



Gut Microbiota and Probiotic Science
Foundation (India)

PRO GUT VI

NEWSLETTER • JAN 2024



Human
GUT

Contains around
100 Trillion
Bacteria -
good & bad

PROBIOTICS

ARE HERE TO STAY

Probiotic Awareness Day



Probiotic Awareness Day Sikkim University

30th May 2023

With an aim of increasing awareness about probiotics among school children, and igniting their minds to research, read, present and gain knowledge on probiotics, a school level competition was organized by Sikkim University (Central University) in association with Gut Microbiota & Probiotic Science Foundation (India) for Senior Secondary schools (Class XI and XII) of Gangtok on 30th May (Tuesday) 2023.

Nine Senior Secondary schools located in and around Gangtok participated in the competition. Each presenter made the presentations so informative and scientific, with full emphasis on health benefits of probiotics in combatting diseases.





SMC College of Dairy Science, Kamdhenu University, Gujarat

25th July 2023

SMC College of Dairy Science, Kamdhenu University, Gujarat, in association with Gut Microbiota and Probiotic Science Foundation, India and Swedish South Asian Network on Fermented Foods (SASNET) organized "PROBIOTIC AWARENESS DAY"- an awareness program and competition for school children on 25th July 2023.

Twenty schools in and around Anand, enthusiastically participated in the contest and presented on the topic 'Probiotics and Human Health'.



Glimpses from The 13th India Probiotic Symposium

25th March & 26th March 2023
Institute of Liver and Biliary Sciences, New Delhi



The 13th India Probiotic Symposium

The 13th INDIA PROBIOTIC SYMPOSIUM on "Science Based Evidence on the Benefits of Probiotics for Human Health" was organized on 25th and 26th March '23, at the Institute of Liver and Biliary Sciences, New Delhi. The symposium also witnessed the official release of the book **"GUT MICROBIOME, PROBIOTICS AND GOOD HEALTH- THE EVIDENCE GETS STRONGER"**. With two interesting Key Note Lectures by International experts and seven illustrious talks on the emerging scientific evidence of the benefits of probiotics, on human health, the symposium highlighted key take aways on the benefits of probiotics, in athletes, for the elderly, in patients undergoing surgery/ transplants and to combat the growing burden of anti microbial resistance. The symposium also witnessed active deliberations on "Probiotics as Vaccine Immunity Boosters in Immunization and their role in combatting Non-Communicable Diseases."



Young Investor's Award



1 Prize - Krupali Ramanuj



Dairy Microbiology Department, SMC College of Dairy Science, Kamdhenu University, Anand, Gujarat, India

Influence of *Limosilactobacillus fermentum* and *Saccharomyces cerevisiae* on the growth performance, hematological traits, metagenomic analysis of caecal microbiota of broiler chicken.

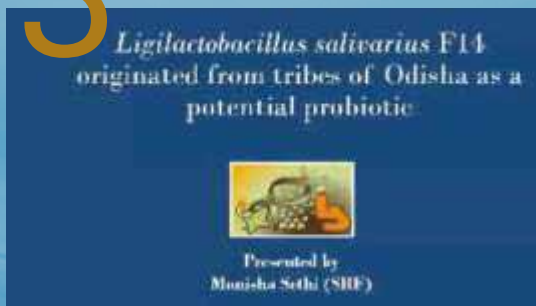
2 Prize - Basavaprabhu H N



Translational Health Science and Technology Institute, NCR Biotech Science Cluster, Faridabad, Haryana, India

Gut microbial functions linked with the Non-Alcoholic Fatty Liver Diseases of Indian patients.

3 Prize - Manisha Sethi



Institute of Life Sciences, Bhubaneshwar, Odisha

Ligilactobacillus salivarius F14, originated from tribes of Odisha as a potential probiotic.

3 Prize - Vaishali Dasriya



Dairy Microbiology, National Dairy Research Institute (ICAR-NDRI), Karnal, Haryana, India

γ -aminobutyric acid (GABA) producing *Lactobacilli* E31 exhibited anti-alzheimer potential in an animal model.



