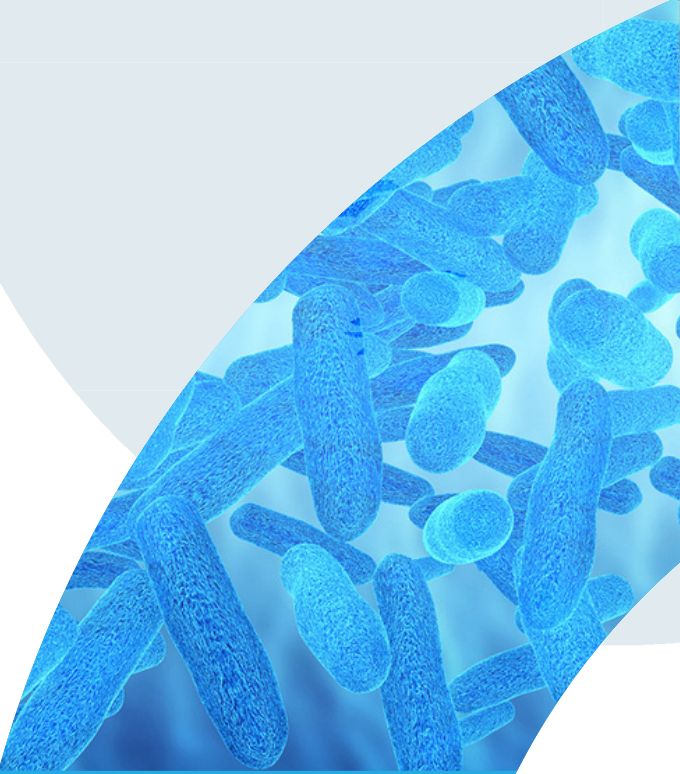


The logo for Probiotal, featuring the word "PROBIOTAL" in a white, sans-serif font inside a blue oval. Above the text is a stylized white outline of a mountain range.

PROBIOTAL

OUR PROBIOTIC STRAINS



**Our Innovative
64 Strains:
Ready for Your Health**

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Probiotal is driving probiotics innovation since 1985.

Our expertise comprises strain selection, advanced R&D, production of strains to finished products with all guarantees of stability and demonstrated efficacy in many functionalities.

Our strains can be proposed in allergen-free quality, microencapsulated, and standardized in different concentrations.

Strains available as raw material can be provided in bulk or as customized finished products.

Strains available as finished dosage form can be provided only as Probiotal finished products.



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(under worldwide exclusive license from the CERELA)
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- *Lacticaseibacillus rhamnosus* - LR04 (DSM 16605) (formerly *Lactobacillus rhamnosus*) Gastroenterology: Strain: [pag. 11, 15, 16, 18](#) - Blend: [pag. 11, 16](#); Immunology: Blend: [pag. 20](#); Urology: Blend: [pag. 39](#)
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- *Lactococcus lactis* - LLC02 (DSM 29536) Gastroenterology: Blend: [pag. 6](#)

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Bifidobacterium breve - BR03™ (DSM 16604)

Bifidobacterium breve - B632™ (DSM 24706)



New Study

DAILY DOSAGE IN CLINICAL STUDY 1,3) BR03 100 million CFU + B632 100 million CFU

FINISHED DOSAGE FORM

FUNCTIONALITY Gaseous colic • Prevention of gastrointestinal symptoms • Rebalance of the intestinal microbiota in children and in infants
• Inhibition of Enterobacteriaceae and of other coliforms isolated from colicky infants

SCIENTIFIC SUPPORT

Human clinical trials

- 1) Bona G. et al. The association of BR03 and B632 is effective to prevent colics in bottle-fed infants: a pilot, controlled, randomized and double blind study. Published in J Clin Gastroenterol, 2016.
- 2) Aloisio I. et al. Three-Month Feeding Integration With *Bifidobacterium* Strains Prevents Gastrointestinal Symptoms in Healthy Newborns. Frontiers in Nutrition, May 2018, art. 39.
- 3) Mogna L. et al. Capability of the Two Microorganisms *Bifidobacterium breve* B632 and *Bifidobacterium breve* BR03 to Colonize the Intestinal Microbiota of Children J Clin Gastroenterol, 2014. Suppl. 1, November/December, Vol. 48.

See next page for other studies on this combination in celiac disease

In vitro studies

- a) Simone M. et al. The Probiotic *Bifidobacterium breve* B632 Inhibited the Growth of Enterobacteriaceae within Colicky Infant Microbiota Cultures. BioMed Research International 1- 6, 2014.
- b) Aloisio I. et al. Characterization of *Bifidobacterium spp.* strains for the treatment of enteric disorders in newborns. Appl Microbiol Biotechnol 2012, 96:1561–1576.
- c) Nicola S. et al. Interaction between probiotics and human immune cells: the prospective anti-inflammatory activity of *Bifidobacterium breve* BR03. AgroFOOD, 2010; 21(2):S44-47.
- d) Mogna L. et al. Assessment of the In Vitro Inhibitory Activity of Specific Probiotic Bacteria Against Different *Escherichia coli* strains. J Clin Gastroenterol. 2012; 46 Suppl.S29-32.
- e) Del Piano M. et al. In Vitro Sensitivity of Probiotics to Human Pancreatic Juice. J Clin Gastroenterol. Vol 42, Suppl. 3, Part 2, Sept. 2008. (DSM 20074 was re-deposited as 22106).

Lactobacillus delbrueckii subsp. *delbrueckii* - LDD01 (DSM 22106)

FINISHED DOSAGE FORM

FUNCTIONALITY Gaseous colic • Inhibition of *E. coli*, including toxinogenic O157:H7 • Inhibition of *Klebsiella pneumoniae* and of different coliforms isolated from colicky infants

SCIENTIFIC SUPPORT

In vitro studies

- a) Savino F. et al. Antagonistic effect of *Lactobacillus* strains against gas-producing coliforms isolated from colicky infants. BMC Microbiology 2011, 11:157.
- b) Mogna L. et al. Assessment of the In Vitro Inhibitory Activity of Specific Probiotic Bacteria Against Different *Escherichia coli* strains. J Clin Gastroenterol. 2012;46 Suppl.S29-32.

- c) Mogna L. et al. In Vitro Inhibition of *Klebsiella pneumoniae* by *Lactobacillus delbrueckii* subsp. *delbrueckii* LDD01 (DSM 22106): An Innovative Strategy to Possibly Counteract Such Infections in Humans? J Clin Gastroenterol. 2016 Nov/Dec;50 Suppl 2, Proceedings from the 8th Probiotics, Prebiotics & New Foods for Microbiota and Human Health meeting held in Rome, Italy on September 13-15, 2015:S136-S139.

Bifidobacterium breve - BR03™ (DSM 16604)
Bifidobacterium breve - B632™ (DSM 24706)

+

DAILY DOSAGE IN CLINICAL STUDY 1) BR03 100 million cells + B632 100 million cells
• 2-4) BR03 1 billion CFU + B632 1 billion CFU

FINISHED DOSAGE FORM

FUNCTIONALITY Decrease inflammation in celiac disease

SCIENTIFIC SUPPORT

Human clinical trials

- 1) Mogna L. et al. Capability of the two microorganisms B632 and BR03 to colonize the intestinal microbiota of children. *J Clin Gastroenterol.* 2014; 48 Suppl:S37-39.
- 2) Klemenak M. et al. Administration of decreases the production of TNF- α in children with celiac disease. *Dig Dis Sci* (2015).

3) Quagliariello A. et al. Effect of *Bifidobacterium breve* on the Intestinal Microbiota of Coeliac Children on a Gluten Free Diet: A Pilot Study. *Nutrients.* 2016 Oct 22;8(10). pii:E660.

4) Primec M. et al. Clinical intervention using *Bifidobacterium* strains in celiac disease children reveals novel microbial modulators of TNF- α and short-chain fatty acids. *Clinical Nutrition* 2018, 1-9.

See precedent page for studies in infant colics.

Lactiplantibacillus plantarum - LP01™ (LMG P-21021) (formerly *Lactobacillus plantarum*)
Lactococcus lactis - LLC02 (DSM 29536) + **New Studies**
Lactobacillus delbrueckii subsp. *delbrueckii* - LDD01 (DSM 22106)

DAILY DOSAGE IN CLINICAL STUDY LP01 1 billion cells • LLC02 800 million cells • LDD01 200 million cells

FINISHED DOSAGE FORM

FUNCTIONALITY Opposing dysbiosis and improving symptoms such as abdominal pain and bloating in patients with Inflammatory bowel diseases, in patients having undergone abdominal surgery and in patients after colonoscopy

SCIENTIFIC SUPPORT

Human clinical trial

- 1) Bonavina L, Arini A, Ficano L, Iannuzziello D, Pasquale L, Aragona SE, Ciprandi G, On Digestive Disorders ISG. Abincol® (*Lactobacillus plantarum* LP01, *Lactobacillus lactis* subspecies *cremoris* LLC02, *Lactobacillus delbrueckii* LDD01), an oral nutraceutical, pragmatic use in patients with chronic intestinal disorders. *Acta Biomed.* 2019 Jul 10;90(7-S):8-12.
- 2) Bonavina L, Arini A, Ficano L, Iannuzziello D, Pasquale L, Aragona SE, Ciprandi G, On Digestive Disorders ISG. Post-surgical intestinal dysbiosis: use of an innovative mixture (*Lactobacillus plantarum* LP01, *Lactobacillus lactis* subspecies *cremoris* LLC02, *Lactobacillus delbrueckii* LDD01). *Acta Biomed.* 2019 Jul 10;90(7-S):18-23.

3) Bonavina L, Ariani A, Ficano L, Iannuzziello D, Pasquale L, Aragona SE, Drago L, Ciprandi G, On Digestive Disorders ISG. *Lactobacillus plantarum* LP01, *Lactobacillus lactis* subspecies *cremoris* LLC02, and *Lactobacillus delbrueckii* LDD01) in patients undergoing bowel preparation. *Acta Biomed.* 2019 Jul 10;90(7-S):13-17.

In vitro studies

- a) Mogna L. et al. Assessment of the In Vitro Inhibitory Activity of Specific Probiotic Bacteria Against Different *Escherichia coli* strains. *J Clin Gastroenterol.* 2012;46 Suppl.S29-32.
- b) Deidda F. et al. (2020) How Probiotics may Kill Harmful Bacteria: The in vitro Activity against Some Haemolytic Strains. *J. Prob. Health.*

Lactiplantibacillus plantarum - LP01™ (LMG P-21021) (formerly *Lactobacillus plantarum*)

DAILY DOSAGE IN CLINICAL STUDY 1) 10 billion CFU

**RAW MATERIAL
AND FINISHED DOSAGE FORM**

FUNCTIONALITY Constipation • Intestinal transit • Leaky gut • Inhibition of *E. coli* and other pathogens

SCIENTIFIC SUPPORT

Human clinical trial

Del Piano M. et al. The use of probiotics in the treatment of constipation in the elderly. CIBUS, 2005; 1(1):23-30.

In vitro studies

a) Mogna L. et al. Assessment of the in vitro inhibitory activity of specific probiotic bacteria against different *Escherichia coli* strains. J Clin Gastroenterol. 2012; 46 Suppl:S29-32.

b) Del Piano M. et al. In Vitro Sensitivity of Probiotics to Human Pancreatic Juice. J Clin Gastroenterol. Vol 42, Suppl. 3, Part 2, Sept. 2008.

c) Deidda F. et al. (2020) How Probiotics may Kill Harmful Bacteria: The in vitro Activity against Some Haemolytic Strains. J. Prob. Health 8:216.

Further internal data on anti-inflammatory activity and intestinal barrier are available upon request

Bifidobacterium animalis subsp. *lactis* - BS01™ (LMG P-21384)

DAILY DOSAGE IN CLINICAL STUDY 1) 5 billion CFU • 2) 10 billion CFU • 3) 5 billion CFU
• 4) 5 billion CFU uncoated and 1 billion cells microencapsulated

**RAW MATERIAL
AND FINISHED DOSAGE FORM**

FUNCTIONALITY Constipation • Intestinal transit • Reduction of gastrointestinal discomfort • Leaky gut

SCIENTIFIC SUPPORT

Human clinical trials

1) Del Piano M. et al. The use of probiotics in healthy volunteers with evacuation disorders and hard stools. A double blind, randomized, placebo-controlled study. J Clin Gastroenterol, 2010; 44(8):S30-34.

2) Del Piano M. et al. The use of probiotics in the treatment of constipation in the elderly. CIBUS, 2005; 1(1):23-30.

3) Dimidi E. et al. The effect of probiotics on functional constipation in adults: a systematic review and meta-analysis of randomized controlled trials. Am J Clin Nutr 2014;100:1075-84.

4) Del Piano M. et al. Comparison of the Kinetics of Intestinal Colonization by Associating 5 Probiotic Bacteria Assumed Either in Microencapsulated or in a Traditional, Uncoated Form. J Clin Gastroenterol 2012;46:S85-S92.

Bifidobacterium breve - BR03™ (DSM 16604)

DAILY DOSAGE IN CLINICAL STUDY 1) 10 billion CFU (uncoated) • 2) 5 billion CFU uncoated and 1 billion cells microencapsulated

**RAW MATERIAL
AND FINISHED DOSAGE FORM**

FUNCTIONALITY Constipation • Intestinal transit • Anti-inflammatory • Reduction of gastro-intestinal discomfort • Inhibition of pathogenic *E. coli*

SCIENTIFIC SUPPORT

Human clinical trials

- 1) Del Piano M. et al. The use of probiotics in the treatment of constipation in the elderly CIBUS, 2005; 1(1):23-30.
- 2) Del Piano M. et al. Evaluation of the intestinal colonization by micro-encapsulated probiotic bacteria in comparison with the same uncoated strains. J Clin Gastroenterol. 2010; 44 Suppl 1:S42-6.

