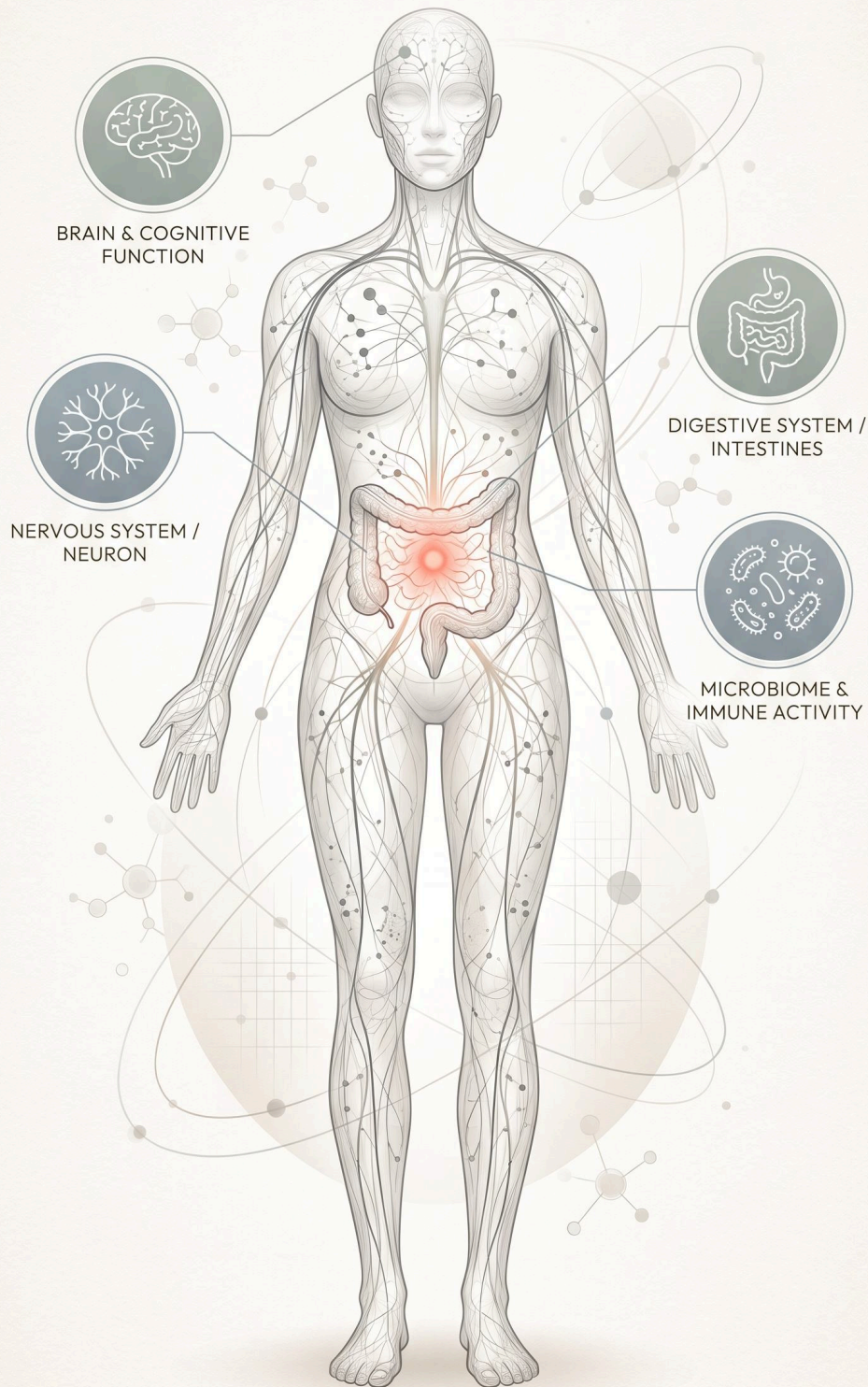


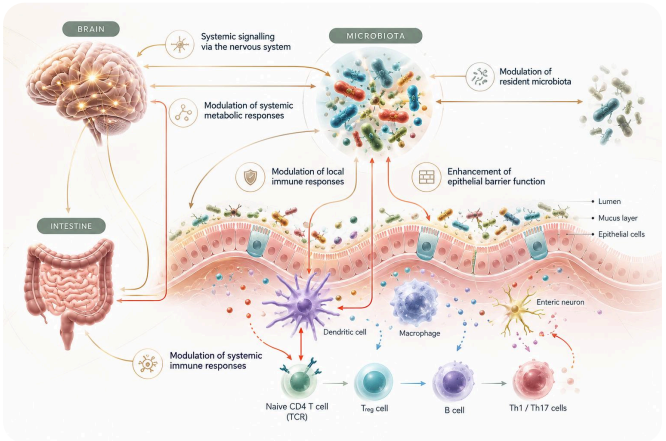
Gutlex®



LEX (Lactobacillus Fermentation Extract) was developed from soymilk fermentation with 16 strains of genus Lactobacillus in 1984, starting from the fermentation of yogurt in 1914. The traditional basic manufacturing process has been maintained since. The leading characteristic of LEX is that it is a multi-component extract derived from fermented soybeans that does not contain live microorganisms. We have demonstrated that LEX has significant effects on human health, though unlike probiotics, it remains relatively unknown in the market. While probiotics and prebiotics are well known for their health benefits, new concepts have recently been proposed that align closely with the LEX concept.

Research on gut microbiota and human health began about half a century ago. Areas such as “probiotics” (which utilize live microorganisms) and “prebiotics” (which are substrates selectively utilized by host microorganisms) have emerged. “Postbiotics” represents a third area that sets it apart from these two, and the concept of LEX aligns closely with this category. Instead of relying on the action of live microorganisms, it utilizes their metabolites and/or cell lysis components to support human health.

According to the International Scientific Association of Probiotics and Prebiotics (ISAPP), postbiotics are defined as a “preparation of inanimate microorganisms and/or their components that confers a health benefit to the host”. Like probiotics and prebiotics, the purpose of postbiotics is to