobacterium longum BB536 on diarrhoea and/or upper respiratory illnesses in 520 healthy Malaysian pre-school children aged 2-6 years old. The subjects randomly received a one-gram sachet containing either BB536 (5×109 cfu) or placebo daily. Data analysis was performed on 219 subjects who fully complied over 10-months (placebo n=110, BB536 n=109). While BB536 did not exert significant effects against diarrhoea in children, Poisson regression with generalised estimating equations model indicated significant intergroup difference in the mean number of times of respiratory illnesses over 10 months. The duration of sore throat was reduced by 46% (P=0.018), with marginal reduction for duration of fever (reduced by 27%, P=0.084), runny nose (reduced by 15%, P=0.087) and cough (reduced by 16%, P=0.087) as compared to the placebo. Principal coordinate analysis at genus level of the gut microbiota revealed significant differences

between 0 and 10 months in the BB536 group (P<0.01) but not in placebo group (P>0.05). The abundance of the genus Faecalibacterium which is associated with anti-inflammatory and immuno-modulatory properties was significantly higher in the BB536 group (P<0.05) compared to the placebo group. Altogether, our present study illustrated the potential protective effects of BB536 against upper respiratory illnesses in pre-school Malaysian children, with gut microbiota modulating properties.

KEYWORDS: Bifidobacterium longum BB536; gastrointestinal; gut microbiota; upper respiratory

Front Microbiol. 2017 Sep 11;8:1732. doi: 10.3389/fmicb.2017.01732. eCollection 2017.

Prophylactic Supplementation of Bifidobacterium longum 51A Protects Mice from Ovariectomy-Induced Exacerbated Allergic Airway Inflammation and Airway Hyperresponsiveness.

Mendes E[1], Acetturi BG[2], Thomas AM[3,4,5], Martins FDS[6], Crisma AR[7], Murata G[7], Braga TT[8], Camâra NOS[8], Franco ALDS[9], Setubal JC[4], Ribeiro WR[1], Valduga CJ[10], Curi R[7], Dias-Neto E[3,11], Tavares-de-Lima W[2], Ferreira CM[1].

Asthma is a chronic inflammatory disease that affects more females than males after puberty, and its symptoms and severity in women change during menstruation and menopause. Recently, evidence has demonstrated that interactions among the microbiota, female sex hormones, and immunity are associated with the development of autoimmune diseases. However, no studies have investigated if therapeutic gut microbiota modulation strategies could affect asthma exacerbation during menstruation and menopause. Here we aimed to examine the preventive effects of a probiotic, *Bifidobacterium longum* 5[1A], on airway inflammation exacerbation in allergic ovariectomized mice. We first evaluated the gut microbiota composition and diversity in mice 10 days after ovariectomy. Next, we examined whether re-exposure of ovariectomized allergic mice to antigen (ovalbumin) would lead to exacerbation of lung inflammation. Finally, we evaluated the preventive and treatment effect of *B. longum* 5[1A] on lung inflammation and airway hyperresponsiveness. Our results showed that whereas ovariectomy caused no alterations in the gut microbiota composition and diversity in this animal model, 10 days after ovariectomy, preventive use administration of *B. longum* 5[1A], rather than its use after surgery was capable of attenuate the exacerbated lung inflammation and hyperresponsiveness in ovariectomized allergic mice. This prophylactic effect of *B. longum* 5[1A] involves acetate production, which led to increased fecal acetate levels and, consequently, increased Treg cells in ovariectomized allergic mice.

KEYWORDS: Bifidobacterium longum; airway inflammation; microbiota; ovariectomy; probiotic

Am J Clin Nutr. 2017 Nov;106(5):1274-1286. doi: 10.3945/ajcn.117.157529. Epub 2017 Sep 6.

Randomized controlled trial on the impact of early-life intervention with bifidobacteria on the healthy infant fecal microbiota and metabolome.

Bazanella M[1], Maier TV[2], Clavel T[3], Lagkouvardos I[3], Lucio M[2], Maldonado-Gòmez MX[4], Autran C[5], Walter J[6], Bode L[5], Schmitt-Kopplin P[7,2], Haller D[8,3].

Background: Early-life colonization of the intestinal tract is a dynamic process influenced by numerous factors. The impact of probiotic-supplemented infant formula on the composition and function of the infant gut microbiota is not well defined.**Objective:** We sought to determine the effects of a bifidobacteria-containing formula on the healthy human intestinal microbiome during the first year of life.**Design:** A double-blind, randomized, placebo-controlled study of newborn infants assigned to a standard whey-based formula containing a total of 10^7colony-forming units (CFU)/g of *Bifidobacterium bifidum*, *Bifidobacterium breve*, *Bifidobacterium longum*, *B. longum* subspecies *infantis*(intervention), or to a control formula without bifidobacteria (placebo). Breastfed controls were included. Diversity and composition of fecal microbiota were determined by 16S ribosomal RNA gene amplicon sequencing, and metabolite profiles were analyzed by ultrahigh-performance liquid chromatography-mass spectrometry over a period of 2 y.**Results:** Infants (n = 106) were randomly assigned to either the interventional (n = 48) or placebo (n = 49) group; 9 infants were exclusively breastfed throughout the entire intervention period of 12 mo. Infants exposed to bifidobacteria-supplemented formula showed decreased occurrence of *Bacteroides* and *Blautia* spp. associated with changes in lipids and unknown metabolites at month 1. Microbiota and metabolite profiles of intervention and placebo groups converged during the study period, and long-term colonization (24 mo) of the supplemented *Bifidobacterium* strains was not detected. Significant differences in microbiota and metabolites were detected between infants fed breast milk and those fed formula ($P < 0.005$) and between infants birthed vaginally and those birthed by cesarean delivery ($P < 0.005$). No significant differences were observed between infant feeding groups regarding growth, antibiotic uptake, or other health variables ($P > 0.05$).**Conclusion:** The supplementation of bifidobacteria to infant diet can modulate the occurrence of specific bacteria and metabolites during early life with no detectable long-term effects. This trial was registered at germanctr.de as DRKS00003660.

