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Improving food & health

Evaluation of the immune benefits of two probiotic strains *Bifidobacterium animalis* ssp. *lactis*, BB-12® and *Lactobacillus paracasei* ssp. *paracasei*, L. casei 431® in an influenza vaccination model; a randomised, double-blind, placebo-controlled study

Rizzardini G, Eskesen D, Calder PC, Capetti A, Jespersen L, Clerici M

British Journal of Nutrition 2011

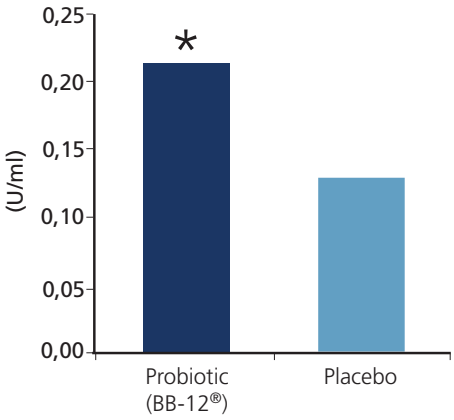
Demonstrates that BB-12®

- Improves immune system and thus may improve the body's resistance to common infections such as flu and colds

Results

- Significantly greater changes in vaccine-specific plasma IgG, IgG1 and IgG3 in BB-12® group compared to placebo group
- Number of subjects obtaining a substantial increase in specific IgGs was significantly greater in BB-12® group compared to placebo group
- Significantly greater increase of secretory IgA in saliva in BB-12® group compared to placebo group

Change from baseline in vaccine-specific plasma IgG



Conclusion

- BB-12® improves immune function by augmenting systemic and mucosal immune responses to challenge

Facts

- Study design: Randomized, double-blind, placebo-controlled, parallel-group study
- Subjects: 106 adults
- Dosage: 1 billion CFU/day in a capsule
- Duration: 6 weeks in total. After two weeks an influenza vaccination was given
- Primary endpoints: Vaccine-specific plasma IgG and subclasses IgG1 and IgG3, and vaccine-specific salivary IgA, IgG and IgM

Further Reading

- Taipale T, Pienihäkkinen K, Isolauri E, Larsen C, Brockmann E, Alanen P, Jokela J & Söderling E. *Bifidobacterium animalis* subsp. *lactis* BB-12® in reducing the risk of infections in infancy. British Journal of Nutrition 2010
- Sciffrin EJ, Brassart D, Servin AL, Rochat F & Donnet-Hughes A. Immune modulation of blood leukocytes in humans by lactic acid bacteria: criteria for strain selection. American Journal of Clinical Nutrition 1997;66(2):515S-520S
- Fukushima Y, Kawata Y, Hara H, Terada A & Mitsuoka T. Effect of a probiotic formula on intestinal immunoglobulin A production in healthy children. International Journal of Food Microbiology 1998;42:39-44

Probio-Tec®... when science matters

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Improving food & health

Evaluation of the immune benefits of two probiotic strains *Bifidobacterium animalis* ssp. *lactis*, BB-12® and *Lactobacillus paracasei* ssp. *paracasei*, L. casei 431® in an influenza vaccination model; a randomised, double-blind, placebo-controlled study

Rizzardini G, Eskesen D, Calder PC, Capetti A, Jespersen L, Clerici M

British Journal of Nutrition 2011

Demonstrates that L. casei 431®

- Improves immune system and thus may improve the body's resistance to common infections such as flu and colds

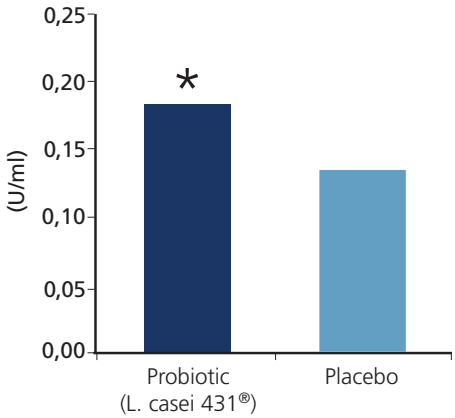
Results

- Significantly greater changes in vaccine-specific plasma IgG, IgG1 and IgG3 in L. casei 431® group compared to placebo group
- Number of subjects obtaining a substantial increase in specific IgGs was significantly greater in L. casei 431® group compared to placebo group
- Significantly greater increase of secretory IgA in saliva in L. casei 431® group compared to placebo group

