

A PRACTITIONER'S GUIDE TO PROBIOTICS:

Gastrointestinal Conditions

Probiotic supplements contain beneficial microorganisms, similar to those found in the human gastrointestinal tract. When ingested, these live microorganisms confer a number of health benefits to the host. Probiotics, particularly *Lactobacillus*, *Bifidobacterium*, and *Saccharomyces* species, have been studied for their effectiveness in numerous gastrointestinal conditions.

Imbalances in the intestinal microbiota are believed to be involved in the development of certain gastrointestinal disorders. Probiotic supplements may support a healthy composition of bacteria in the gastrointestinal tract and improve GI function by a number of mechanisms, such as:

- Alteration of intestinal flora via acidification of the colon by fermentation of nutrients
- Inhibition of pathogenic bacteria through displacement of gas-producing, bile salt-deconjugating bacterial species
- Modulation of gastrointestinal immune function via action on inflammatory cytokines and inflammatory mechanisms
- Improvement of epithelial barrier function
- Induction of intestinal epithelial cell receptors (e.g., μ -opioid, cannabinoid)
- Attenuation of stress response, spinal afferent traffic, and visceral hypersensitivity

While the therapeutic use of probiotics is becoming increasingly common, especially within the field of gastroenterology, clear guidelines for clinical application have yet to be established. This is particularly important as the effectiveness of probiotic supplementation may be dependent on the condition, strain, dosing, and duration of therapy.

This guide provides an overview of the available research for the clinical application of probiotics in gastrointestinal conditions, including dosing and administration for single-strain and multi-strain probiotics.

Condition or Use	Strain or Combination	Dosing & Administration	Outcomes
Acute Amoebiasis	Single strain		
	<i>Saccharomyces boulardii</i>	<u>Adult:</u> 250 mg three times per day with metronidazole and iodoquinol for 4 weeks	Reduces duration of diarrhea, fever, abdominal pain and incidence of amoebic cysts compared to antibiotics alone
Acute Diarrhea	Single strain		
	<i>Bacillus coagulans</i> LBSC or unique IS-2	<u>Adult:</u> 2x10 ⁽⁹⁾ CFU twice per day for 10 days	Improves recovery, abdominal pain and discomfort, stool consistency; reduces diarrhea duration, frequency
	<i>Escherichia coli</i> Nissle 1917	<u>Infant:</u> 1-3 ml of 1x10 ⁽⁸⁾ CFU/ml per day for 10-21 days max	Reduces days to achieve reduction in watery/loose stools (median approx 2.5 days)
	<i>Lactobacillus casei</i> DN-114 001	<u>Pediatric:</u> 1x10 ⁽⁸⁾ CFU/ml in 100g of yogurt per day for 4 months	Reduces incidence of diarrhea
	<i>Lactobacillus casei</i> GG	1x10 ⁽¹⁰⁻¹¹⁾ CFU twice per day for 5 days	Reduces duration of diarrhea
	<i>Lactobacillus paracasei</i> ST11	<u>Infant:</u> 1x10 ⁽¹⁰⁾ CFU per day for 5 days	Reduces nonrotavirus-induced diarrhea, frequency and need for rehydration solution; resolves in 6 days
	<i>Lactobacillus reuteri</i> DSM 17938	<u>Pediatric:</u> 1x10 ⁽¹⁰⁻¹¹⁾ CFU per day for 5 days	Reduces days and incidence of rotavirus-associated watery diarrhea during treatment
<i>Lactobacillus rhamnosus</i> GG	<u>Pediatric:</u> 2x10 ⁽¹⁰⁾ twice per day for 7 days min.	Reduces frequency & duration, intravenous therapy requirement, hospital stay length, and acid/base imbalance	

Condition or Use	Strain or Combination	Dosing & Administration	Outcomes
Acute Diarrhea	Single strain		
	<i>Saccharomyces boulardii</i>	<u>Adult:</u> 500-750 mg for 8-10 days	Reduces duration of diarrhea and hospitalization
		<u>Infant:</u> 200 mg twice per day	Reduces diarrhea within 72 hours
	<i>Saccharomyces boulardii</i> CNCM I-745	<u>Pediatric:</u> 250 mg twice per day for 5 days	Reduces duration of diarrhea and hospitalization, stool frequency; improves consistency
	Multistrain		
	<i>B. animalis</i> subs. <i>lactis</i> BB-12 & <i>L. rhamnosus</i> GG	<u>Pediatric:</u> 1x10(10) CFU per day during hospitalization and 8-12 weeks thereafter in severe acute malnutrition	Reduces days of diarrhea after release from hospital
	<i>B. bifidum</i> & <i>L. acidophilus</i> (Infloran®)	<u>Pediatric</u> 2x10(9) CFU (stored at room temperature for 1 month) three times per day for 5 days	Reduces duration and frequency of diarrhea
	<i>B. longum</i> BORI & <i>L. acidophilus</i> AD031	<u>Infant:</u> 2.2x10(10) CFU twice per day for 3 days	Reduces duration of rotavirus-associated diarrhea
<i>L. reuteri</i> DSM 12246 & <i>L. rhamnosus</i> 19070-2	<u>Pediatric:</u> 2x10(10) CFU twice per day for 5 days	Reduces diarrhea duration with early intervention, length of hospital stay and rotavirus antigen	
<i>Bc. mesentericus</i> TO-A, <i>C. butyricum</i> TO-A, & <i>E. faecalis</i> T-110	<u>Pediatric:</u> 2.5x10(7) CFU/kg per day in three divided doses for 7 days	Reduces duration of diarrhea; increases bifidobacteria and lactobacillus, IL-10, IFN-γ; Down-regulates TNF-α	

Condition or Use	Strain or Combination	Dosing & Administration	Outcomes
Acute Diarrhea	Multistrain		
	<i>B. bifidum</i> LMG-P 17500, <i>L. acidophilus</i> LMG-P 17549, <i>L. delbrueckii subs bulgaricus</i> LMG-P 17550, <i>S. thermophilus</i> LMG-P 17503	<u>Pediatric:</u> 3x10(9) CFU per day for duration of diarrhea	Reduces duration and number of stools after one day
	<i>B. longum</i> , <i>L. acidophilus</i> , <i>L. rhamnosus</i> , & <i>S. boulardii</i>	<u>Pediatric:</u> 8x10(7)-1.25x10(9) CFU twice per day for at least 5 days	Reduces duration of rotavirus-associated diarrhea, vomiting
	<i>B. lactis</i> , <i>B. longum</i> , <i>L. acidophilus</i> , <i>L. plantarum</i> , <i>L. rhamnosus</i> , & <i>P. pentosaceus</i>	<u>Pediatric:</u> 1x10(9) CFU/g twice per day for 1 week	Reduces duration of diarrhea
Acute Gastroenteritis	Single strain		
	<i>Lactobacillus casei</i> Shirota	<u>Geriatric:</u> 4x10(10) CFU per day in milk for 1 month	Reduces the duration of fever, Enterobacteriaceae; increases bifidobacterium, lactobacillus
	<i>Lactobacillus reuteri</i> DSM 17938 or ATCC 55730	<u>Pediatric:</u> 1x10(8) CFU per day for 5 days	Reduces duration and incidence of diarrhea, and days at hospital
	<i>Lactobacillus rhamnosus</i> GG	<u>Pediatric:</u> 6x10(9) CFU per day for 7 days 1x10(10) CFU per day for 4 weeks	Reduces duration of diarrhea equally to smectite clay combination therapy, stool frequency more than combo therapy on day 4 Reduces recurrence of rotavirus diarrhea, impaired GI function; increases IgG in px with rotavirus diarrhea, intestinal permeability in px with cryptosporidial diarrhea