KEYWORDS: 16S rRNA gene; bifidobacteria; breastfeeding; infant gut microbiota; metabolomics; probiotics

Nutrients. 2017 Aug 16;9(8). pii: E887. doi: 10.3390/nu9080887.

The Efficacy of Bifidobacterium longum BORI and Lactobacillus acidophilus AD031 Probiotic Treatment in Infants with Rotavirus Infection.

Park MS[1], Kwon B[2], Ku S[3], Ji GE[4,5].

A total of 57 infants hospitalized with rotavirus disease were included in this study. The children were randomly divided into the study's two treatment groups: three days of the oral administration of (i) a probiotics formula containing both *Bifidobacterium longum* BORI and *Lactobacillus acidophilus* AD031 (*N* = 28); or (ii) a placebo (probiotic-free skim milk, *N* = 29) and the standard therapy for diarrhea. There were no differences in age, sex, or blood characteristics between the two groups. When the 57 cases completed the protocol, the duration of the patients' diarrhea was significantly shorter in the probiotics group (4.38 ± 1.29, *N* = 28) than the placebo group (5.61 ± 1.23, *N* = 29), with a *p*-value of 0.001. Symptoms such as duration of fever (*p* = 0.119), frequency of diarrhea (*p* = 0.119), and frequency of vomiting (*p* = 0.331) tended to be ameliorated by the probiotic treatment; however, differences were not statistically significant between the two groups. There were no serious, adverse events and no differences in the frequency of adverse events in both groups.

KEYWORDS: Bifidobacterium; Lactobacillus; probiotics; rotavirus

World J Gastroenterol. 2017 Apr 21;23(15):2696-2704. doi: 10.3748/wjg.v23.i15.2696.

Effect of Lactobacillus rhamnosus HN001 and Bifidobacterium longum BB536 on the healthy gut microbiota composition at phyla and species level: A preliminary study.

Toscano M[1], De Grandi R[1], Stronati L[1], De Vecchi E[1], Drago L[1].

AIM:

To evaluate the ability of *Lactobacillus rhamnosus* HN001 and *Bifidobacterium longum* BB536 to colonize the intestinal environment of healthy subjects and modify the gut microbiota composition.

METHODS:

Twenty healthy Italian volunteers, eight males and twelve females, participated in the study. Ten subjects took a sachet containing 4 × 10^9 colony-forming units (CFU) of *Bifidobacterium longum* BB536 and 10^9 CFU of *Lactobacillus rhamnosus* HN001, 30 min before breakfast (pre-prandial administration), while ten subjects took a sachet of probiotic product 30 min after breakfast (post-prandial administration). The ability of *Lactobacillus rhamnosus* HN001 and *Bifidobacterium longum* BB536 to colonize human gut microbiota was assessed by means of

quantitative real-time PCR, while changes in gut microbiota composition were detected by using Ion Torrent Personal Genome Machine.

RESULTS:

Immediately after 1-mo of probiotic administration, *B. longum* BB536 and *L. rhamnosus* HN001 load was increased in the majority of subjects in both pre-prandial and post-prandial groups. This increase was found also 1 mo after the end of probiotic oral intake in both groups, if compared to samples collected before probiotic consumption. At phyla level a significant decrease in *Firmicutes* abundance was detected immediately after 1-mo of *B. longum* BB536 and *L. rhamnosus* HN001 oral intake. This reduction persisted up to 1 mo after the end of probiotic oral intake together with a significant decrease of *Proteobacteria* abundance if compared to samples collected before probiotic administration. Whereas, at species level, a higher abundance of *Blautia producta*, *Blautia wexlerae* and *Haemophilus ducrey* was observed, together with a reduction of *Holdemania filiformis*, *Escherichia vulneris*, *Gemmiger formicilis* and *Streptococcus sinensis* abundance. In addition, during follow-up period we observed a further reduction in *Escherichia vulneris* and *Gemmiger formicilis*, together with a decrease in *Roseburia faecis* and *Ruminococcus gnavus* abundance. Conversely, the abundance of *Akkermansia muciniphila* was increased if compared to samples collected at the beginning of the experimental time course.

CONCLUSION:

B. longum BB536 and *L. rhamnosus* HN001 showed the ability to modulate the gut microbiota composition, leading to a significant reduction of potentially harmful bacteria and an increase of beneficial ones. Further studies are needed to better understand the specific mechanisms involved in gut microbiota modulation.

KEYWORDS: Bifidobacterium; Gut microbiota; Human health; Lactobacillus; Probiotics

Gastroenterology. 2017 Aug;153(2):448-459.e8. doi: 10.1053/j.gastro.2017.05.003. Epub 2017 May 5.

Probiotic Bifidobacterium longum NCC3001 Reduces Depression Scores and Alters Brain Activity: A Pilot Study in Patients With Irritable Bowel Syndrome.

Pinto-Sanchez MI[1], Hall GB[2], Ghajar K[2], Nardelli A[1], Bolino C[1], Lau JT[1], Martin FP[3], Cominetti O[3], Welsh C[1], Rieder A[2], Traynor J[2], Gregory C[2], De Palma G[1], Pigrau M[1], Ford AC[4], Macri J[5], Berger B[6], Bergonzelli G[6], Surette MG[1], Collins SM[1], Moayyedi P[1], Bercik P[7].
Author information

Abstract

BACKGROUND & AIMS:

Probiotics can reduce symptoms of irritable bowel syndrome (IBS), but little is known about their effects on psychiatric comorbidities. We performed a prospective study to evaluate the effects of Bifidobacterium longum NCC3001 (BL) on anxiety and depression in patients with IBS.

METHODS:

We performed a randomized, double-blind, placebo-controlled study of 44 adults with IBS and diarrhea or a mixed-stool pattern (based on Rome III criteria) and mild to moderate anxiety and/or depression (based on the Hospital Anxiety and Depression scale) at McMaster University in Canada, from March 2011 to May 2014. At the screening visit, clinical history and symptoms were assessed and blood samples were collected. Patients were then randomly assigned to groups and given daily BL (n = 22) or placebo (n = 22) for 6 weeks. At weeks 0, 6, and 10, we determined patients' levels of anxiety and depression, IBS symptoms, quality of life, and somatization using validated questionnaires. At weeks 0 and 6, stool, urine and blood samples were collected, and functional magnetic resonance imaging (fMRI) test was performed. We assessed brain activation patterns, fecal microbiota, urine metabolome profiles, serum markers of inflammation, neurotransmitters, and neurotrophin levels.

