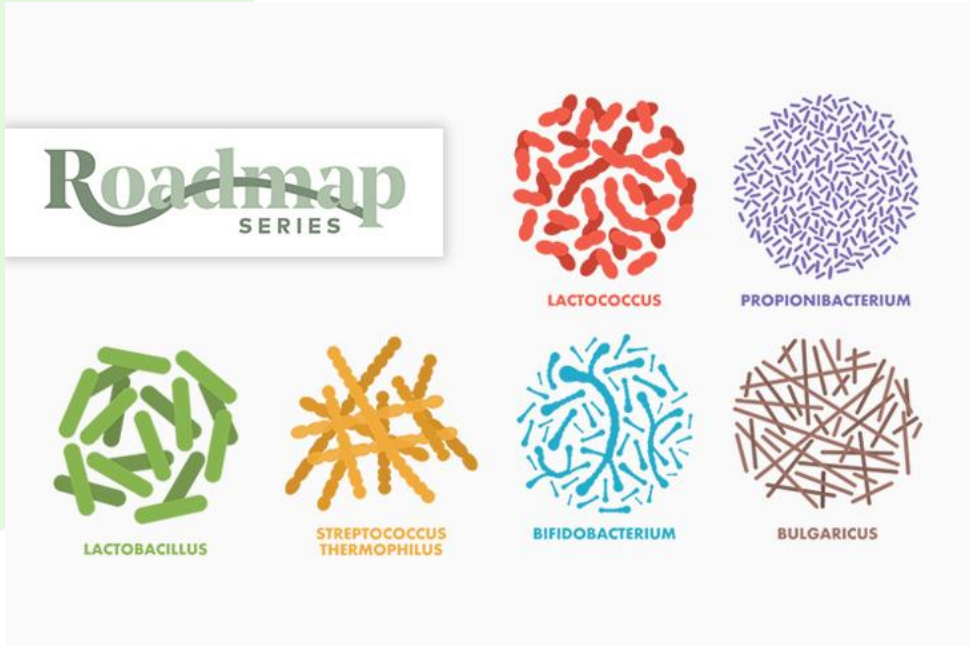
The Roadmap Series



Mapping How to Use Probiotics

Tanya Borowski

Head of Education

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Probiotic History

"It can only be a matter of time, we shall obtain exact information on the influence of diets, which prevent intestinal putrefaction, prolong life and maintain the body's forces,"
"The indigested food and feces in the intestine are responsible for the production of toxins and shorten human's life," Metchnikoff(1907)

Table 1. History of probiotics—discoveries and highlights.

PMID: 33266303

Period	Discoveries and Highlights
1857–1864	Pasteur discovered LAB as spoilage organisms
1878	LAB isolated from milk by Lister
1889	Tissier described *Bifidobacterium*
1907	Metchnikoff describes Bulgarian *Bacillus* associated with health
1900	*Bacillus acidophilus* described by Moro
1930	The commercialization of fermented milk-based on *Lactobacillus casei* isolate by Shirota
1953	The use of the term 'probiotika' referring to active compounds promoting health
1965	Definition of probiotics by Lilly and Stillwell: "Microbes stimulating growth of other microorganisms"
1989	Definition of probiotics by Fuller: "Beneficial microbial supplements"
2001	FAO/WHO: Definition of probiotics
2003	Era of Genomics: First genome sequencing of the probiotic *Lactobacillus plantarum*
2005	Relman and the use of high-throughput 16S amplicon sequencing to catalogue gut microbiome
2016	FDA/CBER guidelines for live biotherapeutics

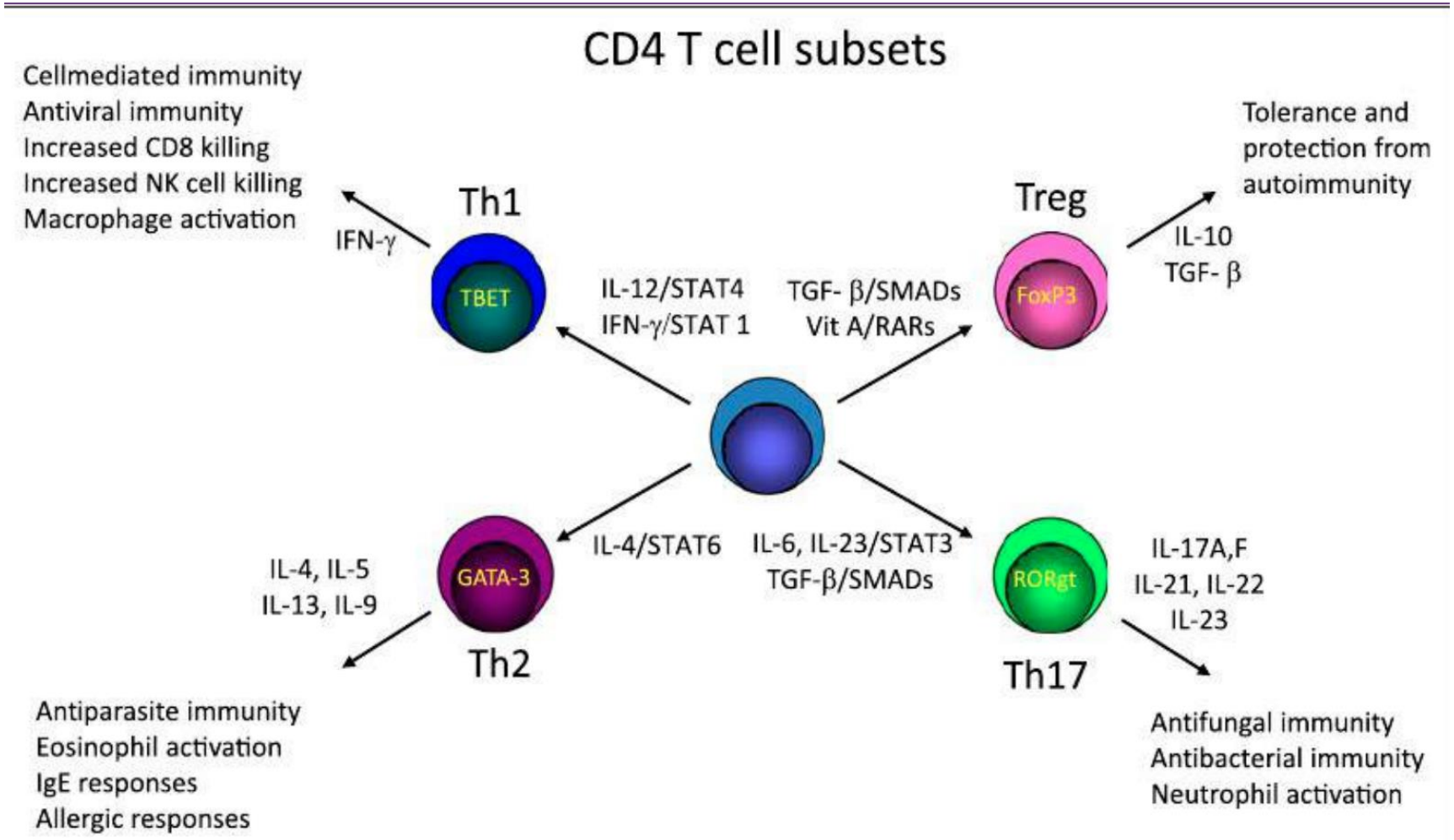
FAO: Food and Agriculture Organization; WHO: World Health Organization; FDA: Food and Drug Administration; CBER: Center for Biologics Evaluation and Research.

TABLE 1. History and Origin of Some Fermented Foods

History of Some Fermented Foods

Food Origin	Approximate Year of Introduction	Region
Mushrooms	4000 BC	China
Soy sauce	3000 BC	China, Korea, Japan
Wine	3000 BC	North Africa, Europe, Middle East
Fermented milk	10,000 BC	Middle East
Fermented milk products	7000-5000 BC	Egypt, Greece, Italy
Fermented rice	2000 BC	China, Asia
Fermented honey (mead)	2000 BC	North Africa, Middle East
Cheese	2000 BC	Middle East, China
Fermented malted cereals: beer	2000 BC	North Africa, China, Middle East
Bread	1500 BC	Egypt, Europe
Fermented meats	1500 BC	Middle East
Sourdough bread	1000 BC	Europe
Fish sauce	1000 BC	Southeast Asia, North Africa
Garum (from fish guts)	400 BC	Greece, Italy (Rome)
Pickled vegetables	1000 BC	China, Europe
Tea	200 BC	China

Based on immunology



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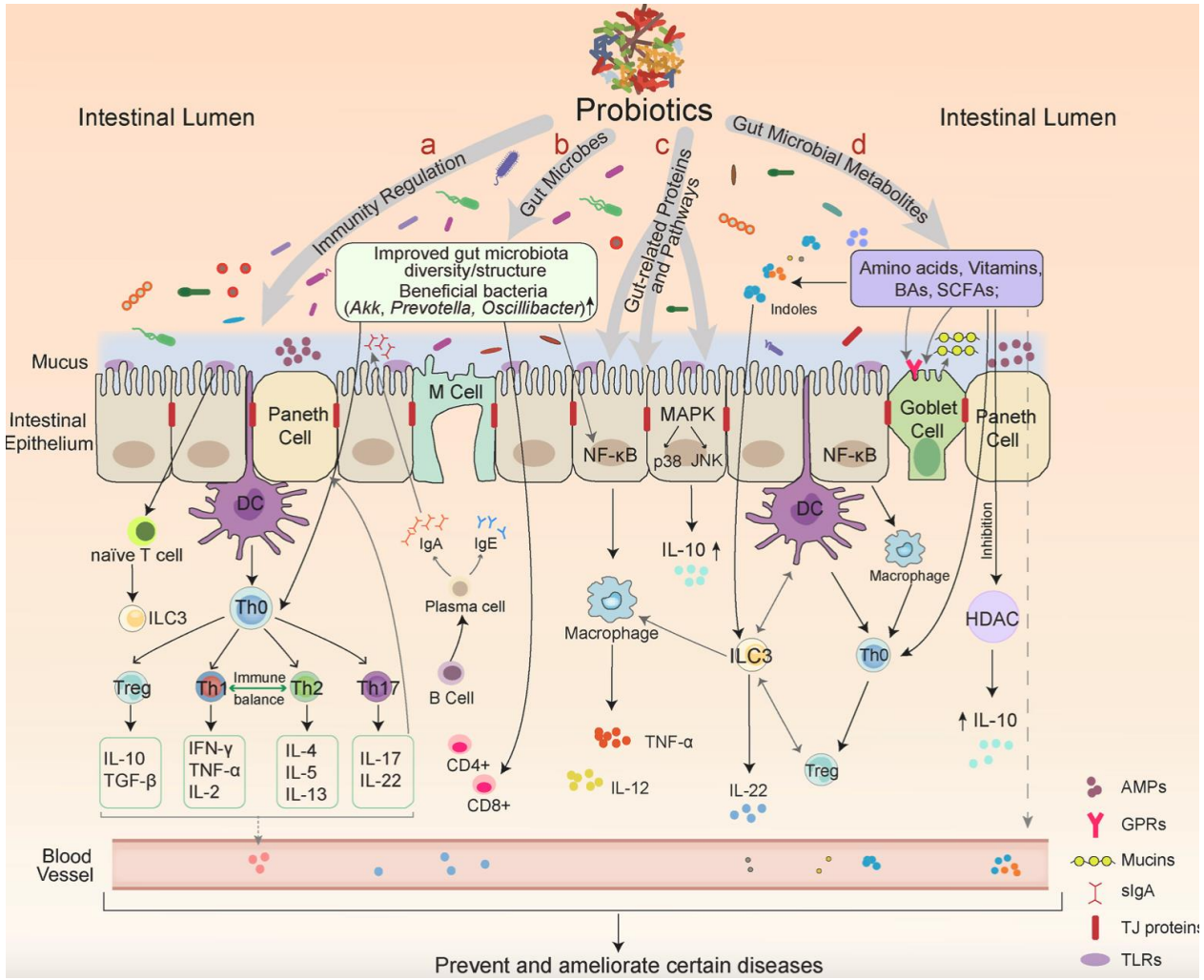
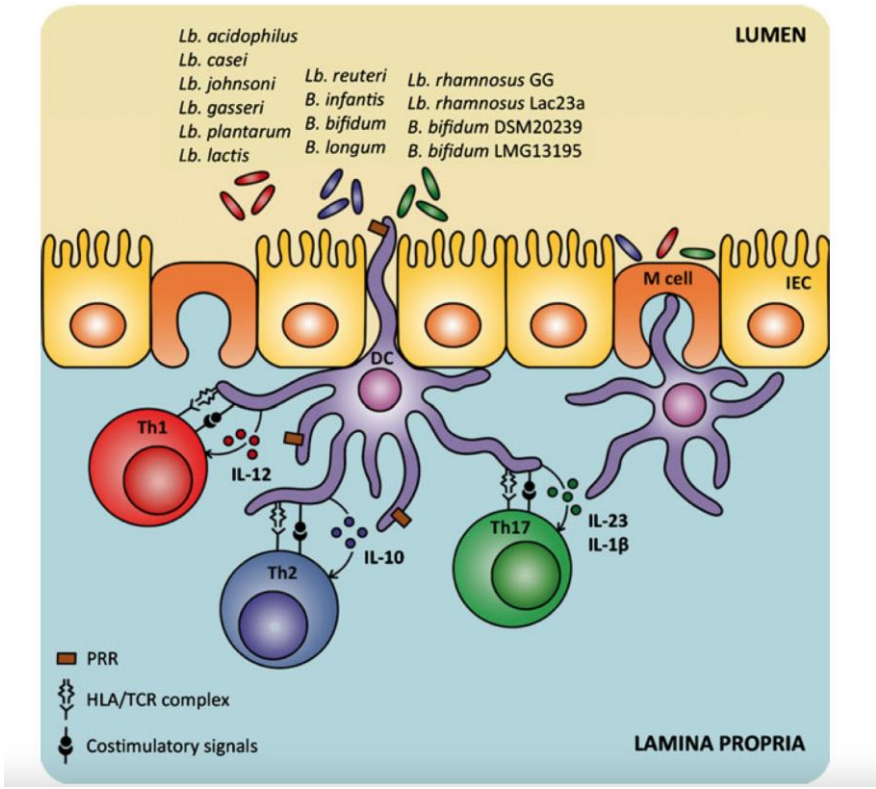
Based on immunology