Condition or Use	Strain or Combination	Dosing & Administration	Outcomes
Acute Pouchitis	Multistrain		
	<i>B. bifidus</i> , <i>L. acidophilus</i> , & <i>L. delbrueckii subs. bulgaricus</i>	<u>Adult:</u> 3.2x10(9) CFU three times per day for one month and 1.6x10(9) CFU twice per day for 8 following months	Reduces incidence and severity of pouchitis, levels of calprotectin and pyruvate kinase isoenzyme M2-PK
	<i>B. breve</i> , <i>B. infantis</i> , <i>B. longum</i> , <i>L. acidophilus</i> , <i>L. delbrueckii subs. bulgaricus</i> , <i>L. paracasei</i> , <i>L. plantarum</i> , & <i>S. thermophilus</i> (VSL#3®)	<u>Adult:</u> 9x10(11) CFU per day for one year after ileostomy closure 9x10(11) CFU twice per day for 4 weeks, and once per day for 6 months if remission is achieved	Reduces risk of acute pouchitis; improves IBD score Reduces disease activity score; improves IBD Questionnaire score; all 16/23 patients achieving remission maintained status with half-dose thereafter
Antibiotic-associated Diarrhea	Single strain		
	<i>Lactobacillus casei</i> CNCM I-1518	<u>Adult:</u> 1x10(10) CFU twice per day in milk product for during antibiotic therapy	Reduces incidence of AAD
	<i>Lactobacillus reuteri</i> ATCC 55730	<u>Adult:</u> 1x10(8) CFU twice per day for 4 weeks	Reduces diarrhea frequency
	<i>Lactobacillus rhamnosus</i> GG	<u>Pediatric:</u> 1x10(10) to 2x10(10) CFU twice per day during antibiotic treatment	Prevents AAD

Condition or Use	Strain or Combination	Dosing & Administration	Outcomes
Antibiotic-associated Diarrhea	Single strain		
	<i>Saccharomyces boulardii</i>	<u>Adult:</u> 500-1000 mg per day during antibiotics + 3 days-2 weeks	Reduces risk for diarrhea
		<u>Geriatric:</u> 500 mg twice per day for 21 days during antibiotics	Reduces incidence, frequency and duration of diarrhea
		<u>Infant:</u> 250 mg per day during antibiotics and 14 days after	Reduces incidence of AAD during and after antibiotics esp. in patients younger than age 1
		<u>Pediatric:</u> 500 mg per day with antibiotics for LRTI for 2 weeks	Reduces prevalence, risk, frequency, & duration of diarrhea; increase recovery rate
	Multistrain		
	<i>B. animalis subs. lactis</i> BB-12 & <i>L. acidophilus</i> LA-5	<u>Adult:</u> 4x10(9) CFU per day for during antibiotics for 14 days	Reduces duration of diarrhea
<i>L. acidophilus</i> CL1285 & <i>L. casei</i> LBC80R	<u>Adult:</u> 1x10(11) CFU per day during antibiotic use and for 5 days after	Reduces incidence of diarrhea, symptom duration	
<i>B. lactis</i> ATCC SD5220 & ATCC SD5219, <i>L. acidophilus</i> ATCC 700396, & <i>L. paracasei</i> ATCC SD5275	<u>Adult:</u> 1.7x10(10) CFU per day during antibiotics use	Reduces incidence of diarrhea, diarrhea duration, frequency of stool, fever, abdominal cramping and bloating	

Condition or Use	Strain or Combination	Dosing & Administration	Outcomes
Antibiotic-associated Diarrhea	Multistrain		
	<i>B. lactis</i> BB-12, <i>L. acidophilus</i> LA-5, & <i>L. rhamnosus</i> GG	<u>Adult:</u> 5.25x10(10) CFU per day in milk product for 14 days during antibiotic use	Reduces incidence of diarrhea and risk
	<i>B. lactis</i> BB-12, <i>L. acidophilus</i> LA-5, & <i>L. rhamnosus</i> GG	<u>Pediatric</u> 1.83x10(10) CFU per day in milk product during antibiotic treatment	Reduces incidence of severe and minor diarrhea
	<i>B. longum</i> PL03, <i>L. plantarum</i> PL02, & <i>L. rhamnosus</i> KL53A	<u>Pediatric:</u> 1x10(8) CFU twice per day during antibiotic use	Reduces number of stools per day
<i>B. breve</i> , <i>B. infantis</i> , <i>B. longum</i> , <i>L. acidophilus</i> , <i>L. delbrueckii</i> subs. <i>bulgaricus</i> , <i>L. paracasei</i> , <i>L. plantarum</i> , & <i>S. thermophilus</i> (VSL#3®)	<u>Adult:</u> 4.5x10(11) CFU twice per day during systemic antibiotic therapy	Reduces incidence of diarrhea	
C. difficile	Single strain		
	<i>Enterococcus faecium</i> L3	<u>Infant:</u> 1 ml of 5x10(8) CFU/ml twice per day for 10 days during antibiotics	Reduces infectious complication frequency, risk of dyspeptic disorder, <i>C. difficile</i> persistence, opportunistic microorganisms; increases bifidobacteria and lactobacilli
	<i>Lactobacillus plantarum</i> 299v	<u>Adult:</u> 1x10(10) CFU per day for 12 months during antibiotic therapy	Reduces CDI incidence and <i>C. difficile</i> associated diarrhea
<i>Saccharomyces boulardii</i>	<u>Adult:</u> 1000 mg per day for 4 weeks with vancomycin or metronidazole	Prevention of associated diarrhea, infection and recurrence	

Condition or Use	Strain or Combination	Dosing & Administration	Outcomes
C. difficile	Multistrain		
	<i>L. acidophilus</i> CL1285 & <i>L. casei</i> LBC80R	<u>Adult:</u> 1x10(11) CFU per day during antibiotic use and for 5 days after	Reduces incidence of diarrhea
	<i>B. lactis</i> ATCC SD5220 & ATCC SD5219, <i>L. acidophilus</i> ATCC 700396, & <i>L. paracasei</i> ATCC SD5275	<u>Adult:</u> 1.7x10(10) CFU per day during antibiotics administration	Reduces incidence of diarrhea, diarrhea duration, frequency of stool, fever, abdominal cramping and bloating
Cancer Therapy-induced GI Side Effects	Single strain		
	<i>Lactobacillus acidophilus</i>	<u>Adult:</u> 1x10(8) CFU twice per day during radiation therapy for prostate cancer	Reduces percentage volume change of the rectum
	<i>Lactobacillus brevis</i> CD2	<u>Adult:</u> 2x10(9) CFU six times per day (lozenges) for 7-weeks of therapy and 1-week after last therapy admin	Reduces incidence of mucositis; increases anticancer therapy completion rates
	<i>Lactobacillus casei</i> DN-114 001	<u>Adult:</u> 1x10(8) CFU/g in milk product three times per day for 1 week	Improves stool consistency during radiation therapy
	<i>Lactobacillus rhamnosus</i> GG	<u>Adult:</u> 1-2x10(10) CFU per for 24 weeks	Reduces the incidence of grade 3-4 diarrhea, GI discomfort, hospital care, and number of chemotherapy dose reductions from toxicity

Condition or Use	Strain or Combination	Dosing & Administration	Outcomes
Cancer Therapy-induced GI Side Effects	Multistrain		
	<i>B. breve</i> & <i>L. acidophilus</i>	<u>Adult:</u> 2x10(9) CFU twice per day for 7 days before radiotherapy and during radiotherapy	Reduces incidence of grade 2-3 diarrhea, use of anti-diarrheal medications; improves stool consistency
	<i>B. longum</i> BB-536 & <i>L. acidophilus</i> LAC-361	<u>Pediatric:</u> 1.3x10(9) CFU twice per day during pelvic radiation therapy (60 days)	Reduces moderate-severe diarrhea prevalence, very severe diarrhea in px who had surgery
	<i>B. breve</i> , <i>B. infantis</i> , <i>B. longum</i> , <i>L. acidophilus</i> , <i>L. delbrueckii</i> subs. <i>bulgaricus</i> , <i>L. paracasei</i> , <i>L. plantarum</i> , & <i>S. thermophilus</i> (VSL#3®)	<u>Adult:</u> 4.5x10(12) CFU three times per day during postoperative radiation therapy	Reduces incidence of radiation-induced enteritis and colitis, severe diarrhea, bowel movements, need for anti-diarrhea medication
Celiac Disease	Single strain		
	<i>Bifidobacterium breve</i> B632 and BR03	<u>Pediatric:</u> 1-2x10(9) CFU per day for 3 months with gluten-free diet	Normalizes Firmicutes/Bacteroidetes ratio; increases Actinobacteria; decreases TNF- α
	<i>Bifidobacterium infantis</i> Lifestart 2	<u>Adult:</u> 4x10(9) CFU three times per day before meals for 3 weeks	Improves indigestion, constipation and reflux scores; increases serum macrophage inflammatory protein-1 β
<i>Bifidobacterium longum</i> CECT 7347	<u>Pediatric:</u> 1x10(9) per day for 3 months with gluten-free diet	Greater height percentile; reduced peripheral CD3+ T lymphocytes, HLA-DR+ T lymphocytes, <i>Bacteroides fragilis</i> content and sIgA in stool	