RESULTS:

At week 6, 14 of 22 patients in the BL group had reduction in depression scores of 2 points or more on the Hospital Anxiety and Depression scale, vs 7 of 22 patients in the placebo group (P = .04). BL had no significant effect on anxiety or IBS symptoms. Patients in the BL group had a mean increase in quality of life score compared with the placebo group. The fMRI analysis showed that BL reduced responses to negative emotional stimuli in multiple brain areas, including amygdala and fronto-limbic regions, compared with placebo. The groups had similar fecal microbiota profiles, serum markers of inflammation, and levels of neurotrophins and neurotransmitters, but the BL group had reduced urine levels of methylamines and aromatic amino acids metabolites. At week 10, depression scores were reduced in patients given BL vs placebo.

CONCLUSION:

In a placebo-controlled trial, we found that the probiotic BL reduces depression but not anxiety scores and increases quality of life in patients with IBS. These improvements were associated with changes in brain activation patterns that indicate that this probiotic reduces limbic reactivity. ClinicalTrials.gov no. NCT01276626.

Arch Gerontol Geriatr. 2017 Jul;71:142-149. doi: 10.1016/j.archger.2017.04.004. Epub 2017 Apr 14.

The effect of probiotics as a treatment for constipation in elderly people: A systematic review.

Martínez-Martínez MI[1], Calabuig-Tolsá R[1], Cauli O[2].
Author information

Abstract

PURPOSE:

Treating constipation in elderly people remains a challenge; the administration of probiotics may be a valid therapy for this problem as an alternative to traditional drug-based treatments. The objective of this systematic review was to evaluate the efficiency of probiotics in treating constipation in elderly people.

METHODS:

Articles related to this topic and published, without any time limitations, in the Medline, Embase, Scopus, Lilacs, or Cochrane databases were systematically reviewed according to Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) guidelines. The primary search terms were 'constipation' and 'probiotics'. The main inclusion criteria were: 1) the article was original and the whole text was published in English or Spanish and 2) included the primary search terms in the title, summary, or body text; 3) the studies had to have included 60 or more participants defined as 'elderly' and 4) have specifically evaluated the effect of the administration of probiotics.

RESULTS:

Of the 475 articles consulted, 9 met the inclusion criteria. Among the selected studies, there were four randomised and placebo-controlled trials and the remaining five reports were observational. Overall, our analysis of the randomised and placebo-controlled trials suggests that administration of probiotics significantly improved constipation in elderly individuals by 10-40% compared to placebo controls in which no probiotic was administered. The strain of bacteria most commonly tested was Bifidobacterium longum. However, caution is needed when interpreting these reports because of the heterogeneity of the original study designs, populations, and the risk of bias. Therefore, further placebo-controlled trials are necessary to determine the most efficient strains, doses, and the optimal treatment duration.

KEYWORDS: Aging; Bacteria; Gastrointestinal transit; Gut; Nutraceutical; Probiotic

Am J Clin Nutr. 2017 Mar;105(3):758-767. doi: 10.3945/ajcn.116.140012. Epub 2017 Feb 22.

Probiotics (Lactobacillus gasseri KS-13, Bifidobacterium bifidum G9-1, and Bifidobacterium longum MM-2) improve rhinoconjunctivitis-specific

quality of life in individuals with seasonal allergies: a double-blind, placebo-controlled, randomized trial.

Dennis-Wall JC[1], Culpepper T[1], Nieves C Jr[1], Rowe CC[1], Burns AM[1], Rusch CT[1], Federico A[1], Ukhanova M[2], Waugh S[2], Mai V[2], Christman MC[3], Langkamp-Henken B[4].

Background: Rhinoconjunctivitis-specific quality of life is often reduced during seasonal allergies. The Mini Rhinoconjunctivitis Quality of Life Questionnaire (MRQLQ) is a validated tool used to measure quality of life in people experiencing allergies (0 = not troubled to 6 = extremely troubled). Probiotics may improve quality of life during allergy season by increasing the percentage of regulatory T cells (Tregs) and inducing tolerance.Objective: The objective of this study was to determine whether consuming Lactobacillus gasseri KS-13, Bifidobacterium bifidum G9-1, and B. longum MM-2 compared with placebo would result in beneficial effects on MRQLQ scores throughout allergy season in individuals who typically experience seasonal allergies. Secondary outcomes included changes in immune markers as part of a potential mechanism for changes in MRQLQ scores.Design: In this double-blind, placebo-controlled, parallel, randomized clinical trial, 173 participants (mean ± SEM: age 27 ± 1 y) who self-identified as having seasonal allergies received either a probiotic (2 capsules/d, 1.5 billion colony-forming units/capsule) or placebo during spring allergy season for 8 wk. MRQLQ scores were collected weekly throughout the study. Fasting blood samples were taken from a subgroup (placebo, n = 37; probiotic, n = 35) at baseline and week 6 (predicted peak of pollen) to determine serum immunoglobulin (Ig) E concentrations and Treg percentages.Results: The probiotic group reported an improvement in the MRQLQ global score from baseline to pollen peak (-0.68 ± 0.13) when compared with the placebo group (-0.19 ± 0.14; P = 0.0092). Both serum total IgE and the percentage of Tregs increased from baseline to week 6, but changes were not different between groups.Conclusions: This combination probiotic improved rhinoconjunctivitis-specific quality of life during allergy season for healthy individuals with self-reported seasonal allergies; however, the associated mechanism is still unclear. This trial was registered at clinicaltrials.gov as NCT02349711.

KEYWORDS: Bifidobacterium bifidum; Bifidobacterium longum; Lactobacillus gasseri; allergic rhinitis; healthy adults; probiotics; quality of life; seasonal allergies

Eur Rev Med Pharmacol Sci. 2016 Dec;20(23):4943-4949.

Growth and adhesion to HT-29 cells inhibition of Gram-negatives by Bifidobacterium longumBB536 e Lactobacillus rhamnosus HN001 alone and in combination.