https://doi.org/10.1016/j.tifs.2023.06.013

Viral infections

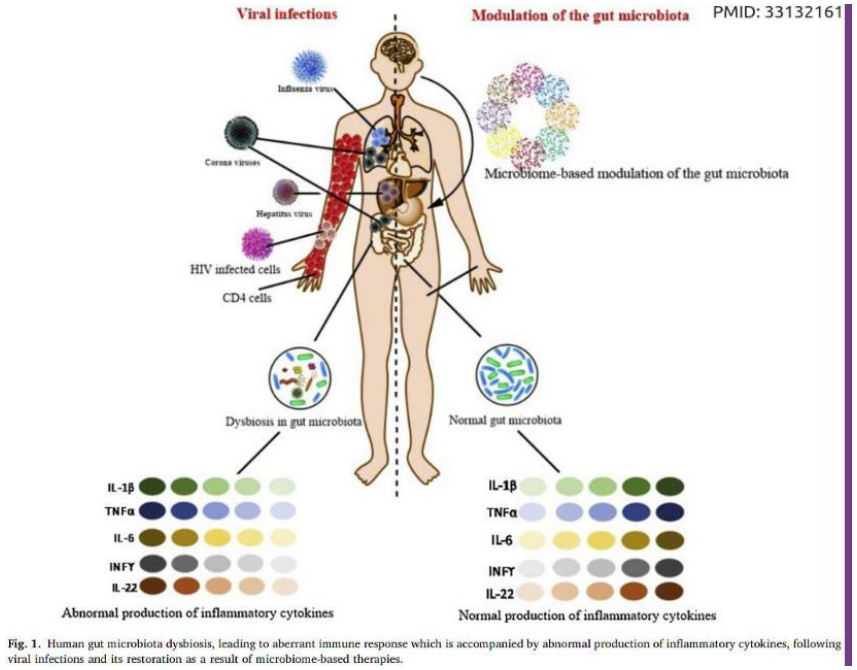
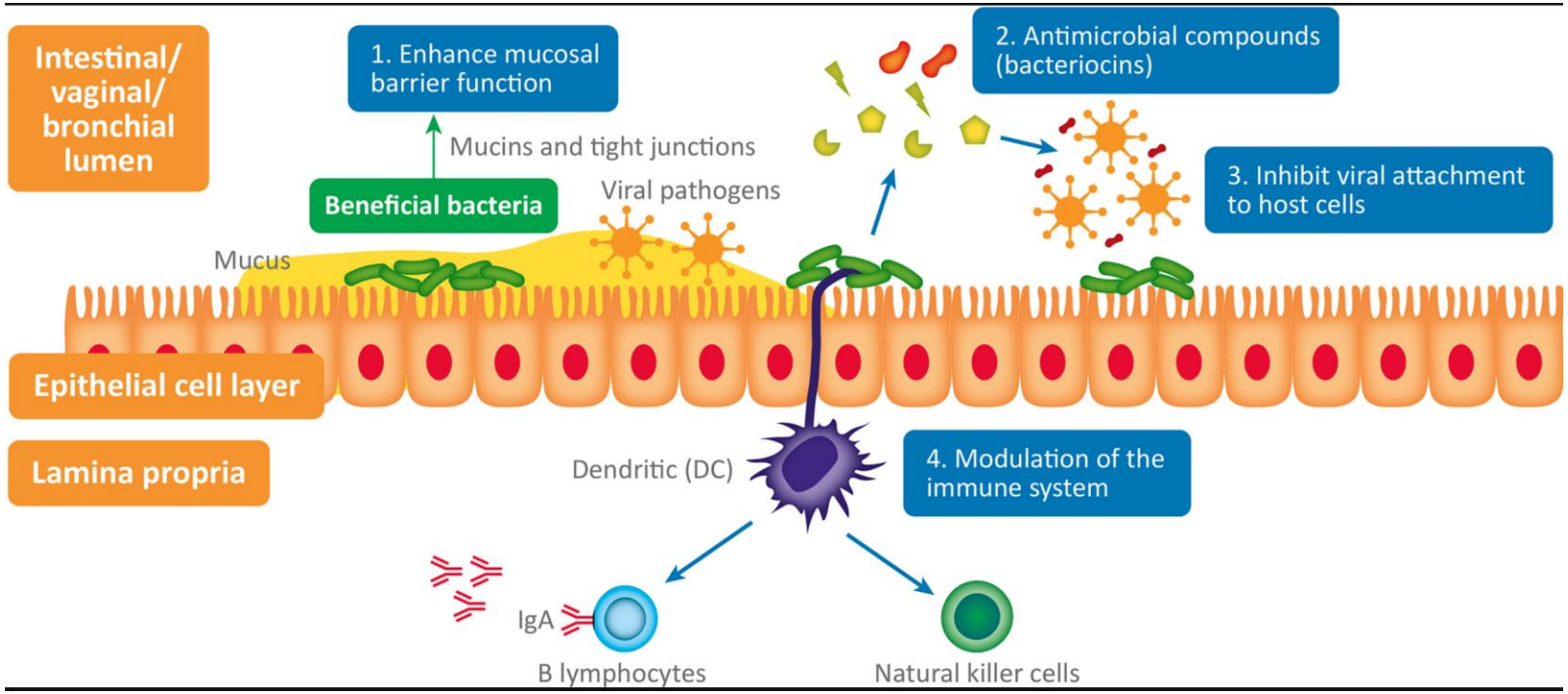


Fig. 1. Human gut microbiota dysbiosis, leading to aberrant immune response which is accompanied by abnormal production of inflammatory cytokines, following viral infections and its restoration as a result of microbiome-based therapies.



Gut Brain

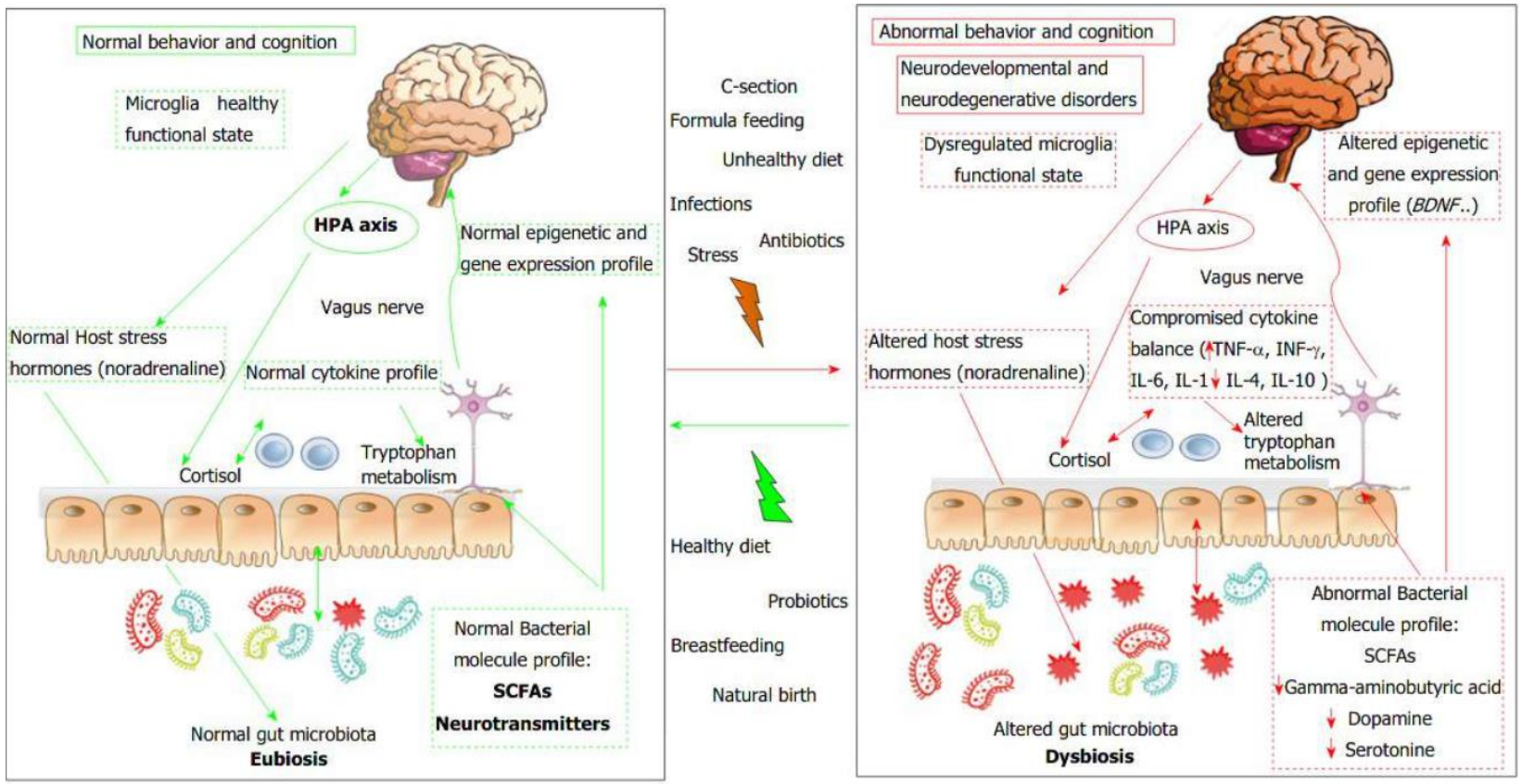


Figure 1 Schematic representation of the mechanisms involved in the relationship between microbiota and brain development and function: Cytokine balance and microglia activation (immune pathway), cortisol (endocrine pathway) and vagus and enteric nervous system (neural pathway). The axis plays an important role in homeostasis and has been linked to several disorders. Altered gut microbiota composition enhances the risk of neurodevelopmental and neurodegenerative disorders possibly from microbiota-derived products such as small chain fatty acids and neurotransmitters. HPA: Hypothalamic-pituitary-adrenal.

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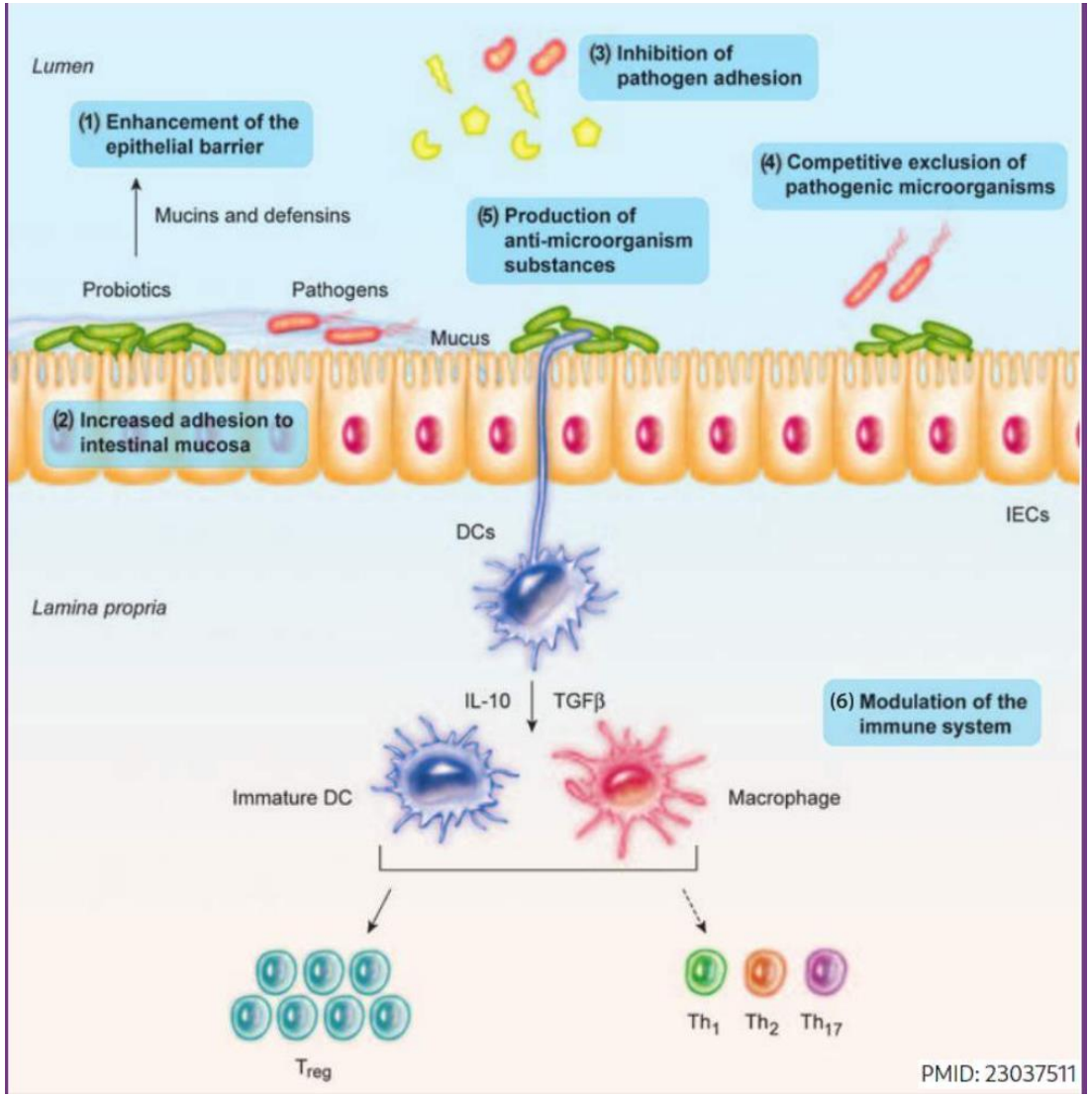
Using probiotics