Condition or Use	Strain or Combination	Dosing & Administration	Outcomes
Chronic Constipation	Single strain		
	<i>Escherichia coli</i> Nissle 1917	<u>Adult:</u> 2.5-25x10 ⁹ CFU twice per day for 12 weeks	Increases stool frequency within 4 weeks and stool consistency
	<i>Lactobacillus casei</i> Shirota	<u>Adult:</u> 6.5x10 ⁹ CFU per day for 4 weeks	Improve constipation severity, stool consistency
	<i>Lactobacillus casei</i> LCR35	<u>Pediatric:</u> 8x10 ⁸ CFU twice per day for 4 weeks	Increase defecation frequency, treatment success, reduce glycerin enema and stool hardness
	<i>Lactobacillus reuteri</i> DSM 17938	<u>Adult:</u> 1x10 ⁸ CFU twice per day for 4 weeks	Increases bowel movement frequency; decreases discomfort, pain, bloating, incomplete defecation and defecation assistors
	<i>Lactobacillus reuteri</i> DSM 17938	<u>Infant:</u> 1x10 ⁸ CFU per day for 8 weeks	Increases bowel movement frequency; decreases stool hardness
	Multistrain		
	<i>B. lactis</i> AGAL NM97/09513 & <i>L. acidophilus</i> ATCC 700396	<u>Adult:</u> 2x10 ⁹ CFU per day for 14 days in milk product	Reduces colonic transit time
	<i>L. plantarum</i> LRCC5193 & <i>S. thermophilus</i> MG510	<u>Adult:</u> 4x10 ⁸ CFU/g per day for 4 weeks	Improves stool consistency, QoL
Chronic Diarrhea	Single strain		
	<i>Bacillus subtilis</i> C-3102	<u>Adult:</u> 2.2x10 ⁹ CFU per day for 8 weeks	Improves Bristol Stool score after 4 weeks and GI sounds; reduces stool frequency
	<i>Lactobacillus rhamnosus</i> GG	<u>Pediatric:</u> 6x10 ⁷ CFU twice per day for at least 7 days	Reduces duration of diarrhea, vomiting, hospital stay length

Condition or Use	Strain or Combination	Dosing & Administration	Outcomes
Chronic Diarrhea	Multistrain		
	<i>L. acidophilus</i> CERELA & <i>L. casei</i> CERELA	<u>Adult:</u> 1.5g per day for 21 days	Reduces frequency after 15 days and maintains level 15 days after withdrawal, and bacterial overgrowth
	<i>L. acidophilus</i> CERELA & <i>L. casei</i> CERELA	<u>Pediatric:</u> 1x10(10-12) CFU/g in 175g milk product twice per day for 5 days	Reduces diarrhea duration, frequency, vomiting
Chronic Pouchitis	Multistrain		
	<i>B. breve</i> , <i>B. infantis</i> , <i>B. longum</i> , <i>L. acidophilus</i> , <i>L. delbrueckii</i> subs. <i>bulgaricus</i> , <i>L. paracasei</i> , <i>L. plantarum</i> , & <i>S. thermophilus</i> (VSL#3®)	<u>Adult:</u> 1.8-3x10(12) CFU per day for 9-12 months	Reduces rate of relapse; increases <i>lactobacili</i> , <i>bifidobacteria</i> , <i>S. thermophilus</i> , fungal diversity; increases remission rate; maintains QoL compared to worsening in placebo
	<i>B. bifidum</i> W23, <i>B. lactis</i> W51 & W52, <i>L. acidophilus</i> W52, <i>L. casei</i> W56, <i>L. paracasei</i> W20, <i>L. plantarum</i> W62, <i>L. salivarius</i> W24 & <i>Lc. lactis</i> W19	<u>Adult:</u> 2.5x10(9) CFU twice per day for 8 weeks (after a 4 week antibiotic treatment)	Reduces disease activity, <i>E. coli</i> passage (associated with microbial diversity)
Collagenous Colitis	Single strain		
	<i>Escherichia coli</i> Nissle 1917	<u>Adult:</u> 1-6 caps containing 2..5-25x10(9) CFU per day for 4-18 weeks	Reduces stool frequency; improves stool consistency

Condition or Use	Strain or Combination	Dosing & Administration	Outcomes
Constipation	Single strain		
	<i>Bifidobacterium animalis</i> subsp. <i>lactis</i> DN-173010	<u>Adult:</u> 1.25x10(10) CFU per day for 2 weeks	Increases stool frequency; improves stool consistency and condition
	<i>Bifidobacterium animalis</i> subsp. <i>Lactis</i> HN019	1x10(9-10) CFU per day for 28 days	Increases stool frequency in px with ≤ 3 bowel movements per week; high dose decreases straining
	<i>Bifidobacterium breve</i> Yakult	<u>Pediatric:</u> 1x10(8-10) CFU per day for 4 weeks	Increases defecation frequency, stool consistency; reduces frequency of fecal incontinence and abdominal pain
	<i>Lactobacillus casei</i> Shirota	<u>Adult:</u> 1x10(10) CFU in milk per day for 3-4 weeks	Improves defecation frequency, stool consistency, constipation symptoms
	<i>Lactobacillus paracasei</i> LMGP22043	<u>Adult:</u> 2x10(10) CFU per day in enriched artichokes for 15 days	Increases symptom relief; improves Bristol stool and GI symptom rating scale scores
	<i>Lactobacillus reuteri</i> DSM 17938	<u>Adult:</u> 2-4x10(8) CFU per day for 3-4 months	Reduces abdominal discomfort, pain, bloating, incomplete defecation, need for laxatives, serum serotonin, brain-derived neurotrophic factor
	<i>Lactococcus lactis</i> subs. <i>cremoris</i> FC	<u>Adult:</u> 1x10(8) CFU/g in 200g milk product per day for 4 weeks	Increases defecation frequency, stool volume; reduces stool ammonia
	Multistrain		
	<i>B. breve</i> DSM 16604 & <i>L. plantarum</i> LMG P-21021	<u>Adult:</u> 5x10(9) CFU per day for 30 days	Improves frequency of bowel movements, stool consistency, easy of expulsion, bloating, anal itching, burning or pain
<i>B. bifidum</i> W23, <i>B. lactis</i> W52, <i>B. longum</i> W108, <i>L. casei</i> W79, <i>L. plantarum</i> W62, <i>L. rhamnosus</i> W7	<u>Adult:</u> 4x10(9) CFU per day for 4 weeks during pregnancy	Increases defecation frequency; reduces sensations of anorectal obstruction, incomplete evacuation, straining, episodes of abdominal pain and reflux	

Condition or Use	Strain or Combination	Dosing & Administration	Outcomes
Constipation	Multistrain		
	<i>B. breve</i> , <i>B. infantis</i> , <i>B. longum</i> , <i>L. acidophilus</i> , <i>L. delbrueckii subs. bulgaricus</i> , <i>L. paracasei</i> , <i>L. plantarum</i> , & <i>S. thermophilus</i> (VSL#3®)	<u>Geriatric</u> : 4.5x10(11) CFU per day for 45 days	Reduces incidence of diarrhea, use of laxatives; increases serum albumin, prealbumin, and protein especially in px >80 years
Crohn's Disease	Single strain		
	<i>Lactococcus lactis</i> LL-Thy12	<u>Adult</u> : 1x10(10) CFU twice per day for 7 days	Reduces disease activity
	Multistrain		
	<i>B. breve</i> , <i>B. infantis</i> , <i>B. longum</i> , <i>L. acidophilus</i> , <i>L. delbrueckii subs. bulgaricus</i> , <i>L. paracasei</i> , <i>L. plantarum</i> , & <i>S. thermophilus</i> (VSL#3®)	<u>Adult</u> : 9x10(11) CFU per day for 9 months after ileocolonic resection and reanastomosis	Reduces mucosal inflammatory cytokines
Diverticular Disease	Single strain		
	<i>Lactobacillus casei</i> subs. DG	<u>Adult</u> : 1.6-2.4x10(9) CFU per day with mesalazine for 10 days per month for 1-2 years	Combination prevented recurrence in all px, reduced recurrence similarly to drug when probiotic given alone. Symptoms reappear if treatments are suspended