Inturri R[1], Stivala A, Furneri PM, Blandino G.

OBJECTIVE:

The aim of this study was to test the inhibitory effect of supernatants of broth cultures of Bifidobacterium longum BB536 and Lactobacillus rhamnosus HN001, both individually and in combination, against Gram-negative strains (uropathogens, enteropathogens and a reference strain). Moreover, in vitro protection of B. longum BB536 and L. rhamnosus HN001, both individually and in combination, against pathogen adhesion to HT-29 cell line, was investigated.

MATERIALS AND METHODS:

The inhibitory activity was performed by the agar diffusion test and in vitro antagonistic activity against pathogen adhesion to human epithelial intestinal HT-29 cells was performed using standardized culture techniques.

RESULTS:

The study showed that B. longum BB536 and L. rhamnosus HN001, individually and in combination have inhibitory activity against the majority of the Gram negative strains tested. Furthermore, the results showed that both probiotic strains have a good capacity to inhibit pathogenic adhesion to HT-29 cells. Moreover, the ability of B. longum BB536 and L. rhamnosus HN001 to inhibit pathogenic adhesion increased when they were used in combination.

DISCUSSION:

The combination of B. longum BB536 and L. rhamnosus HN001 showed inhibitory activity against Gram-negatives and an improved ability to reduce their adhesion properties and to compete with them.

CONCLUSIONS:

The simultaneous presence of the two-probiotic strains could promote competitive mechanisms able to reduce the adhesion properties of pathogen strains and have an important ecological role within the highly competitive environment of the human gut.

MBio. 2017 Oct 3;8(5). pii: e00928-17. doi: 10.1128/mBio.00928-17.

Bifidobacterium bifidum Extracellular Sialidase Enhances Adhesion to the Mucosal Surface and Supports Carbohydrate Assimilation.

Nishiyama K[1], Yamamoto Y[2], Sugiyama M[3], Takaki T[4], Urashima T[5], Fukiya S[6], Yokota A[6], Okada N[7], Mukai T[2].

Bifidobacterium is a natural inhabitant of the human gastrointestinal (GI) tract. We studied the role of the extracellular sialidase (SiaBb2, 835 amino acids [aa]) from *Bifidobacterium bifidum* ATCC 15696 in mucosal surface adhesion and carbohydrate catabolism. Human milk oligosaccharides

(HMOs) or porcine mucin oligosaccharides as the sole carbon source enhanced *B. bifidum* growth. This was impaired in a *B. bifidum* ATCC 15696 strain harboring a mutation in the *siabb2* gene. Mutant cells in early to late exponential growth phase also showed decreased adhesion to human epithelial cells and porcine mucin relative to the wild-type strain. These results indicate that SiaBb2 removes sialic acid from HMOs and mucin for metabolic purposes and may promote bifidobacterial adhesion to the mucosal surface. To further characterize SiaBb2-mediated bacterial adhesion, we examined the binding of His-tagged recombinant SiaBb2 peptide to colonic mucins and found that His-SiaBb2 as well as a conserved sialidase domain peptide (aa 187 to 553, His-Sia) bound to porcine mucin and murine colonic sections. A glycoarray assay revealed that His-Sia bound to the α2,6-linked but not to the α2,3-linked sialic acid on sialyloligosaccharide and blood type A antigen [GalNAcα1-3(Fucα1-2)Galβ] at the nonreducing termini of sugar chains. These results suggest that the sialidase domain of SiaBb2 is responsible for this interaction and that the protein recognizes two distinct carbohydrate structures. Thus, SiaBb2 may be involved in *Bifidobacterium*-mucosal surface interactions as well as in the assimilation of a variety of sialylated carbohydrates.**IMPORTANCE**Adhesion to the host mucosal surface and carbohydrate assimilation are important for bifidobacterium colonization and survival in the host gastrointestinal tract. In this study, we investigated the mechanistic basis for *B. bifidum* extracellular sialidase (SiaBb2)-mediated adhesion. SiaBb2 cleaved sialyl-human milk oligosaccharides and mucin glycans to produce oligosaccharides that supported *B. bifidum* growth. Moreover, SiaBb2 enhanced *B. bifidum* adhesion to mucosal surfaces via specific interactions with the α2,6 linkage of sialyloligosaccharide and blood type A antigen on mucin carbohydrates. These findings provide insight into the bifunctional role of SiaBb2 and the adhesion properties of *B. bifidum* strains.

KEYWORDS: adhesion molecules; bacterial adhesion; bifidobacteria; carbohydrate metabolism; sialidase

J Am Coll Nutr. 2017 Nov-Dec;36(8):660-665. doi: 10.1080/07315724.2017.1347074. Epub 2017 Sep 18.

The Effects of Probiotic Supplementation on Gene Expression Related to Inflammation, Insulin, and Lipids in Patients With Multiple Sclerosis: A Randomized, Double-Blind, Placebo-Controlled Trial.

Tamtaji OR[1], Kouchaki E[1,2], Salami M[1], Aghadavod E[1], Akbari E[3], Tajabadi-Ebrahimi M[4], Asemi Z[3].

BACKGROUND:

Limited data are available assessing the effects of probiotic supplementation on gene expression related to inflammation, insulin, and lipids in patients with multiple sclerosis (MS).

OBJECTIVES:

The current study was conducted to assess the effects of probiotic supplementation on gene expression related to inflammation, insulin, and lipids in patients with MS.

METHODS:

This randomized, double-blind, placebo-controlled clinical trial was performed among 40 patients with MS. Participants were randomly assigned into two groups to receive either a probiotic capsule containing Lactobacillus acidophilus, Lactobacillus casei, Bifidobacterium bifidum, and Lactobacillus fermentum (2×10^9 colony-forming units/g each; n = 20) or placebo (n = 20) for 12 weeks. Gene expression related to inflammation, insulin, and lipids was quantified in blood samples of patients with MS with the reverse transcription polymerase chain reaction (RT-PCR) method.