Using probiotics

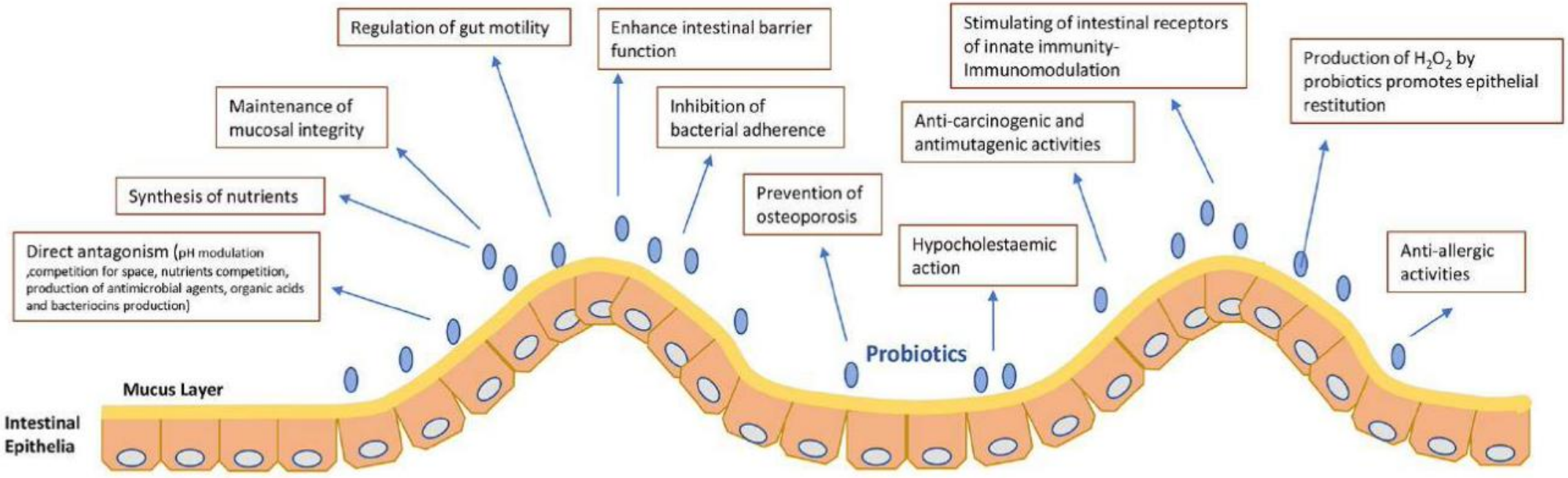


FIGURE 1 | Mechanisms of action and properties of probiotics.

Using probiotics

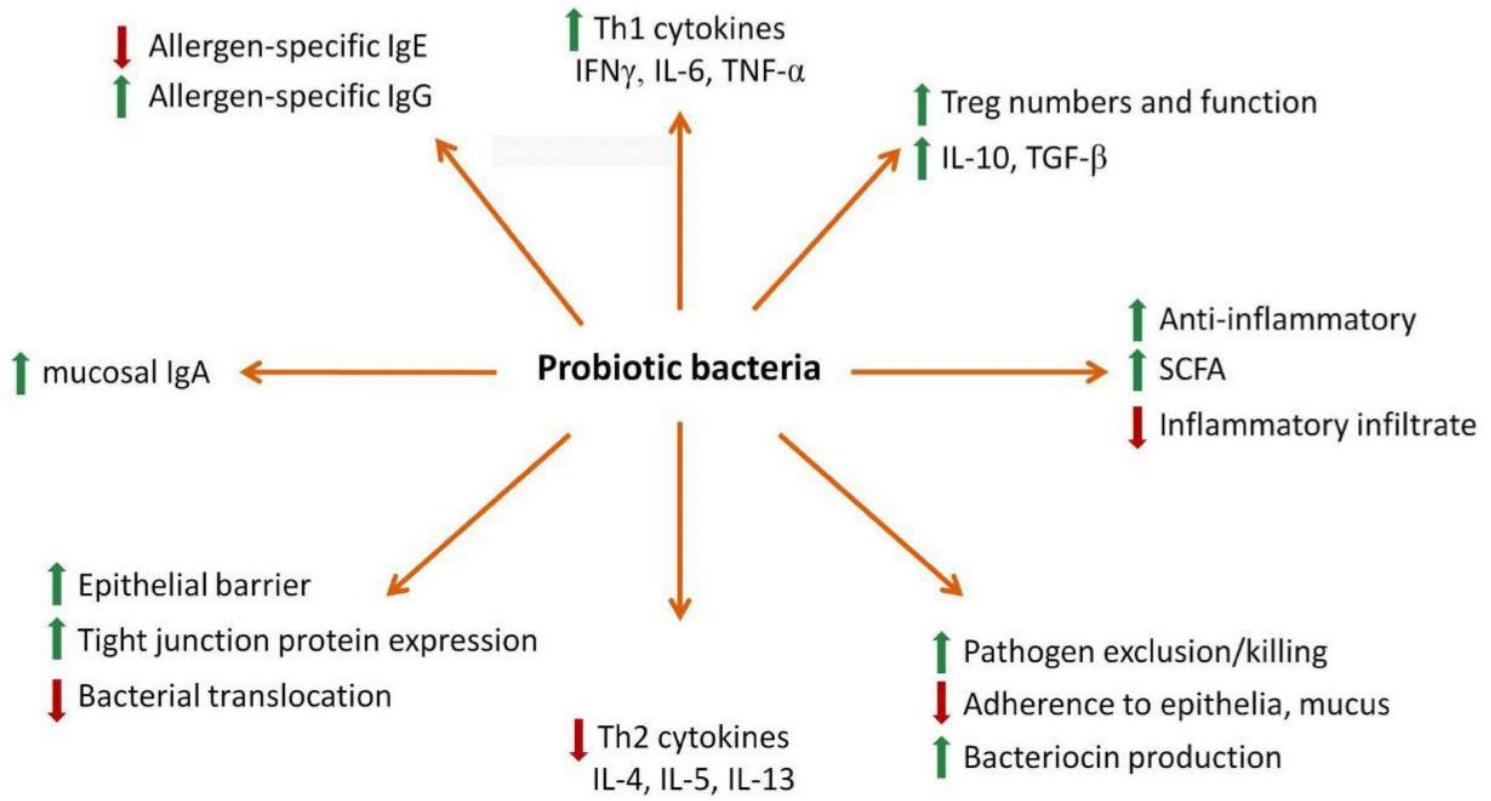
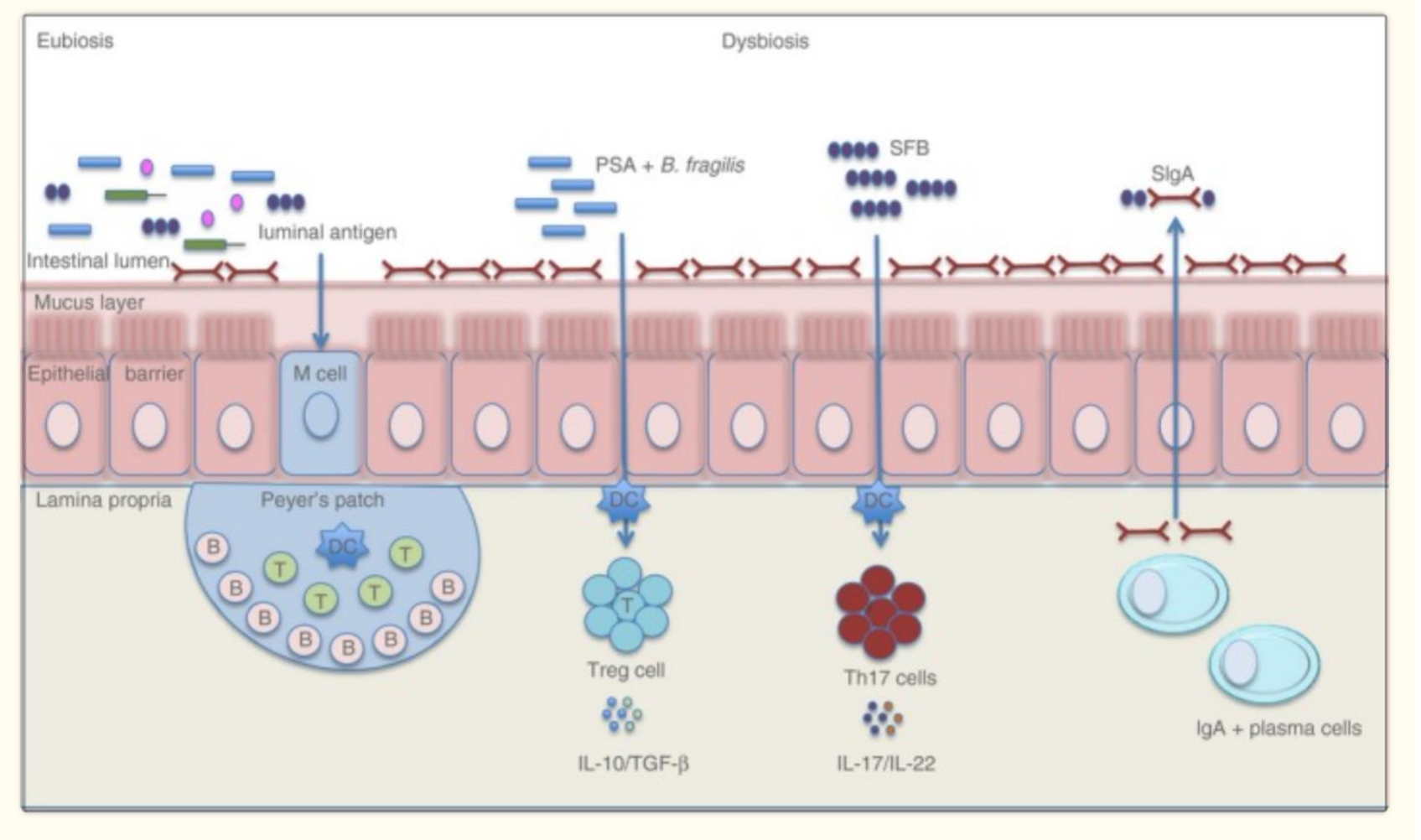


FIGURE 1 | A summary of probiotic biological effects.