Conclusion

- L. casei 431® improves immune function by augmenting systemic and mucosal immune responses to challenge

Change from baseline in vaccine-specific plasma IgG



Facts

- Study design: Randomized, double-blind, placebo-controlled, parallel-group study
- Subjects: 115 adults
- Dosage: 1 billion CFU/day in an acidified dairy drink
- Duration: 6 weeks in total. After two weeks an influenza vaccination was given
- Primary endpoints: Vaccine-specific plasma IgG and subclasses IgG1 and IgG3, and vaccine-specific salivary IgA, IgG and IgM

Further Reading

- de Vrese M, Rautenberg P, Laue C, Koopmans M, Herremans T & Schrezenmeir J. Probiotic bacteria stimulate virus-specific neutralizing antibodies following a booster polio vaccination. European Journal of Nutrition 2005;44:406-413

Probio-Tec®... when science matters

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Improving food & health

Oral administration of the probiotic Lactobacillus fermentum VRI-003 and mucosal immunity in endurance athletes

Cox AJ, Pyne DB, Saunders PU & Fricker PA

Br J Sports Med 2010;44(4):222-6

Demonstrates that PCC®

- Induces a protective immune response

Results

- Reduced number of days of respiratory illness symptoms in highly trained athletes (figure)
- Tendency to reduced severity of respiratory illness

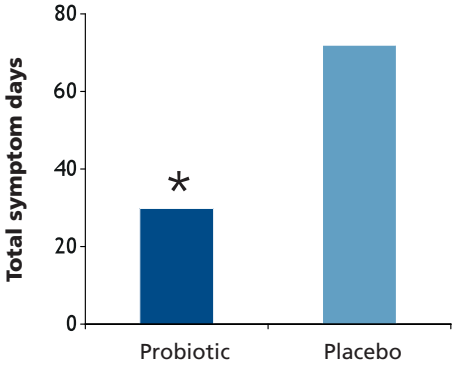
Conclusion

- PCC® reduces total number of days with respiratory illness

Facts

- Study design: Randomized, double-blind, placebo-controlled, cross-over study
- Subjects: 20 highly-trained distance runners
- Dosage: 12 billion CFU/day in capsules
- Duration: 4 weeks intervention
- Primary endpoints: mucosal immune response and incidence, severity and/or duration of respiratory illness

Symptoms of respiratory illness



Further Reading

- French & Penny. Use of probiotic bacteria as an adjuvant for an influenza vaccine. International Journal of Probiotics and Prebiotics 2009;4(3):175-180

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Improving food & health

Use of probiotic bacteria as an adjuvant for an influenza vaccine

French PW & Penny R

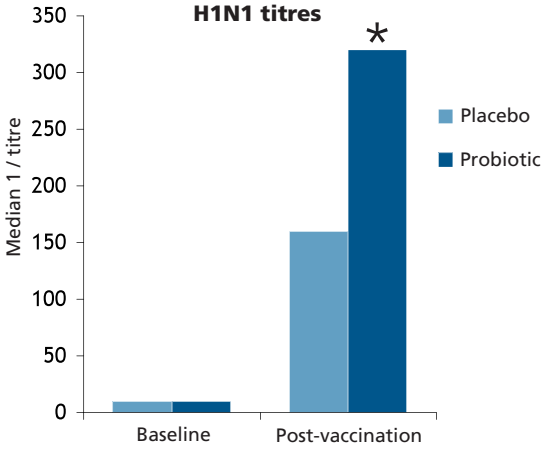
International Journal of Probiotics and Prebiotics 2009;4(3):175-180