In vitro studies

- a) Mogna L. et al. Assessment of the In Vitro Inhibitory Activity of Specific Probiotic Bacteria Against Different *Escherichia coli* strains. J Clin Gastroenterol. 2012;46 Suppl.S29-32.
- b) Nicola S. et al. Interaction between probiotics and human immune cells: the prospective anti-inflammatory activity of *Bifidobacterium breve* BR03. AgroFOOD, 2010; 21(2):S44-47.
- c) Del Piano M. et al. In Vitro Sensitivity of Probiotics to Human Pancreatic Juice. J Clin Gastroenterol. Vol 42, Suppl. 3, Part 2, Sept. 2008. (DSM 20074 was re-deposited as 22106).

Bifidobacterium longum - BL03 (DSM 16603)

Lactiplantibacillus plantarum - LP01™ (LMG P-21021) (formerly *Lactobacillus plantarum*)

Bifidobacterium animalis subsp. *lactis* - BS01™ (LMG P-21384)

Bifidobacterium adolescentis - BA02 (DSM 18351, formerly ALB 1)

Bifidobacterium breve - BR03™ (DSM 16604)

DAILY DOSAGE IN CLINICAL STUDY 10 billion CFU

**RAW MATERIAL
AND FINISHED DOSAGE FORM**

FUNCTIONALITY Constipation • Intestinal transit

SCIENTIFIC SUPPORT

Human clinical trial

Del Piano M. et al. The use of probiotics in the treatment of constipation in the elderly (BL03, LP01, BS01, LR05, BA02 and BR03 separately). CIBUS, 2005; 1(1):23-30.

In vitro studies

- a) Del Piano M. et al. In Vitro Sensitivity of Probiotics to Human Pancreatic Juice (LA02, LPC00, LP01, LR04, BR03, BL03 and BA02). J Clin Gastroenterol. Vol 42, Suppl. 3, Part 2, Sept. 2008.
- b) Rossi M. et al. fermentation of fructooligosaccharides and inulin by *Bifidobacteria*: a comparative study of pure and fecal cultures (BA02). Applied and Environmental Microbiology, 2005;71(10):6150-6158.
- c) Deidda F. et al. (2020) How Probiotics may Kill Harmful Bacteria: The in vitro Activity against Some Haemolytic Strains. J. Prob. Health 8:216. (LP01)

Bifidobacterium longum - W11 (LMG P-21586)

New Studies

DAILY DOSAGE IN CLINICAL STUDY 1,2,3,4,5,6,7) 5 billion CFU + FOS

RAW MATERIAL
AND FINISHED DOSAGE FORM

FUNCTIONALITY Reduction of gastro-intestinal discomfort related to IBS • Rebalance of intestinal microbiota
• Non-transmissible rifamycins resistance • Production of Exopolysaccharides

SCIENTIFIC SUPPORT

Human clinical trials

- 1) Amenta M. et al. Diet and chronic constipation. Benefits of oral supplementation with symbiotic zir fos (*Bifidobacterium longum* W11 + FOS Actilight). Acta Biomed 2006; 77(3):157-62.
- 2) Colecchia A. et al. Effect of a symbiotic preparation on the clinical manifestations of irritable bowel syndrome, constipation-variant. Results of an open, uncontrolled multicenter study. Minerva Gastroenterol Dietol 2006; 52(4):349-58.
- 3) Fanigliulo L. et al. Role of gut microflora and probiotic effects in the irritable bowel syndrome. Acta Biomed 2006; 77(2):85-9.
- 4) Sarnelli G. et al. Effects of oral supplementation with the symbiotic (*Bifidobacterium longum* W11 + FOS Actilight) on IBS with constipation: a randomized, dose finding trial, versus fibers. Digestive and Liver Disease 2008; 40(1):S141.
- 5) Malaguarnera M. et al. *Bifidobacterium longum* with fructo-oligosaccharides (FOS) treatment in minimal hepatic encephalopathy: a randomized, double-blind, placebo-controlled study. Dig Dis Sci 2007; 52:3259-3265.
- 6) Dughera L. et al. Effects of symbiotic preparation on constipated irritable bowel syndrome symptoms. Acta Biomed 2007; 78:111-116.
- 7) Del Piano M. et al. Clinical Experience With Probiotics in the Elderly on Total Enteral Nutrition. J Clin Gastroenterol 2004;38:S111-S114.
- 8) Di Pierro F. et al. Effects of rifaximin-resistant *Bifidobacterium longum* W11 in subjects with symptomatic uncomplicated diverticular disease treated with rifaximin. Minerva Gastroenterol Dietol. 2019 Dec; 65(4):259-264.

In vitro studies

- a) Graziano T. et al. The possible innovative use of *Bifidobacterium longum* W11 in association with rifaximin: a new horizon for combined approach? J Clin Gastroenterol. 2016 Nov/Dec;50 Suppl 2, Proceedings from the 8th Probiotics, Prebiotics & New Foods for Microbiota and Human Health meeting held in Rome, Italy on September 13-15, 2015:S153-S156.
- b) Inturri R. et al. Complete Genome Sequence of *Bifidobacterium longum* W11 (LMG P-21586), Used as a Probiotic Strain. Genome Announc. 2017 Mar 9;5(10). pii: e01659-16. doi: 10.1128/genome.A.01659-16.
- c) Inturri R. et al. Chemical and biological properties of the novel exopolysaccharide produced by a probiotic strain of *Bifidobacterium longum*, Carbohydrate polymers / Elsevier 2017.
- d) Medina et al. Differential immunomodulatory properties of *Bifidobacterium longum* strains: relevance to probiotic selection and clinical applications, Clinical and Experimental Immunology, 2007.
- e) Izquierdo E. et al. Resistance to Simulated Gastrointestinal Conditions and Adhesion to Mucus as Probiotic Criteria for *B. longum* strains. Curr Microbiol 2008, 56:613-618.
- f) Interri R. et al. Scanning Electro Microscopy Observation of Adhesion Properties of *B. longum* W11 and Chromatographic Analysis of Its Exopolysaccharide 2014, Food and Nutrition Sciences 1787-1792.
- g) Interri R. et al. Immunomodulatory Effects of *B. longum* W11 Produced Exopolysaccharide on Cytokine Production. 2017, Current Pharmaceutical Biotechnology.
- h) *B. longum* W11, an antibiotic resistant probiotic, Di Pierro 2018, CEC online article: <http://ceceditore.com/bifidobacterium-longum-w11-an-antibiotic-resistant-probiotic/?lang=en>.

Lactiplantibacillus plantarum - LP01™ (LMG P-21021) (formerly *Lactobacillus plantarum*) *Bifidobacterium breve* - BR03™ (DSM 16604) + **New Study**

- DAILY DOSAGE IN CLINICAL STUDY**
- 1) LP01 5 billion CFU + BR03 5 billion CFU
 - 2) LP01 5 billion CFU / strain (uncoated form) vs. BR03 1 billion cells/strain (microencapsulated form)
 - 3-4) LP01 2.5 billion CFU + BR03 2.5 billion CFU • 5) 10 billion CFU

RAW MATERIAL
AND FINISHED DOSAGE FORM

FUNCTIONALITY IBS • Constipation • Intestinal transit • Reduction of gastro-intestinal discomfort • Reduction of inflammation
• Inhibition of *E. coli*, including toxinogenic O157:H7 and other pathogens

SCIENTIFIC SUPPORT

Human clinical trials

- 1) Saggiaro A. Probiotics in the treatment of Irritable Bowel Syndrome. *J Clin Gastroenterol*, 2004; 38(8): S104-106.
- 2) Del Piano et al. Evaluation of the intestinal colonization by microencapsulated probiotic bacteria in comparison to the same uncoated strains. *J Clin Gastroenterol*, 2010; 44(8):S42-46.
- 3) Del Piano M. et al. The use of probiotics in healthy volunteers with evacuation disorders and hard stools. A double blind, randomized, placebo-controlled study. *J Clin Gastroenterol*, 2010; 44(8): S30-34.
- 4) Dimidi E. et al. The effect of probiotics on functional constipation in adults: a systematic review and meta-analysis of randomized controlled trials. *Am J Clin Nutr* 2014;100:1075–84.
- 5) Del Piano M. et al. The use of probiotics in the treatment of constipation in the elderly (BL03, LP01, BS01, LR05, BA02 and BR03 separately). *CIBUS*, 2005; 1(1):23-30.

In vitro studies

- a) Mogna L. et al. Assessment of the in vitro inhibitory activity of specific probiotic bacteria against different *Escherichia coli* strains. *J Clin Gastroenterol*. 2012; 46 Suppl:S29-32.
- b) Nicola S. et al. Interaction between probiotics and human immune cells: the prospective anti-inflammatory activity of *Bifidobacterium breve* BR03. *AgroFOOD*, 2010; 21(2):S44-47.
- c) Amoroso A. et al. (2019) A Systematic Evaluation of the Immunomodulatory and Functional Properties of Probiotic *Bifidobacterium Breve* BR03 (DSM 16604) *Lactobacillus Plantarum* LP01 (LMG P-21021). *J Prob Health*. 7:214.
- d) Deidda F. et al. (2020) How Probiotics may Kill Harmful Bacteria: The in vitro Activity against Some Haemolytic Strains. *J. Prob. Health* 8:216 (LP01).

Internal data in vitro on gut permeability available upon request

Lactiplantibacillus plantarum - LP01™ (LMG P-21021) (formerly *Lactobacillus plantarum*) *Lactobacillus acidophilus* - LA02 (DSM 21717) + **New Study**

- DAILY DOSAGE IN CLINICAL STUDY** LP01 5 billion CFU + LA02 5 billion CFU

RAW MATERIAL
AND FINISHED DOSAGE FORM

FUNCTIONALITY IBS • Reduction of gastro-intestinal discomfort • Reduction of inflammation • Anti-pathogen activity

SCIENTIFIC SUPPORT

Human clinical trial

Saggiaro A. Probiotics in the treatment of Irritable Bowel Syndrome. *J Clin Gastroenterol*, 2004; 38(8): S104-106.

In vitro study

a) Deidda F. et al. (2020) How Probiotics may Kill Harmful Bacteria: The in vitro Activity against Some Haemolytic Strains. *J. Prob. Health* 8:216.

Internal data in vitro on gut permeability and anti-inflammatory activity available upon request.

Lacticaseibacillus rhamnosus - LR04 (DSM 16605) (formerly *Lactobacillus rhamnosus*)

DAILY DOSAGE IN CLINICAL STUDY 1) 10 billion CFU

- 2) 5 billion CFU uncoated and 1 billion cells microencapsulated

**RAW MATERIAL
AND FINISHED DOSAGE FORM**

FUNCTIONALITY Diarrhea • Inhibition of *E. coli*, including enterohemorrhagic O157:H7 and other pathogens

SCIENTIFIC SUPPORT

Human clinical trials

1) Dezi A. et al. Probiotics and chronic diarrhea in the elderly. CIBUS, 2004; 8(2):58-64.

2) Del Piano M. et al. Comparison of the Kinetics of Intestinal Colonization by Associating 5 Probiotic Bacteria Assumed Either in Microencapsulated or in a Traditional, Uncoated Form. J Clin Gastroenterol 2012;46:S85-S92.

In vitro studies

a) Mogna L. et al. Assessment of the in vitro inhibitory activity of specific probiotic bacteria against different *Escherichia coli* strains. J Clin

Gastroenterol. 2012; 46 Suppl:S29-32.

b) Del Piano M. et al. In Vitro Sensitivity of Probiotics to Human Pancreatic Juice. J Clin Gastroenterol. Vol 42, Suppl. 3, Part 2, Sept. 2008.

d) Deidda F. et al. (2020) How Probiotics may Kill Harmful Bacteria: The in vitro Activity against Some Haemolytic Strains. J. Prob. Health 8:216.

e) Chamignon C et al. Evaluation of the Probiotic Properties and the Capacity to Form Biofilms of Various *Lactobacillus* Strains. Microorganisms. 2020 Jul 15;8(7):1053.

Lacticaseibacillus rhamnosus - GG (ATCC 53103) (formerly *Lactobacillus rhamnosus*)

FUNCTIONALITY Diarrhea • Rotaviral diarrhea • Gastroenteritis • Allergy, including cow's milk allergy
• ADHD and autism prevention • NEC • Respiratory diseases, URTI • Oral health, caries

**RAW MATERIAL
AND FINISHED DOSAGE FORM**

SCIENTIFIC SUPPORT *One of the most recognized probiotic strains in the world, with special regard to pediatric diarrhea, with over 1000 publications and 300 clinical studies from preterm infants to elderly population and pregnant women*

Also available as Active Pharmaceutical Ingredient (API)

Lacticaseibacillus rhamnosus - LR04 (DSM 16605) (formerly *Lactobacillus rhamnosus*)
Limosilactobacillus reuteri - LRE02 (DSM 23878) (formerly *Lactobacillus reuteri*) +

DAILY DOSAGE IN CLINICAL STUDY LR04 1 billion cells/day + LRE02 200 million cells/day

**RAW MATERIAL
AND FINISHED DOSAGE FORM**

FUNCTIONALITY Prevention of antibiotic-associated diarrhea

SCIENTIFIC SUPPORT

Human clinical trials

Drago L, Meroni G, Chiaretti A, Laforgia N, Cucchiara S, Baldassarre ME, On Behalf Of The Surveyflor Group. Effect of *Limosilactobacillus reuteri* LRE02-*Lacticaseibacillus rhamnosus* LR04 Combination on Antibiotic-Associated Diarrhea in a Pediatric Population: A National Survey. *J Clin Med*. 2020 Sep 24;9(10):E3080.