PMID: 23049509

Autoimmunity



https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5543467/

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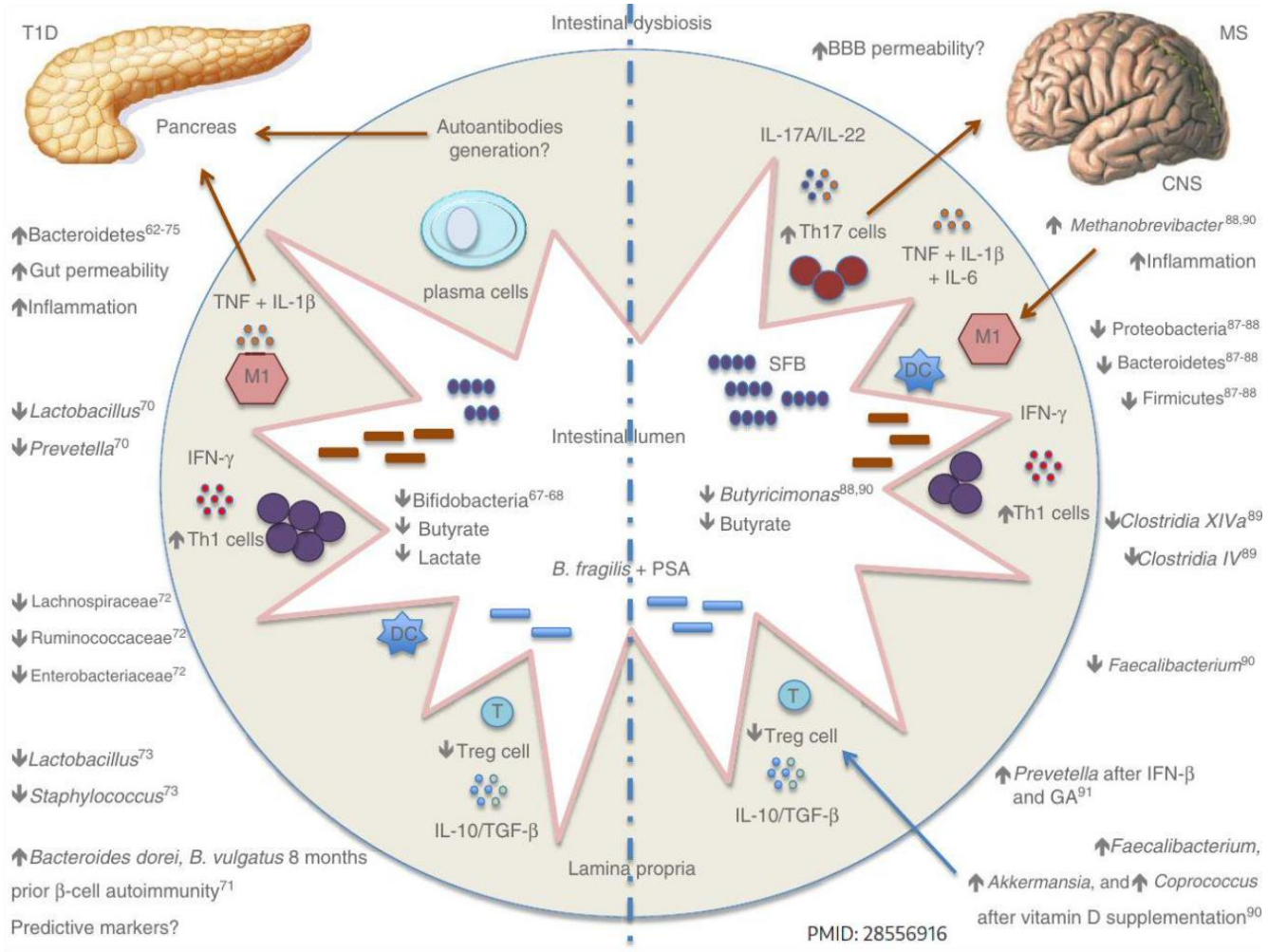
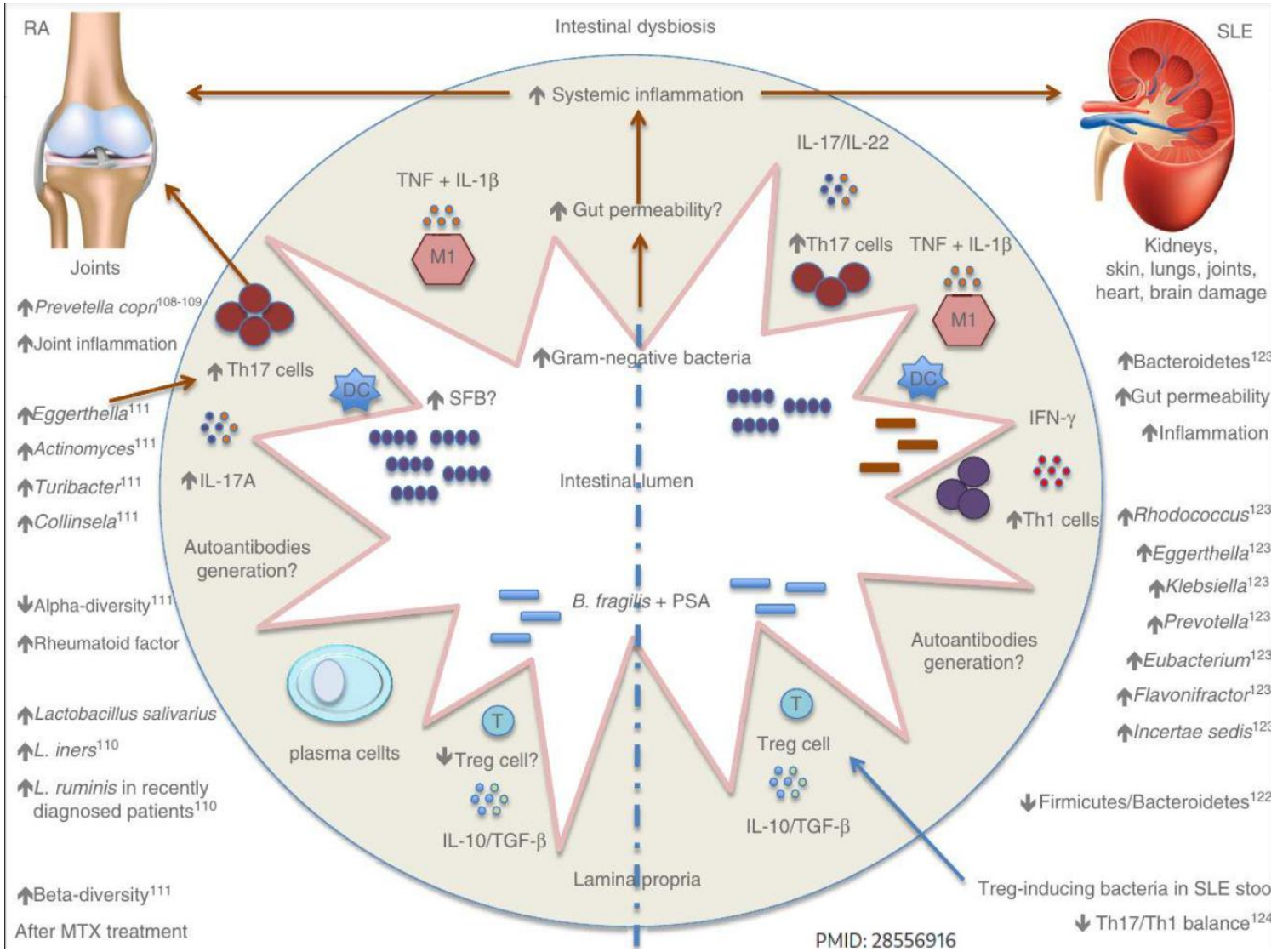
Autoimmunity Patterns



PMID: 28556916

Autoimmunity Patterns



What else

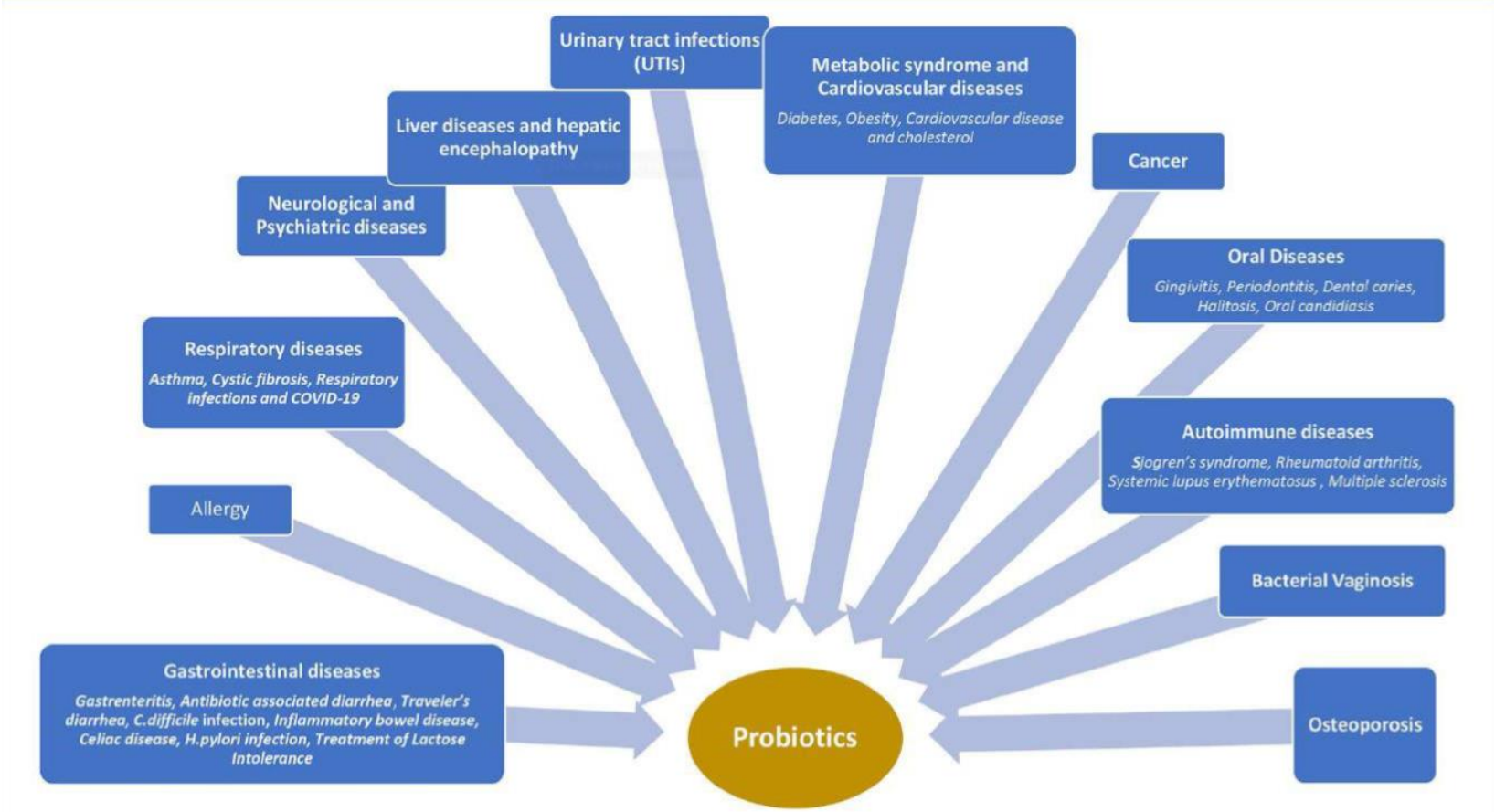
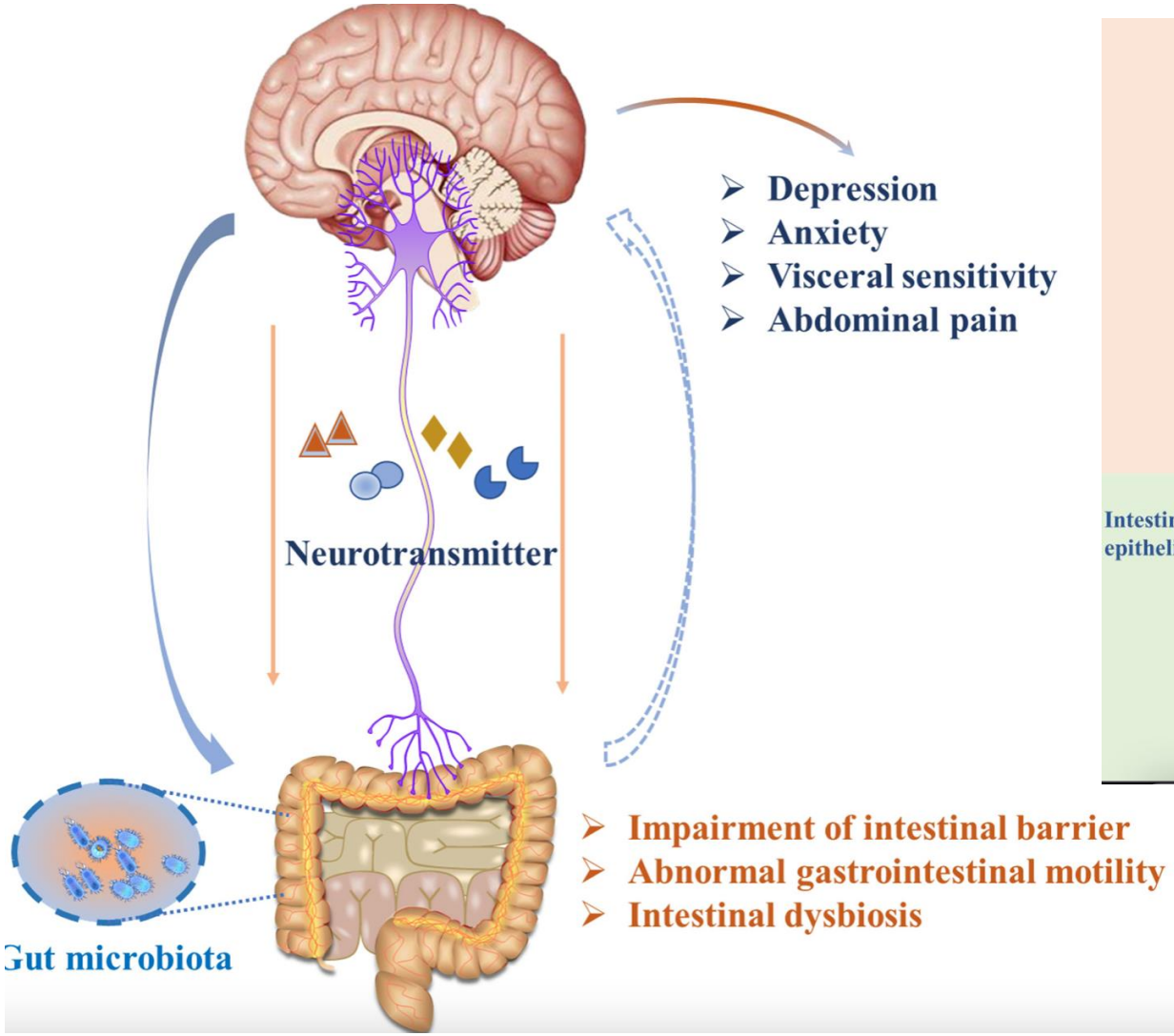


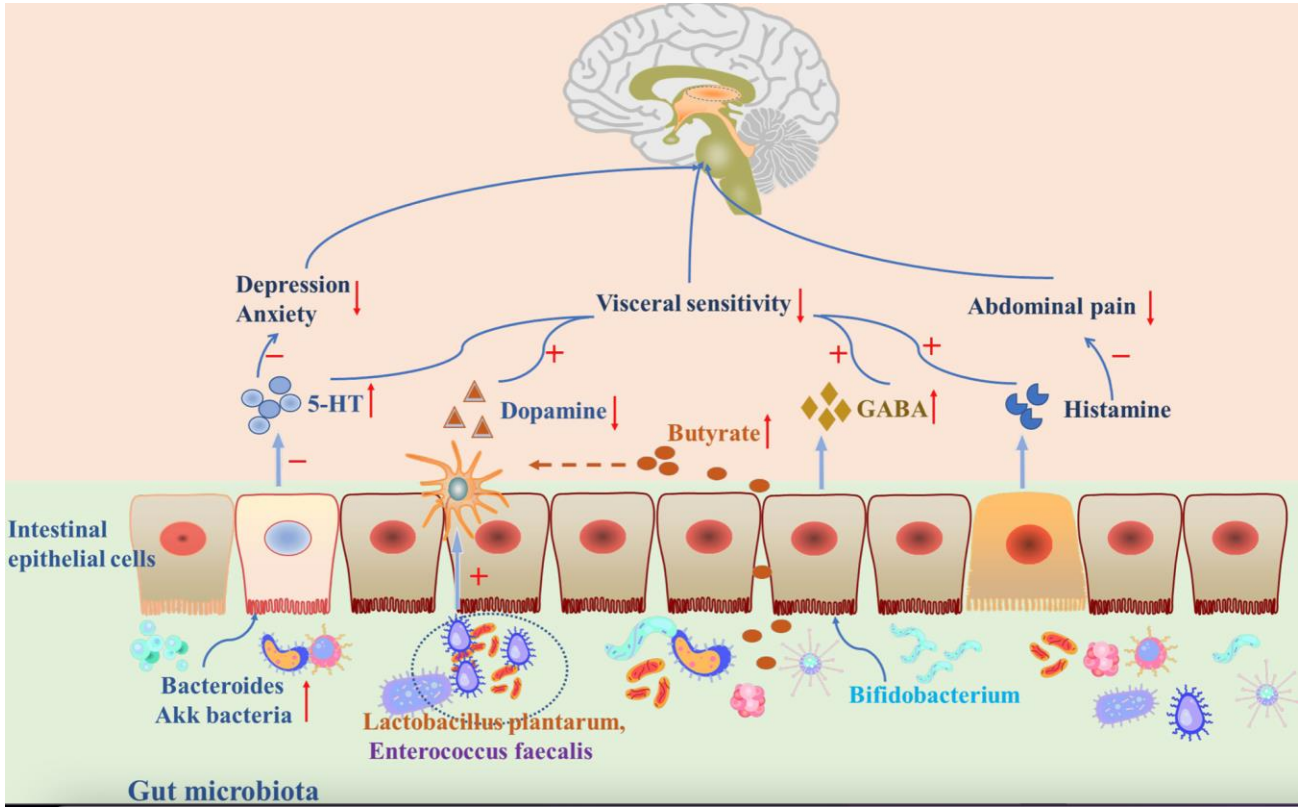
FIGURE 2 | Clinical use of probiotics in different disease states.