Condition or Use	Strain or Combination	Dosing & Administration	Outcomes
Enteral Nutrition-related Diarrhea	Single strain		
	<i>Bacillus cereus</i> A05	<u>Adult:</u> Four vials of 5x10(6) CFU every 6 hours for 5 days	Reduces time to cease diarrhea, especially in malnourished patients
	<i>Bifidobacterium longum</i> BB536	<u>Adult:</u> 2.5-5x10(10) CFU per day for 16 weeks	Normalizes bowel movements, stool characteristics; increases fecal <i>Bifidobacterium</i> content
	<i>Saccharomyces boulardii</i>	<u>Adult:</u> 2000 mg per day for 8-28 days	Reduces days with diarrhea
	Multistrain		
	<i>B. breve</i> , <i>B. infantis</i> , <i>B. longum</i> , <i>L. acidophilus</i> , <i>L. delbrueckii</i> subs. <i>bulgaricus</i> , <i>L. paracasei</i> , <i>L. plantarum</i> , & <i>S. thermophilus</i> (VSL#3®)	<u>Adult:</u> 4.5x10(11) CFU twice per day during enteral-nutrition (mean 8.5 days)	Reduces frequency of diarrhea, frequency of episodes and weight of liquid and loose stool
Functional GI Symptoms	Single strain		
	<i>Bifidobacterium animalis</i> subsp. <i>lactis</i> BB-12 or HN019	<u>Adult:</u> 1x10(9-10) per day for 2-4 weeks	Increases defecation frequency in px with gastrointestinal discomfort; reduces transit time, vomiting, regurgitation, abdominal pain, nausea, gurgling, constipation, irregular bowel movements, flatulence
	<i>Bifidobacterium bifidum</i> YIT 10347	<u>Adult:</u> 3x10(7) CFU/ml per day in 100ml dairy product for 4 weeks	Reduces post-meal discomfort and pain, GI symptoms, flatus, and diarrhea in px with gastrointestinal discomfort
	<i>Bacillus coagulans</i> GBI-30, 6086	<u>Adult:</u> 2x10(9) CFU per day for 4 weeks	Reduces pain and total GI symptom rating scale in px with functional gas symptoms
	<i>Bifidobacterium longum</i> subs. <i>infantis</i> CECT7210	<u>Infant:</u> 1x10(7) CGU/g in formula for 12 weeks	Reduces incidence of diarrhea after 8 weeks, constipation prevalence

Condition or Use	Strain or Combination	Dosing & Administration	Outcomes
Functional GI Symptoms	Single strain		
	<i>Lactobacillus gasseri</i> OLL2716	<u>Adult:</u> >1x10(9) CFU in milk product per day for 12 weeks	Improves self-assessed condition, postprandial fullness, bloating, heartburn scores and symptom elimination rate in px with functional dyspepsia
	<i>Lactobacillus reuteri</i> DSM 17938	<u>Infant:</u> 1x10(8) CFU per day for 30 days	Increases gastric emptying rate; reduces regurgitation episodes, fasting antral area
	<i>Lactobacillus reuteri</i> DSM 17938	<u>Pediatric:</u> 1x10(8) CFU per day for 4 weeks	Reduces frequency and intensity of pain in px with functional abdominal pain
	<i>Saccharomyces cerevisiae</i>	<u>Adult:</u> 500 mg per day for 6 weeks	Improves bloating/distention, feeling of fullness, stool consistency, constipation-associated QoL and stress; increases in <i>Bacteroidaceae</i> , <i>Prevotellaceae</i> , and <i>Akkermansia muciniphila</i> in px with gastrointestinal discomfort
	Multistrain		
	<i>B. lactis</i> BI-07, & <i>L. acidophilus</i> NCFM	<u>Adult:</u> 2x10(11) CFU twice per day for 8 weeks	Reduces bloating
General Gastrointestinal Health	Single strain		
	<i>Bifidobacterium bifidum</i> OLB6378	<u>Infant:</u> 2.5x10(9) CFU twice per day 48h after birth until BW reaches 2000g	Reduces time to achieve enteral feeding in preterm infants without increased prevalence of side effects
	<i>Bifidobacterium breve</i> M-16V	<u>Cesarean-delivered Infant:</u> 7.5x10(8) CFU/100 ml in prebiotic formula for 16 weeks	Emulates gut microbiota of vaginally-delivered infants via: Increase in bifidobacteria proportion, fecal acetate; reduction of <i>Enterobacteriaceae</i> , fecal pH

Condition or Use	Strain or Combination	Dosing & Administration	Outcomes
General Gastrointestinal Health	Single strain		
	<i>Bifidobacterium infantis</i> EVC001	<u>Infant:</u> 1.8-2.8x10(10) CFU per day in breast milk for 21 days	Increases fecal Bifidobacterium, fecal frequency, soft stool; reduces watery stool
	<i>Bifidobacterium lactis</i> HN019	<u>Geriatric:</u> 6.5-x10(7-9) CFU per day for 4 weeks	Increases bifidobacteria, lactobacilli, enterococci; reduces enterobacteria
	<i>Bifidobacterium lactis</i> BB-12	<u>Infant:</u> 1.6 × 10(9) on day 1 to 3 and 4.8 × 10(9) CFU from day 4 to day 35 in formula	Increases bifidobacteria; reduces Enterobacteriaceae, Clostridium
	<i>Bifidobacterium longum</i> BB536	<u>Adult:</u> 2x10(9-10) CFU per day in milk for 7 days	Reduces fecal ammonia and activity of fecal enzymes; increases fecal Bifidobacterium content, defecation frequency and characteristics
	<i>Bifidobacterium longum</i> BB536	<u>Infant:</u> 1x10(7) CFU/g per formula feeding for 6 months	Increases Bifidobacteria and bifidobacteria/enterobacteriaceae ratio, IFN- γ secretion cells and the ratio of IFN- γ /IL-4 secretion cells, Th1 response
	<i>Bifidobacterium longum</i> subs. <i>Infantis</i> ATCC 15697	1.4x10(9) CFU twice per day for two weeks in formula or breast milk	Compared with <i>L. acidophilus</i> Increases bifidobacteria; reduces γ -Proteobacteria
	<i>Lactobacillus acidophilus</i>	<u>Infant:</u> 1x10(8) CFU divided in three daily doses in breast milk or formula	Increases feeding tolerance, colonization of lactobacillus
	<i>Lactobacillus casei</i> subs. <i>rhamnosus</i> GG	<u>Infant:</u> 6x10(9) CFU per day added to breast milk for 12 months	Reduces incidence of fungal <i>Candida</i> colonization, number of fungal isolates
<i>Lactobacillus paracasei</i> LC01	<u>Adult:</u> 1x10(10) CFU per day in milk for 4 weeks	Increases <i>Lactobacillus</i> , <i>Bifidobacterium</i> , <i>Roseburia intestinalis</i> , acetic acid, butyric acid; inhibits fecal <i>E. coli</i> , ammonia	