Demonstrates that PCC®

- Induces an enhanced immune response to an influenza vaccines

Results

- Significantly higher antigen H1N1 titres after vaccination (figure)
- No significant differences in titres for antigen H3N2 and antigen B
- Average number of days with respiratory symptoms was significantly reduced (2 vs. 5 days)



Conclusion

- PCC® enhances the immune response to an influenza vaccine and reduces number of days with respiratory symptoms

Facts

- Study design: Randomized, double-blind, placebo-controlled, parallel study
- Subjects: 47 healthy adults
- Dosage: 1 billion CFU/day in capsules
- Duration: 6 weeks intervention, 2 weeks prior to vaccination and 4 weeks after vaccination
- Primary endpoint: hemagglutinin antibody inhibition (HAI) titre

Further Reading

- Cox et al. Oral administration of the probiotic Lactobacillus fermentum VRI-003 and mucosal immunity in endurance athletes. Br J Sports Med 2010;44(4):222-6

Probio-Tec®... when science matters

CHR HANSEN

Improving food & health

Immune modulation of blood leucocytes in humans by lactic acid bacteria: criteria for strain selection

Schiffrin EJ, Brassart D, Servin AL, Rochat F & Donnet-Hughes A

Am J Clin Nutr 1997;66:515S-520S

Demonstrates that BB-12®

- Has an immune modulating effect

Results

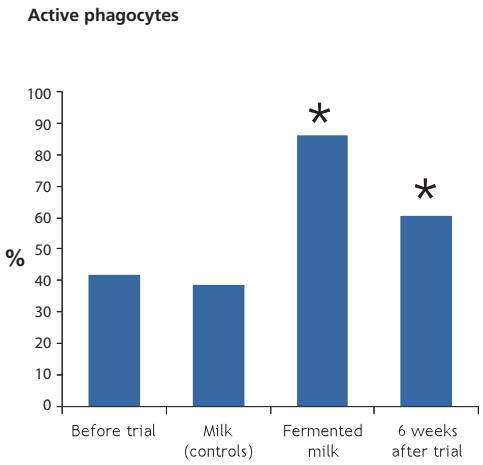
- Phagocytic activity significantly increased after intake of BB-12®

Conclusion

- BB-12® has an immune modulating effect

Facts

- Study design: Open, placebo-controlled study
- Subjects: 14 adults
- Dosage: 10 billion CFU/day in fermented milk
- Duration: 3 weeks with milk, 3 weeks with fermented milk, 6 weeks with milk
- Primary endpoints: Effect on blood cell subsets and phagocytic activity



Further Reading

- de Vrese M, Rautenberg P, Laue C, Koopmans M, Herremans T & Schrezenmeir J. Probiotic bacteria stimulate virus-specific neutralizing antibodies following a booster polio vaccination. Eur J Nutr 2005;44:406-413
- Fukushima Y, Kawata Y, Hara H, Terada A & Mitsuoka T. Effect of a probiotic formula on intestinal immunoglobulin A production in healthy children. International Journal of Food Microbiology 1998;42:39-44.
- Isolauri E, Arvola T, Sutas Y, Moilanen E & Salminen S. Probiotics in the management of atopic eczema. Clinical and Experimental Allergy 2000;30:1604-1610.

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Improving food & health

Probiotic bacteria stimulate virus-specific neutralizing antibodies following a booster polio vaccination

de Vrese M, Rautenberg P, Laue C, Koopmans M, Herremans T & Schrezenmeir J

Eur J Nutr 2005;44:406-413

Demonstrates that LGG® and L. casei 431®

- Enhances the immune response after vaccination

Results

- Increase in poliovirus neutralizing antibodies
- Increase in poliovirus-specific IgA and IgM

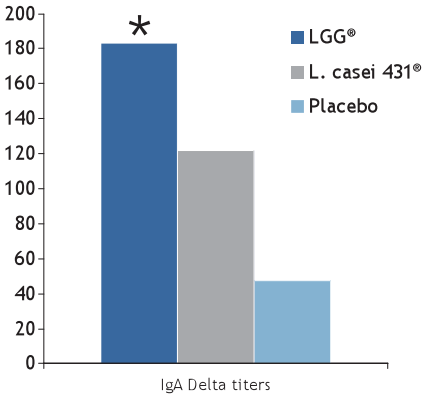
Conclusion

- Probiotics may enhance systemic protection against virus by increasing virus neutralizing antibodies