RESULTS:

We found that compared with placebo, probiotic supplementation down-regulated gene expression of interleukin-8 (IL-8; $p < 0.001$) and tumor necrosis factor-alpha (TNF-α) mRNA ($p < .001$) in peripheral blood mononuclear cells of patients with MS. We did not observe any significant effect of probiotic supplementation on gene expression of interleukin-1 (IL-1), peroxisome proliferator-activated receptor gamma (PPAR-γ), or oxidized low-density lipoprotein receptor (LDLR) in peripheral blood mononuclear cells of patients with MS.

CONCLUSIONS:

Overall, probiotic supplementation for 12 weeks in patients with MS significantly improved gene expression of IL-8 and TNF-α but did not influence IL-1, PPAR-γ, or LDLR.

KEYWORDS: Probiotic; gene expression; inflammation; insulin; multiple sclerosis

PLoS One. 2017 Nov 30;12(11):e0188634. doi: 10.1371/journal.pone.0188634. eCollection 2017.

Effects of Lactobacillus acidophilus on gut microbiota composition in broilers challenged with Clostridium perfringens.

Li Z[1], Wang W[1], Liu D[1], Guo Y[1].

This study shows the effects of dietary supplementation with Lactobacillus acidophilus on the gut microbiota of broiler chickens challenged with Clostridium perfringens infection during a 21-day period according to pyrosequencing of the 16S ribosomal RNA gene. In a 2 × 2 factorial arrangement of treatments, 308 1-day-old male Arbor Acres broiler chicks were analyzed for the

effects of the probiotic (groups without or with L. acidophilus supplementation), pathogen challenge (groups without or with C. perfringens), and the effects of interaction. The infection decreased the number of Observed species, Chao1, and ACE of ileal microbiota and increased Chao1 of cecal microbiota of broilers, whereas L. acidophilus supplementation decreased the Shannon index of the ileal microbiota. Shannon index and Simpson indices were lower in the ileal microbiota than in the cecal microbiota. In the ileal microbiota, the control group had higher relative abundance of Lachnospiraceae and Ruminococcaceae in comparison with the other groups; however, the relative abundance of Gammaproteobacteria was significantly higher in the challenge group than in the other groups. C. perfringens infection tended to increase lactate concentration and decreasedconcentrations of formate, acetate and propionate in the ileum; decreased isobutyrate concentration; and tended to decrease isovalerate concentration in the cecum. Besides, L. acidophilus supplementation increased the concentration of lactate and butyrate and decreased concentrations of formate and propionate in the ileum, and increased concentrations of lactate and valerate in the cecum. In conclusion, C. perfringens infection and/or dietary supplementation with L. acidophilus modulated the relative abundance of some bacteria taxa, and the L. acidophilus supplementation helped to restore the microbial community disrupted by C. perfringens infection.

MBio. 2017 Nov 21;8(6). pii: e01421-17. doi: 10.1128/mBio.01421-17.

Lactobacillus acidophilus Metabolizes Dietary Plant Glucosides and Externalizes Their Bioactive Phytochemicals.

Theilmann MC[1], Goh YJ[2], Nielsen KF[1], Klaenhammer TR[2], Barrangou R[3], Abou Hachem M[4].

Therapeutically active glycosylated phytochemicals are ubiquitous in the human diet. The human gut microbiota (HGM) modulates the bioactivities of these compounds, which consequently affect host physiology and microbiota composition. Despite a significant impact on human health, the key players and the underpinning mechanisms of this interplay remain uncharacterized. Here, we demonstrate the growth of *Lactobacillus acidophilus* on mono- and diglucosyl dietary plant glycosides (PGs) possessing small aromatic aglycones. Transcriptional analysis revealed the upregulation of host interaction genes and identified two loci that encode phosphotransferase system (PTS) transporters and phospho-β-glucosidases, which mediate the uptake and deglucosylation of these compounds, respectively. Inactivating these transport and hydrolysis genes abolished or severely reduced growth on PG, establishing the specificity of the loci to distinct groups of PGs. Following intracellular deglucosylation, the aglycones of PGs are externalized, rendering them available for absorption by the host or for further modification by

other microbiota taxa. The PG utilization loci are conserved in *L. acidophilus* and closely related lactobacilli, in correlation with versatile growth on these compounds. Growth on the tested PG appeared more common among human gut lactobacilli than among counterparts from other ecologic niches. The PGs that supported the growth of *L. acidophilus* were utilized poorly or not at all by other common HGM strains, underscoring the metabolic specialization of *L. acidophilus* These findings highlight the role of human gut *L. acidophilus* and select lactobacilli in the bioconversion of glycoconjugated phytochemicals, which is likely to have an important impact on the HGM and human host.**IMPORTANCE** Thousands of therapeutically active plant-derived compounds are widely present in berries, fruits, nuts, and beverages like tea and wine. The bioactivity and bioavailability of these compounds, which are typically glycosylated, are altered by microbial bioconversions in the human gut. Remarkably, little is known about the bioconversion of PGs by the gut microbial community, despite the significance of this metabolic facet to human health. Our work provides the first molecular insights into the metabolic routes of diet relevant and therapeutically active PGs by *Lactobacillus acidophilus* and related human gut lactobacilli. This taxonomic group is adept at metabolizing the glucoside moieties of select PG and externalizes their aglycones. The study highlights an important role of lactobacilli in the bioconversion of dietary PG and presents a framework from which to derive molecular insights into their metabolism by members of the human gut microbiota.

KEYWORDS: Lactobacillus; beta-glucoside; bioavailability; gut microbiota; phytochemical; polydatin; polyphenols; resveratrol; xenobiotic metabolism

Cell J. 2018 Jan;19(4):559-568. doi: 10.22074/cellj.2018.4447. Epub 2017 Nov 4.

Dual Effects of Cell Free Supernatants from Lactobacillus acidophilus and Lactobacillusrhamnosus GG in Regulation of MMP-9 by Up-Regulating TIMP-1 and Down-Regulating CD147 in PMADifferentiated THP-1 Cells.

Maghsood F[1], Mirshafiey A[1], Farahani MM[1], Modarressi MH[2], Jafari P[3], Motevaseli E[4,5].