promote human health through microorganism-derived compounds. Postbiotics are bioactive compounds produced by food-related microorganisms during the fermentation process. Microorganisms involved in fermentation do not have to be alive: postbiotics include secreted factors produced by live microorganisms during fermentation and/or factors released after microorganism lysis, such as microbial cell fractions, functional peptides and proteins, short-chain fatty acids (SCFAs), extracellular polysaccharides, cell lysates, teichoic acid, peptidoglycan-derived muropeptides, and more.

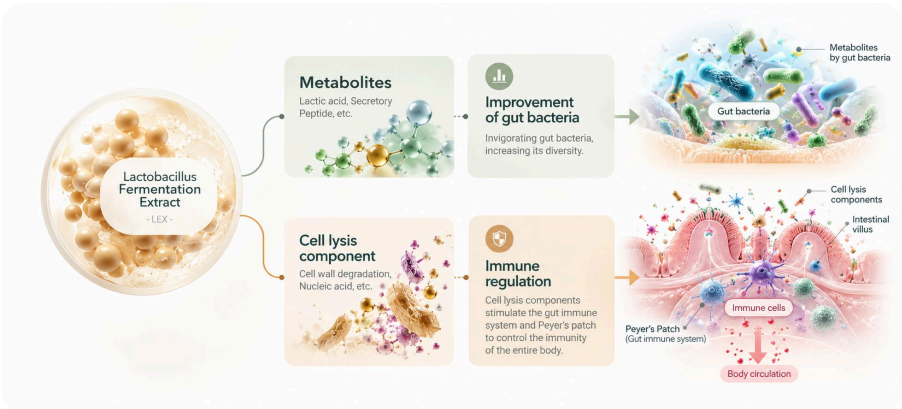


Note: Table1 and Image1 were adopted from Salminen, S., Collado, M.C., Endo, A. et al. The International Scientific Association of Probiotics and Prebiotics (ISAPP) consensus statement on the definition and scope of postbiotics. Nat Rev Gastroenterol Hepatol 18, 671 (2021). <https://doi.org/10.1038/s41575-021-00506-5>

Class	Definition	Example
Probiotics	Live microorganisms that confer health benefits when administered in adequate amounts.	Live bacteria (31 genera from the Lactobacillaceae family or Bifidobacterium genus)
Prebiotics	Substrates selectively utilized by host microorganisms that confer health benefits.	Oligosaccharides, dietary fiber, resistant starch
Postbiotics	Preparations of non-living microorganisms and/or their components that confer health benefits, including bacterial metabolites, secreted compounds, and components released after cell lysis.	Lactobacilli metabolites (short-chain fatty acids, peptides, amino acids, lactic acid, etc.)