Condition or Use	Strain or Combination	Dosing & Administration	Outcomes
General Gastrointestinal Health	Single strain		
	<i>Lactobacillus plantarum</i> 299v	<u>Adult:</u> 1x10 ¹¹ CFU per day for 2-4 weeks	Increases fecal lactobacilli, clostridia; may revert after discontinuation
	<i>Lactobacillus plantarum</i> P-8	6x10 ¹⁰ CFU per day for 4 weeks	Increases bifidobacterium; reduces <i>Desulfovibrio</i>
	<i>Lactobacillus reuteri</i> NCIMB 30242	<u>Adult:</u> 2-3x10 ⁹ CFU twice per day for 9 weeks	Improves general GI health status scores and diarrhea
	<i>Lactobacillus reuteri</i> ATCC 55730	4x10 ⁸ CFU per day for 28 days	Increases rate of colonization, numbers of duodenal B-lymphocytes, CD4-positive T-lymphocytes in the ileal epithelium; reduces gastric mucosal histiocytes
	<i>Lactobacillus reuteri</i> ATCC 55730	<u>Infants:</u> 1x10 ⁸ CFU per day as drops for 6 weeks	Reduces <i>Candida</i> colonization prevalence, gastrointestinal symptoms, abnormal neurological outcomes
	<i>Lactobacillus rhamnosus</i> GR-1	<u>Adult:</u> 1x10 ¹⁰ CFU per day in milk product for last two trimesters of pregnancy until birth	Prevents further increases in mercury and arsenic blood levels
	<i>Lactobacillus rhamnosus</i> GG	<u>Infant:</u> 1-6x10 ⁹ CFU for 6 weeks	Increases lactobacilli, but no decrease in pathogenic bacteria; colonization may depend on postnatal age and antibiotic use
<i>Lactobacillus rhamnosus</i> ATCC 53103	6x10 ⁹ CFU for 6 weeks	Reduces <i>Candida</i> colonization prevalence, abnormal neurological outcomes	
<i>Lactobacillus salivarius</i> CECT5713 or UBL S22	<u>Adult:</u> 2x10 ⁹ CFU per day for 4-6 weeks	Increases lactobacilli, defecation frequency; reduces coliforms, <i>E. coli</i>	

Condition or Use	Strain or Combination	Dosing & Administration	Outcomes
General Gastrointestinal Health	Single strain		
	Saccharomyces boulardii CNCM I-745	<u>Adult:</u> 500 mg twice per day for 14 days with amoxicillin-clavulanate	Reduces shifts in microbiota caused by antibiotics, AAD
	Saccharomyces boulardii	<u>Pediatric:</u> 5x10(9) CFU per day for 5 days	Reduces E. coli colonies; increases S. boulardii colonies
	Multistrain		
	B. longum BB536 & L. rhamnosus HN001	<u>Adult:</u> 8x10(9) CFU per day for 1 month	Reduces harmful bacteria; increases beneficial bacteria
	L. paracasei IMC 502 & L. rhamnosus IMC 501	<u>Adult:</u> >2x10(9) CFU per day in milk product for 12 weeks	Increases lactobacilli, bifidobacteria, stool frequency and volume
	L. rhamnosus LC705 & P. freudenreichii sus. shermanii JS	<u>Adult:</u> 4x10(10) CFU per day for 4 weeks	Increases lactobacilli, propionibacteria (negatively correlated with decrease in beta-glucosidase activity)
	B. bifidum W23, L. lactis W52, & Lc. lactis W58	<u>Infant:</u> 3x10(9) CFU per day for mothers during last 6 weeks of pregnancy and to infants during 1st year	Reduces incidence of eczema within first 2 years of life; increases diversity of Proteobacteria
	B. bifidum BF3, B. breve BR3, B. longum BG7, B. longum subs. infantis BT1	<u>Infant:</u> 1x10(7) CFU/g in formula for one year	Reduces Bacteroides and Blautia after 1 month

Condition or Use	Strain or Combination	Dosing & Administration	Outcomes
General Gastrointestinal Health	Multistrain		
	<i>B. breve</i> BB99, <i>L. rhamnosus</i> LC705, & <i>P. freudenreichii subs. shermanii</i> JS	<u>Infant:</u> 1.2x10(10) CFU per day to pregnant mothers at 35 weeks gestation until birth then to infants for 6 months	Increases bifidobacteria and lactobacilli especially in breastfed group; reduces Clostridia, Gammaproteobacteria; prevents cesarean-birth induced loss of bifidobacteria and increase in Enterococcaceae, Clostridiaceae and Veillonellaceae, prevents antibiotic-induced increases in Bacteroidaceae, Enterococcaceae and Enterobacteriaceae and the decline in Bifidobacteriaceae
	<i>B. lactis</i> BB-12, <i>L. acidophilus</i> LA-5, <i>L. delbrueckii subs bulgaricus</i> , & <i>S. thermophilus</i>	<u>Adult:</u> 1-2x10(10) CFU/100g in milk product per day for 4 weeks	Increases bifidobacteria, lactobacilli; reduces enterococci
	<i>B. animalis subs lactis</i> BL-04, <i>B. bifidum</i> BB-02, <i>L. acidophilus</i> LA-14, <i>L. casei</i> KE-99, <i>L. plantarum</i> CLP0611 & LP-115, & <i>L. salivarius</i> LS-33	<u>Adult:</u> 2x10(10) CFU per day for 60 days	Reduces <i>Citrobacter</i> , <i>Klebsiella</i> , and <i>Methanobrevibacter</i> (associated with reduced flatulence)
Gastrointestinal infection	Multistrain		
	<i>B. bifidum</i> , <i>B. longum</i> , & <i>L. gasseri</i>	<u>Athletes:</u> 3x10(12) CFU per day for 28 days	Reduces incidence of gastrointestinal episodes
Giardiasis	Single strain		
	<i>Saccharomyces boulardii</i>	<u>Adult:</u> 500 mg per day for 10 days with metronidazole	Reduces <i>Giardia lamblia</i> presence

Condition or Use	Strain or Combination	Dosing & Administration	Outcomes
H. pylori	Single strain		
	<i>Bifidobacterium animalis</i> subsp. <i>lactis</i> B94	<u>Adult:</u> 7x10(9) CFU per day with eradication therapy for 2 weeks	Increases eradication rates compared to standard therapy alone
	<i>Bifidobacterium infantis</i> 2036	<u>Adult:</u> 3x10(9) CFU twice per day for 2 weeks before triple therapy or adjunct	Increases eradication rates compared to triple therapy alone
	<i>Lactobacillus acidophilus</i> LB	<u>Adult:</u> 5x10(9) CFU (inactivated) twice per day with standard triple therapy treatment	Increases eradication rate more often than triple therapy alone
	<i>Lactobacillus casei</i> DG	<u>Adult:</u> 2.4x10(9) CFU per day with triple therapy for 1 week	Increases eradication rate compared to triple therapy alone
	<i>Lactobacillus casei</i> DG	1.6x10(10) CFU per day with 10 day quadruple therapy	Reduces therapy side effects
	<i>Lactobacillus gasseri</i> OLL2716	<u>Adult:</u> >1x10(9) CFU in milk product twice per day for 4 weeks with 1 week of triple therapy	Increases overall eradication rate
	<i>Lactobacillus johnsonii</i> LA1	<u>Adult:</u> 1x10(6)-1x10(7) CFU/g in 125g milk product, twice per day for 16 weeks	Reduces severity and activity of gastritis & H. pylori density in antrum; increases antrum and corpus mucus thickness
<i>Lactobacillus johnsonii</i> LA1	<u>Pediatric:</u> 1x10(7) CFU/ml in 80ml per day for 3 weeks	Increases H. pylori eradication rates and colonization	

Condition or Use	Strain or Combination	Dosing & Administration	Outcomes
H. pylori	Single strain		
	<i>Lactobacillus reuteri</i> DSMZ 17648 or ATCC 55730	<u>Adult:</u> 1-2x10 ⁽⁸⁾ CFU per day for 4 weeks	Reduces H. pylori load and dyspeptic symptoms
	<i>Lactobacillus reuteri</i> DSM 17938 and ATCC PTA 6475	1x10 ⁽⁸⁾ CFU per day in 10 day sequential triple therapy with antibiotics	Increases eradication rate compared with 7-day triple regimen + probiotics; reduces dyspeptic symptoms
	<i>Lactobacillus reuteri</i> ATCC 55730	<u>Pediatric:</u> 1x10 ⁽⁸⁾ CFU per day for 20 days with triple therapy	Reduces gastrointestinal symptom rating scale score during and after therapy
	<i>Saccharomyces boulardii</i>	<u>Adult:</u> 1000 mg per day for 2 weeks with standard triple therapy	Reduces incidence of triple therapy associated diarrhea, nausea, and taste disturbance during eradication; increases eradication rate
	Multistrain		
	<i>B. animalis subs. lactis</i> BB-12 & <i>L. rhamnosus</i> GG	<u>Adult:</u> 1x10 ⁽⁸⁻¹⁰⁾ CFU twice per day for 14 days with triple therapy	Increases cure rate; reduces epigastric pain, bloating, flatulence, taste disturbance, nausea, heartburn, diarrhea and average symptom intensity
	<i>B. animalis subs lactis</i> BB-12 & <i>L. acidophilus</i> LA-5	<u>Adult:</u> 1.3x10 ⁽¹⁰⁾ CFU twice per day in milk product for 6 weeks	Reduces H. pylori urease activity
	<i>L. delbrueckii</i> & <i>S. thermophilus</i>	<u>Adult:</u> >1x10 ⁽⁸⁾ CFU per day for 7 days followed by 7-day triple therapy	Increases eradication rate compared with triple therapy alone
<i>B. breve</i> BB99, <i>L. rhamnosus</i> GG & LC705, & <i>P. freudenreichii subs. shermanii</i> JS	<u>Adult:</u> 1x10 ⁽⁹⁾ CFU/ml in 65 ml milk during 7 day triple therapy twice per day and one per day for 3 weeks thereafter	Reduces triple therapy related symptoms	