OBJECTIVES:

Recent studies have reported dysregulated expression of matrix metalloproteinases (MMPs), especially MMP-2, MMP-9, tissue inhibitor of metalloproteinase-1, -2 (TIMP-1, TIMP-2), and extracellular matrix metalloproteinase inducer (EMMPRIN/CD147) in activated macrophages of patients with inflammatory diseases. Therefore, MMP-2, MMP-9, and their regulators may represent a new target for treatment of inflammatory diseases. Probiotics, which are comprised of lactic acid bacteria, have the potential to modulate inflammatory responses. In this experimental

study, we investigated the anti-inflammatory effects of cell-free supernatants (CFS) from Lactobacillus acidophilus (L. acidophilus) and L. rhamnosus GG (LGG) in phorbol myristate acetate (PMA)-differentiated THP-1 cells.

MATERIALS AND METHODS:
In this experimental study, PMA-differentiated THP-1 cells were treated with CFS from L. acidophilus, LGG and uninoculated bacterial growth media (as a control). The expression of MMP-2, MMP-9, TIMP-1, and TIMP-2 mRNAs were determined using real-time quantitative reverse transcription polymerase chain reaction (RTPCR). The levels of cellular surface expression of CD147 were assessed by flow cytometry, and the gelatinolytic activity of MMP-2 and MMP-9 were determined by zymography.

RESULTS:
Our results showed that CFS from both L. acidophilus and LGG significantly inhibited the gene expression of MMP-9 (P=0.0011 and P=0.0005, respectively), increased the expression of TIMP-1 (P<0.0001), decreased the cell surface expression of CD147 (P=0.0307 and P=0.0054, respectively), and inhibited the gelatinolytic activity of MMP-9 (P=0.0003 and P<0.0001, respectively) in PMA-differentiated THP-1 cells. Although, MMP-2 expression and activity and TIMP-2 expression remained unchanged.

CONCLUSIONS:
Our results indicate that CFS from L. acidophilus and LGG possess anti-inflammatory properties and can modulate the inflammatory response.
KEYWORDS: CD147; Inflammation; MMP; Probiotics; TIMP

Korean J Food Sci Anim Resour. 2017;37(4):529-534. doi: 10.5851/kosfa.2017.37.4.529. Epub 2017 Aug 31.

Lactobacillus acidophilus NS1 Reduces Phosphoenolpyruvate Carboxylase Expression by Regulating HNF4α Transcriptional Activity.

Park SS[1], Yang G[1], Kim E[1].

Probiotics have been known to reduce high-fat diet (HFD)-induced metabolic diseases, such as obesity, insulin resistance, and type 2 diabetes. We recently observed that *Lactobacillus acidophilus* NS1 (LNS1), distinctly suppresses increase of blood glucose levels and insulin resistance in HFD-fed mice. In the present study, we demonstrated that oral administration of LNS1 with HFD feeding to mice significantly reduces hepatic expression of phosphoenolpyruvate

carboxykinase (PEPCK), a key enzyme in gluconeogenesis which is highly increased by HFD feeding. This suppressive effect of LNS1 on hepatic expression of PEPCK was further confirmed in HepG2 cells by treatment of LNS1 conditioned media (LNS1-CM). LNS1-CM strongly and specifically inhibited HNF4α-induced PEPCK promoter activity in HepG2 cells without change of HNF4α mRNA levels. Together, these data demonstrate that LNS1 suppresses PEPCK expression in the liver by regulating HNF4α transcriptional activity, implicating its role as a preventive or therapeutic approach for metabolic diseases.

KEYWORDS: HNF4α; Lactobacillus acidophilus NS1; PEPCK; gluconeogenesis

Int J Obes (Lond). 2017 Nov;41(11):1607-1614. doi: 10.1038/ijo.2017.161. Epub 2017 Jul 10.

Effect of Lactobacillus on body weight and body fat in overweight subjects: a systematic review of randomized controlled clinical trials.

Crovesy L[1], Ostrowski M[1], Ferreira DMTP[2], Rosado EL[1], Soares-Mota M[1].

Gut microbiota is important for maintaining body weight. Modulation of gut microbiota by probiotics may result in weight loss and thus help in obesity treatment. The aim of this systematic review was to evaluate the effects of Lactobacillus on weight loss and/or fat mass in overweight adults. A search was performed on the Medline (PubMed) and Scopus electronic databases using the search terms: 'probiotics', 'Lactobacillus, 'obesity', 'body weight changes', 'weight loss', 'overweight', 'abdominal obesity', 'body composition', 'body weight', 'body fat' and 'fat mass'. In the total were found 1567 articles, but only 14 were included in this systematic review. Of these nine showed decreased body weight and/or body fat, three did not find effect and two showed weight gain. Results suggest that the beneficial effects are strain dependent. It can highlight that Lactobacillus plantarum and Lactobacillus rhamnosus when combined with a hypocaloric diet, L. plantarum
with Lactobacillus curvatus, Lactobacillus gasseri, Lactobacillus amylovorus, Lactobacillus acidophilus and Lactobacillus casei with phenolic compounds, and multiple species of Lactobacillus.

Eur J Clin Pharmacol. 2017 Oct;73(10):1199-1208. doi: 10.1007/s00228-017-2291-6. Epub 2017 Jul 5.

Efficacy and safety of probiotic-supplemented triple therapy for eradication of Helicobacter pylori in

children: a systematic review and network meta-analysis.

Feng JR[1,2], Wang F[1,2], Qiu X[1,2], McFarland LV[3], Chen PF[1,2,4], Zhou R[1,2], Liu J[1,2], Zhao Q[5,6], Li J[7,8].

AIM:

The aim of this study was to identify the best probiotic supplementation in triple therapy for pediatric population with Helicobacter pylori infection.

METHODS:

Eligible trials were identified by comprehensive searches. Relative risks with 95% confidence intervals and relative ranks with P scores were assessed.