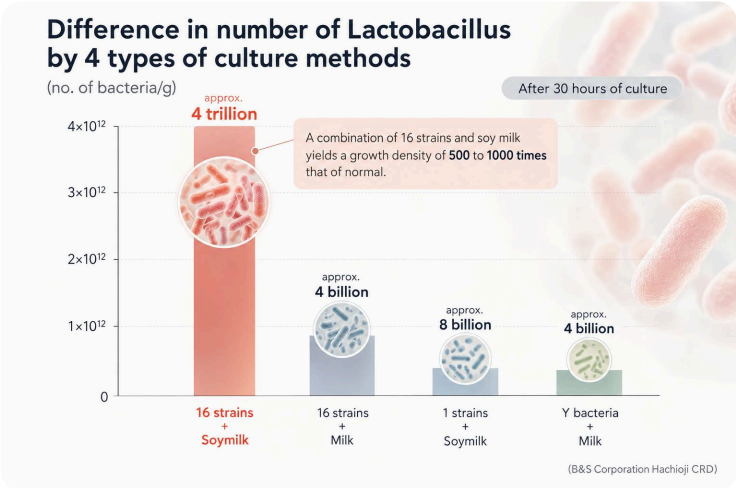
02 Function of LEX

LEX contains the metabolites of lactobacilli and cell lysis components. The metabolites invigorate gut microbiota and increase its diversity. Oral administration of these metabolites promotes rapid growth of beneficial bacteria in the gut and maintains a healthy microbiome, while the cell lysis components stimulate the gut immune system and Peyer’s patches to control the immune balance of the entire body.



1 Fermentation

LEX is produced through the fermentation of non-GMO soymilk using 16 strains of genus *Lactobacillus*. Our proprietary lactic acid bacteria strains are specifically selected for their ability to ferment plant-based materials and achieve exceptionally high cell densities when cultured in soymilk medium. The fermentation process reaches bacterial densities on the order of trillions per gram.



16 strains of genus *Lactobacillus*

Genus	Lactobacillus											
Species	Lacticaseibacillus paracasei Lactiplantibacillus plantarum Levilactobacillus brevis											
Strains	R0101	R0201	R0301	R0401	R0502	R0601	R0701	R0801	R0901	R1001	R1101	Y1201R1305
	R1402	R1502	R1602									

2 Aging

Like fine wine, the fermented soymilk undergoes an extensive maturation process over 12 months. During aging, lactic acid bacteria cells within the fermented product gradually degrade, producing smaller molecules with enhanced bioactivity.

3 Extraction

The aged fermentation product undergoes extraction to remove large molecules such as soybean-derived proteins. Smaller molecules are selectively extracted to obtain a clear lysate without turbidity.

Metabolomic analysis of LEX extract

Metabolomic analysis detected approximately 4,000 peaks in the extract, with about 1,300 sample-specific peaks identified. The average molecular weight of these 1,300 peaks was 442.298, with a maximum of 1437.65 and minimum of 99.0684. Database comparison identified 363 small molecule components, including 202 peptides. Low molecular weight compounds include amino acids, amino acid derivatives, short-chain fatty acids, amines, nucleotides, and purine derivatives. The abundance of short-chain peptides warrants detailed analysis to identify specific peptide species responsible for functional benefits.

1 Grown on Gutlex Farm: Non-Chemical Cultivation of Non-GMO Soybeans

Gutlex Farm is located at the foot of Mt. Fuji in the beautiful countryside surrounded by rich natural landscapes. The non-GMO soybeans used to produce LEX are grown naturally without pesticides or chemical fertilizers. LEX is also applied to soybean saplings and soil to cultivate beneficial bacteria. With careful attention throughout the growing process, soybean saplings develop robustly. After harvest, soybeans are carefully selected to ensure optimal fermentation quality.



Fertilizing the soil



Spraying



Catching bugs



Harvest



Selecting high-quality soybeans by hand

2 Gut Health Across 2,700+ Clinics In Japan

Since 2002, we have been working with medical institutions in Japan, and over 2,700 clinics now provide LEX, the formula behind Gutlex, products to their patients.



3 GMP-Certified Factory

The Gutlex manufacturing facility is certified as a Health Supplement Food GMP by the Japan Health and Nutrition Food Association. Additionally, it has adopted the HACCP system to ensure consistent product quality. We are committed to delivering the highest quality products to customers worldwide.