In vitro study

a) Deidda F. et al. (2020) How Probiotics may Kill Harmful Bacteria: The in vitro Activity against Some Haemolytic Strains. *J. Prob. Health* 8:216.
b) Chamignon C et al. Evaluation of the Probiotic Properties and the Capacity to Form Biofilms of Various *Lactobacillus* Strains. *Microorganisms*. 2020 Jul 15;8(7):1053 (LR04).

Lacticaseibacillus rhamnosus - GG (ATCC 53103) (formerly *Lactobacillus rhamnosus*)
Bifidobacterium animalis subsp. *lactis* - BS01™ (LMG P-21384) +
Bifidobacterium breve - BR03™ (DSM 16604) +
Bifidobacterium longum - BL03 (DSM 16603) +

DAILY DOSAGE IN CLINICAL STUDY GG 25 billion + BS01 15 billion + BR03 5 billion + BL03 5 billion

**RAW MATERIAL
AND FINISHED DOSAGE FORM**

FUNCTIONALITY Constipation • Intestinal transit

SCIENTIFIC SUPPORT

Human clinical trials

Yilmaz B, Schibli S, Macpherson AJ, et al. D-lactic Acidosis: Successful Suppression of D-lactate-Producing *Lactobacillus* by Probiotics. *Pediatrics*. 2018;142(3):e20180337.

In vitro studies

Mogna L. et al. Assessment of the In Vitro Inhibitory Activity of Specific Probiotic Bacteria Against Different *Escherichia coli* strains. *J Clin Gastroenterol*. 2012;46 Suppl.S29-32.

Lacticaseibacillus rhamnosus - LR06 (DSM 21981) (formerly *Lactobacillus rhamnosus*) +
Lactiplantibacillus pentosus - LPS01 (DSM 21980) (formerly *Lactobacillus pentosus*) +
Lactiplantibacillus plantarum - LP01™ (LMG P-21021) (formerly *Lactobacillus plantarum*) +
Lactobacillus delbrueckii subsp. *delbrueckii* - LDD01 (DSM 22106)

DAILY DOSAGE IN CLINICAL STUDY 1,2) LR06 3 billion CFU + LPS01 3 billion CFU + LP01 3 billion CFU + LDD01 1 billion CFU 500 million CFU • 3) 1.5 billion CFU per strain

FINISHED DOSAGE FORM

FUNCTIONALITY Gastric barrier function • Improvement of the incidence and severity of bad breath (halitosis) – see section oral health

SCIENTIFIC SUPPORT

Human clinical trials

1) Del Piano M. et al. The Innovative Potential of *Lactobacillus rhamnosus* LR06, *Lactobacillus pentosus* LPS01, *Lactobacillus plantarum* LP01 and *Lactobacillus delbrueckii* subsp. *delbrueckii* LDD01 to Restore the Gastric Barrier Effect” in Patients Chronically Treated with PPIs – a Pilot Study. J Clin Gastroenterol 2010;46:S18-S26.

2) Del Piano M. et al. Correlation Between Chronic Treatment With Proton Pump Inhibitors (PPIs) and Bacterial Overgrowth in the Stomach – Any Possible Beneficial Role for Selected *Lactobacilli*? J Clin Gastroenterol 2014;48:S40-S46.

3) Del Piano M. et al. Correlation Between Specific Bacterial Groups in the Oral Cavity and the Severity of Halitosis: any Possible Beneficial Role for Selected *Lactobacilli*? J Gastroint Dig Syst, 2014; 4:197.

In vitro studies

a) Mogna L. et al. In Vitro Inhibition of *Klebsiella pneumoniae* by *Lactobacillus delbrueckii* subsp. *delbrueckii* LDD01 (DSM 22106): An Innovative Strategy to Possibly Counteract Such Infections in Humans? J Clin Gastroenterol. 2016 Nov/Dec;50 Suppl 2, Proceedings from the 8th Probiotics, Prebiotics & New Foods for Microbiota and Human Health meeting held in Rome, Italy on September 13-15, 2015:S136-S139.

b) Mogna L. et al. Assessment of the in vitro inhibitory activity of specific probiotic bacteria against different *Escherichia coli* strains. J Clin Gastroenterol. 2012; 46 Suppl:S29-32.

c) Deidda F. et al. (2020) How Probiotics may Kill Harmful Bacteria: The in vitro Activity against Some Haemolytic Strains. J. Prob. Health 8:216 (LP01).

Bifidobacterium bifidum - BB01 (DSM 22892)

Lacticaseibacillus casei - LC03 (DSM 27537) (formerly *Lactobacillus casei*)

Lactobacillus delbrueckii subsp. *bulgaricus* - LDB01 (DSM 16606)

Streptococcus thermophilus - Y08 (DSM 17843)

RAW MATERIAL
AND FINISHED DOSAGE FORM

FUNCTIONALITY Rebalance of intestinal microbiota

SCIENTIFIC SUPPORT

In vitro study

a) Chamignon C, Guéneau V, Medina S, Deschamps J, Gil-Izquierdo A, Briandet R, Mousset PY, Langella P, Lafay S, Bermúdez-Humarán LG. Evaluation of the Probiotic Properties and the Capacity to Form Biofilms of Various Lactobacillus Strains. *Microorganisms*. 2020 Jul 15;8(7):1053 (LC03).

These strains are proposed without specific scientific literature, in quality of recognized probiotic species

Streptococcus thermophilus - ST10 (DSM 25246)

DAILY DOSAGE IN CLINICAL STUDY 1 billion CFU

FINISHED DOSAGE FORM

FUNCTIONALITY Production of exopolysaccharides (EPS) in the gut • Restoration of a physiological intestinal barrier

SCIENTIFIC SUPPORT

Human clinical trial

Del Piano M. et al. Assessment of the Capability of a Gelling Complex Made of Tara Gum and the Exopolysaccharides Produced by the Microorganism *Streptococcus thermophilus* ST10 to Prospectively Restore the Gut Physiological Barrier. A Pilot Study. *J. Clin Gastroenterol*, Volume 48, Supp. 1, November/December 2014.

Lactiplantibacillus plantarum - LP01™ (LMG P-21021) (formerly *Lactobacillus plantarum*)

Lactiplantibacillus plantarum - LP02 (LMG P-21020) (formerly *Lactobacillus plantarum*)

Lacticaseibacillus rhamnosus - LR04 (DSM 16605) (formerly *Lactobacillus rhamnosus*)

Lacticaseibacillus rhamnosus - LR06 (DSM 21981) (formerly *Lactobacillus rhamnosus*)

Lactiplantibacillus pentosus - LPS01 (DSM 21980) (formerly *Lactobacillus pentosus*)

Bifidobacterium breve - BR03™ (DSM 16604)

RAW MATERIAL
AND FINISHED DOSAGE FORM

FUNCTIONALITY Inhibition of *E. coli*

SCIENTIFIC SUPPORT

In vitro study

a) Mogna L. et al. Assessment of the in vitro inhibitory activity of specific probiotic bacteria against different *Escherichia coli* strains. J Clin Gastroenterol. 2012; 46 Suppl:S29-32.

b) Deidda F. et al. (2020) How Probiotics may Kill Harmful Bacteria: The in vitro Activity against Some Haemolytic Strains. J. Prob. Health 8:216 (LP01, LR04).

Lactobacillus delbrueckii subsp. *delbrueckii* - LDD01 (DSM 22106)

FINISHED DOSAGE FORM

FUNCTIONALITY Inhibition of *E. coli*, including enterohemorrhagic O157:H7

- Inhibition of *Klebsiella pneumoniae* and of different coliforms isolated from colicky infants

SCIENTIFIC SUPPORT

In vitro studies

a) Mogna L. et al. Assessment of the in vitro inhibitory activity of specific probiotic bacteria against different *Escherichia coli* strains. J Clin Gastroenterol. 2012; 46 Suppl:S29-32.

b) Mogna L. et al. In Vitro Inhibition of *Klebsiella pneumoniae* by *Lactobacillus delbrueckii* subsp. *delbrueckii* LDD01 (DSM 22106): An In-

novative Strategy to Possibly Counteract Such Infections in Humans? J. Clin Gastroenterol. 2016 Nov/Dec; 50 Suppl 2.

c) Savino F. et al. Antagonistic effect of *Lactobacillus* strains against gas-producing coliforms isolated from colicky infants. BMC Microbiology 2011, 11:157.

Lactiplantibacillus plantarum - LP01™ (LMG P-21021) (formerly *Lactobacillus plantarum*)

Lactiplantibacillus plantarum - LP14 (DSM 33401)

Limosilactobacillus fermentum - LF26 (DSM 33402)

Lacticaseibacillus casei - LC04 (DSM 33400)

Lacticaseibacillus rhamnosus - LR04 (DSM 16605) (formerly *Lactobacillus rhamnosus*)

Lactobacillus acidophilus - LA02 (DSM 21717)

Limosilactobacillus reuteri - LRE02 (DSM 23878) (formerly *Lactobacillus reuteri*)

RAW MATERIAL
AND FINISHED DOSAGE FORM

Ligilactobacillus salivarius - LS01™ (DSM 22775) (formerly *Lactobacillus salivarius*)

Lacticaseibacillus paracasei - LPC09 (DSM 24243) (formerly *Lactobacillus paracasei*)

FINISHED DOSAGE FORM

FUNCTIONALITY inhibition of pathogenic *E. coli*, *E. faecalis*, *K. Pneumoniae*, *S. aureus* and/or *P. aeruginosa*

SCIENTIFIC SUPPORT

In vitro studies

Deidda F. et al. (2020) How Probiotics may Kill Harmful Bacteria: The in vitro Activity against Some Haemolytic Strains. 8:216.

Limosilactobacillus reuteri - LRE02 (DSM 23878) (formerly *Lactobacillus reuteri*)

RAW MATERIAL
AND FINISHED DOSAGE FORM

FUNCTIONALITY Production of reuterin and vitamin B12 • Anti-pathogen activity and immunostimulation • Diarrhea

SCIENTIFIC SUPPORT Internal data available upon request

Refer to the section on diarrhea for a published clinical trial including this strain

In vitro studies

Deidda F. et al. (2020) How Probiotics may Kill Harmful Bacteria: The in vitro Activity against Some Haemolytic Strains. J. Prob. Health 8:216.

Lactiplantibacillus plantarum - LP09 (DSM 25710) (formerly *Lactobacillus plantarum*)

FUNCTIONALITY Anti-pathogen activity

RAW MATERIAL
AND FINISHED DOSAGE FORM

SCIENTIFIC SUPPORT

Internal data available upon request

Bifidobacterium breve - BR03™ (DSM 16604)

FUNCTIONALITY Gaseous colic • Inhibition of pathogenic *E. coli* • Inhibition of Enterobacteriaceae and of other coliforms isolated from colicky infants

RAW MATERIAL
AND FINISHED DOSAGE FORM

SCIENTIFIC SUPPORT

In vitro studies

a) Aloisio I. et al. Characterization of *Bifidobacterium spp.* strains for the treatment of enteric disorders in newborns. *Appl Microbiol Biotechnol* 2012, 96:1561–1576.

b) Mogna L. et al. Assessment of the In Vitro Inhibitory Activity of Specific Probiotic Bacteria Against Different *Escherichia coli* strains. *J. Clin.*

Gastroenterol. 2012;46 Suppl.S29-32.

c) Del Piano M. et al. In Vitro Sensitivity of Probiotics to Human Pancreatic Juice. *J. Clin. Gastroenterol.* Vol 42, Suppl. 3, Part 2, Sept. 2008.

Refer to the section on baby colics and on celiac disease for published clinical trials

Limosilactobacillus fermentum - LF5 (CNCM I-789) (formerly *Lactobacillus fermentum*)

Limosilactobacillus fermentum - LF09 (DSM 18298) (formerly *Lactobacillus fermentum*)

Limosilactobacillus fermentum - LF10 (DSM 19187) (formerly *Lactobacillus fermentum*)

Limosilactobacillus fermentum - LF11 (DSM 19188) (formerly *Lactobacillus fermentum*)

FUNCTIONALITY Inhibition of pathogenic *Candida* species

FINISHED DOSAGE FORM

SCIENTIFIC SUPPORT

In vitro study

Deidda F. et al. The In Vitro Effectiveness of *Lactobacillus fermentum* Against Different *Candida* Species Compared With Broadly Used Azoles. 2016 *J Clin Gastroenterol* 50:S171-S174.

Ligilactobacillus salivarius - CRL1328 (DSM 24441) (formerly *Lactobacillus salivarius*) (under worldwide exclusive license from the CEntro de REferencia para LActobacilos, Argentina)

FUNCTIONALITY Inhibition of *Enterococcus faecalis*, *Enterococcus faecium* and *Neisseria gonorrhoeae*

RAW MATERIAL
AND FINISHED DOSAGE FORM

SCIENTIFIC SUPPORT

In vitro study

Ocana V. et al. Characterization of a bacteriocin like substance produced by a vaginal *Lactobacillus salivarius* strain. Applied and Environmental Microbiology, 1999; 65(12):5631-5635.

Lacticaseibacillus rhamnosus - LR04 (DSM 16605) (formerly *Lactobacillus rhamnosus*)

FUNCTIONALITY Inhibition of *Klebsiella pneumoniae* and *E. coli*

RAW MATERIAL
AND FINISHED DOSAGE FORM

SCIENTIFIC SUPPORT

In vitro studies

a) Mogna L. et al. In Vitro Inhibition of *Klebsiella pneumoniae* by *Lactobacillus delbrueckii* subsp. *delbrueckii* LDD01 (DSM 22106). An Innovative Strategy to Possibly Counteract Such Infections in Humans? J Clin Gastroenterol, Vol 50, Supp. 2, November/December 2016.

b) Mogna L. et al. Assessment of the in vitro inhibitory activity of specific probiotic bacteria against different *Escherichia coli* strains. J Clin Gastroenterol. 2012; 46 Suppl:S29-32.

c) Deidda F. et al. (2020) How Probiotics may Kill Harmful Bacteria: The in vitro Activity against Some Haemolytic Strains. J. Prob. Health 8:216.