RESULTS:

Twenty-nine trials (3122 participants) involving 17 probiotic regimens were identified. Compared with placebo, probiotic-supplemented triple therapy significantly increased H. pylori eradication rates (relative ratio (RR) 1.19, 95% CI 1.13-1.25) and reduced the incidence of total side effects (RR 0.49, 95% CI 0.38-0.65). Furthermore, to supplemented triple therapy, Lactobacillus casei was identified the best for H. pylori eradication rates (P score = 0.84), and multi-strain of Lactobacillus acidophilus and Lactobacillus rhamnosus for total side effects (P score = 0.93). As for the subtypes of side effects, multi-strain of Bifidobacterium infantis, Bifidobacterium longum, L. acidophilus, L. casei, Lactobacillus plantarum, Lactobacillus reuteri, L. rhamnosus, Lactobacillus salivarius, Lactobacillus sporogenes, and Streptococcus thermophilus was the best to reduce the incidence of diarrhea; multi-strain of Bacillus mesentericus, Clostridium butyricum, and Streptococcus faecalis for loss of appetite; multi-strain of B. longum, Lactobacillus bulgaricus, and S. thermophilus for constipation; multi-strain of Bifidobacterium bifidum, B. infantis, L. acidophilus, L. bulgaricus, L. casei, L. reuteri, and Streptococcus for taste disturbance; Saccharomyces boulardii for bloating; and multi-strain of Bifidobacterium breve, B. infantis, L. acidophilus, L. bulgaricus, L. casei, L. rhamnosus, and S. thermophilus for nausea/vomiting.

CONCLUSIONS:

Probiotics are recommended to supplement triple therapy in pediatrics, and the effectiveness of triple therapy is associated with specific probiotic supplementation.

KEYWORDS: Children; Efficacy; Helicobacter pylori; Network meta-analysis; Probiotics; Safety

Front Immunol. 2017 Nov 17;8:1553. doi: 10.3389/fimmu.2017.01553. eCollection 2017.

Probiotic Strain Lactobacillus casei BL23 Prevents Colitis-Associated Colorectal Cancer.

Jacouton E[1], Chain F[1], Sokol H[1,2], Langella P[1], Bermúdez-Humarán LG[1].

The gut microbiota plays a major role in intestinal health, and an imbalance in its composition can lead to chronic gut inflammation and a predisposition to developing colorectal cancer (CRC). Currently, the use of probiotic bacteria represents an emerging alternative to treat and prevent cancer. Moreover, consumption of these beneficial bacteria may also favorably modulate the composition of the gut microbiota, which has been described in several studies to play an important role in CRC carcinogenesis. In this context, the aim of this study was to assess the protective effect of oral treatment with *Lactobacillus casei* BL23, a probiotic strain well known for its anti-inflammatory and anticancer properties. First, CRC was induced in C57BL6 mice by a single intraperitoneal injection with azoxymethane (8 mg/kg), followed by four courses of dextran sodium sulfate (2.5%) in drinking water that were separated by an adjustable recovery period. At the time of sacrifice (day 46), tumor incidence, histological scores, and epithelial proliferation were determined in colon samples. Our results show that *L. casei* BL23 significantly protected mice against CRC development; specifically, *L. casei* BL23 treatment reduced histological scores and proliferative index values. In addition, our analysis revealed that *L. casei* BL23 had an immunomodulatory effect, mediated through the downregulation of the IL-22 cytokine, and an antiproliferative effect, mediated through the upregulation of *caspase-7, caspase-9*, and *Bik*. Finally, *L. casei* BL23 treatment tended to counterbalance CRC-induced dysbiosis in mice, as demonstrated by an analysis of fecal microbiota. Altogether our results demonstrate the high potential of *L. casei* BL23 for the development of new, probiotic-based strategies to fight CRC.

KEYWORDS: Lactobacillus casei BL23; azoxymethane-dextran sodium sulfate; colorectal cancer; immunomodulation; lactic acid bacteria; probiotic

EBioMedicine. 2017 Oct;24:159-165. doi: 10.1016/j.ebiom.2017.09.013. Epub 2017 Sep 14.

Effect of Lactobacillus rhamnosus HN001 in Pregnancy on Postpartum Symptoms of Depression and Anxiety: A Randomised Double-blind Placebo-controlled Trial.

Slykerman RF[1], Hood F[2], Wickens K[2], Thompson JMD[1], Barthow C[2], Murphy R[3], Kang J[2], Rowden J[1], Stone P[4], Crane J[2], Stanley T[5], Abels P[2], Purdie G[6], Maude R[7], Mitchell EA[8]; Probiotic in Pregnancy Study Group.

BACKGROUND:

Probiotics may help to prevent symptoms of anxiety and depression through several putative mechanisms.

OBJECTIVE:

The aim of this study was to evaluate the effect of Lactobacillus rhamnosus HN001 (HN001) given in pregnancy and postpartum on symptoms of maternal depression and anxiety in the postpartum period. This was a secondary outcome, the primary outcome being eczema in the offspring at 12months of age.

DESIGN, SETTING, PARTICIPANTS:

A randomised, double-blind, placebo-controlled trial of the effect of HN001 on postnatal mood was conducted in 423 women in Auckland and Wellington, New Zealand. Women were recruited at 14-16weeks gestation.

INTERVENTION:

Women were randomised to receive either placebo or HN001 daily from enrolment until 6months postpartum if breastfeeding.

OUTCOME MEASURES:

Modified versions of the Edinburgh Postnatal Depression Scale and State Trait Anxiety Inventory were used to assess symptoms of depression and anxiety postpartum.

TRIAL REGISTRATION:

Australia NZ Clinical Trials Registry: ACTRN12612000196842.

FINDINGS:

423 women were recruited between December 2012 and November 2014. 212 women were randomised to HN001 and 211 to placebo. 380 women (89.8%) completed the questionnaire on psychological outcomes, 193 (91.0%) in the treatment group and 187 (88.6%) in the placebo group. Mothers in the probiotic treatment group reported significantly lower depression scores (HN001 mean=7·7 (SD=5·4), placebo 9·0 (6·0); effect size -1·2, (95% CI -2·3, -0·1), p=0·037) and anxiety scores (HN001 12·0 (4·0), placebo 13·0 (4·0); effect size -1·0 (-1·9, -0·2), p=0·014) than those in the placebo group. Rates of clinically relevant anxiety on screening (score>15) were significantly lower in the HN001 treated mothers (OR=0·44 (0·26, 0·73), p=0·002).

INTERPRETATION:

Women who received HN001 had significantly lower depression and anxiety scores in the postpartum period. This probiotic may be useful for the prevention or treatment of symptoms of depression and anxiety postpartum.