PMID: 33072084

Gut Brain – IBS

https://doi.org/10.3389/fendo.2022.817100





Gut Brain: IBS

Neuroticism	Location	Gastrointestinal Function (Constipation or diarrhea. etc.)	Neurological diseases with gastrointestinal dysfunction	Gut bacteria disorder	Clinical medication
5-HT	Enterochromaffin cells (ECs), mucosal mast cells, and myenteric neurons (13–15)	Diarrhea (16, 17) Abdominal pain and discomfort (16)	Affective disorders (18) Multiple sclerosis (19) Major Depressive Disorder (20)	Indigenous spore-forming bacteria (Sp) (21)	Ondansetron (22) Tricyclic antidepressants (TCA) and selective serotonin reuptake inhibitors (SSRIs) (18)Resveratrol (23)
Dopamine	Nerve terminal layer of the intestinal wall, and the intestinal mucosa (24)	Visceral pain Increase intestinal permeability (25, 26)	Anxiety (27, 28) Depression (29, 30) Multiple sclerosis (31) Schizophrenia (32), Alzheimer's disease (AD) (33) and Parkinson's disease (PD) (34)	*Enterococcus faecalis* (35) *Lactobacillus plantarum* PS128 (36)	Metformin (25) Butyrate, Losartan (26) Imipramine (37)
GABA	In intermuscular and submucosal neurons and intestinal epithelial cells (38)	Intestinal motility, gastric emptying, nociceptive sensation, and acid secretion (39)	Behavioral disorders, pain, and sleep (40, 41) Major Depressive Disorder (42)	*B. fragilis* KLE1758 (42)	Pregabalin, gabapentin or baclofen (43)CGP7930 (39) *Bifidobacterium* NCIMB8807 (44)
Histamine	Gastrointestinal chromaffin cells (45)	Gastric acid, gastrointestinal inflammation, and abdominal pain (46)	Major Depressive Disorder (47)	*Plesiomonas shigelloides* *Streptococcus thermophilus*, *Staphylococcus warneri*, *Lactobacillus parabuchneri*, and *Lactobacillus reuteri* (48)	Ebastin (49) Ketotifen (50)

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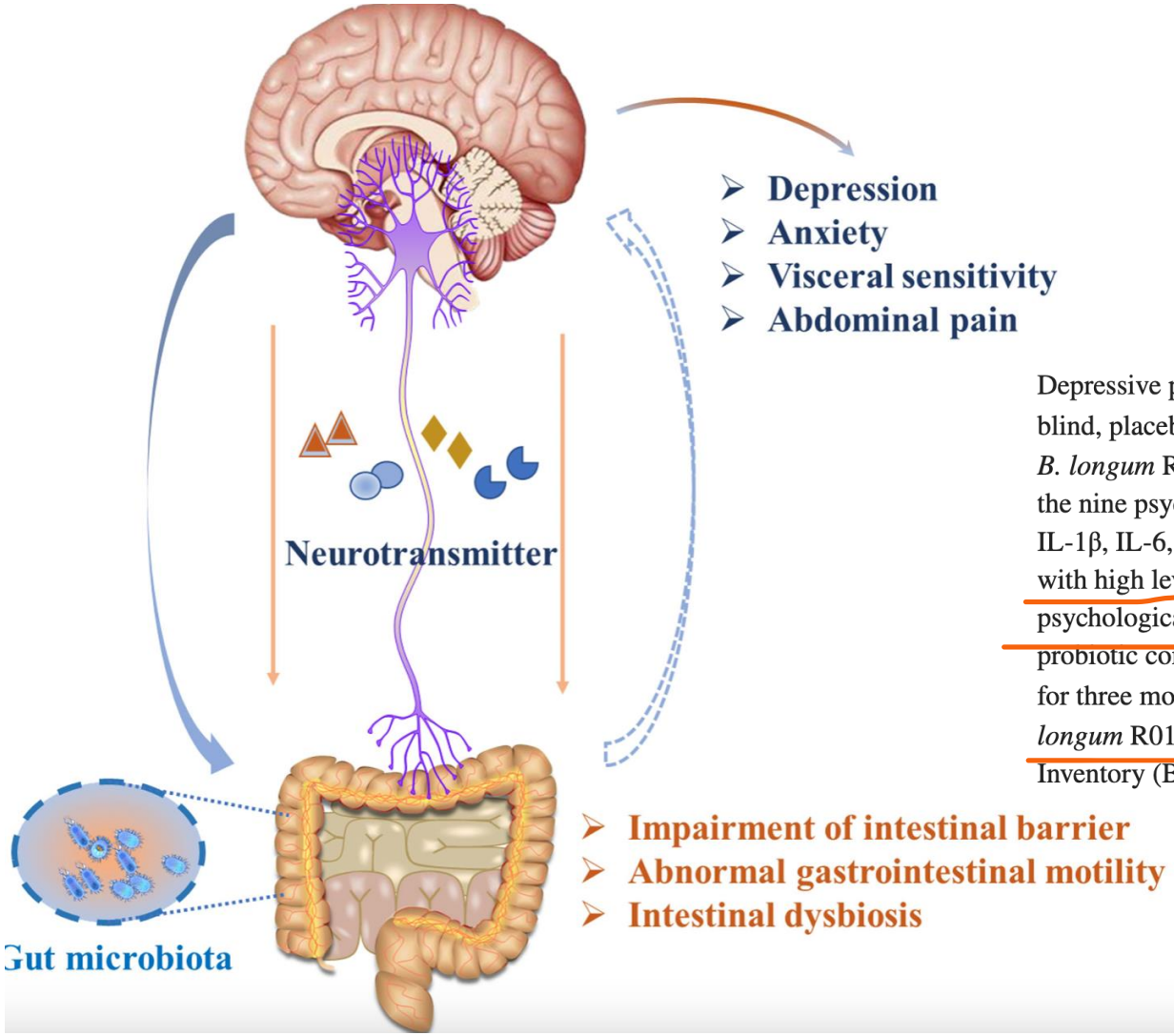
https://doi.org/10.3389/fendo.2022.817100

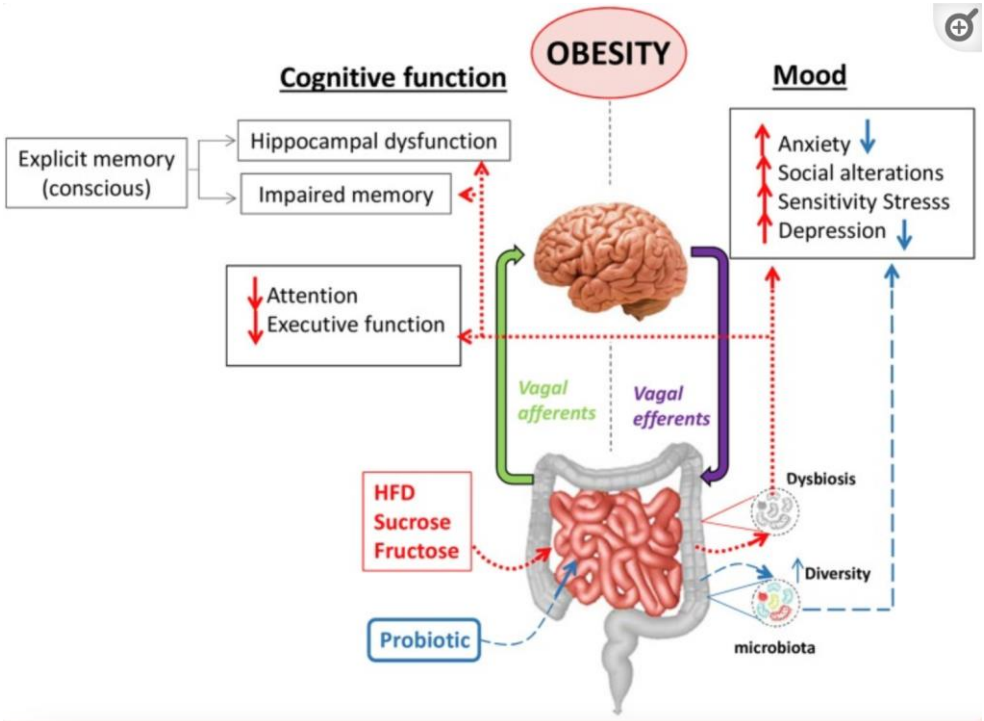
Gut Brain – Mood



Lactobacillus helveticus Rosell®-52 + Bifidobacterium longum Rosell®-175

Depressive patients free of any psychiatric medication were recruited for the next randomized, double-blind, placebo-controlled trial to investigate the effects of 3×10^9 CFU per day of *L. helveticus* R0052 and *B. longum* R0175 for eight weeks. There was no significant effect of the probiotic combination on any of the nine psychological outcome measures included in the study, or on any blood-based biomarker (CRP, IL-1β, IL-6, TNF-α, and BDNF) [97]. However, in the probiotic group, it was observed that participants with high levels of vitamin D at baseline experienced a significantly greater improvement in several psychological outcomes over time compared to those with low baseline levels of vitamin D [97]. The probiotic combination was next investigated in patients with MDD who were taking antidepressant drugs for three months or more before the trial commenced. The combination of *L. helveticus* R0052 and *B. longum* R0175 significantly reduced depressive symptoms as measured using the Beck Depression Inventory (BDI), compared to the placebo group [167]. Lastly, the probiotic combination was investigated

Interplay Interplay Between the Gut-Brain Axis, Obesity and Cognitive Function



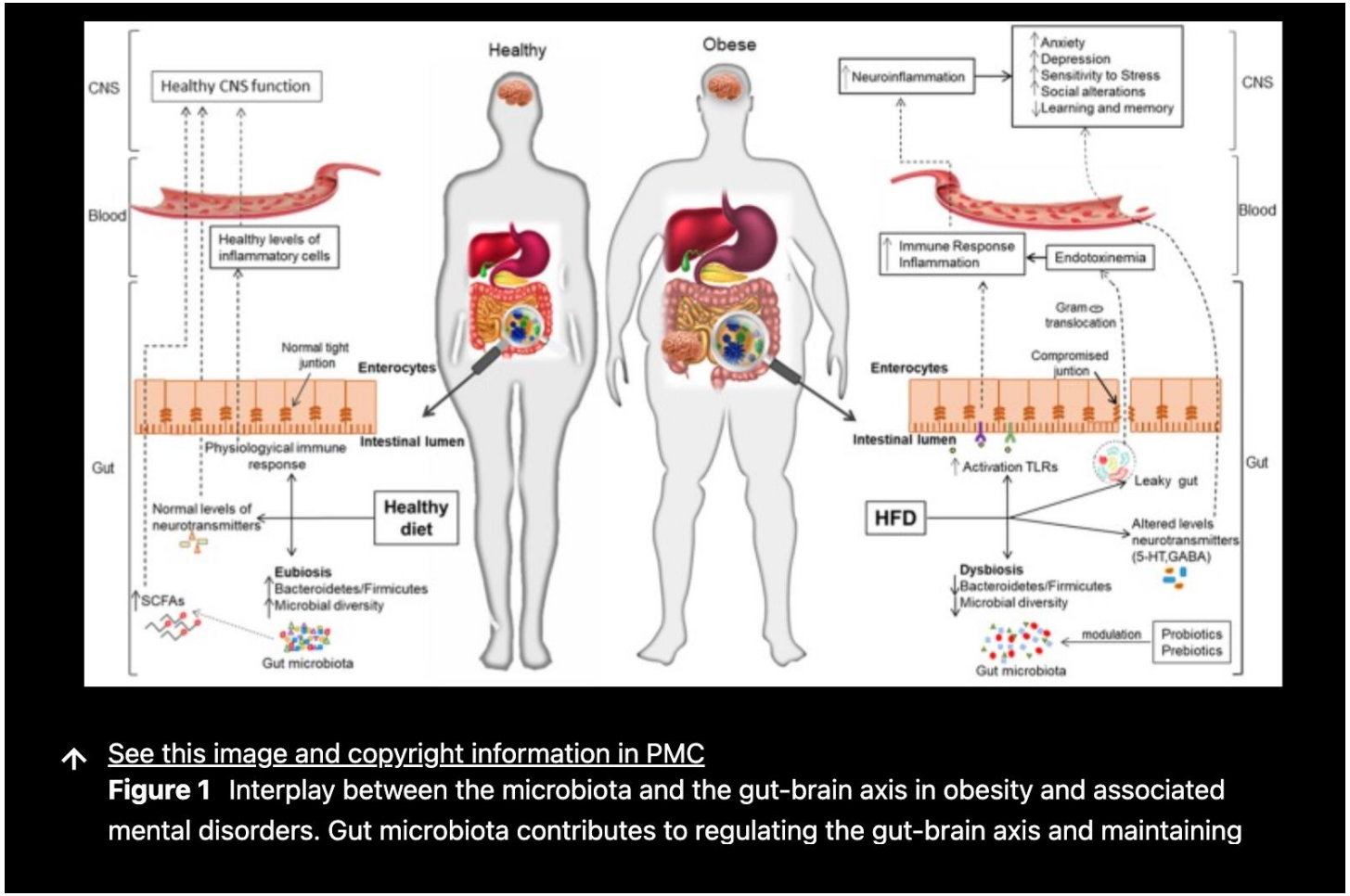


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Figure 1 Interplay between the microbiota and the gut-brain axis in obesity and associated mental disorders. Gut microbiota contributes to regulating the gut-brain axis and maintaining