PARKINSONS
DISEASE

UPPER RESPIRATORY
TRACT INFECTIONS

IMMUNE
SENESCENCE

Learnings from The 13th India Probiotic Symposium

NEUROINFLAMMATION

Dr. Michael Bailey

Associate Professor of Pediatrics
The Ohio State University, College of Medicine
Principal Investigator
Center for Microbial Pathogenesis
Nationwide Children's Hospital

Two strategies were employed to reduce neuroinflammatory responses. In the first, probiotic *Lactobacillus reuteri* was grown as a biofilm on a biocompatible, microsphere. The administration of probiotic *L. reuteri* and the microsphere attenuates inflammatory diseases, even severe inflammatory diseases (such as necrotizing enterocolitis) and brain damage that can occur as a consequence of severe inflammation. The second strategy involved the use of prebiotic galactooligosaccharide, which led to the expansion of bacteria (such as *Akkermansia*) capable of producing anti-inflammatory metabolites.

PARKINSON'S DISEASE

Dr. Lynne Barker

Associate Professor,
Cognitive Neuroscience
Sheffield Hallam University, Sheffield, UK

Parkinson's Disease (PD) is a neurodegenerative condition, that affects multiple motor and non-motor functions. One pattern of underlying pathology involves the accumulation of abnormal clumps of alpha-synuclein protein (Lewy bodies) in the central nervous system (CNS) of people with Parkinson's Disease, that impede normal neuronal function. Evidence indicates that the production of alpha-synuclein begins in the gut. Gastrointestinal problems termed gut dysbiosis are a common feature in Parkinson's Disease.

IMMUNE SENESCENCE

Dr. Caroline Childs

Associate Professor,
Nutritional Sciences, University of Southampton,
England

Immune function declines with age, resulting in impaired vaccination responses and an increased risk of infections, complications and mortality, arising from communicable diseases. The gut microbiome also shows changes with ageing, with both direct and indirect effects arising upon the immune system. There is evidence that probiotics can improve in vivo and ex vivo measures of immune function in older adults.

UPPER RESPIRATORY TRACT INFECTIONS

Prof. Michael Gleeson

Emeritus Professor of Exercise Biochemistry,
Loughborough University, UK

According to UK Sport, a third of missed training sessions are caused by illness, with 40-60% of athletes' illnesses involving the respiratory tract, and 10-20% the digestive system. Studies have shown that taking daily *Lactobacillus/Bifidobacterium*, probiotics at a dose of at least 10^{10} CFU for several months, ensuring adequate vitamin D status and eating plenty of fruit and vegetables, can help to reduce episodes of respiratory illness.

Gut Dysbiosis

What is New?



1 Gut-Brain connection in Anorexia - Is there a link?

Differences have been found in the levels of both viral and bacterial components, in stool samples, from women with anorexia, compared to women with a healthy weight. Increase in viral richness and decreased in bacterial diversity was observed. A reduction in gut bacteria responsible for the production of Short Chain Fatty Acids (SCFAs) such as *Roseburia* species, was observed in people with anorexia. This resulted in alteration of the epithelial barrier function, and reduced colonic motility. 35 microbiota related metabolites were observed in serum samples which correlated with anorexia. These include increased levels of secondary bile acids, tryptophan metabolites etc.

Reference : Nature Microbiology, Volume 8, 787–802 (2023)

2 Thousands of new viruses found in baby diapers

A study on the diaper samples of 650 healthy one year-old babies, for 5 years, led to the discovery of 10,000 species of viruses, most of them unknown until now. Far from causing children to be sick, those viruses are thought to be true friends, playing an important role in protecting them from chronic diseases.

Reference: Nature Microbiology, Volume 8, 986–998 (2023)

3 Study finds bacteria in semen may impact male fertility

A study conducted by researchers at the Department of Urology at University of California, Los Angeles (UCLA) recruited 73 men who were either undergoing a vasectomy consultation or fertility evaluation. The study founds that increased presence of the *microbe Lactobacillus inners* correlated with issues in sperm motility, one of the key factors in male fertility. The researchers showed that *Lactobacillus inners* is known to produce L-lactic acid which creates a pro-inflammatory environment detrimental to sperm movement. The findings are crucial because it is the first time a negative link between this microbe and male-factor fertility has been reported.

Reference: Sci Rep, 14(1):1068, 2024



THE PROMISE OF PROBI

Can
the trio of
Prebiotics,
Probiotics, and
Postbiotics
prevent
Anemia?


