



Probiotic Association of India

Probiotics and Microbiome: Gut and Beyond

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From The Chief Editor's Desk

Dear Readers,

A very warm welcome and Season's Choicest Greetings!

It has indeed been a matter of great pleasure and honor for us to launch the 8th issue of the Probiotic News-letter especially after the conduct of the 2nd bi-annual PAi conference and international symposium 'Probiotics and Microbiome – Gut and Beyond' at India Habitat Centre, New Delhi from 3rd to 4th Nov., 2014. This special issue has been exclusively dedicated to the comprehensive coverage of the two days deliberations of the conference from a broader perspective to highlight the burgeoning issues that emerged from the presentations and talks delivered by eminent speakers and young researchers. The Conference was attended by around 250 delegates representing all the stake-holders from different parts of India extensively involved in Probiotic research and marketing. The major focus of this conference had been on the role of probiotics in the modulation of gut brain axis from the perspective of managing neurological disorders with serious health implications. The conference was inaugurated by Dr. V.M. Katoch, Secretary, DHR and DG, ICMR. Dr. N.K. Ganguly, Former DG, ICMR and presently distinguished Biotechnologist (DBT) and Dr. John Bienenstock, Distinguished University Professor & Director, Body Brain Institute, Canada also graced the occasion with their presence as the guests of honor. The Conference had a very exhaustive scientific program covering almost all the emerging domains of probiotic applications not only confined to gut health alone but also beyond that too. The scientific program began with a session on oral presentations from young investigators on day 1 i.e. 3rd Nov., 2014 which was a special attraction in the conference. Besides this, there were two plenary and six technical sessions wherein eminent speakers recognized internationally for their pioneering work on probiotics in their respective areas of specialization from India and abroad delivered their specialized key note addresses and invited talks. Another special attraction in the Conference was the Academia-Industry interphase wherein a panel of prominent experts in probiotic science and regulations from academia along with the representatives from the industry actively participated in the panel discussions on some burning issues related to probiotic applications as foods, supplements, nutraceuticals and pharma products from regulatory and commercial perspectives. As per the feedback received from the enlightened delegates, prominent invited speakers from both India and abroad, highly distinguished professionals from medical science, nutrition and academics well known for their pioneering work in Probiotics, who participated in the conference, the conference, was an instant success. In their opinion, it was rated as one of the best meticulously conceived and designed conference with a well-designed scientific program in this highly exciting subject of probiotics ever conducted in the country where high quality hard-core science in emerging domains of Probiotic research was discussed at length and brain stormed at molecular level with some take home message for all the stakeholders from human health perspective. The overall proceedings of the individual talks and presentations made during the conference in various technical sessions have been summarized under the following sections. I hope, our esteemed readers will find the contents of this newsletter interesting and enable them to revisit those wonderful moments will refresh the fond memories of particularly those who happened to participate in the conference and motivate them to direct their new research initiatives on similar lines to reap the rich harvest of probiotic health promoting functions from a broader perspective.

(SUNITA GROVER)
Chief Editor

Conference Highlights

2nd Annual Conference of PAi and international symposium 'Probiotics and Microbiome – Gut and Beyond' was organized by Probiotic Association of India on Nov. 3-4, 2014 at India Habitat Centre, Lodi Road, New Delhi. The Conference was attended by around 250 delegates representing faculty and students from academia, universities, research organizations, medical professionals, clinicians, nutritionists, dieticians and representatives of local and multinational food/dairy and pharma industry from different parts of India and abroad who were extensively involved in probiotic research, gut microbiota as well as marketing. The conference was inaugurated by Dr. V.M. Katoch, Secretary, DHR and DG, ICMR as a chief



guest. Dr. N.K. Ganguly, Former DG, ICMR, and presently distinguished Biotechnologist (DBT) and Dr. John Bienenstock, Distinguished University Professor and Director, Body Brain Institute, Canada also graced the occasion with their presence as the guests of honor. The conference inaugural session was presided over by Dr. A.K.Srivastava, Director and Vice Chancellor, NDRI and President PAi. The occasion also marked the release of a status paper on Probiotic Research and Product Development carried out in India from National Perspective and a Consumer's Guide on Probiotics for Health Applications along with the conference souvenir.