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5864897/

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Gut Brain – Mood

Nutrients. 2023 Mar; 15(6): 1382.
Published online 2023 Mar 13. doi: 10.3390/nu15061382
PMCID: PMC10053794
PMID: 36986112

A Microbial-Based Approach to Mental Health: The Potential of Probiotics in the Treatment of Depression

Dinyadarshini Johnson,[1] Vengadesh Letchumanan,[1,2] Chern Choong Thum,[3] Sivakumar Thurairajasingam,[4,*] and Learn-Han Lee[1,2,*]

Silke Matura, Academic Editor and Antonios Dakanalis, Academic Editor

Lactobacillus and *Bifidobacterium* strains are the most prominent probiotics associated with enhanced neurotransmitters, whose mechanisms are similar to antidepressant drugs .In pre-clinical models of depression, *L. paracasei* PS23, *L. helveticus* NS8, *B. longum*, and *L. rhamnosus* were associated with increased hippocampal 5-HT levels *L. plantarum* PS128 has been shown to elevate 5-HT and DA levels in the striatum *B. infantis* was associated with decreased NA levels. Regarding GABA, Bifidobacterium strains of human gut origin have been identified as the most significant contributors to this neurotransmitter, followed by *Lactobacillus* strains Among these strains, *L. plantarum* 90sk and *B. adolescentis* 150 have been ascertained as efficient GABA manufacturers with anti-depressant effects similar to fluoxetine
L. helveticus R0052 and *B. longum* R0175 are the most commonly studied probiotics associated with such an effect on the BDNF levels in depression

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Antibiotics

Int J Mol Sci. 2023 Feb; 24(4): 3074.
Published online 2023 Feb 4. doi: 10.3390/ijms24043074
PMCID: PMC9959899
PMID: 36834485

Antibiotic-Therapy-Induced Gut Dysbiosis Affecting Gut Microbiota—Brain Axis and Cognition: Restoration by Intake of Probiotics and Synbiotics

Divakar Dahiya[1] and Poonam Singh Nigam[2,*]

Antibiotic-induced gut dysbiosis and barrier disruption and the potential protective strategies

Hui Duan, Leilei Yu, Fengwei Tian, **Qixiao Zhai**, **Liuping Fan** & Wei Chen

Pages 1427-1452 | Published online: 16 Nov 2020

Cite this article https://doi.org/10.1080/10408398.2020.1843396 Check for updates

Antibiotics

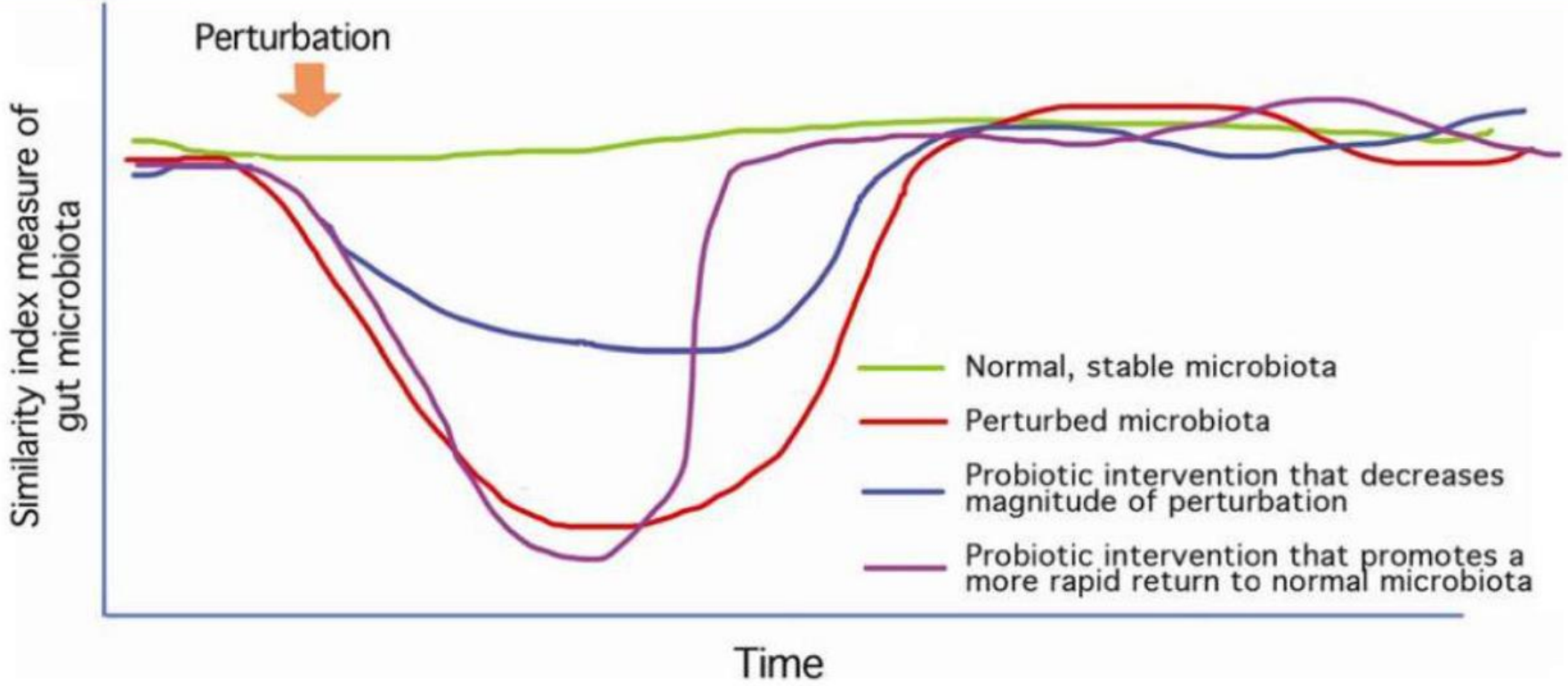

FIGURE 1. Probiotic intervention that decreases the magnitude of change or promotes a more rapid return to normal in a perturbed gut bacterial community. (Sanders et al. In Press). Reprinted with permission from Gut Microbes.

Sanders ME. Impact of probiotics on colonizing microbiota of the gut. J Clin Gastroenterol. 2011 Nov;45 Suppl:S115-9. doi: 10.1097/MCG.0b013e318227414a. PMID: 21992949.

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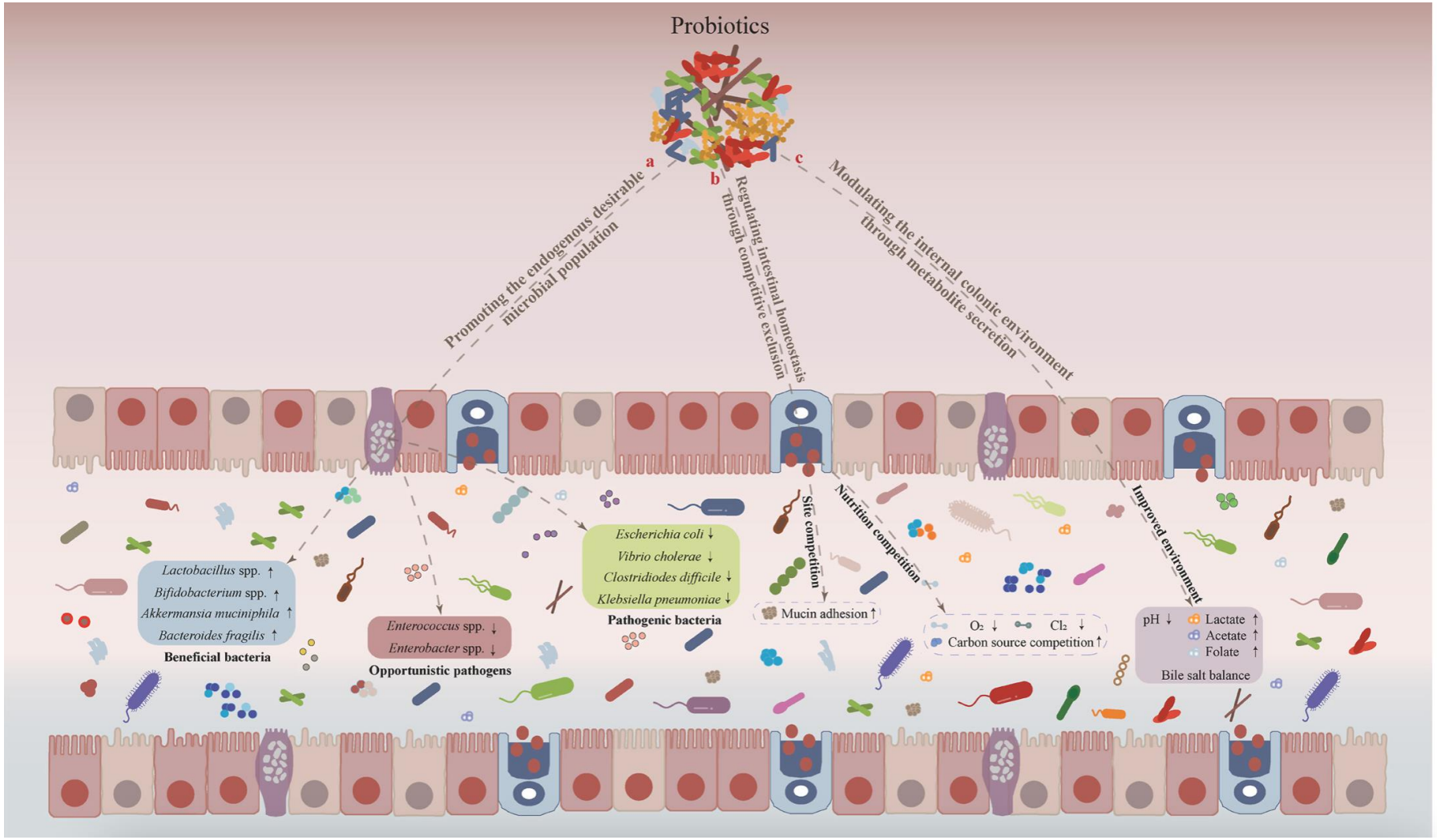
Probiotics
a
b
c
Promoting the endogenous desirable microbial population
Regulating intestinal homeostasis through competitive exclusion
Modulating the internal colonic environment through metabolite secretion
Lactobacillus spp. ↑
Bifidobacterium spp. ↑
Akkermansia muciniphila ↑
Bacteroides fragilis ↑
Beneficial bacteria
Enterococcus spp. ↓
Enterobacter spp. ↓
Opportunistic pathogens
Escherichia coli ↓
Vibrio cholerae ↓
Clostridiodes difficile ↓
Klebsiella pneumoniae ↓
Pathogenic bacteria
Site competition
Mucin adhesion ↑
Nutrition competition
O2 ↓ Cl2 ↓
Carbon source competition ↑
Improved environment
pH ↓
Lactate ↑
Acetate ↑
Folate ↑
Bile salt balance

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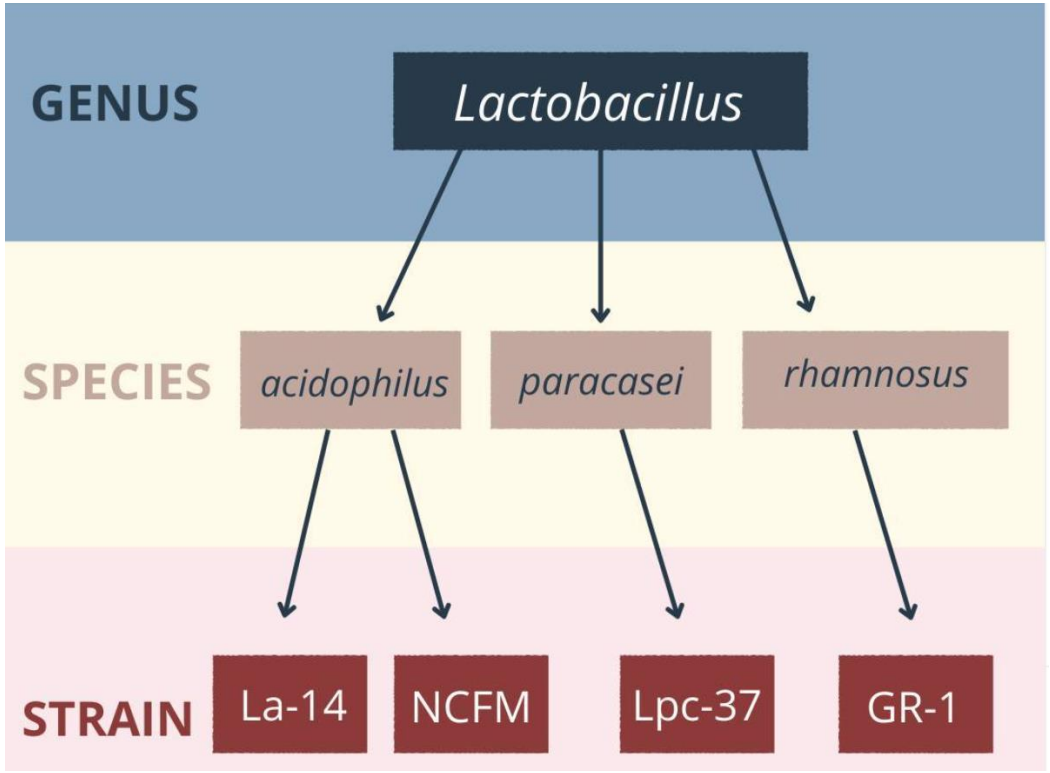
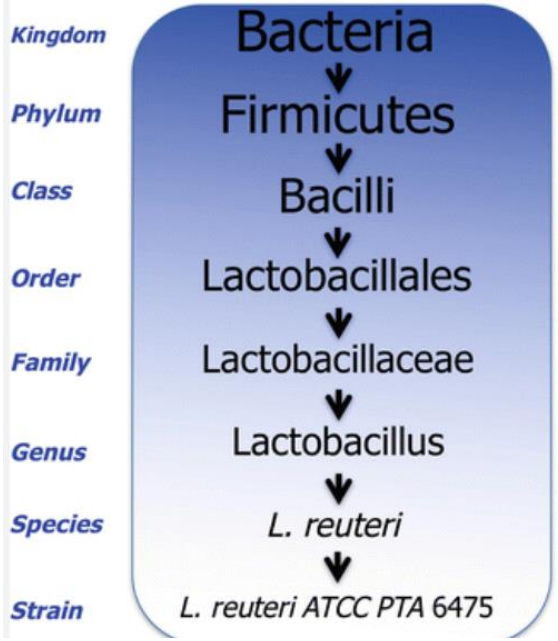
Nomenclature