A Combination
of Oral and
Vaginal Probiotics
may prevent
Urinary Tract
Infections (UTIs)

Iron deficiency anaemia (IDA) is very common and affects approximately 1/3 of the world's human population. There is scientific data to show that some *Lactobacillus* and *Bifidobacterium* species, improve iron absorption and influence the course of anemia. Furthermore, prebiotics, including galactooligosaccharides (GOS) and fructooligosaccharides (FOS), increase iron bioavailability and decrease its destructive effect on the intestinal microbiota. In addition, multiple postbiotics, which are probiotic metabolites, including vitamins, short-chain fatty acids (SCFAs), and tryptophan, are involved in the regulation of intestinal absorption and may influence iron status in humans. In conclusion, prebiotics, probiotics and postbiotics influence iron absorption, and its condition in humans and should be considered in the holistic treatment of iron deficiency anemia.

Reference: *Microorganisms*. 10(7): 1330, 2022 Jul

Nearly half of all women, will have one UTI during their lifetime with the prevalence rising with age. A double blind randomized control trial was conducted to enrol 174 premenopausal women to received placebo, vaginal, oral or a combination of oral and vaginal probiotics. Supplementation with either vaginal or in combination with oral probiotics demonstrated effectiveness in preventing recurrent symptomatic UTI episodes.

Reference: *Clinical Infectious Diseases*, ciad766
<https://doi.org/10.1093/cid/ciad766>



A 2023 meta-analysis of 14 studies with 15,494 participants indicated significant decreases in both systolic and diastolic blood pressure following probiotics supplementation.

Reference: Nutr Metab Cardiovasc Dis; 33(2):275-286, 2023 Feb

PROBIOTICS

**PROBIOTICS SHOW
PROMISE IN POTENTIALLY
MITIGATING RISK OF
HYPERTENSION BY
INFLUENCING OXIDATIVE
STRESS, METABOLITE
PRODUCTION,
ENDOTHELIAL FUNCTION,
AND VASCULAR
INFLAMMATION.**

Effect of (*Lacticaseibacillus paracasei*) strain Shirota supplementation

a. 128 participants diagnosed with Parkinson's disease were randomized to receive (*Lacticaseibacillus paracasei*) strain Shirota or placebo for 12 weeks. Fecal and blood samples were also collected and fecal metabolites analyzed. Results indicated a higher frequency of defecation, greater improvement in the quality-of-life score and greater improvement in psychiatric symptoms such as depression and anxiety. L-tyrosine, an amino acid that serves as a precursor for neurotransmitters, was also found in significantly decreased concentrations in the stool samples, and significantly elevated concentrations in the blood samples of participants in the probiotic group as compared to those in the placebo group.

Reference: X. Yang, et al., 2023/7
Food Funct. 14(15), 6828-6839

b. Effect on nutrient absorption Physically active males were provided a plant protein along with either a probiotic supplement containing (*Lactobacillus paracasei*) strain Shirota or a placebo, and the concentration of amino acid in their blood, was examined. Compared to the placebo group, the probiotic group possessed significantly increased concentrations of amino acids, in their blood, following consumption of the plant protein. This research suggests that probiotics may aid in the digestion and absorption of plant proteins.

Reference: R. Jäger, et al.,
Curr Opin Clin Nutr Metab 2020/11,
Care. 23(6), 428-436

10th YAKULT SHIROTA CONFERENCE & 31st SYMPOSIUM ON INTESTINAL MICROBIOTA, TOKYO, 2023



Dr. Daisuke Chinda
Associate Professor, Division of Endoscopy,
Hirosaki University Hospital, Japan

Small Intestinal Fluid Perfusion using Endoscopic Retrograde Bowel Insertion (ERBI) which tested ileal fluid showed that following consumption of *Lactobacillus paracasei* strain Shirota (LcS) or *Bifidobacterium breve* strain Yakult (BbrY), both strains reach the distal ileum, while maintaining the colony forming ability, and occupied over 90% of the microbiota, for several hours suggesting that these strains reach the distal ileum live and stimulate host cells.