4 Anti-Doping Certification & Supporting Athletes

Gutlex is certified as Informed Choice by the British organization, LGC Limited. (<https://www.lgcgroup.com/>)



Gutlex supports athletes by providing LEX products, and we have been conducting research with Professor Sugita at Nippon Sport Science University (<https://www.nittai.ac.jp/eng/>) on the efficacy of LEX in athletes. The most recent studies on endurance athletes included:

1. Changes in gut microbiota composition during the test period
2. Changes in urinary metabolites due to LEX ingestion
3. Association between gut microbiota and urinary metabolites

For more information, see the original research article on PLOS ONE: <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0262906>

5 Clinical Applications of Gutlex

Digestive Disorders

Constipation: Reduced short-chain fatty acid (SCFA) production leads to decreased colonic motility and waste accumulation. LEX delivers butyrate to fuel colonocytes and restore peristalsis.

Diarrhea: Compromised gut barrier integrity impairs water absorption regulation. LEX restores bacterial balance, reducing frequency and urgency.

Bloating: Enzyme deficiency causes incomplete food breakdown and fermentation. LEX provides metabolites that reduce gas production and abdominal distension.

Indigestion: Sluggish motility and enzyme insufficiency delay gastric emptying. LEX supports bacteria that produce digestive compounds, improving transit time.

Acid Reflux: Dysbiosis weakens the lower esophageal sphincter and increases gastric acid secretion. LEX restores bacterial balance and regulates acid production.

Antibiotic Compatibility: Unlike probiotics, postbiotics remain stable during antibiotic therapy. Studies demonstrate that LEX increases antibiotic efficacy by 10–14%, reduces antibiotic-associated diarrhea from 20–40% to 0–13%, and accelerates microbiome recovery post-treatment.

Immune Function

Barrier: The epithelial barrier regulates molecular absorption. Barrier dysfunction permits translocation of toxins and antigens, triggering systemic inflammation. LEX strengthens tight junctions, preventing immune dysregulation.

Immune Modulation: Approximately 70% of immune cells reside in gut-associated lymphoid tissue (GALT), where bacterial metabolites regulate immune responses. LEX delivers these regulatory metabolites, maintaining appropriate immune activation.

Food Sensitivities

Lactose Intolerance: Insufficient lactase production impairs lactose digestion. LEX provides metabolites that support lactose breakdown, reducing gastrointestinal symptoms.

Enzyme Deficiency: Inadequate digestive enzyme production causes incomplete macronutrient breakdown and fermentation. LEX supports enzyme-producing bacteria.

Barrier Dysfunction: Compromised intestinal barrier allows antigenic proteins to trigger immune responses. LEX strengthens epithelial integrity and reduces inflammatory reactions to dietary antigens.

Dermatological Conditions

Gut-Skin Axis: Intestinal barrier breakdown allows inflammatory mediators to enter systemic circulation, manifesting as dermatological pathology. LEX reduces intestinal inflammation and strengthens barrier integrity.

Acne: Dysbiosis increases systemic inflammation and disrupts hormonal regulation, affecting sebum production and keratinocyte turnover. LEX restores bacterial homeostasis.

Eczema & Rosacea: Increased intestinal permeability triggers immune hyperreactivity against cutaneous tissue. LEX strengthens barrier function and modulates immune response.

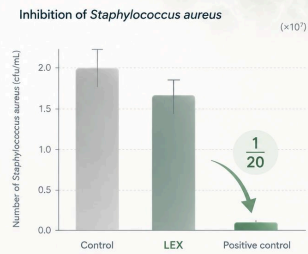
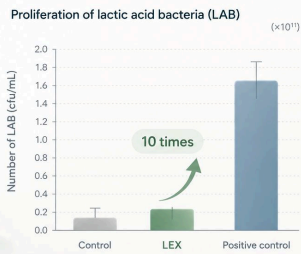
Skin Quality: Gut bacteria produce metabolites essential for collagen synthesis and cellular renewal. LEX delivers these compounds to support dermal health.