The probiotic nomenclature begins with identifying its genus, species, subspecies (if applicable), and strain, which comes with an alphanumeric designation of the probiotic species, i.e., ***Lactobacillus rhamnosus* GR-1**

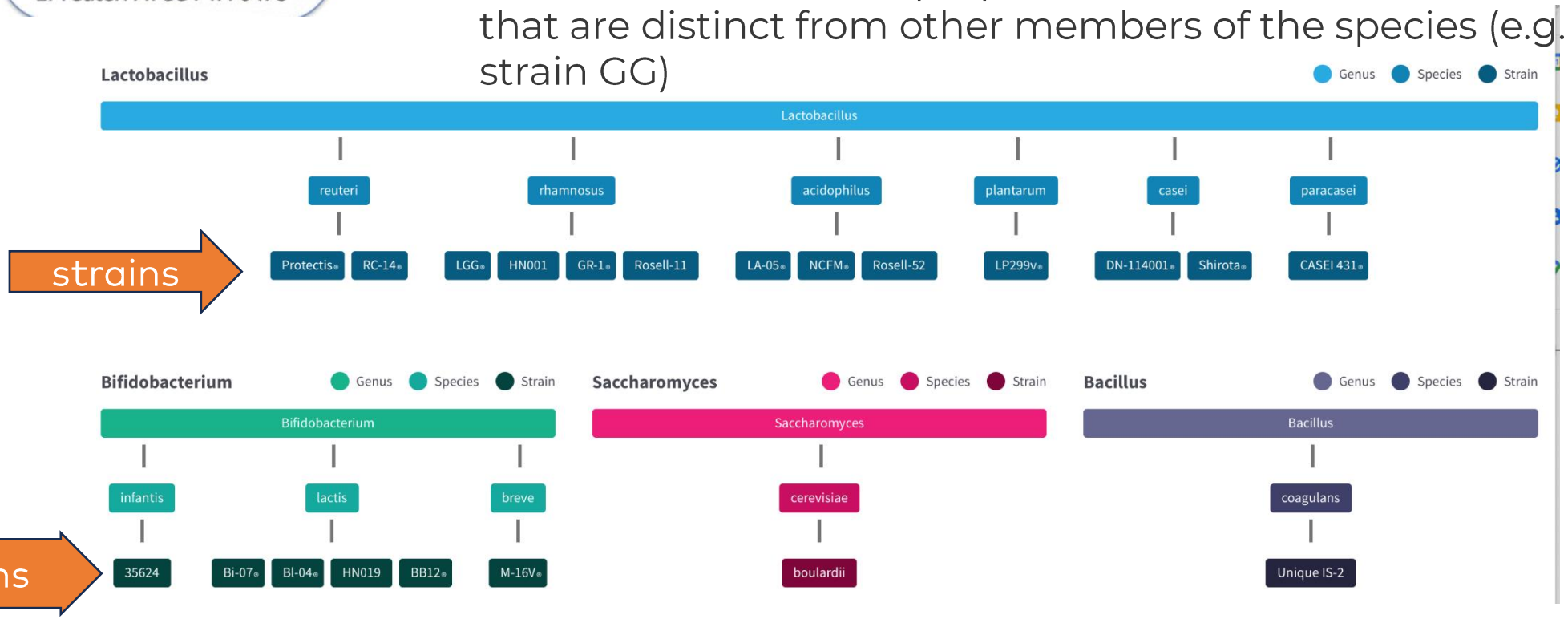




Genus is the first name of a bacterium (e.g., Lactobacillus).

Species is a bacterium's second name (e.g., rhamnosus). It is a much more **narrow classification** based on shared common features that distinguish them from other species with that genus.

Strain is an even more specific classification that distributes members of the same species into subgroups based on one or more properties that these bacteria have that are distinct from other members of the species (e.g., strain GG)



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Naming- who is the dog!

All dogs belong to the genus *Canis* and the species *familiaris*. But as we know, within this one species there is great diversity in shape, size, strength, fur length, and other physical characteristics!

Strains of bacteria within the same species may vary in regards to:

- shelf stability
- resistance to gastric acid and bile salts
- adherence capacity & method of adherence

And most importantly...

CLINICAL EFFICACY

1. McKane, L. and J. Kandel, Microbiology: Essentials and Applications. 1986, New York: McGraw-Hill. 720-735.

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Species: Lactobacillus & Bifido

probiotics belong mainly to the genera *Lactobacillus* and *Bifidobacterium*, although strains from other genera, such as *Saccharomyces* and *Bacillus*

- 500+ papers
- Lactic-acid producing bacteria – usually don't colonize (possibly some Lactobacillus)
- Allergies
- IBD
- Anxiety & Depression
- Inflammatory conditions
- Vaginal infections
- Reduces biofilms
- Cancers
- UTIs
- Bacterial overgrowth (SIBO)
- Gas
- Abdominal pain
- Tooth decay
- Healthy immune response
- Balances microbiome
- Promotes normal gut function
- Infantile diarrhea

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Species: SB

- 100+ studies
- Beneficial yeast
- Does not colonize
- H. pylori
- Blastocystis hominis (Equal to Flagyl)
- Equal to Nystatin
- Giardia
- C. difficile
- Synergizes antibiotics

- IBS
- Crohn’s
- Ulcerative colitis
- Diarrhea
- Corrects dysbiosis
- Improves SIgA
- Breaks down fungal biofilms

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Species: Soil Based

- Bacillus strains
- Spore-forming
- Colonizes the gut
- Secrete antimicrobial peptides
- Balances microbiome
- Decrease inflammation
- Improves leaky gut
- IBS
- Leaky gut

- Diarrhea
- Bloating
- Abdominal pain
- Constipation
- Mitigate antibiotic side effects
- Upper respiratory tract infections
- Muscle soreness

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Research .....published 2020

Clinical studies and the effect of probiotic administration on human health.

	increase in fibrinogen levels.	
Lactobacillus gasseri SBT2055	Significant decrease in body mass index (BMI), waist, abdominal Visceral Fat Area (VFA) and hip circumference.	[64]
Lactobacillus salivarius Ls-33	Increase in the ratios of *Bacteroides*, *Prevotellae* and *Porphyromonas*.	[65]
Lactobacillus gasseri SBT2055	Decrease in BMI and arterial blood pressure values.	[66]
Lactobacillus plantarum	Reduction in BMI and arterial blood pressure levels.	[67]
Lactobacillus acidophilus La5, *Bifidobacterium lactis* Bb12, *Lactobacillus casei* DN001	Drastic modifications in gene expression in PBMCs as well as BMI, fat percentage and leptin values.	[68,69,70]
Bifidobacterium, Streptococcus thermophilus	Improvement in lipid profile, insulin sensitivity, and decrease in CRP (C-reactive protein).	[71]
Lactobacillus paracasei N19	No effects have been noticed.	[72]
Lactobacillus acidophilus La5, *Bifidobacterium animalis* Bb12	Significant drop in fasting glucose concentration and increase in HOMA-IR (Homeostasis Model Assessment of Insulin Resistance).	[73]

Type-2 diabetes and Dyslipidemia		
Lactobacillus acidophilus La5, *Bifidobacterium lactis* Bb12	Total cholesterol (TC) and LDL-C improvement.	[74]
Lactobacillus acidophilus La5, *Bifidobacterium lactis* Bb12	Decreased fasting blood glucose and antioxidant status.	[75]
Bifidobacterium animalis DSMZ 23733, *Bifidobacterium breve* DSMZ 23732	Reduction of total cholesterol (TC).	[76]
Lactobacillus acidophilus La-5, *Bifidobacterium animalis* BB-12	Improved HDL-C levels and reduced LDL-C/HDL-C ratio.	[77]
Lactobacillus plantarum A7	Decreased methylation process, SOD (superoxide dismutase).	[78]
Lactobacillus acidophilus La-5, *Lactobacillus animalis* BB-12	Significant difference between groups concerning mean changes of HbA1c, TC, and LDL-C.	[79]

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Research Review

Antibiotic-Associated Diarrhea, Diarrheas, Colic, Ulcerative colitis		
Saccharomyces cerevisiae, *Saccharomyces boulardii*	Reduction of diarrhea rates in children receiving probiotic yeast (7.5%) compared to those receiving placebo (23%).	[88]
Lactobacillus reuteri ATCC 55730	Elimination of pain and symptoms in direct association with intestinal colic.	[89]
Probiotic VSL#3	Remission in 42.9% of patients in the probiotic group versus 15.7% in the placebo group.	[90]
Escherichia coli Nissle 1917	Treatment of inflammatory bowel disease.	[91]
Bifidobacterium longum CMCC P0001	Treatment of gastro-intestinal disorders.	[92]
Lactobacillus, Bifidobacterium	Reduction of the incidence of severe necrotizing enterocolitis by 57% and the risk of mortality by 35%.	[93]
Lactobacillus rhamnosus, Saccharomyces boulardii	A protective role in preventing antibiotic-associated diarrhea after intake of 50^{11} CFU/day.	[94]

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Research review

Clinical studies and reported specific benefits to human health—Microbial antagonism.

Probiotic Microorganisms	Main Results—Microbial Antagonism	References
Antifungal activity		
Lactobacillus acidophilus ATCC 4495, *Lactobacillus plantarum* NRRL B-4496	Significant antifungal activity.	[135]
Lactobacillus acidophilus, Bifidobacterium lactis, Bifidobacterium longum, Bifidobacterium bifidum	Probiotic strains have the potential to reduce enteral fungal colonization and decrease invasive fungal sepsis rates in low–birth-weight neonates.	[136]
Lactobacillus acidophilus ATCC 4356	*L. acidophilus* produced substances with anti-*Candida* activity, reducing its growth by 45.1%.	[137]
Lactobacillus buchneri	Antagonistic potential against *Candida albicans*	[131]
Eradication of *Helicobacter*		
Lactobacillus casei Shirota	Inhibition of the growth of *Helicobacter pylori* (by 64% in the probiotic group and by 33% in the control).	[138]
Pediococcus acidilactici BA28	Significant rates of elimination of *H. pylori* infections.	[139]
Antimicrobial activity		
Lactobacillus acidophillus	Antimicrobial activity against *Campylobacter jejuni* and *Listeria monocytogenes*	[143]
Lactobacillus casei	Antagonistic potential against *Cronobacter sakazakii*, *Cl. jejuni* and *L. monocytogenes*	[143]
Lactobacillus plantarum	Microbial antagonism against *Salmonella enteritidis*, *Cr. sakazakii*, *Cl. jejuni*, *L. monocytogenes* and *E. coli*	[143]
Lactobacillus lactis	Antimicrobial activity against *S. enteritidis*, *Cr. sakazakii*, *Cl. jejuni*, *L. monocytogenes* and *E. coli*	[143]
Bifidobacterium bifidum	Antagonistic activity against *Cr. sakazakii*, *Cl. jejuni*, *L. monocytogenes* and *E. coli*	[143]
Lactobacillus salivarius	Antimicrobial activity against *L. monocytogenes*, *S. enteritidis*, *St. mutans*, *Candida albicans*, *Cr. sakazakii* and *Cl. Jejuni*	[143,144]

Research review

Alleviation of lactose intolerance	
Streptococcus lactis, Streptococcus plantarum, Streptococcus cremoris, Streptococcus casei, Streptococcus diacetylactis, Streptococcus florentinus, Streptococcus cremoris	Improved lactose digestion and tolerance.
Lactobacillus delbrueckii subsp. bulgaricus and *Streptococcus thermophilus*	Consumption of live yogurt cultures in yogurt improves the digestion of lactose present in yogurt in individuals with lactose maldigestion. Yogurt should contain at least 10^8 CFU live probiotic strains per gram
Bifidobacterium animalis DSM 26137 and *Lactobacillus plantarum* DSM 26329	Significant reduction of diarrhea frequency and flatulence.