+ Internal data on immune stimulation and anti-pathogen activity available upon request for certain strains

Lacticaseibacillus rhamnosus - LR04 (DSM 16605) (formerly *Lactobacillus rhamnosus*) +
Lacticaseibacillus rhamnosus - LR05 (DSM 19739) (formerly *Lactobacillus rhamnosus*) +
Lactiplantibacillus plantarum - LP01™ (LMG P-21021) (formerly *Lactobacillus plantarum*) +
Lactiplantibacillus plantarum - LP02 (LMG P-21020) (formerly *Lactobacillus plantarum*) +
Bifidobacterium animalis subsp. *lactis* - BS01™ (LMG P-21384)

DAILY DOSAGE IN CLINICAL STUDY LR04 2.5 billion CFU + LR05 2.5 billion CFU + LP01 2.5 billion CFU +
 LP02 2.5 billion CFU + BS01 5 billion CFU + FOS or GOS

FINISHED DOSAGE FORM

FUNCTIONALITY Reinforcement of the natural defences • Reduction of the intestinal discomfort • Rebalance of the intestinal microbiota
 • Inhibition of intestinal and respiratory pathogens

Human clinical trials

1) Pregliasco F. et al. A New Chance of Preventing Winter Diseases by the Administration of Symbiotic Formulations. *Journal of Clinical Gastroenterology*, 2008; 42(2): 224-233.

2) Belcaro G. et al. Prevention of flu episodes with colostrum and Bifivir compared with vaccination: an epidemiological, registry study. *Panminerva Medica* 2010;52:269-75.

+ Internal data on immune stimulation and anti-pathogen activity available upon request for certain strains

In vitro study

a) Mogna L. et al. Micronized Cells of the Probiotic Strain *Bifidobacterium lactis* BS01 Activate Monocyte Polarization: A New Approach. *J Clin Gastroenterol*. 2018;52:S57-S61.

b) Mogna L. et al. Assessment of the in vitro inhibitory activity of specific probiotic bacteria against different *Escherichia coli* strains (LP01, LP02, LR04). *J Clin Gastroenterol*. 2012; 46 Suppl:S29-32.

c) Deidda F. et al. (2020) How Probiotics may Kill Harmful Bacteria: The in vitro Activity against Some Haemolytic Strains. *J. Prob. Health* 8:216.

Bifidobacterium animalis subsp. *lactis* - BS01™ (LMG P-21384) + **New Study**
Lacticaseibacillus rhamnosus - LR04 (DSM 16605) (formerly *Lactobacillus rhamnosus*) +
Lactiplantibacillus plantarum - LP02 (LMG P-21020) (formerly *Lactobacillus plantarum*)

DAILY DOSAGE IN CLINICAL STUDY BS01 10 billion CFU + LR04 10 billion CFU + LP02 10 billion CFU + 3 g FOS

**RAW MATERIAL
AND FINISHED DOSAGE FORM**

FUNCTIONALITY Reinforcement of the natural defences • Reduction of the incidence, severity and duration of Acute Respiratory Infections (ARI) during the cold season • Inhibition of intestinal and respiratory pathogens

SCIENTIFIC SUPPORT

Human clinical trial

Pregliasco F. et al. A New Chance of Preventing Winter Diseases by the Administration of Symbiotic Formulations. Journal of Clinical Gastroenterology, 2008; 42(2): 224-233.

+ Internal data on immune stimulation and anti-pathogen activity available upon request for certain strains

In vitro study

a) Mogna L. et al. Micronized Cells of the Probiotic Strain *Bifidobacterium lactis* BS01 Activate Monocyte Polarization: A New Approach. J Clin Gastroenterol. 2018;52:S57-S61.

b) Mogna L. et al. Assessment of the in vitro inhibitory activity of specific probiotic bacteria against different *Escherichia coli* strains (LP02, LR04). J Clin Gastroenterol. 2012; 46 Suppl:S29-32.

c) Deidda F. et al. (2020) How Probiotics may Kill Harmful Bacteria: The in vitro Activity against Some Haemolytic Strains. J. Prob. Health 8:216 LR04).

Lacticaseibacillus rhamnosus - GG (ATCC 53103) (formerly *Lactobacillus rhamnosus*)

FUNCTIONALITY / SCIENTIFIC SUPPORT

The most studied probiotic strain in the world, over 1000 publications available, including immune support, anti-pathogen activity and digestive health

**RAW MATERIAL
AND FINISHED DOSAGE FORM**

Bifidobacterium animalis subsp. *lactis* - BS01™ (LMG P-21384)

FUNCTIONALITY Strengthening of natural defences and natural immunity

RAW MATERIAL
AND FINISHED DOSAGE FORM

SCIENTIFIC SUPPORT

In vitro study

Mogna L. et al. Micronized Cells of the Probiotic Strain *Bifidobacterium lactis* BS01 Activate Monocyte Polarization: A New Approach. *J Clin Gastroenterol.* 2018;52:S57-S61.

+ Refer to precedent page for clinical data

+ Internal data on immune stimulation available upon request

Limosilactobacillus reuteri - LRE02 (DSM 23878) (formerly *Lactobacillus reuteri*)

FUNCTIONALITY Production of reuterin and vitamin B12 • Anti-Pathogen activity • Diarrhea

RAW MATERIAL
AND FINISHED DOSAGE FORM

SCIENTIFIC SUPPORT

In vitro study

Deidda F. et al. (2020) How Probiotics may Kill Harmful Bacteria: The in vitro Activity against Some Haemolytic Strains. *J. Prob. Health* 8:216.

+ Internal data available on immune stimulation available upon request

Ligilactobacillus salivarius - LS01™ (DSM 22775) (formerly *Lactobacillus salivarius*) +
Bifidobacterium breve - B632™ (DSM 24706)

FINISHED DOSAGE FORM

FUNCTIONALITY Immunomodulatory activity in asthmatic subjects

SCIENTIFIC SUPPORT

Clinical study on-going on asthma

+ Internal data available on the immunomodulation capacities of the strains

Lactiplantibacillus plantarum - LP01™ (LMG P-21021) (formerly *Lactobacillus plantarum*) +
Lacticaseibacillus paracasei - LPC00 (LMG P-21380) (formerly *Lactobacillus paracasei*)

RAW MATERIAL
AND FINISHED DOSAGE FORM

DAILY DOSAGE IN CLINICAL STUDY LP01 1 billion cells + LPC00 1 billion cells + 2,5 g FOS

FUNCTIONALITY Allergic rhinitis

SCIENTIFIC SUPPORT

Clinical studies and review

a) Manzotti G. et al. Multi-strain Symbiotic Preparations as a Novel Adjuvant Approach to Allergic Rhinitis. *Journal of Contemporary Immunology*, Vol. 1 No.2 pp. 67-80, 2014.

b) Fassio F. House dust mite-related respiratory allergies and probiotics: a narrative review. *Clin Mol Allergy*, 2018,16:15.

+ Internal data on immunomodulation available upon request

In vitro study

a) Mogna L. et al. Assessment of the in vitro inhibitory activity of specific probiotic bacteria against different *Escherichia coli* strains (LP01). *J Clin Gastroenterol*. 2012; 46 Suppl:S29-32.

c) Deidda F. et al. (2020) How Probiotics may Kill Harmful Bacteria: The in vitro Activity against Some Haemolytic Strains. *J. Prob. Health* 8:216 (LP01).

Ligilactobacillus salivarius - LS01™ (DSM 22775) (formerly *Lactobacillus salivarius*)

DAILY DOSAGE IN CLINICAL STUDY 1,2,3) 2 billion CFU
4) 5 billion CFU + 2 billion CFU of *Streptococcus thermophilus* ST10
+ Tara gum

FINISHED DOSAGE FORM

FUNCTIONALITY Treatment of atopic dermatitis • Improvement of the Quality of Life in subjects with Atopic Dermatitis
• Skin health • Inhibition of *C. acnes* (formerly classified as *P. acnes*)–induced IL-8 release • Inhibition of *S. aureus*

SCIENTIFIC SUPPORT

Human clinical trials

- 1) Drago L. et al. Effects of *Lactobacillus salivarius* LS01 (DSM 22775) treatment on adult atopic dermatitis: a randomized placebo-controlled study. *Int J Immunopathol Pharmacol.* 2011; 24(4):1037-48.
- 2) Drago L. et al. Changing of fecal flora and clinical effect of *L. salivarius* LS01 in adults with atopic dermatitis. *J Clin Gastroenterol.* 2012; 46 Suppl:S56-63.
- 3) Niccoli A. et al. Preliminary results on clinical effects of probiotic *Lactobacillus salivarius* LS01 in children affected by atopic dermatitis. *J Clin Gastroenterol.* 2014; 48 Suppl:S34-36.
- 4) Drago L. et al. Treatment of atopic dermatitis eczema with a high concentration of *Lactobacillus salivarius* LS01 associated with an innovative gelling complex. *J Clin Gastroenterol.* 2014; 48 Suppl:S47-511.

In vitro studies

- a) Drago L. et al. Strain-dependent release of cytokines modulated by *Lactobacillus salivarius* human isolates in an in vitro model. *BMC Res Notes.* 2010; 3:44.
 - b) Deidda F. et al. New Approach in Acne Therapy, A Specific Bacteriocin Activity and a Targeted Anti IL-8 Property in Just 1 Probiotic Strain, the *L. salivarius* LS03. (LS01, LS02, LS03) *J Clin Gastroenterol* 2018;52:S78-S81.
 - c) Deidda F. et al. (2020) How Probiotics may Kill Harmful Bacteria: The in vitro Activity against Some Haemolytic Strains. *J. Prob. Health* 8:216.
- + Refer to next page for further studies on LS01 associated with *B. breve* BR03

Bifidobacterium animalis subsp. *lactis* - BS01™ (LMG P-21384) + *Lacticaseibacillus rhamnosus* - LR05 (DSM 19739) (formerly *Lactobacillus rhamnosus*)

DAILY DOSAGE IN CLINICAL STUDY BS01 1 billion cells + LR05 1 billion cells + 2.5 g FOS

RAW MATERIAL
AND FINISHED DOSAGE FORM

FUNCTIONALITY Atopic dermatitis

SCIENTIFIC SUPPORT

Human clinical trial

Manzotti G. et al. Probiotics as a Novel Adjuvant Approach to Atopic Dermatitis. *Journal of Contemporary Immunology* (2014) Vol. 1 No. 2 pp. 57-66.

+ Immunomodulation in vitro data available upon request

Ligilactobacillus salivarius - LS01™ (DSM 22775) (formerly *Lactobacillus salivarius*) *Bifidobacterium breve* - BR03™ (DSM 16604)



DAILY DOSAGE IN CLINICAL STUDY LS01 1,3,4) 2 billion CFU + BR03 2 billion CFU
2) LS01 1 billion CFU + BR03 1 billion CFU

FINISHED DOSAGE FORM

FUNCTIONALITY Reduce frequency, duration and intensity of Atopic Dermatitis symptoms • Improvement of the Quality of Life in subjects with Atopic Dermatitis (AD) • Rosacea • Chronic urticaria • Skin health

SCIENTIFIC SUPPORT

Human clinical trials

- 1) Iemoli E. et al. Probiotics reduce gut microbial translocation and improve adult atopic dermatitis. *J Clin Gastroenterol.* 2012; 46 Suppl:S33-40.
- 2) Licari A. et al. Efficacia clinica di *Lactobacillus salivarius* LS01 e *Bifidobacterium breve* BR03 in pazienti pediatrici affetti da dermatite atopica. *Il medico pediatra* 2016;38-42.
- 3) Nettis E. et al. Probiotics and refractory chronic spontaneous urticaria. *Eur Ann Allergy Immunol* 2016, Vol 48, N 5, 182-187.
- 4) Fortuna M. C. et al. A case of Scalp Rosacea treated with low dose doxycycline and probiotic therapy and literature review on therapeutic options. *Dermatologic Therapy* ISSN 1396-0296.

+ Refer to precedent page for additional studies on LS01 alone in atopic dermatitis

In vitro studies

- a) Deidda F. et al. New Approach in Acne Therapy: A Specific Bacteriocin Activity and a Targeted Anti IL-8 Property in Just 1 Probiotic Strain, the *L. salivarius* LS03. *J Clin Gastroenterol.* 2018 May 18.
- b) Drago L. Immunomodulatory Effects of *Lactobacillus salivarius* LS01 and *Bifidobacterium breve* BR03, alone and in combination, on Peripheral Blood Mononuclear Cells of Allergic Asthmatics. *Allergy Asthma Immunol Res.* 2015 July; 7(4):409-413.
- c) Deidda F. et al. (2020) How Probiotics may Kill Harmful Bacteria: The in vitro Activity against Some Haemolytic Strains. *J. Prob. Health* 8:216 (LS01).

Ligilactobacillus salivarius - LS03 (DSM 22776) (formerly *Lactobacillus salivarius*)

FUNCTIONALITY Acne - Anti-pathogen activity: inhibition of *C. acnes* (formerly classified as *P. acnes*) and its induction of IL-8 • Immunomodulation • Strong adhesion to the intestinal mucosa

**RAW MATERIAL
AND FINISHED DOSAGE FORM**

SCIENTIFIC SUPPORT:

In vitro study

Deidda F. et al. New Approach in Acne Therapy: A Specific Bacteriocin Activity and a Targeted Anti IL-8 Property in Just 1 Probiotic Strain, the *L. salivarius* LS03. *J Clin Gastroenterol.* 2018 May 18.