BASIC RESEARCH

Postbiotics Definition and Scope - ISAPP Consensus Statement

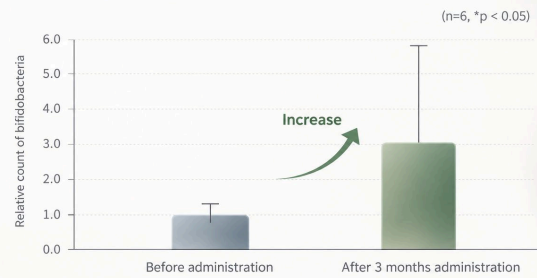
Proliferation of lactic acid bacteria (LAB) and inhibition of *Staphylococcus aureus*.



BASIC RESEARCH

Effects of 'LEX' on intestinal bacteria

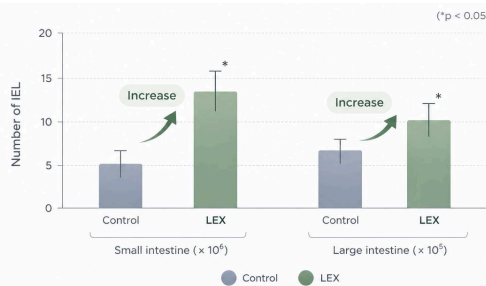
Increasing endogenous intestinal bifidobacteria



BASIC RESEARCH

Activation of intestinal immunity on mice

Increase of intestinal intraepithelial lymphocytes (IELs)



Dr. Toru Abo / Niigata University Graduate School
Immunol Lett. 102: 74-78 (2006).

BASIC RESEARCH

Anti-*Helicobacter pylori* (*H. pylori*) effect

Bacteriostatic effect of *H. pylori* on *H. pylori*-positive patients.

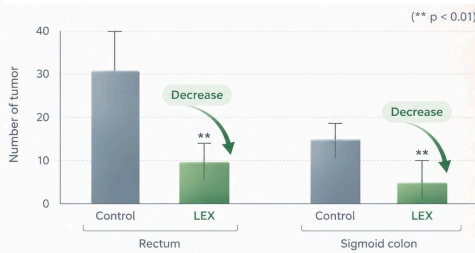


Dr. Hiromi Shinya / Clinical Professor Albert Einstein College of Medicine
<https://pubmed.ncbi.nlm.nih.gov/articles/PMC3997687/>

BASIC RESEARCH

Anti-tumor effects on mice

Suppression of tumor development on colon carcinogenesis

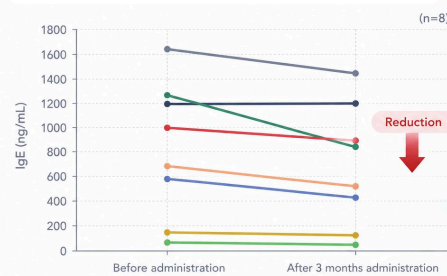


Dr. Takehiko Fujino / Professor Emeritus, Kyushu University
Oncology reports 8 (2001): 1073-1078
https://www.researchgate.net/publication/12617122_Oxidative_stress_induced_by_L-buthionine-SR-sulfoximine_a_selective_inhibitor_of_glutathione_metabolism_abrogates_mouse_kidney_mineralocorticoid_receptor_function

BASIC RESEARCH

Suppression of allergic reaction

Reduction of non-specific IgE on allergic patients

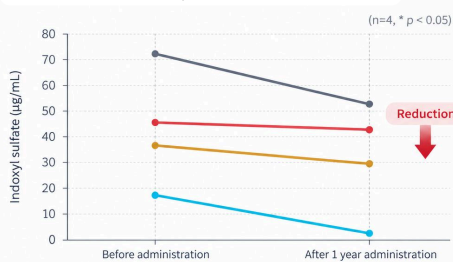


Dr. Atsushi Matsunaga / Executive Director, Ohkita Clinic

BASIC RESEARCH

Reduction of uremic toxin

Reduction of serum indoxyl sulfate (human)

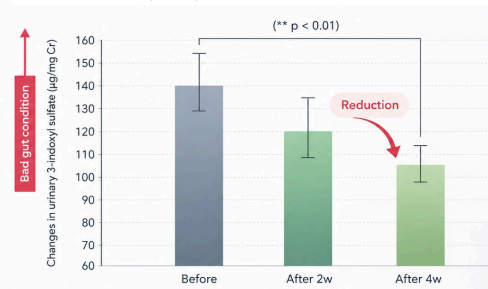


Dr. Akira Kawashima / Associate Professor, Tokyo Aike Medical University
Japan Soc Nephrol. 2006; 48(3):280.