Differences in the live microbiota composition among different parts of the large intestine

Conventional assays (live and dead bacteria derived 16S rRNA gene sequencing) which tested the gut microbiota composition, in mucus secretions of the intestinal tract (ascending colon, descending colon and rectum), showed no difference in the microbiota composition, in the contents of different sections of the large intestine, while Propidium Monoazide (PMA) - MiSeq (live bacteria – derived 16S rRNA gene sequencing), showed a decrease in the number of *Lachnospiraceae* as one moves from proximal to distal colon, as well as an increase in *Bacteroidaceae* and *Bifidobacteriaceae*.

Propidium Monoazide (PMA) – MiSeq is an effective approach, to determine the live microbial composition, in different parts of the large intestine.

Mucosal defense by Polymeric Ig A

Prof. Reiko Shinkura,
Professor, Institute for Quantitative Biosciences,
Laboratory of Immunology and Infection Control,
University of Tokyo, Japan

In an attempt, to develop the world's first drinkable Ig A antibody drug, as a curative CDI therapy, a murine monoclonal antibody was isolated, that had the ability to screen intestinal bacteria and eliminate only the pathogenic bacteria, without affecting beneficial microbes. It could recognize multiple bacterial species including *C difficile* and helps to maintain the overall balance of the gut microbiota, rather than eliminating a specific bacterial species.

Role of Microbiota and its metabolites during viral infections

Ana Paula Duarte de Souza
Pontifical Catholic University of Santa Maria (UFSM),
Brazil

A high fiber, diet can protect against RSV infection in mice, and the mechanism of protection is associated with microbiota modulation, and the production of Short Chain Fatty Acid - Acetate. The mechanism of acetate protection against infection, was dependent on the production of type 1 interferon in the lungs. Investigations to use a bacterial lysate, (postbiotic) showed that the short chain fatty acid – acetate protects against RSV infection, when administered orally, before infection and intranasally after infection

Gut Microbiota and Synbiotic therapy in critically ill patients

World – wide, there are nearly 50 million cases of sepsis of which more than 10 million die. In such a state the diversity of the gut microbiota is drastically reduced and organisms such as MRSA (Methicillin Resistant *Staphylococcus aureus*) and fungi are increased. When 72 patients with sepsis were started on synbiotics (*B. breve*, *L. casei*, Oligosaccharides) within 3 days of admission, total number of bacteria increased significantly over time. In addition there was an increased in short chain fatty acids, especially acetic acid. Regarding the infectious complications the incidence of diarrhoea (6.3% vs. 27.0 %), and ventilator associated pneumonia, was significantly lower in the treated group (14.3% vs. 48.6%).

World Gastroenterology Organisation Global Guidelines

Probiotics and prebiotics

February 2023



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A Classification System for Defining and Estimating Dietary Intake of Live Microbes in US Adults and Children

Reference : J Nutr 2022 Jul 6;152(7):1729-1736. doi:
10.1093/jn/nxac074.

What's new?

01 The bacteria *Blautia*, is abundant in non - overweight and non - diabetic individuals. Oral administration of *Blautia* into mice fed a high fat diet, resulted in weight loss & reduction of diabetic symptoms. It appears that *Blautia* produces a unique amino acid metabolite – ornithine, acetylcholine and S - adenosylmethionine, which are known to promote energy metabolism.

02 Ethanol treated human faecal samples composed of spores of *Clostridium* IV and XIV has been approved in the for rCDI in the United States in April 2023. *Clostridium* IV and XIV exhibit strong colonization resistance against enteropathogenic bacteria.

03 The Hongkong Consumer council, is urging the government to set up legislation, to regulate dietary supplements including probiotics. The council announced when releasing its review of 40 different probiotic products.



DIFFERENTIATING REALITY FROM MYTHS

The word MICROBIOME was used in its modern context more than a decade before Joshua Lederberg first used it in 2001

There are 10^{10} and 10^{11} microbial cells per wet-weight gram of faeces and not 10^{12} microbial cells per gram of the wet faeces

The total weight of the human microbiota is much more likely to be less than 500 g, and perhaps even considerably lower than this in some cases

The microbiota outnumbers human cells by 10:1, more detailed analyses indicate that the true figure, albeit still impressive, is probably closer to a ratio of 1:1

GOVERNING BODY MEMBERS



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President



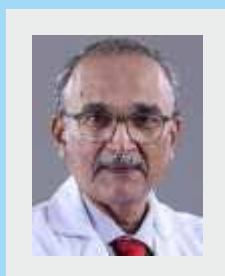
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