Bifidobacterium animalis subsp. lactis - BS05 (DSM 23032)

Lactobacillus acidophilus - LA06 (DSM 23033)

FINISHED DOSAGE FORM

FUNCTIONALITY Antioxidant activity • Reduced glutathione (GSH) and increased superoxide dismutase production

SCIENTIFIC SUPPORT

In vitro and animal model studies

a) Amaretti A. et al. Antioxidant properties of potentially probiotic bacteria: in vitro and in vivo activities. *Appl Microbiol Biotechnol.* 2013; 97(2):809-17.

Deidda F. et al. (2020) How Probiotics may Kill Harmful Bacteria: The in vitro Activity against Some Haemolytic Strains. *J. Prob. Health* 8:216 (LA06).

Ligilactobacillus salivarius - LS01™ (DSM 22775) **New data**
(formerly *Lactobacillus salivarius*)

FINISHED DOSAGE FORM

Lactobacillus acidophilus - LA02 (DSM 21717)

Bifidobacterium breve - BR03™ (DSM 16604)

Lactiplantibacillus plantarum - LP01™ (LMG P-21021) (formerly *Lactobacillus plantarum*)

Lacticaseibacillus rhamnosus - LR06 (DSM 21981) (formerly *Lactobacillus rhamnosus*)

Bifidobacterium animalis subsp. lactis - BS01™ (LMG P-21384) **New data**

RAW MATERIAL
AND FINISHED DOSAGE FORM

FUNCTIONALITY Antioxidant activity • Reduced glutathione (GSH) and increased superoxide dismutase production • Anti-pathogen activity

SCIENTIFIC SUPPORT

In vitro studies

a) Magistrelli L et al. (2019) Probiotics May Have Beneficial Effects in Parkinson's Disease: In vitro Evidence. *Front. Immunol.* 10:969.

b) Mogna L. et al. Assessment of the in vitro inhibitory activity of specific probiotic bacteria against different *Escherichia coli* strains (LP01, LP02, LR04, LR06, LPS01, LDD01, BR03, B632). *J Clin Gastroenterol.* 2012; 46 Suppl:S29-32.

c) Deidda F. et al. (2020) How Probiotics may Kill Harmful Bacteria: The in vitro Activity against Some Haemolytic Strains. *J. Prob. Health* 8:216 (LA02 LS01, LP01).

Limosilactobacillus reuteri - Lb26 (DSM 16341) (formerly *Lactobacillus reuteri*)

(under worldwide exclusive license from BIOMAN for nutraceutical and pharma applications)

RAW MATERIAL
AND FINISHED DOSAGE FORM

FUNCTIONALITY Carrier of selenium with high bioavailability • Organic selenium from probiotic strain allergen free with High Bioavailability: Protection of DNA, proteins and lipids from oxidative damage

SCIENTIFIC SUPPORT

In vitro studies

a) Mogna L. et al. Selenium and zinc internalized by *Lactobacillus buchneri* Lb26 (DSM 16341) and *Bifidobacterium lactis* Bb1 (DSM 17850): improved bioavailability using a new biological approach. J Clin Gastroenterol. 2012; 46 Suppl:S41-5.

b) Mangiapane E. et al. An integrated proteomic and physiological approach to understand the adhesion mechanism of the probiotic *Lactobacillus reuteri* Lb26 DSM16341. Journal of integrated Omics, 2013.

c) Galano E. et al. Privileged Incorporation of Selenium as Selenocysteine in *Lactobacillus reuteri* Proteins Demonstrated by Selenium-specific Imaging and Proteomics. Molecular & Cellular Proteomics 12.8, 2013.

d) Mangiapane E. et al. Selenium effects on the metabolism of a Se-metabolizing *Lactobacillus reuteri*: analysis of envelope-enriched and extracellular proteomes. The Royal Society of Chemistry, 2014.

e) Mangiapane E. et al. Selenium and Selenoproteins: An Overview on Different Biological Systems. Current Protein and Peptide Science, 2014, 15, 598-607.

Bifidobacterium animalis subsp. *lactis* - Bb1 (DSM 17850)

(under worldwide exclusive license from BIOMAN for nutraceutical and pharma applications)

RAW MATERIAL
AND FINISHED DOSAGE FORM

FUNCTIONALITY Carrier of zinc with High Bioavailability:

- Normal function of the immune system • Normal DNA synthesis and cell division
- Protection of DNA, proteins and lipids from oxidative damage • Maintenance of normal bone
- Normal cognitive function • Fertility and reproduction

SCIENTIFIC SUPPORT

In vitro study

Mogna L. et al. Selenium and zinc internalized by *Lactobacillus buchneri* Lb26 (DSM 16341) and *Bifidobacterium lactis* Bb1 (DSM 17850): improved bioavailability using a new biological approach. J Clin Gastroenterol. 2012; 46 Suppl:S41-5.

<i>Bifidobacterium longum</i> - DLBL07 (DSM25669)	+
<i>Bifidobacterium longum</i> - DLBL08 (DSM 25670)	+
<i>Bifidobacterium longum</i> - DLBL09 (DSM 25671)	+
<i>Bifidobacterium longum</i> - DLBL10 (DSM 25672)	+
<i>Bifidobacterium longum</i> - DLBL11 (DSM 25673)	New Studies

FINISHED DOSAGE FORM

FUNCTIONALITY Strains isolated from centenarians with immunomodulation properties

SCIENTIFIC SUPPORT

Human clinical trial

- 1) Drago L. Cultivable and Pyrosequenced Fecal Microflora in Centenarians and Young Subjects. J Clin Gastroenterol/ Volume 46, Supp. 1, October 2012.
- 2) Ghini V. et al. Effects of Probiotics Administration on Human Metabolic Phenotype. Metabolites. 2020 Oct 7;10(10):E396.
- 3) De Mauri A. et al. Probiotics-addicted low-protein diet for microbiota modulation in patients with advanced chronic kidney disease (Pro-LowCKD): A protocol of placebo-controlled randomized trial. Journal of Functional Foods (2020) 104133

In vitro study

Nicola S. et al. Searching for the Perfect Homeostasis Five Strains of *Bifidobacterium longum* From Centenarians Have a Similar Behavior in the Production of Cytokines. J Clin Gastroenterol Volume 50, Supp. 2, November/December 2016.

Bifidobacterium lactis - MB2409 (DSM 23733) +
Bifidobacterium bifidum - MB109 (DSM 23731) +
Bifidobacterium longum - 04 (DSM 23233)

DAILY DOSAGE IN CLINICAL STUDY 1 billion CFU/strain

FINISHED DOSAGE FORM

FUNCTIONALITY Cardiovascular health • Cholesterol lowering

SCIENTIFIC SUPPORT

Human clinical trial

Guardamagna O. et al. Bifidobacteria supplementation: effects on plasma lipid profile in dyslipidemic children. *Nutrition* (2014), doi: 10.1016/j.nut.2014.01.014.

In vitro and in vivo testing

Bordoni et al. Cholesterol-lowering probiotics: in vitro selection and in vivo testing of *Bifidobacteria*. *Appl. Microbiol. Biotechnol.* 2013. 97:8273-8281.

Bifidobacterium breve - MB113 (DSM 23732)
Bifidobacterium lactis - MB2409 (DSM 23733)
Bifidobacterium bifidum - MB109 (DSM 23731)
Bifidobacterium bifidum - BB06 (DSM 24688, formerly MB 107)
Bifidobacterium animalis subsp. *lactis* - BS07 (DSM 24690, formerly MB 243)

FUNCTIONALITY Cardiovascular health • Cholesterol lowering

FINISHED DOSAGE FORM

SCIENTIFIC SUPPORT

In vitro and in vivo testing

Bordoni et al. Cholesterol-lowering probiotics: in vitro selection and in vivo testing of *Bifidobacteria*. *Appl. Microbiol. Biotechnol.* 2013. 97:8273-8281.

Bifidobacterium infantis - BI02 (DSM 24687, formerly MB287)

FUNCTIONALITY Cardiovascular health • Cholesterol lowering

RAW MATERIAL
AND FINISHED DOSAGE FORM

SCIENTIFIC SUPPORT Internal in vitro data on Bile Salt Hydrolase (BSH) production available upon request

Limosilactobacillus fermentum - ME-3 (DSM 14241) (formerly *Lactobacillus fermentum*)
(under license from the University of Tartu for food applications)

FUNCTIONALITY Cardiovascular health • LDL-cholesterol lowering • Antioxidant properties

RAW MATERIAL
AND FINISHED DOSAGE FORM

SCIENTIFIC SUPPORT Many scientific studies are available, including several human clinical trials

Bifidobacterium breve - BR03™ (DSM 16604) *Streptococcus thermophilus* - FP4 (DSM 18616)

+

DAILY DOSAGE IN CLINICAL STUDY 1) 5 billion CFU + 5 billion CFU

RAW MATERIAL
AND FINISHED DOSAGE FORM

FUNCTIONALITY Immune response improving • Performance enhancing

SCIENTIFIC SUPPORT

Human clinical trials

1) Jäger R. et al. Probiotic *Streptococcus thermophilus* FP4 and *Bifidobacterium breve* BR03 Supplementation Attenuates Performance and Range-of-Motion Decrements Following Muscle Damaging Exercise. *Nutrients*. 2016 Oct 14;8(10). pii: E642.

2) Pane M. et al. Gut Microbiota, Probiotics, and Sport: From Clinical Evidence to Agonistic Performance. *J Clin Gastroenterol*, 2018;52:S46-S49.

In vitro studies

a) Nicola S. et al. Interaction between probiotics and human immune cells: the prospective anti-inflammatory activity of *Bifidobacterium breve* BR03. *AgroFOOD*, 2010; 21(2):S44-47.

b) Mogna L. et al. Assessment of the in vitro inhibitory activity of specific probiotic bacteria against different *Escherichia coli* strains (BR03). *J Clin Gastroenterol*. 2012; 46 Suppl:S29-32.

+ Internal data available upon request on CLA production and protection of gut epithelial barrier with BR03 (TEER)

Bifidobacterium breve - BR03™ (DSM 16604)

RAW MATERIAL
AND FINISHED DOSAGE FORM

FUNCTIONALITY Restoration of a better dietary ω -6/ ω -3 balance • Conjugated linoleic acids (CLA) production
• Prospective use in the treatment of obesity

SCIENTIFIC SUPPORT

In vitro studies

a) Nicola S. et al. Interaction between probiotics and human immune cells: the prospective anti-inflammatory activity of *Bifidobacterium breve* BR03. *AgroFOOD*, 2010; 21(2):S44-47.

b) Mogna L. et al. Assessment of the in vitro inhibitory activity of specific probiotic bacteria against different *Escherichia coli* strains. *J Clin Gastroenterol*. 2012; 46 Suppl:S29-32.

+ Internal data available upon request on CLA production and protection of gut epithelial barrier with BR03 (TEER)

+ On going clinical study in combination with *B. breve* B632 in weight management and insulin sensitivity in obese children

+ Internal data available upon request on CLA production and protection of gut epithelial barrier with BR03 (TEER)

Bifidobacterium longum - 04 (DSM 23233)

DAILY DOSAGE IN CLINICAL STUDY 1 billion CFU

FINISHED DOSAGE FORM

FUNCTIONALITY Restoration of a better dietary ω -6/ ω -3 balance • Conjugated linoleic acids (CLA) production
• Prospective use in the treatment of obesity • Cholesterol management

SCIENTIFIC SUPPORT

Human clinical trial

Guardamagna O. et al. Bifidobacteria supplementation: effects on plasma lipid profile in dyslipidemic children. Nutrition (2014).

Internal data available upon request

Lactobacillus gasseri - LGS06 (DSM 32405)

**RAW MATERIAL
AND FINISHED DOSAGE FORM**

FUNCTIONALITY Weight management

SCIENTIFIC SUPPORT

Scientific publications are available on gasseri strains on weight loss and reduction of visceral fats

Limosilactobacillus fermentum - LF5 (CNCM I-789) (API) (formerly *Lactobacillus fermentum*)

DAILY DOSAGE IN CLINICAL STUDY 1,2,3,4) 1 billion CFU

FINISHED DOSAGE FORM

FUNCTIONALITY Vaginal health • Inhibition of *Candida* strains • Treatment of vulvovaginal candidiasis (VVC)

SCIENTIFIC SUPPORT

Human clinical trials

- 1) Presidio Ospedaliero Delmati, Divisione di Ostetricia - Ginecologia. LF5 - LAB: studio di tollerabilità locale e di attività in pazienti affette da *Candida albicans*. 1992.
- 2) Centro di ricerca: USSL Lombardia 55 - Presidio Ospedaliero Delmati, S. Angelo Lodigiano, Divisione di Ostetricia-Ginecologia, Primario: Dott. Francesco Rovere. LF5 (IAB): Studio di dose range finding in pazienti affette da *Candida albicans*. 1992.
- 3) Donini G. Studio clinico sull'efficacia e la tollerabilità di LF5 (LAB) capsule vaginali in confronto a placebo in pazienti affette da *Candida Albicans*. Ospedale S. Salvatore, Divisione Ostetrico-Ginecologica, Pesaro. 1992.
- 4) Rovere F. Local tolerability and activity study in patients suffering from *Candida albicans* ("Delmati2 Hospital, Italy, 1992).

In vitro studies

- a) Deidda F. et al. The In Vitro Effectiveness of *Lactobacillus fermentum* Against Different *Candida* Species Compared With Broadly Used Azoles. J Clin Gastroenterol, Vol 50, Supp. 2, November/December 2016.
- b) Deidda F. et al. In Vitro Activity of *Lactobacillus fermentum* LF5 Against Different *Candida* Species and *Gardnerella vaginalis* A New Perspective to Approach Mixed Vaginal Infections? J Clin Gastroenterol Volume 50, Supp. 2, November/December 2016.