Atopic Dermatitis	
Lactobacillus fermentum VRI 033 PCC™	Reduction in SCORAD (SCORing Atopic Dermatitis).
Bifidobacterium animalis subsp *lactis*	Important decrease in the sternness of atopic dermatitis with an improvement in the ration of IFN- and IL-10.
Lactobacillus rhamnosus HN001	Substantially reduced the cumulative prevalence of eczema in infants

Cancer and side effects associated with cancer		
Lactobacillus rhamnosus 573	Patients had less abdominal discomfort, with less hospital care and fewer chemo dose reductions.	[110]
Lactobacillus acidophilus, Bifidobacterium bifidum	Reduction in incidence of diarrhea and better stool consistency.	[111]
Lactobacillus plantarum CGMCC 1258, *Lactobacillus acidophilus* LA-11, *Bifidobacterium longum* BL-88	Significant improvement in the integrity of gut mucosal barrier and reduction in infections complications.	[112]
Lactobacillus casei Shirota (LcS)	Significant evidence of cancer preventing particularly colorectal cancer.	[113]
Lactobacillus casei ATCC 393	Significant in vivo anti-proliferative effects accompanied by apoptotic cell death in colon carcinoma cells.	[114]
Lactobacillus acidophilus and *Bifidobacterium* spp.	Inhibit growth of tumor cell, produce anti-carcinogens and reduces cancer risks	[115]
Lactobacillus paracasei	Anticancer activity	[116]

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Research review

Allergic Rhinitis		
Streptococcus paracasei-33	Clinical improvements in nasal blockage, rhinorrhea, and nasal itching.	[103]
Lactobacillus paracasei-33	Significant evidence of beneficial clinical and immunologic effects of probiotics in the treatment of seasonal Allergic Rhinitis.	[104]
Blood Pressure		
Various strains of *Lactobacillus* sp.	Regulation of blood pressure.	[105]
Lactobacillus helveticus and *Saccharomyces cerevisiae*	Reduction of hypertension effects	[106]
Atopic Dermatitis		
Lactobacillus fermentum VRI 033 PCC™	Reduction in SCORAD (SCORing Atopic Dermatitis).	[107]

Bacterial Vaginosis		
Lactobacillus rhamnosus	The vaginal administration of the probiotic strain leads to stabilization of the vaginal flora with obvious reduction of bacterial vaginosis recurrence.	[117]
Lactobacillus gasseri LN40, *Lactobacillus fermentum* LN99, *Lactobacillus casei* LN113, *Pediococcus acidilactici* LN23	Strain LN is characterized by a high colonial rate in the vagina bacterial vaginosis, patients and women receiving LN strain were totally cured 2–3 days after administration.	[118]
Lactobacillus acidophilus La-14® and *Lactobacillus rhamnosus* HN001®	The addition of a combination of the probiotic strains La-14® and HN001® alongside bovine lactoferrin to antibiotic treatment, was shown to significantly improve symptoms of BV. It also decreased the recurrence rate, as compared with antibiotic treatment alone.	[119]
Lactobacillus crispatus CTV-05	The administration of 2 billion CFU of *L. crispatus* CTV-05 to 228 premenopausal women with recurrent BV using a vaginal applicator daily for 24 weeks led to 30% of recurrence of BV in the intervention group compared with 45% of the placebo group	[120]

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7760123/

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How to dose

Probiotics are measured in colony forming units (CFU), which indicate the number of viable cells.

Amounts may be written on product labels as, for example, 1×10^9 for 1 billion CFU or 1×10^{10} for 10 billion CFU. Many probiotic supplements contain 1 to 10 billion CFU per dose, but some products contain up to 50 billion CFU or more. However, higher CFU counts do not necessarily improve the product's health effects!

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How to dose

- A 2017 review of dose-response from seven meta-analyses of probiotics for reducing risk for AAD found a 10^{10} cfu/day (10 billion) to be the break point for effectiveness.
- a meta-analysis which observed that higher doses (>10^{11}cfu/day/ 100 billion) of probiotics were more effective than lower doses in blood pressure reduction.

- Given the minimum dose for some strains is 10^9 CFU/day, it is best practice to ensure that supplements contain bacteria in concentrations >10^9 CFU/dose, unless research has demonstrated that the specific strain contained in the supplement is effective in smaller amounts. If a product contains multiple strains, then each strain should be present at levels of >10^9 to ensure effectiveness.

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Dosing Tip

Supplements are best consumed with/after meals in order to take advantage of the increased alkalinity of the stomach environment – which equates to greater bacterial survival.

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How to select a probiotic

(courtesy probiotic advisor)

The **first step** is finding out the identity of the organism(s) in the preparation. One needs to know not only the genus and species of the organism(s), but also the strain details. Ideally, this information should be detailed on the label, but in cases where it is not, manufacturers should tell you this information upon request.

The **second step** is working out whether there is any research conducted on the exact strains found in the supplement, finding it, and then reading the trials. What has the research shown? What clinical presentations is this strain proven to be helpful for? What applications is the strain ineffective in? Or is the research to date on the strain equivocal for a certain use?

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How to select a probiotic

(courtesy probiotic advisor)

Thirdly, there should be adequate amounts of viable organisms contained in the product at the time of consumption – for most strains this is currently considered to be >10^9 CFU of each organism per dose

To make this critical, but time-consuming, process far easier, Probiotic Advisor has done the background research for you.
The Probiotic Advisor allows you to search specific probiotic preparations (foods and supplements) to determine:

- which strains are contained in the products;
- the amounts of each strain per dose; and most importantly
- the evidence for (and sometimes against) a particular strain in specific health conditions

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Triple Probiotic Therapy

- Lactobacillus & Bifido Blend 1 X B.I.D
- Saccharmoyces boulardii 1 X B.I.D
- Spore-based 1 x QD

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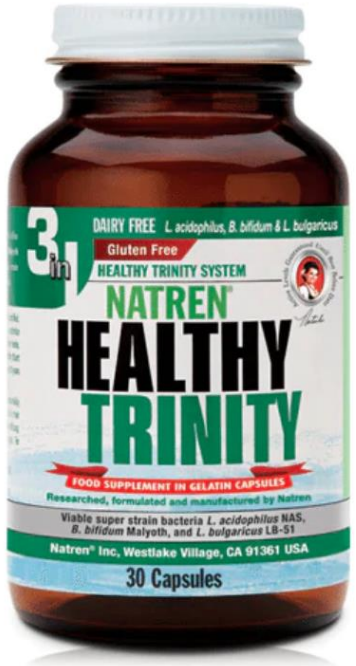
Probiotics


MOSS NUTRITION
Probiotic Select
25+ Billion CFUs
High Potency
Multi-Strain Formula
Dietary Supplement
120 Vegetarian Capsules
MOSS NUTRITION
Saccharomyces
boulardii
Supports Healthy Gut Flora Balance*
Dietary Supplement
120 Vegetarian Capsules
MOSS NUTRITION
BacilloSpore Select
3+ Billion CFUs
Shelf-Stable
Spore Based Probiotics
Dietary Supplement
100 Vegetarian Capsules


MICROBIOME LABS
HU58
High-Potency
Bacillus Subtilis
60
Food Supplement


MICROBIOME LABS
RESTOR FLORA
Dual-Action
Formula For
Digestive
Support
50
Food Supplement

Trinity



- Lactobacillus acidophilus Super Strain NAS
- Bifidobacterium bifidum Super Strain Malyoth
- Lactobacillus bulgaricus Super Strain LB-51

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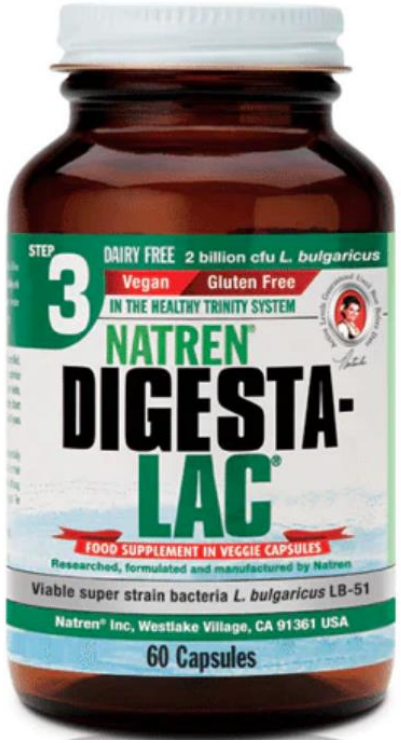
Lactose Intolerance



Lactobacillus bulgaricus Super Strain LB-51 (L. delbruekii, subspecies bulgaricus)

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H.Pylori

Lactobacillus reuteri DSM17648,

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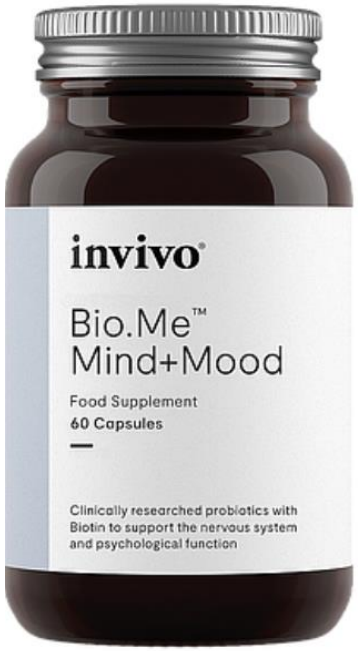
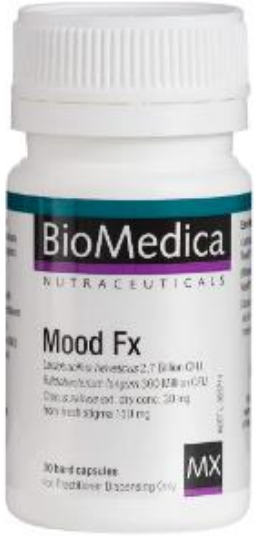
Mood



Mind+Mood Live Bacteria (Cerebiome® Inside)	4 Billion CFU
L. helveticus Rosell®-52 R0052	
B. longum Rosell® -175 R0175	
B. bifidum Rosell®-71 R0071	
L. plantarum Rosell®-1012 R1012	



Cerebiome®

equiv. *Lactobacillus helveticus* Rosell®-52

and *Bifidobacterium longum* Rosell®-*175*

Crocus sativus (Saffron as Safr'Inside™)

Lactobacillus plantarum LP01 (LMG P-21021)
Lactobacillus rhamnosus LR06 (DSM 21981)
Bifidobacterium longum 04 (DSM 23233)
Lactobacillus fermentum LF16 (DSM 26 DSM 26956)

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Vaginal probiotics

Clear Live Bacteria	3 billion CFU
L. acidophilus W22, *L. brevis* W63, *L. casei* W56, *L. helveticus* W74, *L. pentosus* W2 (KCA1), *L. plantarum* W21, *L. salivarius* W24	

Probiotic Blend	3 billion CFU
L. plantarum – DSM 24937 *B. lactis* – LMG P-29510 *L. rhamnosus* – LMG P-29513 *L. gasseri* – LMG P-29638 *L. crispatus* – LMG P-31003	

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Histamine

Avoid

- Lactobacillus casei.
- Lactobacillus Bulgaricus.
- Streptococcus thermophilus.
- Lactobacillus delbrueckii.
- Lactobacillus helveticus.

Some histamine-lowering strains include:

- *Bifidobacterium infantis*
- *Lactobacillus gasseri*
- *Bifidobacterium breve*
- *Bifidobacterium bifidum*
- *Lactobacillus salivarius*
- *Lactobacillus rhamnosus GG*

– May support stabilisation of mast cells

Bifidobacterium longum

– Degrades histamine

Bifidobacterium lactis

– May support breakdown of histamine and tyramine

- *Lactobacillus plantarum*

– May support breakdown of biogenic amines (histamine, tyramine)

Lactobacillus acidophilus

Well-studied, with lower doses (<1 billion CFU) histamine-neutral

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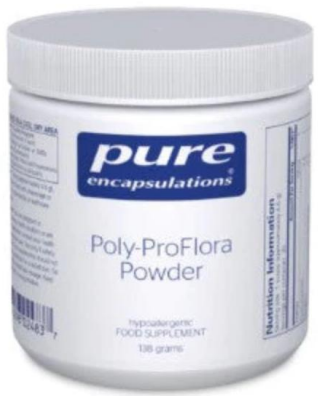
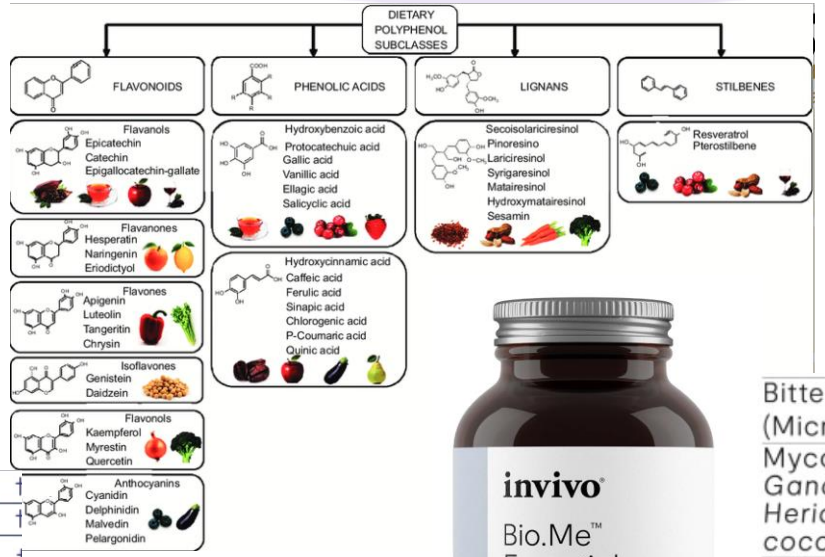
Polyphenols



PreticX™ xylooligosaccharide (XOS)	1.4 g	†
BioEcolians® α-glucooligosaccharide (α-GOS)	1 g	†
Cranberry (*Vaccinium macrocarpon*) fruit extract (standardized to contain 12 mg proanthocyanidins [PACs])	1.2 g	†
Blueberry (*Vaccinium angustifolium*) fruit extract (standardized to contain 4% polyphenols)	100 mg	†
Pomegranate (*Punica granatum*) fruit juice powder	500 mg	†



Bitter Orange Bioflavonoid Extract (MicrobiomeX®)	500mg
MycoMix®Immun (*Cordyceps spp., Ganoderma lucidum, Lentinula edodes, Hericium erinaceus, Grifola frondosa, Poria cocos, Trametes versicolor, Agaricus blazei*)	300mg
Ashwagandha Root Extract (1.5% Withanolide)	250mg
Cocoa Extract (20% Theobromine)	200mg
Blackcurrant Extract (11% Anthocyanins)	200mg
Pomegranate Powder	200mg
Green Tea Powder	100mg
Grapeseed Extract 10:1 (95% Proanthocyanins)	100mg
Chamomile Powder	75mg
Lemon Balm	50mg

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What's coming

The Roadmap Series | Mapping SIBO with Tracey Randell

20th of March at 12:30 pm

https://amritanutrition.zoom.us/meeting/register/tZ0of-2prTgiEtOrefmwM3UgRH505CtY8HpK#/registration

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