Facts

- Study design: Randomized, double-blind, placebo-controlled, 3 arm study
- Subjects: 64 healthy adults
- Dosage: 10 billion CFU/day of LGG® or L. casei 431® in acidified milk
- Duration: 5 weeks, 1 week before vaccination and 4 weeks after
- Primary endpoint: Effect on neutralizing antibodies

Effect on Polio vaccination (serotype 1)



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Improving food & health

Effect of a probiotic formula on intestinal immunoglobulin A production in healthy children

Fukushima Y, Kawata Y, Hara H, Terada A & Mitsuoka T

International Journal of Food Microbiology 1998;42:39-44

Demonstrates that BB-12®

- Has an impact on the immune system

Results

- Fecal IgA and anti-poliovirus IgA increased significantly during intake and peaked at day 8

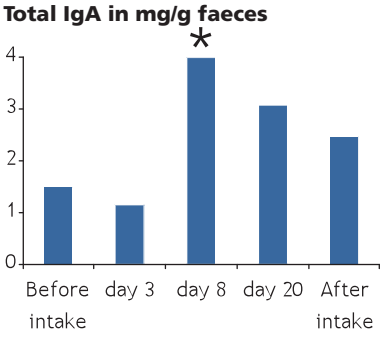
Conclusion

- BB-12® modulates the immune system

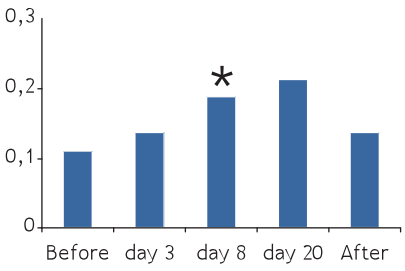
Facts

- Study design: Feeding study
- Subjects: 7 healthy children aged 15-31 months
- Dosage: ≥1 billion CFU/day in follow-on formula
- Duration: 20 days
- Primary endpoints: Intestinal microbiota and production of IgA

Total IgA in mg/g faeces



Anti-poliovirus IgA in absorbance 450/650 nm



Further Reading

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- Schiffrin EJ, Brassart D, Servin AL, Rochat F & Donnet-Hughes A. Immune modulation of blood leucocytes in humans by lactic acid bacteria: criteria for strain selection. Am J Clin Nutr 1997;66:515S-520S.

Probio-Tec®... when science matters

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Improving food & health

Effect of long term consumption of probiotic milk on infections in children attending day care centres: double blind, randomised trial

Hatakka K, Savilahti E, Pönkä A, Meurman JH, Poussa T & Näse L

British Medical Journal 2001;322:1327-9

Demonstrates that LGG®

- May reduce respiratory infections
- May reduce the use of antibiotic treatment

Results

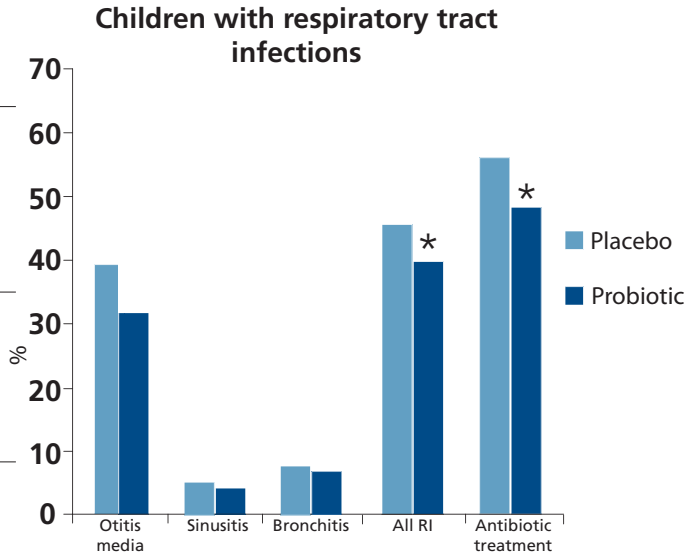
- Fewer children with respiratory infections
- Longer time without respiratory symptoms
- Fewer prescriptions of antibiotics for respiratory infections