Limosilactobacillus fermentum - LF08 (DSM 18297) (formerly *Lactobacillus fermentum*)

FUNCTIONALITY Inhibition of *Candida* strains

**RAW MATERIAL
AND FINISHED DOSAGE FORM**

SCIENTIFIC SUPPORT:

Internal vitro data, available upon request

Limosilactobacillus fermentum - LF09 (DSM 18298) (formerly *Lactobacillus fermentum*)

FUNCTIONALITY Restoration of a physiological gut barrier • Inhibition of *Candida* growth
• Strain from brushing of the gut mucosa

FINISHED DOSAGE FORM

SCIENTIFIC SUPPORT: In vitro data

In vitro study

Deidda F. et al. The In Vitro Effectiveness of *Lactobacillus fermentum* Against Different *Candida* Species Compared With Broadly Used Azoles. J Clin Gastroenterol. 2016 Nov/Dec;50 Suppl 2, S171-S174

Limosilactobacillus fermentum - LF10 (DSM 19187) (formerly *Lactobacillus fermentum*)

DAILY DOSAGE IN CLINICAL STUDY 1,2) 400 million CFU

FINISHED DOSAGE FORM

FUNCTIONALITY Vaginal health • Inhibition of *Candida* strains • Counteraction of vulvovaginal candidiasis (VVC)

SCIENTIFIC SUPPORT

Human clinical trials

1) Vicariotto F. et al. Effectiveness of the association of 2 probiotic strains formulated in a slow release vaginal product, in women affected by vulvovaginal candidiasis: a pilot study. *J Clin Gastroenterol*. 2012; 46 Suppl:S73-80.

2) Murina F et al. Can *Lactobacillus fermentum* LF10 and *Lactobacillus acidophilus* LA02 in a Slow-release Vaginal Product be Useful for Prevention of Recurrent Vulvovaginal Candidiasis? A Clinical Study. *J Clin Gastroenterol* 2014;48:S102-S105.

In vitro study

Deidda F. et al. In vitro effectiveness of *Lactobacillus fermentum* against different *Candida* species compared with broadly used azoles. *Journal of Clinical Gastroenterology*, 2016;50:S171-S174.

Limosilactobacillus fermentum - LF11 (DSM 19188) (formerly *Lactobacillus fermentum*)

FUNCTIONALITY Vaginal health • Inhibition of *Candida* strains
• Counteraction of vulvovaginal candidiasis (VVC)

FINISHED DOSAGE FORM

SCIENTIFIC SUPPORT

In vitro data

Deidda F. et al. In vitro effectiveness of *Lactobacillus fermentum* against different *Candida* species compared with broadly used azoles. *Journal of Clinical Gastroenterology*, 2016;50:S171-S174.

Limosilactobacillus fermentum - LF16 (DSM 26856) (formerly *Lactobacillus fermentum*)

FUNCTIONALITY Vaginal health • Inhibition of *Candida* growth

FINISHED DOSAGE FORM

SCIENTIFIC SUPPORT

Internal in vitro data, available upon request

Lactobacillus acidophilus - LA02 (DSM 21717) + *Limosilactobacillus fermentum* - LF10 (DSM 19187) (formerly *Lactobacillus fermentum*)

DAILY DOSAGE IN CLINICAL STUDY 1,2) LA02 400 million CFU + LF10 400 million CFU + Carbon dioxide + FOS + Arabinogalactan

FINISHED DOSAGE FORM

FUNCTIONALITY Vaginal health • Inhibition of *Candida* strains • Innovative effervescent slow release tablet for enhanced delivery and activity of lactobacilli • Counteraction of *Candida* vulvovaginitis

SCIENTIFIC SUPPORT

Human clinical trials

- 1) Vicariotto F. et al. Effectiveness of the association of 2 probiotic strains formulated in a slow release vaginal product, in women affected by vulvovaginal candidiasis: a pilot study. *J Clin Gastroenterol.* 2012; 46 Suppl:S73-80.
- 2) Murina F. et al. Can *Lactobacillus fermentum* LF10 and *Lactobacillus acidophilus* LA02 in a Slow-release Vaginal Product be Useful for Prevention of Recurrent Vulvovaginal Candidiasis? *J Clin Gastroenterol.* 2014; 48:S102-105.

In vitro study

- a) Deidda F. et al. The In Vitro Effectiveness of *Lactobacillus fermentum* Against Different *Candida* Species Compared With Broadly Used Azoles. *J Clin Gastroenterol.* 2016; 50:S171-S174 (LF10).
- b) Deidda F. et al. (2020) How Probiotics may Kill Harmful Bacteria: The in vitro Activity against Some Haemolytic Strains. *J. Prob. Health* 8:216 (LA02).

Lactobacillus gasseri - CRL1259 (DSM 24512) (under exclusive worldwide license from the CERELA)

FUNCTIONALITY Vaginal health and inhibition of urogenital pathogens

FINISHED DOSAGE FORM

SCIENTIFIC SUPPORT

In vitro study

- a) Tomas MSJ. Et al. Growth and lactic acid production by vaginal *Lactobacillus acidophilus* CRL 1259, and inhibition of uropathogenic *Escherichia coli*, *Journal of Medical Microbiology*, 2003;52-1-8.
- b) Ocana V. and Nader-Macias ME. Adhesion of *Lactobacillus* vaginal strains with probiotic properties to vaginal epithelial cells. *Biocell*, 2001;25(3):265-273;

- c) Tomas MSJ. Et al. Characterization of potentially probiotic vaginal lactobacilli isolated from Argentinean women. *British Journal of Biomedical Science*, 2005; 62(4).
- d) Zarate G. and Nader-Macias ME. Influence of probiotic vaginal lactobacilli on in vitro adhesion of urogenital pathogens to vaginal epithelial cells. *Letters in Applied Microbiology* ISSN 0266-8254;

Ligilactobacillus salivarius - CRL 1328 (DSM 24441) (formerly *Lactobacillus salivarius*)

FUNCTIONALITY Vaginal health • Prevention of urogenital infections • Inhibition of *Candida* and *Gonorrhoeae*

RAW MATERIAL
AND FINISHED DOSAGE FORM

SCIENTIFIC SUPPORT

In vitro studies

- a) Ocana V. et al. Characterization of a bacteriocin like substance produced by a vaginal *Lactobacillus salivarius* strain. *Applied and Environmental Microbiology*, 1999; 65(12):5631-5635.
- b) Ocana V. et al. Surface characteristics of lactobacilli isolated from human vagina. *J. Gen. Appl. Microbiol.*, 1999; 45:203-212.
- c) Tomas MSJ. et al. Influence of pH, temperature and culture media on the growth and bacteriocin production by vaginal *Lactobacillus salivarius* CRL 1328. *Journal of Applied Microbiology*, 2002; 93: 714-724.
- d) Gillor O. et al. The dual role of bacteriocins as anti- and probiotics. *Appl Microbiol Biotechnol*. 2008 December; 81(4): 591–606.
- e) Dover S.E. et al. Natural antimicrobials and their role in vaginal health: a short review. *Int J Probiotics Prebiotics*. 2008 ; 3(4): 219–230.
- f) Juárez Tomás M.S. et al. Viability of vaginal probiotic *lactobacilli* during refrigerated and frozen storage. *Anaerobe*, Vol 10, Issue 1, February 2004, 1-5.
- g) Zàrate G. and Nader-Macias ME. Influence of probiotic vaginal *lactobacilli* on in vitro adhesion of urogenital pathogens to vaginal epithelial cells. *Letters in Applied Microbiology* ISSN 0266-8254.
- h) Ocana V and Nader-Macias ME. Adhesion of *Lactobacillus* Vaginal Strains with Probiotic Properties to Vaginal Epithelial Cells, 2011, *Bio-cell* 25(3):265-273.
- i) Ocana V and Nader-Macias ME. Vaginal *Lactobacilli*: self and co-aggregating ability, *British Journal of Biomedical Science* 2002, 59(4).
- j) Tomas MSJ et al. Characterization of potentially probiotic vaginal *lactobacilli* isolated from Argentinean women. *British Journal of Biomedical Science* 2005 62(4).
- k) Vera Pingitore E. et al. Characterization of salivaricin CRL 1328, a two-peptide bacteriocin produced by *Lactobacillus salivarius* CRL 1328 isolated from the human vagina. *Res Microbiol*. 2009;160(6):401-408.
- l) Vera Pingitore E. et al. Influence of vitamins and osmolites on growth and bacteriocin production by *Lactobacillus salivarius* CRL 1328 in a chemically defined medium. *Can J Microbiol*. 2009;55(3):304-310.
- m) Vera Pingitore E. et al. Design of novel urogenital pharmabiotic formulations containing lactobacilli, salivaricin CRL 1328 and non-microbial compounds with different functionalities. *Drug Dev Ind Pharm*. 2015;41(6):942-952.
- n) Vera Pingitore E. et al. Effect of lyophilization and storage temperature on the activity of salivaricin CRL 1328, a potential bioactive ingredient of a urogenital probiotic product. *J Gen Appl Microbiol*. 2012;58(2):71-81.

Lactobacillus acidophilus - CRL1294 (DSM 24513)

(under exclusive worldwide license from the CERELA)

FUNCTIONALITY Vaginal health

FINISHED DOSAGE FORM

Lactobacillus crispatus - CRL1251 (DSM 24438)

(under exclusive worldwide license from the CERELA)

FUNCTIONALITY Vaginal health

RAW MATERIAL
AND FINISHED DOSAGE FORM

Lactobacillus crispatus - CRL1266 (DSM 24439)

(under exclusive worldwide license from the CERELA)

FINISHED DOSAGE FORM

FUNCTIONALITY Vaginal health • Inhibition of urogenital pathogens • Production of hydrogen peroxide

SCIENTIFIC SUPPORT

In vitro studies

a) Ocana V. and Nader-Macias ME. Adhesion of *Lactobacillus* vaginal strains with probiotic properties to vaginal epithelial cells. *Biocell*, 2001;25(3):265-273;

b) Zàrate G. and Nader-Macias ME. Influence of probiotic vaginal lactobacilli on in vitro adhesion of urogenital pathogens to vaginal epithelial

cells. *Letters in Applied Microbiology* ISSN 0266-8254;

c) Tomas MSJ. Et al. Comparison of the growth and hydrogen peroxide production by vaginal probiotic lactobacilli under different culture conditions, *Am J Obstet Gynecol*, 2003; 188(1):35-44;

d) Ocana VS. et al. Selection of vaginal H₂O₂-generating *Lactobacillus* species for probiotic use. *Current Microbiology*, 1999; 38:279-84.

Lacticaseibacillus paracasei subsp. paracasei - CRL1289 (DSM 124440)

(formerly *Lactobacillus paracasei*) (under exclusive worldwide license from the CERELA)

FINISHED DOSAGE FORM

FUNCTIONALITY Vaginal health • Inhibition of urogenital pathogens including *Staphylococcus aureus*
• Production of hydrogen peroxide

SCIENTIFIC SUPPORT

Animal study

Zarate G. et al. Protective Effect of Vaginal *Lactobacillus paracasei* CRL 1289 against Urogenital Infection Produced by *Staphylococcus aureus* in a Mouse Animal Model. *Infect Dis Obstet Gynecol*. 2009:48358.

In vitro studies

a) Ocana VS. et al. Selection of vaginal H₂O₂-generating *Lactobacillus* species for probiotic use. *Current Microbiology*, 1999; 38:279-84.

b) Zàrate G. and Nader-Macias ME. Influence of probiotic vaginal lactobacilli on in vitro adhesion of urogenital pathogens to vaginal epithelial cells. *Letters in Applied Microbiology* ISSN 0266-8254;

c) Ocana VS. et al. Growth inhibition of *Staphylococcus aureus* by H₂O₂-producing *Lactobacillus paracasei subsp. paracasei* isolated from the human vagina. *FEMS Immunology and Medical Microbiology*, 1999:23:87-92.

Limosilactobacillus fermentum - LF5 (CNCM I-789) (formerly *Lactobacillus fermentum*)

DAILY DOSAGE IN CLINICAL STUDY 1,2,3,4) 1 billion CFU

FINISHED DOSAGE FORM

FUNCTIONALITY Vaginal health • Inhibition of *Candida* strains • Treatment of vulvovaginal candidiasis (VVC)

SCIENTIFIC SUPPORT

Human clinical trial

For the clinical studies on LF5 in *Candida*, please refer to the prior section on *Candida*

In vitro study

Deidda F. et al. In Vitro Activity of *Lactobacillus fermentum* LF5 Against Different *Candida* Species and *Gardnerella vaginalis*: A New Perspective to Approach Mixed Vaginal Infections? J Clin Gastroenterol. 2016; 50:S168-S170.

Limosilactobacillus fermentum - LF15 (DSM 26955) (formerly *Lactobacillus fermentum*) + *Lactiplantibacillus plantarum* - LP01™ (LMG P-21021) (formerly *Lactobacillus plantarum*)

DAILY DOSAGE IN CLINICAL STUDY LF15 400 million CFU + LP01 400 million CFU + Tara gum + FOS + Arabinogalactan

FINISHED DOSAGE FORM

FUNCTIONALITY Vaginal health • Inhibition of *Gardnerella vaginalis* • Counteraction of Bacterial Vaginosis (BV)

SCIENTIFIC SUPPORT

Human clinical trial

Vicariotto F. et al. Effectiveness of the two microorganisms *L. fermentum* LF15 and *L. plantarum* LP01, formulated in slow release vaginal tablets, in women affected by Bacterial Vaginosis: a pilot study. J Clin Gastroenterol. 2014; 48 Suppl:S106-112.

Further study available on the anti-pathogen activity of LP01 against *E. coli* and other pathogens section (gastroenterology).