Condition or Use	Strain or Combination	Dosing & Administration	Outcomes
H. pylori	Multistrain		
	<i>B. lactis</i> BB-12, <i>L. acidophilus</i> LA-5, <i>L. delbrueckii</i> subs. <i>bulgaricus</i> , & <i>S. thermophilus</i>	<u>Adult:</u> ≥2x10 ¹¹ CFU twice per day in milk product for 4 weeks with 1-week of quadruple therapy	Reduces H. pylori load; increases eradication rate compared with quadruple therapy alone
	<i>B. infantis</i> , <i>B. longum</i> , <i>L. acidophilus</i> , <i>L. casei</i> , <i>L. plantarum</i> , <i>L. reuteri</i> , <i>L. salivarius</i> , <i>L. sporogenes</i>	<u>Pediatric:</u> 3.8x10 ¹⁰ CFU per day with triple therapy for 7 days	Reduces epigastric pain, nausea, vomiting, and diarrhea frequencies compared with triple therapy alone
HIV	Single strain		
	<i>Bacillus coagulans</i> GBI-30, 6086	<u>Adult:</u> 2x10 ⁹ CFU per day for 3 months with antiretroviral therapy	Reduces constipation and total GI symptom rating; associated increases CD4+ T cells
	<i>Saccharomyces boulardii</i>	<u>Adult:</u> 3000 mg per day for 7 days	Reduces associated diarrhea
	Multistrain		
	<i>B. animalis</i> subs. <i>Lactis</i> BB-12, <i>L. acidophilus</i> LA-5, & <i>L. rhamnosus</i> GG	<u>Adult:</u> 5.25x10 ⁸ CFU per day in milk for 8 weeks using antiretroviral therapy	Reduces D-dimers, <i>Bacteroides</i> (positively correlated with LPS); increases <i>Bifidobacteria</i> (negatively correlated with LPS), <i>Lactobacilli</i>
<i>B. breve</i> , <i>B. infantis</i> , <i>B. longum</i> , <i>L. acidophilus</i> , <i>L. casei</i> , <i>L. delbrueckii</i> subs. <i>bulgaricus</i> <i>L. plantarum</i> , <i>S. faecium</i> & <i>S. thermophilus</i> (VSL#3®)	<u>Adult:</u> 3x10 ¹¹ CFU twice per day for 48 weeks with combined antiretroviral therapy	Reduces percentage of CD4+CD38+HLA-DR+ T cells, CD8+CD38+HLA-DR+ T cells, hsCRPs; normalizes LBP	

Condition or Use	Strain or Combination	Dosing & Administration	Outcomes
Infantile Colic	Single strain		
	<i>Lactobacillus reuteri</i> DSM 17938 or ATCC 55730	<u>Infant:</u> 1x10(8) CFU per day for 3-4 weeks	Increases treatment success in 2-3 weeks, frequency of defecation; decreases crying in breastfed infants, regurgitations;; improves parent satisfaction and maternal depression
	Multistrain		
	<i>B. lactis</i> BB-12 & <i>S. thermophilus</i>	<u>Infant:</u> 1x10(6-7) CFU/g in milk or formula for 7 months (ave.)	Reduces incidence of colic or irritability, need for antibiotics
Inflammatory Bowel Disease	<i>B. breve</i> DSM 24732, <i>B. infantis</i> DSM 24737, <i>B. longum</i> DSM 24736, <i>L. acidophilus</i> DSM 24735, <i>L. delbrueckii subs. bulgaricus</i> DSM 24734, <i>L. paracasei</i> DSM 24733, <i>L. plantarum</i> DSM 24730	<u>Infant:</u> 5x10(9) CFU per day for 3 weeks	Reduces crying time
	Single strain		
	<i>Escherichia coli</i> Nissle 1917	<u>Adult:</u> Two caps containing 2.5-25x10(9) CFU three times per day for 12 months (begin with 4-day loading period with half-doses)	Prevents UC relapse, as effective as mesalazine therapy As effective as mesalazine for remission and reducing relapse and complications in IBD
<i>Saccharomyces boulardii</i>	<u>Adult:</u> 750-1000 mg per day for 7 weeks- 6 months with mesalamine	Reduces incidence of Crohn's disease relapse, IBD clinical activity; increases remission of dyspepsia symptoms, clinical remission of ulcerative colitis; improves intestinal permeability in Crohn's	

Condition or Use	Strain or Combination	Dosing & Administration	Outcomes
Inflammatory Bowel Disease	Multistrain		
	<i>B. lactis</i> BB-12 & <i>L. acidophilus</i> LA-5	<u>Adult:</u> 2.5x10(7) CFU per day in milk product	Increases lactobacilli, bifidobacteria, and bacteroides
Intestinal-borne Dermatoses	Single strain		
	<i>Escherichia coli</i> Nissle 1917	<u>Adult:</u> 2.5-25x10(9) CFU twice per day for 1 month (begin with 4-day loading period with half-doses)	Reduces acne, papular-pustular rosacea and seborrheic dermatitis, serum IL-8, pathogenic flora; increases QoL, serum IgA, bifidobacteria, lactobacteria; normalizes stool consistency, color, smell
Intestinal Permeability	Single strain		
	<i>Bifidobacterium lactis</i>	<u>Infant:</u> 2x10(7) CFU/g in formula for 30 days	Increases bifidobacteria, head growth; reduces lactulose:mannitol ratio (gut permeability)
	<i>Lactobacillus plantarum</i> TIFN101	<u>Adult:</u> 5.9x10(10) CFU per day for 7 days	Increases intrinsic repair via mucosal gene transcription, permeability in presence of NSAID induced stress
	<i>Lactobacillus plantarum</i> 229v	1x10(10) CFU per day for 7 days	Decreases lactulose:mannitol ratio (gut permeability) after biliary drainage (120), and with enteral feeding during acute pancreatitis
	<i>Streptococcus thermophilus</i> DSM 25246	<u>Adult:</u> 1x10(9) CFU per day with 250 mg tara gum for 30 days	Increases exopolysaccharides; Reduces small intestine and colonic permeability
	Multistrain		
	<i>L. reuteri</i> DSM 12246 & <i>L. rhamnosus</i> 19070-2	<u>Pediatric:</u> 2x10(10) CFU twice per day for 6 weeks	Decreases lactulose:mannitol ratio (gut permeability), GI symptoms
<i>B. longum</i> BL-88, <i>L. acidophilus</i> LA-11, & <i>L. plantarum</i> CGMCC No. 1258	<u>Adult:</u> 2.6x10(14) CFU per day for 6 days pre-colorectal surgery and 10 days post-surgery	Improves gut barrier function; decreases surgical infection complications	