BASIC RESEARCH

Improvement of intestinal environment factor

Reduction of urinary indoxyl sulfate



B&S Corporation Co., Ltd.
Nutrition and Dietary Supplements 12: 301-309 (2020).

BASIC RESEARCH

Increase of short-chain fatty acid

Increase of acetic acid content in feces (human)

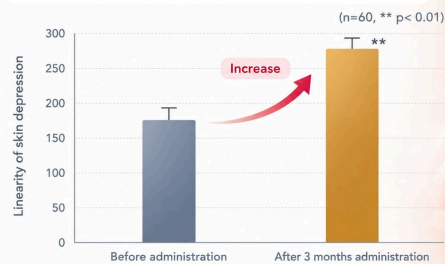


B&S Corporation Co., Ltd.
J Jpn Mibyo Sys Assoc. 20: 71-75 (2014).

BASIC RESEARCH

Improvement of skin quality

Smoothing skin texture



Dr. Tokiko Komura / Tokiko clinic
Aesthetic Dermatology 24: 238 (2014).

BASIC RESEARCH

Improvement of periodontal pocket

Change of average depth of the periodontal pocket (human)

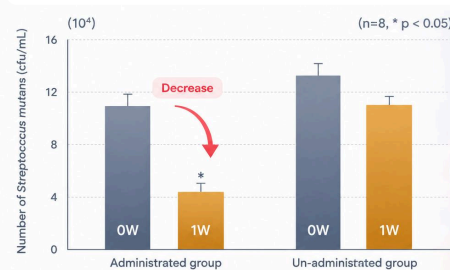


The 16th Annual Meeting of the Japanese Society for Complementary and Alternative Medicine (2013).

BASIC RESEARCH

Propagation inhibition of caries bacteria

Change of number of Streptococcus mutans (human)

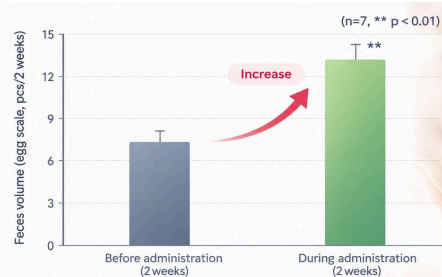


Dr. Takako Yamaguchi / Higa Dental Clinic
The 16th Annual Meeting of the Japanese Society for Complementary and Alternative Medicine (2013).

BASIC RESEARCH

Improvement of bowel movement

Increase of feces on constipated women



Seikoukai Group Clinic

BASIC RESEARCH

Improvement of stomach uncomfortable symptom

Change of stomach symptom on cancer patients



Dr. Mareo Naito / A-ayama blue clinic

Postbiotics Definition and Scope - ISAPP Consensus Statement

Study: The International Scientific Association of Probiotics and Prebiotics (ISAPP) consensus statement on the definition and scope of Postbiotics

Reference: Salminen, S., Collado, M. C., Endo, A., Hill, C., Lebeer, S., Quigley, E. M. M., Sanders, M. E., Shamir, R., Swann, J. R., Szajewska, H., & Vinderola, G. (2021). *Nature Reviews Gastroenterology & Hepatology*, 18(9), 649–667.

Findings: This consensus statement provides the official scientific definition of postbiotics as “preparations of inanimate microorganisms and/or their components that confer a health benefit on the host.” The statement establishes postbiotics as a distinct category from probiotics and prebiotics, clarifying their role in promoting human health through bacterial metabolites and cell components rather than live microorganisms.

Postbiotics as an Evolving Concept in Functional Foods

Study: Postbiotics: An evolving term within the functional foods field

Reference: Aguilar-Toalá, J. E., Garcia-Varela, R., Garcia, H. S., Mata-Haro, V., González-Córdova, A. F., Vallejo-Cordoba, B., & Hernández-Mendoza, A. (2018). *Trends in Food Science & Technology*, 75, 105–114.

Findings: This review explores the emerging concept of postbiotics within functional foods, defining them as bioactive compounds produced during fermentation. The study highlights how postbiotics represent an evolving area in gut health research, distinct from probiotics and prebiotics, and discusses their potential applications in promoting human health through microbial metabolites and cell components.

<https://pubmed.ncbi.nlm.nih.gov/35085328/>

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