Lactiplantibacillus plantarum - LP02 (LMG P-21020) (formerly *Lactobacillus plantarum*) *Limosilactobacillus fermentum* - LF10 (DSM 19187) (formerly *Lactobacillus fermentum*)

New Study

DAILY DOSAGE IN CLINICAL STUDY LP02 500 million CFU + LF10 500 million CFU

FINISHED DOSAGE FORM

FUNCTIONALITY Vaginal health • Counteraction of *Candida* vulvovaginitis • Counteraction of *Candida* vulvovaginitis including recurrences

SCIENTIFIC SUPPORT

Clinical study

Murina F. et al. Thymol, eugenol and lactobacilli in a medical device for the treatment of *bacterial vaginosis* and *vulvovaginal candidiasis*. New Microbiologica, 41,3, 220-224, 2018, ISN 1121-7138.

In vitro study

Mogna L. et al. Assessment of the in vitro inhibitory activity of specific probiotic bacteria against different *Escherichia coli* strains (LP02). J Clin Gastroenterol. 2012; 46 Suppl:S29-32.

Bifidobacterium animalis subsp. *lactis* - BA05 (DSM 18352)

DAILY DOSAGE IN CLINICAL STUDY 5 billion CFU

FINISHED DOSAGE FORM

FUNCTIONALITY Production of folic acid • Rebalance of intestinal microbiota

SCIENTIFIC SUPPORT

Human pilot clinical trial

Strozzi GP. and Mogna L. Quantification of *folic acid* in human faeces after administration of *Bifidobacterium* probiotic strains. Journal of Clinical Gastroenterology, 2008; 42:S179-S184.

Animal model study

Pompei A. et al. Administration of Folate-Producing *Bifidobacteria* Enhances Folate Status in Wistar Rats. Journal of Nutrition, 2007; 137:2742-2746.

In vitro study

Pompei A. et al. Folate production by *Bifidobacteria* as a potential probiotic property. Applied and Environmental Microbiology, 2007; 73(1):179-185.

Bifidobacterium animalis subsp. *lactis* - Bb1 (DSM 17850)

(under worldwide exclusive license from BIOMAN for nutraceutical and pharma applications)

FUNCTIONALITY Organic zinc from probiotic strain allergen free with High Bioavailability

**RAW MATERIAL
AND FINISHED DOSAGE FORM**

SCIENTIFIC SUPPORT

In vitro study

Mogna L. et al. Selenium and zinc internalized by *Lactobacillus buchneri* Lb26 (DSM 16341) and *Bifidobacterium lactis* Bb1 (DSM 17850): improved bioavailability using a new biological approach. J Clin Gastroenterol. 2012; 46 Suppl:S41-5.

Limosilactobacillus reuteri - LRE02 (DSM 23878) (formerly *Lactobacillus reuteri*)

FUNCTIONALITY Production of vitamin B12 • Antipathogen activity

**RAW MATERIAL
AND FINISHED DOSAGE FORM**

SCIENTIFIC SUPPORT

In vitro study

Deidda F. et al. (2020) How Probiotics may Kill Harmful Bacteria: The in vitro Activity against Some Haemolytic Strains. J. Prob. Health 8:216.

Internal in vitro data available upon request

Lactobacillus crispatus - LCR01 (DSM 24619)

FUNCTIONALITY Vaginal health • Rebalance of a healthy vaginal microbiota • Inhibition of Candida

RAW MATERIAL
AND FINISHED DOSAGE FORM

SCIENTIFIC SUPPORT

L. crispatus is a species naturally predominant in the healthy vaginal ecosystem. A body of literature shows that women with a vaginal ecosystem dominated by *L. crispatus* are less at risk of bacterial vaginosis, miscarriage, preterm birth and sexually transmissible diseases

Lactobacillus gasseri - LGS06 (DSM 32405)

FUNCTIONALITY Vaginal health • Rebalance of a healthy vaginal microbiota

RAW MATERIAL
AND FINISHED DOSAGE FORM

SCIENTIFIC SUPPORT

L. gasseri is a species naturally predominant in the healthy vaginal ecosystem. Literature shows that *gasseri* is associated with a decreased risk of early preterm birth and strains of *gasseri* have been found to present antagonistic activity against vaginal pathogens such as *Candida albicans*, *Neisseria gonorrhoea* and *Trichomonas vaginalis*

Lactiplantibacillus plantarum - LP01™ (LMG P-21021) (formerly *Lactobacillus plantarum*) +
Lacticaseibacillus paracasei - LPC09 (DSM 24243) (formerly *Lactobacillus paracasei*) +
Streptococcus thermophilus - ST10 (DSM 25246)

DAILY DOSAGE IN CLINICAL STUDY 1) LP01 2.5 billion cells + LPC09 1 billion cells + ST10 1 billion cells

FINISHED DOSAGE FORM

FUNCTIONALITY Cystitis • Inhibition of *E. coli* • Metabolization of oxalates, prevention of kidney stones

SCIENTIFIC SUPPORT

Clinical study

1) Vicariotto F. Effectiveness of An Association of a Cranberry Dry Extract, D-Mannose, and the 2 Microorganisms *Lactobacillus plantarum* LP01 and *Lactobacillus paracasei* LPC09 in Women Affected by Cystitis. Journal of Clin Gastroenterol 2014;48:S96-S101.

+ Internal data on anti-inflammatory and anti-oxidant properties available upon request

In vitro studies

a) Mogna L. et al. Assessment of the in vitro inhibitory activity of specific probiotic bacteria against different *Escherichia coli* strains. J Clin Gastroenterol. 2012; 46 Suppl:S29-32.

b) Mogna L. et al. Screening of different probiotic strains for their in vitro ability to metabolise oxalates: any prospective use in humans? J Clin Gastroenterol. 2014; 48 Suppl:S91-95 (LPC09, LP01).

c) Deidda F. et al. (2020) How Probiotics may Kill Harmful Bacteria: The in vitro Activity against Some Haemolytic Strains. J. Prob. Health 8:216.

Lactiplantibacillus plantarum - LP01™ (LMG P-21021) (formerly *Lactobacillus plantarum*)
Lactiplantibacillus plantarum - LP02 (LMG P-21020) (formerly *Lactobacillus plantarum*)
Lacticaseibacillus rhamnosus - LR04 (DSM 16605) (formerly *Lactobacillus rhamnosus*)
Lacticaseibacillus rhamnosus - LR06 (DSM 21981) (formerly *Lactobacillus rhamnosus*)
Lactiplantibacillus pentosus - LPS01 (DSM 21980) (formerly *Lactobacillus pentosus*)
Bifidobacterium breve - BR03™ (DSM 16604)

FUNCTIONALITY Cystitis • Inhibition of *E. coli*, *E. faecalis* and *K. pneumoniae* among other

**RAW MATERIAL
AND FINISHED DOSAGE FORM**

SCIENTIFIC SUPPORT

In vitro study

a) Mogna L. et al. Assessment of the in vitro inhibitory activity of specific probiotic bacteria against different *Escherichia coli* strains (LP01, LP02, LR04, LR06, LPS01, LDD01, BR03, B632). J Clin Gastroenterol. 2012; 46 Suppl:S29-32.

b) DDeidda F. et al. (2020) How Probiotics may Kill Harmful Bacteria: The in vitro Activity against Some Haemolytic Strains. J. Prob. Health 8:216 (LP01, LR04).

+ Internal data on anti-inflammatory and anti-oxidant properties available upon request for some of these strains

Lactobacillus delbrueckii subsp. *delbrueckii* - LDD01 (DSM 22106)

FUNCTIONALITY Inhibition of pathogens *E. coli*, *Klebsiella* and gas-producing coliforms

FINISHED DOSAGE FORM

SCIENTIFIC SUPPORT

In vitro studies

a) Mogna L. et al. Assessment of the in vitro inhibitory activity of specific probiotic bacteria against different *Escherichia coli* strains. J Clin Gastroenterol. 2012; 46 Suppl:S29-32.

b) Savino F. et al. Antagonistic effect of *Lactobacillus* strains against gas-producing coliforms isolated from colicky infants. BMC Microbiology 2011, 11:157.

c) Mogna L. et al. In Vitro Inhibition of *Klebsiella pneumoniae* by *Lactobacillus delbrueckii* subsp. *delbrueckii* LDD01 (DSM 22106): An Innovative Strategy to Possibly Counteract Such Infections in Humans? J Clin Gastroenterol. 2016 Nov/Dec;50 Suppl 2, Proceedings from the 8th Probiotics, Prebiotics & New Foods for Microbiota and Human Health meeting held in Rome, Italy on September 13-15, 2015:S136-S139.

Bifidobacterium breve - B632™ (DSM 24706)

FUNCTIONALITY Inhibition of pathogens *E. coli* and *Enterobacteriaceae*

FINISHED DOSAGE FORM

SCIENTIFIC SUPPORT

In vitro studies

a) Mogna L. et al. Assessment of the in vitro inhibitory activity of specific probiotic bacteria against different *Escherichia coli* strains (LP01, LP02, LR04, LR06, LPS01, LDD01, BR03, B632). J Clin Gastroenterol. 2012; 46 Suppl:S29-32.

b) Simone M. et al. The Probiotic *Bifidobacterium breve* B632 Inhibited the Growth of *Enterobacteriaceae* within Colicky Infant Microbiota Cultures. BioMed Research International 1-6, 2014.

Ligilactobacillus salivarius - CRL 1328 (DSM 24441) (formerly *Lactobacillus salivarius*)

FUNCTIONALITY Prevention of urogenital infections • Inhibition of *Enterococcus faecalis*, *Enterococcus faecium* and *Neisseria gonorrhoea* • Inhibition of *Candida*

RAW MATERIAL
AND FINISHED DOSAGE FORM

SCIENTIFIC SUPPORT

In vitro studies

a) Ocana V. et al. Characterization of a bacteriocin like substance produced by a vaginal *Lactobacillus salivarius* strain. Applied and Environmental Microbiology, 1999; 65(12):5631-5635.

b) Ocana V. et al. Surface characteristics of lactobacilli isolated from human vagina. J. Gen. Appl. Microbiol., 1999; 45:203-212.

c) Tomas MSJ. et al. Influence of pH, temperature and culture media on the growth and bacteriocin production by vaginal *Lactobacillus salivarius* CRL 1328. Journal of Applied Microbiology, 2002; 93: 714-724.

d) Rovere F. Local tolerability and activity study in patients suffering from *Candida albicans* (Delmati2 Hospital, Italy, 1992).

e) Gillor O. et al. The dual role of bacteriocins as anti- and probiotics. Appl Microbiol Biotechnol. 2008 December; 81(4): 591-606. doi: 10.1007/s00253-008-1726-5.

f) Dover S.E. et al. Natural antimicrobials and their role in vaginal health: a short review. Int J Probiotics Prebiotics. 2008 ; 3(4): 219-230.

g) Juárez Tomás M.S. et al. Viability of vaginal probiotic lactobacilli during refrigerated and frozen storage. Anaerobe, Vol 10, Issue 1, February 2004, 1-5.

New Study

Lactiplantibacillus plantarum - LP01™ (LMG P-21021) (formerly *Lactobacillus plantarum*) + *Lacticaseibacillus paracasei* - LPC09 (DSM 24243) (formerly *Lactobacillus paracasei*)

DAILY DOSAGE IN CLINICAL STUDY 1) LP01 2.5 billion + LPC09 1 billion
2) LP01 and LPC09 1 billion cells microencapsulated each
+ plant extracts and serenoa repens 320 mg

FINISHED DOSAGE FORM

FUNCTIONALITY Prevention of chronic bacterial prostatitis • UTI • Inhibition of *E. coli* • Anti-inflammatory • Metabolization of oxalates, prevention of kidney stones

SCIENTIFIC SUPPORT

Clinical study

1) Vicariotto F. Effectiveness of An Association of a Cranberry Dry Extract, D-Mannose, and the 2 Microorganisms *Lactobacillus plantarum* LP01 and *Lactobacillus paracasei* LPC09 in Women Affected by Cystitis. Journal of Clin Gastroenterol 2014;48:S96-S101.

2) Chiancone F. et al. The Use of a Combination of Vaccinium Macracarpon, Lycium barbarum L. and Probiotics (Bifiprost®) for the Prevention of Chronic Bacterial Prostatitis: A Double-Blind Randomized Study. Urologia Internationalis 2019.

+ Internal data on anti-inflammatory and anti-oxidant properties available upon request

In vitro studies

a) Mogna L. et al. Assessment of the in vitro inhibitory activity of specific probiotic bacteria against different *Escherichia coli* strains. J Clin Gastroenterol. 2012; 46 Suppl:S29-32.

b) Deidda F. et al. (2020) How Probiotics may Kill Harmful Bacteria: The in vitro Activity against Some Haemolytic Strains. J. Prob. Health 8:216.

c) Mogna L. et al. Screening of different probiotic strains for their in vitro ability to metabolise oxalates: any prospective use in humans? J Clin Gastroenterol. 2014; 48 Suppl:S91-95

Bifidobacterium animalis subsp. *lactis* - Bb1 (DSM 17850)

Limosilactobacillus reuteri - Lb26 (DSM 16341) (formerly *Lactobacillus reuteri*) (under worldwide exclusive license from BIOMAN for nutraceutical and pharma applications)

FUNCTIONALITY Organic zinc and selenium from probiotic strain allergen free with High Bioavailability:
• Normal function of the immune system • Normal DNA synthesis and cell division
• Protection of DNA, proteins and lipids from oxidative damage • Maintenance of normal bone • Normal cognitive function

RAW MATERIAL
AND FINISHED DOSAGE FORM

SCIENTIFIC SUPPORT

In vitro study

Mogna L. et al. Selenium and zinc internalized by *Lactobacillus buchneri* Lb26 (DSM 16341) and *Bifidobacterium lactis* Bb1 (DSM 17850): improved bioavailability using a new biological approach. J Clin Gastroenterol. 2012; 46 Suppl:S41-5.