Condition or Use	Strain or Combination	Dosing & Administration	Outcomes
Intestinal Permeability	Multistrain		
	B. bifidum W23, B. lactis W51 & W52, L. acidophilus W37, L. brevis W63, L. casei W56, L. salivarius W24, & Lc. lactis W19	<u>Adult:</u> 1x10(10) CFU twice per day for 12 weeks	Improves intestinal permeability and cardiometabolic parameters
Irritable Bowel Syndrome	Single strain		
	Bacillus coagulans MTCC 5856 or GBI-30, 6086	<u>Adult:</u> 2x10(9) CFU per day for 90 days with standard care	Reduces bloating, vomiting, diarrhea, abdominal pain, stool frequency, disease severity; increases QoL
	Bifidobacterium animalis subsp. lactis DN-173 010	<u>Adult:</u> 1.25x10(10) CFU in milk product twice per day for 2-6 weeks	Reduces overall symptom severity, max distension, orocaecal and colonic transit times, QoL discomfort and bloating scores in three weeks; increases stool frequency in px with < 3 defecations/week
	Bifidobacterium animalis subsp. Lactis B94	<u>Pediatric:</u> 5x10(9) CFU twice per day with or without 900mg inulin for 4 weeks	Improves belching-abdomen fullness, bloating, constipation and fecal mucus
	Bifidobacterium bifidum MIMBB75	<u>Adult:</u> 1x10(9) CFU per day for 4 weeks	Reduces global, pain/discomfort, distension/bloating, urgency and digestive disorder; increases QoL
	Bifidobacterium infantis 35624	<u>Adult:</u> 1x10(8-10) CFU per day for 4-8 weeks	Reduces abdominal pain, bloating, bowel dysfunction, incomplete evacuation and passage of gas; normalizes IL-10-IL-12 ratio
Escherichia coli Nissle 1917	<u>Adult:</u> 2.5-25x10(9) CFU twice per day for 12 weeks (begin with 4-day loading period with half-doses)	Therapeutic response after 11 weeks, especially in px with gastroenteritis or previous antibiotic treatment	

Condition or Use	Strain or Combination	Dosing & Administration	Outcomes
Irritable Bowel Syndrome	Single strain		
	<i>Lactobacillus acidophilus</i> NCFM	<u>Adult:</u> 1x10 ⁹⁻¹⁰ CFU per day for 12 weeks	Reduces moderate to severe abdominal pain or discomfort
	<i>Lactobacillus plantarum</i> 299V	<u>Adult:</u> 2x10 ¹⁰ CFU per day for 4 weeks	Reduces pain severity and frequency, bloating, and all IBS symptoms score
	<i>Saccharomyces boulardii</i>	<u>Adult:</u> 500-750 mg per day for 4-6 weeks	Improves QoL, lymphocyte and neutrophil infiltrates, epithelial mitosis, intraepithelial lymphocytes; reduces IL-8, TNF- α ; increases IL-10, IL-10:IL-12 ratio
	<i>Saccharomyces cerevisiae</i> CNCM I-3856	<u>Adult:</u> 500-1000 mg per day for 8-12 weeks	Reduces pain/discomfort, bloating during 2nd month; improves stool consistency
	Multistrain		
	<i>B. lactis</i> BI-07 & <i>L. acidophilus</i> NCFM	<u>Adult:</u> 2x10 ¹¹ CFU twice per day for 8 weeks	Reduces bloating
	<i>B. breve</i> BR-03 & <i>L. plantarum</i> LP-01	<u>Adult:</u> 5x10 ⁹ CFU/g per day for 4 weeks	Reduces pain and severity after 14 days
	<i>L. acidophilus</i> LA-02 & <i>L. plantarum</i> LP-01	<u>Adult:</u> 5x10 ⁹ CFU/g per day for 4 weeks	Reduces pain and severity after 14 days
	<i>L. plantarum</i> CECT7484 & CECT7485, & <i>P. acidilactici</i> CECT7483	<u>Adult:</u> 1-6x10 ⁹⁻¹⁰ CFU per day for 6 weeks	Increases QoL; reduces gut anxiety
<i>B. bifidum</i> NCIMB 30153, <i>B. lactis</i> NCIMB 30172, & <i>L. acidophilus</i> NCIMB 30157 & NCIMB 30156	<u>Adult:</u> 2.5x10 ¹⁰ CFU per day for 8 weeks	Reduces symptom severity; improves QoL, days with pain and bowel habit scores	

Condition or Use	Strain or Combination	Dosing & Administration	Outcomes
Irritable Bowel Syndrome	Multistrain		
	<i>B. breve</i> M-16V, <i>B. infantis</i> M-63 & <i>B. longum</i> BB536	<u>Pediatric:</u> 3x10(9) CFU per day for 6 weeks	Reduces abdominal pain frequency (and resolves); increases QoL
	<i>B. breve</i> BB99, <i>L. rhamnosus</i> GG & LC705, & <i>P. freudenreichii</i> subs. <i>shermanii</i> JS	<u>Adult:</u> 8-9x10(9) CFU per day for 6 months	Reduces total symptom score and borborygmi score, <i>Ruminococcus torques</i>
	<i>L. acidophilus</i> CL1285, <i>L. casei</i> LBC80R, & <i>L. rhamnosus</i> CLR2	<u>Adult:</u> 5x10(10) CFU per day for 12 weeks	Improves days of pain, distension, stool consistency and frequency, QoL scores
	<i>B. animalis</i> subs. <i>lactis</i> BB-12, <i>L. acidophilus</i> LA-5, <i>L. delbrueckii</i> subs. <i>Bulgaricus</i> LBY-27, & <i>S. thermophilus</i> STY-31	<u>Adult:</u> 4x10(9) CFU twice per day for 4 weeks	Increases relief rates; reduces bloating and pain
	<i>L. acidophilus</i> NCIMB 30175, <i>L. plantarum</i> NCIMB 30173, <i>L. rhamnosus</i> NCIMB 30174 & <i>E. faecium</i> NCIMB 30176	<u>Adult:</u> 1x10(10) CFU/50ml (admin. 1ml/kg) per day for 12 weeks	Reduces symptom severity
	<i>B. bifidum</i> KCTC 12 199BP, <i>B. longum</i> KCTC 12 200BP, <i>B. animalis</i> subs. <i>lactis</i> KCTC 11 904BP, <i>L. acidophilus</i> KCTC 11 906BP, <i>L. rhamnosus</i> KCTC 12 202BP, & <i>S. thermophilus</i> KCTC 11 870BP	<u>Adult:</u> 5x10(9) CFU once or twice per day for 4 weeks	Reduces discomfort, abdominal pain intensity, bloating; improves stool consistency, global relief of IBS symptoms

Condition or Use	Strain or Combination	Dosing & Administration	Outcomes
Irritable Bowel Syndrome	Multistrain		
	<i>B. breve</i> , <i>B. lactis</i> , <i>B. longum</i> , <i>L. acidophilus</i> , <i>L. plantarum</i> , <i>L. rhamnosus</i> , & <i>S. thermophilus</i>	<u>Adult:</u> 1x10(10) CFU per day for 8 weeks	Improves relief, treatment responsiveness, stool consistency
	<i>B. breve</i> , <i>B. infantis</i> , <i>B. longum</i> , <i>L. acidophilus</i> , <i>L. delbrueckii subs. bulgaricus</i> , <i>L. paracasei</i> , <i>L. plantarum</i> , & <i>S. thermophilus</i> (VSL#3®)	<u>Adult:</u> 4.5x10(11) CFU twice per day for 8 weeks <u>Pediatric:</u> 4.5x10(11) CFU per day for ages 4-11, or twice per day for ages 12-18 for 6 weeks	Reduces flatulence, colonic transit times, and bloating Increases relief of symptoms; improves abdominal pain/discomfort, bloating/flatulence, assessment of life disruption (QoL)
	<i>B. breve</i> PXN 25, <i>B. bifidum</i> PXN 23, <i>B. infantis</i> PXN 27, <i>B. longum</i> PXN 30, <i>Bc. subtilis</i> PXN 21, <i>L. acidophilus</i> PXN 35, <i>L. casei</i> PXN 37, <i>L. delbrueckii subs. Bulgaricus</i> PXN39, <i>L. helveticus</i> PXN 45, <i>L. plantarum</i> PXN 47, <i>L. rhamnosus</i> PXN 54, <i>L. salivarius</i> PXN 57, <i>Lc. lactis</i> PXN 63, & <i>S. thermophilus</i> PXN 66	<u>Adult:</u> 4x10(9) CFU twice per day for 16 weeks	Reduces abdominal pain severity, proportion of moderate-to-severe symptoms, frequency of bowel movements after 2 months, QoL score
Laxative	Single strain		
	<i>Bifidobacterium animalis</i> subsp. <i>Lactis</i> DN-173 010	<u>Adult & Geriatric:</u> 5x10(7-8) CFU/g in 125g milk product 2-3 times day for 10-14 days	Reduces total, colonic, sigmoid and oro-fecal transit times