Conclusion

- LGG® may reduce respiratory infections
- LGG® may reduce the use of antibiotic treatment

Facts

- Randomized, double-blind, placebo-controlled, multi-center study
- 513 children in the age of 1-6 years in day care centers
- 0.1-0.2 billion CFU/day in 260 ml pasteurized milk
- 7 months duration, intervention 5 days/week
- Primary endpoints: number of days with respiratory and gastrointestinal symptoms, absence from day care due to illness, respiratory tract infections and course of antibiotics



Further Reading

- Hojsak I, Snovak N, Abdoviæ S, Szajewska H, Mišak Z, Kolaèek S. Lactobacillus GG in the prevention of gastrointestinal and respiratory tract infections in children who attend day care centers: A randomized, double-blind, placebo-controlled trial. Clin Nutr. 2010;29(3):312-6.
- de Vrese M, Rautenberg P, Laue C, Koopmans M, Herremans T, Schrezenmeir J. Probiotic bacteria stimulate virus-specific neutralizing antibodies following a booster polio vaccination. Eur J Nutr 2005;44.406-13.

Probio-Tec®... when science matters

CHR HANSEN

Improving food & health

Lactobacillus GG in the prevention of gastrointestinal and respiratory tract infections in children who attend day care centers: A randomized, double-blind, placebo-controlled trial

Hojsak I, Snovak N, Abdovic S, Szajewska H, Misak Z & Kolacek S

Clinical Nutrition 2010;29(3):312-6

Demonstrates that LGG®

- Reduces risk of upper respiratory tract infections in children attending day care centers

Results

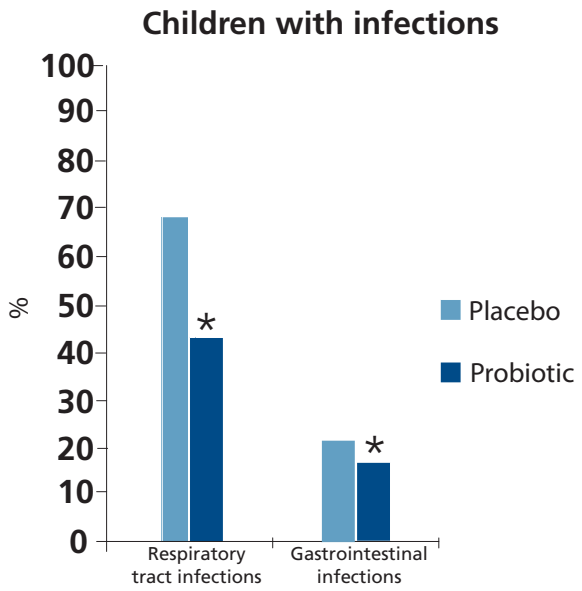
- Risk of respiratory tract infections reduced by 37% (figure)
- Risk of gastrointestinal infections reduced by 37% (figure)
- Less absence from day care center

Conclusion

- Reduces risk of upper respiratory tract infections including rhinitis, pharyngitis, sinusitis, otitis, and the common cold in children attending day care centers
- Authors recommend treatment with LGG® for the prevention of upper respiratory tract infections in children

Facts

- Randomized, double-blind, placebo-controlled
- 281 children 13-86 months (~1-7 years) attending day care
- 1 billion CFU/day in fermented milk
- 3 months intervention
- Primary endpoints: Gastrointestinal and respiratory tract infections



Further Reading

- Hatakka K, Savilahti E, Pönkä A, Meurman JH, Poussa T, Näse L. Effect of long term consumption of probiotic milk on infections in children attending day care centres: double blind, randomised trial. BMJ 2001;322:1327-9
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