+ Further studies on the characterization of Lb26 and its metabolism of selenium available upon request

Lactiplantibacillus plantarum - LP01™ (LMG P-21021) (formerly *Lactobacillus plantarum*) +
Lacticaseibacillus paracasei - LPC09 (DSM 24243) (formerly *Lactobacillus paracasei*)

DAILY DOSAGE IN CLINICAL STUDY 1) LP01 1 billion cells + LPC09 1 billion cells
 plus plant extracts and *Serenoa repens* 320 mg

FINISHED DOSAGE FORM

FUNCTIONALITY Prevention of chronic bacterial prostatitis • Anti-pathogen activity

SCIENTIFIC SUPPORT

Clinical study

Chiancone F, Carrino M, Meccariello C, Pucci L, Fedelini M, Fedelini P. The Use of a Combination of *Vaccinium Macracarpon*, *Lycium barbarum* L. and Probiotics (Bifiprost®) for the Prevention of Chronic Bacterial Prostatitis: A Double-Blind Randomized Study. *Urol Int.* 2019; 103(4):423-426..

In vitro studies

a) Mogna L. et al. Assessment of the in vitro inhibitory activity of specific probiotic bacteria against different *Escherichia coli* strains (LP01, LP02, LR04, LR06, LPS01, LDD01, BR03, B632). *J Clin Gastroenterol.* 2012; 46 Suppl:S29-32.

b) Deidda F. et al. (2020) How Probiotics may Kill Harmful Bacteria: The in vitro Activity against Some Haemolytic Strains. *J. Prob. Health* 8:216.

Lacticaseibacillus paracasei - LPC09 (DSM 24243) (formerly *Lactobacillus paracasei*)

Lactobacillus acidophilus - LA02 (DSM 21717)

Lactiplantibacillus plantarum - LP01™ (LMG P-21021) (formerly *Lactobacillus plantarum*)

Limosilactobacillus reuteri - LRE02 (DSM 23878) (formerly *Lactobacillus reuteri*)

Bifidobacterium animalis subsp. *lactis* - Bb1 (DSM 17850)

Bifidobacterium breve - BR03™ (DSM 16604)

Bifidobacterium longum - BL03 (DSM 16603)

FUNCTIONALITY Oxalate degradation • Reduction of intestinal inflammation • Potential reduction of kidney stones incidence

RAW MATERIAL AND FINISHED DOSAGE FORM

SCIENTIFIC SUPPORT

In vitro study

a) Mogna L. et al. Screening of different probiotic strains for their in vitro ability to metabolise oxalates: any prospective use in humans? (LPC09, LA02, LP01, LRE02, BR03, BL03) *J Clin Gastroenterol.* 2014; 48 Suppl:S91-95.

b) Deidda F. et al. (2020) How Probiotics may Kill Harmful Bacteria: The in vitro Activity against Some Haemolytic Strains. *J. Prob. Health* 8:216. (LPC09, LA02, LP01, LRE02)

+ Internal data on anti-inflammatory and anti-oxidant properties available upon request on certain strains

Bifidobacterium longum - 04 (DSM 23233) + **New Study**

Limosilactobacillus fermentum - LF16 (DSM 26856) (formerly *Lactobacillus fermentum*) +

Lactiplantibacillus plantarum - LP01™ (LMG P-21021) (formerly *Lactobacillus plantarum*) +

Lacticaseibacillus rhamnosus - LR06 (DSM 21981) (formerly *Lactobacillus rhamnosus*)

DAILY DOSAGE IN CLINICAL STUDY 1 billion cfu/afu per strain

FINISHED DOSAGE FORM

FUNCTIONALITY Improvement of the quality of sleep • Reduction of fatigue and anger • Improvement of mood
• Inhibition of *E. coli* and *Candida*

SCIENTIFIC SUPPORT

Human clinical trial

Marotta A. et al., Effects of Probiotics on Cognitive Reactivity, Mood, and Sleep Quality, 2019 *Frontiers in Psychiatry*.

Data is available upon request on the preclinical rationale of selection for these strains

In vitro studies

a) Mogna L. et al. Assessment of the in vitro inhibitory activity of specific probiotic bacteria against different *Escherichia coli* strains (LP01, LP02, LR04, LR06, LPS01, LDD01, BR03, B632). *J Clin Gastroenterol.* 2012; 46 Suppl:S29-32.

b) Deidda F. et al. (2020) How Probiotics may Kill Harmful Bacteria: The in vitro Activity against Some Haemolytic Strains. *J. Prob. Health* 8:216 (LP01).

Ligilactobacillus salivarius - LS01™ (DSM 22775) (formerly *Lactobacillus salivarius*) **New Study**

FINISHED DOSAGE FORM

Lactiplantibacillus plantarum - LP01™ (LMG P-21021) (formerly *Lactobacillus plantarum*)

Lactobacillus acidophilus - LA02 (DSM 21717)

Lacticaseibacillus rhamnosus - LR06 (DSM 21981) (formerly *Lactobacillus rhamnosus*)

Bifidobacterium animalis subsp lactis - BS01™ (LMG P-21384)

Bifidobacterium breve - BR03™ (DSM 16604)

SCIENTIFIC SUPPORT

In vitro study

Magistrelli L et al. (2019) Probiotics May Have Beneficial Effects in Parkinson's Disease: In vitro Evidence. Front. Immunol. 10:969.

RAW MATERIAL
AND FINISHED DOSAGE FORM

Lacticaseibacillus rhamnosus - GG (ATCC 53103) (formerly *Lactobacillus rhamnosus*)

DAILY DOSAGE IN CLINICAL STUDY 1) 10 billion CFU

FUNCTIONALITY Autism and ADHD prevention

SCIENTIFIC SUPPORT

Human clinical trial

Anna Pärtty et al. A possible link between early probiotics intervention and the risk of neuropsychiatric disorders later in childhood: a randomized trial. Pediatric Research, Volume 77, Number 6, June 2015.

RAW MATERIAL
AND FINISHED DOSAGE FORM

Limosilactobacillus fermentum - LF10 (DSM 19187) (formerly *Lactobacillus fermentum*) +
Lactobacillus delbrueckii subsp. *delbrueckii* - LDD01 (DSM 22106) +
Lactiplantibacillus plantarum - LP01™ (LMG P-21021) (formerly *Lactobacillus plantarum*) +
Ligilactobacillus salivarius - LS03 (DSM 22776)(formerly *Lactobacillus salivarius*) +
Streptococcus thermophilus - ST10 (DSM 25246) **New Study**

DAILY DOSAGE IN CLINICAL STUDY 1-2) LF10 4 billion CFU + LDD01 2 billion CFU + LP01 2 billion CFU
+ LS03 2 billion CFU + ST10 5 billion CFU

FINISHED DOSAGE FORM

SCIENTIFIC SUPPORT

Human clinical trial

- 1) Mazzini L. et al. Potential Role of Gut Microbiota in ALS Pathogenesis and Possible Novel Therapeutic Strategies. J Clin Gastroenterol, Vol 00, N 00, 2018.
- 2) Di Gioia et al. A prospective longitudinal study on the microbiota composition in amyotrophic lateral sclerosis. BMC Med June.

Bifidobacterium longum - W11 (LMG P-21586)

DAILY DOSAGE IN CLINICAL STUDY 5 billion CFU + FOS

**RAW MATERIAL
AND FINISHED DOSAGE FORM**

FUNCTIONALITY Minimal hepatic encephalopathy • Reduction of gastro-intestinal discomfort related to IBS
• Rebalance of intestinal microbiota • Non-transmissible rifamycins resistance

SCIENTIFIC SUPPORT

Human clinical trial

Malaguarnera M. et al. *Bifidobacterium longum* with fructo-oligosaccharides (FOS) treatment in minimal hepatic encephalopathy: a randomized, double-blind, placebo-controlled study. Dig Dis Sci 2007; 52:3259-3265.

Lacticaseibacillus rhamnosus - GG (ATCC 53103) (formerly *Lactobacillus rhamnosus*) +
Bifidobacterium animalis subsp. *lactis* - BS01™ (LMG P-21384) +
Bifidobacterium breve - BR03™ (DSM 16604) +
Bifidobacterium longum - BL03 (DSM 16603)

DAILY DOSAGE IN CLINICAL STUDY GG 25 billion cfu + BS01 15 billion cfu + BR03 5 billion cfu + BL03 5 billion cfu

**RAW MATERIAL
AND FINISHED DOSAGE FORM**

FUNCTIONALITY Sleep improvement and cognitive symptoms improvement in patients with encephalomyelitis/
chronic fatigue syndrome

SCIENTIFIC SUPPORT

Human clinical trial

Wallis A. et al. Open-label pilot for treatment targeting gut dysbiosis in myalgic encephalomyelitis / chronic fatigue syndrome: neuropsychological symptoms and sex comparisons. J Transl Med 2018, 16:24.

Lacticaseibacillus rhamnosus - LR06 (DSM 21981) (formerly *Lactobacillus rhamnosus*)
Lactiplantibacillus pentosus - LPS01 (DSM 21980) (formerly *Lactobacillus pentosus*) +
Lactiplantibacillus plantarum - LP01™ (LMG P-21021) (formerly *Lactobacillus plantarum*) +
Lactobacillus delbrueckii subsp. *delbrueckii* - LDD01 (DSM 22106)

DAILY DOSAGE IN CLINICAL STUDY LR06 1.5 billion CFU + LPS01 1.5 billion CFU + LP01 1.5 billion CFU
+ LDD01 500 million CFU

FINISHED DOSAGE FORM

FUNCTIONALITY Restoration of a healthy oral flora • Improvement of the incidence and severity of bad breath (halitosis)
• Inhibition of pathogens and Volatile Sulphur Compounds producing bacteria

SCIENTIFIC SUPPORT

Human clinical trial

Del Piano M. et al. Correlation between specific bacterial groups in the oral cavity and the severity of halitosis: any possible beneficial role for selected Lactobacilli? J Gastroint Dig Syst, 2014; 4:197.

+ Refer to gastroenterology section for further clinical studies on this blend

+ Internal data on immunomodulation, anti-oxidant activity and epithelial barrier effect (TEER in Caco2 cells) available upon request for some of these strains

In vitro studies

a) Mogna L. et al. In Vitro Inhibition of *Klebsiella pneumoniae* by *Lactobacillus delbrueckii* subsp. *delbrueckii* LDD01 (DSM 22106). An Innovative Strategy to Possibly Counteract Such Infections in Humans? J Clin Gastroenterol, Vol 50, Supp. 2, November/December 2016.

b) Mogna L. et al. Assessment of the in vitro inhibitory activity of specific probiotic bacteria against different *Escherichia coli* strains (LP01, LR06, LPS01, LDD01). J Clin Gastroenterol. 2012; 46 Suppl:S29-32.

c) Deidda F. et al. (2020) How Probiotics may Kill Harmful Bacteria: The in vitro Activity against Some Haemolytic Strains. J. Prob. Health 8:216 (LP01).

Lacticaseibacillus rhamnosus - GG (ATCC 53103) (formerly *Lactobacillus rhamnosus*)

DAILY DOSAGE IN CLINICAL STUDY 1) 5 billion CFU (uncoated) • 1 billion cells (microencapsulated)

**RAW MATERIAL
AND FINISHED DOSAGE FORM**

FUNCTIONALITY Oral health • Caries prevention • Inhibition of *Streptococcus mutans*

SCIENTIFIC SUPPORT

One of the most recognized probiotic strains in the world, with over 1000 publications and 300 clinical trials including several demonstrated significant benefits in oral health and caries prevention

All our strains are available with the application of our proprietary technologies:

Microencapsulation

Protect the probiotics from gastric acid, human bile and pancreatic secretions.
Improve stability in the Finished Dosage Form.

SCIENTIFIC SUPPORT

Human trials

- 1) Del Piano M. et al. Comparison of the Kinetics of Intestinal Colonization by Associating 5 Probiotic Bacteria Assumed Either in Microencapsulated or in a Traditional, Uncoated Form. (LA02, LR04, GG, LR06, BS01) J Clin. Gastroenterol 2012;46:S85-S92.
- 2) Del Piano M. et al. Evaluation of the Intestinal Colonization by Microencapsulated Probiotic Bacteria in Comparison With the Same Un-

coated Strains. (LP01, BR03) J Clin Gastroenterol, Vol 44, Supp. 1, September 2010.

Comment:

Del Piano M. et al. Is microencapsulation the future of probiotic preparations? The increased efficacy of gastro-protected probiotics. Gut Microbes 2:2, 120-123 March/April 2011.

Flow cytometry

Methodology of enumeration of live, microencapsulated and/or inactivated bacteria, with increased accuracy compared to plate count, and retrieving more information on the bacteria's status.

SCIENTIFIC SUPPORT

Scientific support on Flow Cytometry Methodology:

- 1) Pane M. et al. Flow cytometry rapid quantification of probiotic bacteria in lyophilised cultures and commercial products. Nutrafoods, 2013, 12:N35-N37.
- 2) Pane M. et al. Flow Cytometry Evolution of Microbiological Methods for Probiotics Enumeration. J Clin Gastroenterol 2018;52:S41-S45.

- 3) Foglia C et al. New insights in enumeration methodologies of probiotic cells in finished products. J Microbiol Methods. 2020 Aug;175:105993. *Further publications and an ISO standard, ISO 19344 IDF 232, support the use of this method for enumeration of live bacteria*

Allergen free

Allows an improved safety profile including for pediatric population, and probiotics that can be assumed by all.

SCIENTIFIC SUPPORT

Scientific support on Allergen-free probiotics production:

- Mogna G. et al. Allergen-free Probiotics. J Clin Gastroenterol 2008; S201-S204.

Our probiotics can be produced in absence of all allergens listed in EU 1169/2011 Annex II