Condition or Use	Strain or Combination	Dosing & Administration	Outcomes
Necrotizing Enterocolitis	Multistrain		
	<i>B. bifidum</i> NCDO 1453 & <i>L. acidophilus</i> NCDO 1748	<u>Infant:</u> 2x10 ⁹ CFU at 125mg/kg twice per day in breast milk or breast milk-formula for 6 weeks	Reduces incidence of NEC \geq stage 2 and death
	<i>B. breve</i> & <i>L. casei</i>	<u>Infant:</u> 3.5x10 ⁷⁻⁹ CFU in milk per day for 28 days	Reduces incidence of NEC; increases intestinal motility
	<i>B. infantis</i> & <i>L. rhamnosus</i> GG	<u>Infant:</u> 1x10 ⁹ CFU per day for 1 month	Reduces incidence of NEC and severity in infants born to HIV-positive women
	<i>B. infantis</i> & <i>L. acidophilus</i>	<u>Infant:</u> 5x10 ⁸ CFU per day for 1 year	Reduces incidence of NEC and death
	<i>B. lactis</i> & <i>L. acidophilus</i>	<u>Infant:</u> 2x10 ¹⁰ CFU per day to lactating mothers after birth	Reduces incidence of necrotizing enterocolitis in very-low birthweight infants
NSAID-induced Intestinal Inflammation	Multistrain		
<i>B. breve</i> , <i>B. infantis</i> , <i>B. longum</i> , <i>L. acidophilus</i> , <i>L. delbrueckii</i> subs. <i>bulgaricus</i> , <i>L. paracasei</i> , <i>L. plantarum</i> , & <i>S. thermophilus</i> (VSL#3®)	<u>Adult:</u> 9x10 ¹¹ CFU per day for 21 days (indomethacin admin on day 16-19)	Reduces fecal calprotectin levels	
Preterm Sepsis	Single strain		
<i>Lactobacillus reuteri</i> DSM 17938	<u>Infant:</u> 1x10 ⁸ CFU per day from first feeding until discharge	Reduces incidence of sepsis, feeding intolerance and days at hospital	

Condition or Use	Strain or Combination	Dosing & Administration	Outcomes
Proton Pump Inhibitor-induced Bowel Symptoms	Single strain		
	<i>Lactobacillus paracasei</i> F19	<u>Adult:</u> 2.5x10(10) CFU twice per day for 3 days/week for 6 months	Prevents PPI-induced bowel symptoms
SIBO	Single strain		
	<i>Lactobacillus casei</i> DG	<u>Adult:</u> 2.4x10(10) CFU for 7 days after a one week per month Rifaximin treatment over 6 months	Reduces diffuse abdominal pain, pain in left iliac area, meteorism, flatulence, and nausea
Stress-associated GI Distress	Single strain		
	<i>Bifidobacterium bifidum</i> R0071	<u>Adult:</u> 3x10(9) CFU per day for 6 weeks	Reduces diarrhea-related symptoms and stress
	Multistrain		
	<i>B. longum</i> Rosell-175 & <i>L. acidophilus</i> Rosell-52	<u>Adult:</u> 3x10(9) CFU per day for 3 weeks	Reduces abdominal pain and nausea/vomiting
Traveler's Diarrhea	Single strain		
	<i>Saccharomyces boulardii</i>	<u>Adult:</u> 250-1000 mg per day for 3 weeks/ duration of trip	Prevents traveler's diarrhea

Condition or Use	Strain or Combination	Dosing & Administration	Outcomes
Ulcerative Colitis	Single strain		
	<i>Bifidobacterium infantis</i> 35624	<u>Adult:</u> 1x10(10) CFU per day for 6 weeks	Reduces CRP & IL-6
	<i>Bifidobacterium longum</i> BB536	<u>Adult:</u> 2-3x10(11) CFU per day for 8 weeks	Reduces disease activity, EI and Mayo scores; improves QoL score for emotional function
	<i>Lactobacillus plantarum</i> 299v	<u>Adult:</u> >10(8) CFU twice per day for 24 weeks	Reduces colitis activity and induces remission
	<i>Lactobacillus reuteri</i> ATCC 55730	<u>Pediatric:</u> 1x10(10) CFU rectally per day for 8 weeks with oral mesalazine	Reduces Mayo, histological scores, mucosal expression of IL-1 β , TNF- α , IL-8; increases mucosal expression of IL-10
	<i>Lactobacillus rhamnosus</i> GG	<u>Adult:</u> 1.8x10(10) CFU per day for 12 months	As effective as mesalazine in relapse rate after 6 and 12 months, but more effective in increasing time to relapse
	Multistrain		
	<i>B. lactis</i> BB-12 & <i>L. acidophilus</i> LA-5	<u>Adult:</u> 2x10(8) CFU/ml in 500 ml milk product for 4 week	Increases lactobacilli, bifidobacteria; reduces involuntary defecation, leakage, abdominal cramps, fecal number and consistency, mucus and urge to evacuate stool, endoscopic inflammation score in px with ileal-pouch-anal-anastomosis Reduces fecal leakage, abdominal cramps in px with familial adenomatous polyposis
	<i>L. delbrueckii</i> subs. <i>bulgaricus</i> & <i>L. fermentum</i>	<u>Adult:</u> 1x10(10) CFU per day for 8 weeks with sulfasalazine	Reduces colonic IL-6, calprotectin, leukocyte recruitment, activity of MPO, expression of TNF- α , NF- κ B p65
	<i>B. bifidum</i> Yakult, <i>B. breve</i> Yakult, & <i>L. acidophilus</i>	<u>Adult:</u> 1x10(10) CFU per day in milk product for 12 weeks with salazosulfapyridine or 5-ASA	Reduces clinical activity index, endoscopic activity index, histological score; increases fecal butyrate, propionate and SCFA

Condition or Use	Strain or Combination	Dosing & Administration	Outcomes
Ulcerative Colitis	Multistrain <i>B. breve</i> , <i>B. infantis</i> , <i>B. longum</i> , <i>L. acidophilus</i> , <i>L. delbrueckii subs. bulgaricus</i> , <i>L. paracasei</i> , <i>L. plantarum</i> , & <i>S. thermophilus</i> (VSL#3®)	<u>Adult:</u> 9x10(11) CFU per day for 1 year	Reduces disease activity, IL-1 β expression; increases mucosal CD4+CD25high and CD4+ LAP-positive cells, Foxp3 expression in px with ileal pouch–anal anastomosis
		3.6x10(12) CFU twice per day for 12 weeks	Reduces disease activity and symptoms after 6 weeks; Increases remission rates after 12 weeks
		1.5x10(12) CFU twice per day for 12 months in px intolerant to mesalamine	Increases and maintains intestinal <i>S. thermophilus</i> , lactobacilli, bifido bacteria concentrations after 20 days and may assist in remission maintenance
		9x10(11) CFU per day for 8 weeks with balsalazide	Increases remission rates and remission speed compared to balsalazide or mesalazine alone
		4.5x10(11) CFU twice per day for 3 months in px with arthralgia	Prevents intestinal disease relapse; improves Ritchie Articular Index (pain)
		3.6x10(12) CFU twice per day for 8 weeks with 5-ASA and/or azathioprine, mercaptopurine, or prednisolone	Reduces disease activity, rectal bleeding, IL-12p40, dendritic cell toll-like receptor expression; increases remission rates, IL-10
		<u>Pediatric:</u> 4.5-1.8x10(11-12) CFU per day with steroid induction and mesalamine	Increases remission rates compared with IBD therapy alone; reduces relapse rates after one year

Safety Considerations & Contraindications

While probiotics are considered safe, rare short term side effects, such as gas and bloating, may occur. Isolated cases of bacteremia or fungemia have been associated with probiotics, though population data also indicates that there is no widespread risk of these complications.

There is some limited evidence that probiotics should not be administered in critically ill patients, as demonstrated by an increased risk of mesenteric ischemia and mortality in a trial of patients with predicted severe acute pancreatitis.

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