FUNDING SOURCE:

Health Research Council of New Zealand (11/318) and Fonterra Co-operative Group Ltd.

KEYWORDS: Anxiety; Depression; Microbiome-gut-brain axis; Probiotic; Randomised controlled trial

Front Cell Infect Microbiol. 2017 Sep 6;7:392. doi: 10.3389/fcimb.2017.00392. eCollection 2017.

Probiotics for the Treatment of Atopic Dermatitis in Children: A Systematic Review and Meta-Analysis of Randomized Controlled Trials.

Huang R[1], Ning H[1], Shen M[2,3], Li J[2,3], Zhang J[2,3], Chen X[2,3].

Objective: Atopic dermatitis (AD) is a prevalent, burdensome, and psychologically important pediatric concern. Probiotics have been suggested as a treatment for AD. Some reports have explored this topic; however, the utility of probiotics for AD remains to be firmly established. **Methods:** To assess the effects of probiotics on AD in children, the PubMed/Medline, Cochrane Library Scopus, and OVID databases were searched for reports published in the English language. **Results:** Thirteen studies were identified. Significantly higher SCORAD values favoring probiotics over controls were observed (mean difference [MD], -3.07; 95% confidence interval [CI], -6.12 to -0.03; *P*< 0.001). The reported efficacy of probiotics in children < 1 year old was -1.03 (95%CI, -7.05 to 4.99) and that in children 1-18 years old was -4.50 (95%CI, -7.45 to -1.54; *P* < 0.001). Subgroup analyses showed that in Europe, SCORAD revealed no effect of probiotics, whereas significantly lower SCORAD values were reported in Asia (MD, -5.39; 95%CI, -8.91 to -1.87). *Lactobacillus rhamnosus* GG (MD, 3.29; 95%CI, -0.30 to 6.88; *P* = 0.07) and *Lactobacillus plantarum* (MD, -0.70; 95%CI, -2.30 to 0.90; *P* = 0.39) showed no significant effect on SCORAD values in children with AD.
However, *Lactobacillus fermentum* (MD, -11.42; 95%CI, -13.81 to -9.04), *Lactobacillus salivarius* (MD, -7.21; 95%CI, -9.63 to -4.78), and a mixture of different strains (MD, -3.52; 95%CI, -5.61 to -1.44) showed significant effects on SCORAD values in children with AD. **Conclusions:** Our meta-analysis indicated that the research to date has not robustly shown that probiotics are beneficial for children with AD. However, caution is needed when generalizing our results, as the populations evaluated were heterogeneous. Randomized controlled trials with larger samples and greater power are necessary to identify the species, dose, and treatment duration of probiotics that are most efficacious for treating AD in children.
KEYWORDS: children; constipation; meta-analysis; probiotics; randomized controlled trial

Front Pharmacol. 2017 Sep 1;8:603. doi: 10.3389/fphar.2017.00603. eCollection 2017.

Lactobacillus rhamnosus GG: An Overview to Explore the Rationale of Its Use in Cancer.

Banna GL[1], Torino F[2], Marletta F[3], Santagati M[4], Salemi R[5], Cannarozzo E[5], Falzone L[5], Ferraù F[6], Libra M[5].

Cancer is the second leading cause of death in the western world. In the era of precision medicine, a significant number of cancer patients can be cured with several anti-cancer therapeutic regimens. However, therapy failure may be caused by treatment side effects, such as diarrhea, especially occurring in patients with gastrointestinal or pelvic malignancies. In particular, diarrhea is one of the most frequent gastrointestinal toxicity during cancer treatment and it can result from nearly bot chemo- and radio-therapeutic strategies currently used. Diarrhea has a serious impact on patients' quality of life and treatment dosing and schedule modification due to its severity can negatively influence treatment outcomes. In this context, probiotics may play an interesting role in several human diseases with an inflammatory bowel involvement and, among these, *Lactobacillus rhamnosus* GG (LGG) is one of the most characterized and utilized. In particular, LGG is able to reverse intestinal dysbiosis and moderate diarrhea. Moreover, preclinical studies have documented its effects in reducing chronic inflammation associated with cancer development. This review summarizes the preclinical results of LGG on cancer cells proliferation and tumor invasion as well as the potential role of LGG use in cancer patients for the prevention and management of diarrhea associated with cancer treatment. Overall, these encouraging data support further investigation on the use of LGG in stratified patients undergoing specific therapeutic protocols, including chemotherapy and pelvic radiotherapy, in order to reduce the development of severe diarrhea and thus improve the adherence to the therapy and patients' quality of life.

KEYWORDS: Lactobacillus rhamnosus GG; cancer; chemotherapy; diarrhea; immunotherapy; probiotics; radiotherapy

Pharmacol Res. 2017 Aug 19. pii: S1043-6618(17)30923-4. doi: 10.1016/j.phrs.2017.08.001. [Epub ahead of print]

Probiotics and antibiotic-associated diarrhea in children: A review and new evidence on Lactobacillus rhamnosus GG during and after antibiotic treatment.

Mantegazza C[1], Molinari P[2], D'Auria E[3], Sonnino M[3], Morelli L[2], Zuccotti GV[3].

Antibiotic associated diarrhea (AAD) is a common complication in childhood in the outpatient and inpatient settings. This review provides up to date information on the use of probiotics in the prevention and treatment of AAD, including that from Clostridium Difficile, in children. The most recently systematic reviews and subsequently published randomized controlleds trials are considered. Different single and multistrain probiotics are described; a specific recommendation for the use of Lactobacillus Rhamnosus GG (LGG) and Saccharomyces boulardii (Sb) emerges. New information on LGG survival under amoxicillin/clavulanate therapy in children is also

provided. This information is relevant in view of the frequent use of this molecule in children, its association with AAD, and LGG's sensitivity to penicillin that might make this probiotic ineffective. In spite of a demonstrated positive effect of specific strains of probiotics on AAD, safety issues still remain among which the risk of associated severe infections and of antibiotic resistant gene exchange.

KEYWORDS: Antibiotic associated diarrhea; Antibiotics; Children; Lactobacillus GG; Probiotics; Saccharomyces boulardii