The Conference had a very exhaustive scientific program spread over two plenary sessions with six technical sessions and covering almost all the emerging domains of probiotic applications not only confined to gut health

alone but also beyond that involving Gut-Brain axis.

The conference began with session on oral presentations by short listed six young researchers namely Miss Angela Verma, Department of Microbiology, Punjab University, Chandigarh; Miss Archana, C., College of Dairy Science and Technology, Mannuthy, Thrissur, Kerala; Mr. Bamola V.D., Department of Microbiology, All India Institute of Medical Sciences, New Delhi; Miss Rashmi H Mallappa, Molecular Biology Unit, Dairy Microbiology Division, National Dairy Research Institute, Karnal; Mr. Rohit Sharma, Animal Biochemistry Division, National Dairy Research Institute, Karnal; Mr. Kumar Siddharth Singh, Animal Biotechnology Centre, National Dairy Research Institute, Karnal who were selected after rigorous scrutiny by a panel of six experts.



Conference Highlights



The first presentation was made by Miss Angela Verma on “Oxidative stress and colonic damage attenuation by symbiotic (*Lactobacillus rhamnosus* + *Lactobacillus acidophilus* + inulin) in 1,2-dimethylhydrazine dihydrochloride-induced colon carcinogenesis in Sprague Dawley rats”. The present study depicted that synbiotic is a better prophylactic strategy than probiotic and prebiotic alone, due to the higher increase in antioxidants associated with the higher degree of attenuation of DMH-induced tumorigenesis. The second presentation was made by Miss Archana on “An *in vivo* bacterial and host specific gene expression study associated with probiotic survival in the mice gut fed with *Lactobacillus plantarum* 91” who presented the work carried out on relative expression of *atpD* (a key part of F1F0-ATPase operon), *bsh* (bile salt hydrolase), *mub* (mucus-binding protein) and *MUC2* (mucin) genes in mouse model for establishing the *in vivo* functional efficacy of *Lactobacillus plantarum* (Lp91). She concluded that the expression of *atpD*, *bsh*, *mub*, *MUC2* genes could be considered as prospective and potential biomarkers for screening of novel probiotic lactobacillus strains for optimal functionality in the gut. The third young investigator Dr. Bamola touched upon a very recent topic on “Metagenomics in health and disease: exploring gut microbial diversity in healthy Individuals, Inflammatory bowel disease and colon cancer patients”. The study revealed that microflora of a healthy adult showed high number of *Bacteroidetes* (84%) and less of *Firmicutes* (4%). When compared with age and sex match patient of colon cancer, there was a remarkable decrease in *Bacteroidetes* (52%) and increase in *Firmicutes* (29%). There was difference in the class Clostridia, which was 2 % in healthy individual and 24 % in colon cancer patient. Results are also indicative of role of gut microflora in colonic health and provide insight into microbial community in IBD and colon cancer and will help to establish certain microbial biomarkers for these diseases.

Miss Rashmi H Mallappa, highlighted the importance of postbiotics and GLP- 1 (Glucagon like peptide -1) during her presentation on “Exploring probiotics and postbiotics for their potential to stimulate GLP-1 secretion from enteroendocrine cells”. She informed that the probiotic strains stimulated the secretion of GLP-1 in a strain specific way. The results of the study revealed that formulation of dietary strategies using probiotic cultures viz. LrhS3, Lr120, Lp91, Lf1 has the prospects to be explored as antidiabetic therapeutics in patients to improve the quality life. Mr. Rohit Sharma presented that the supplementation of potent probiotic strains (*L. fermentum* and *L. rhamnosus*) with known immunomodulatory attributes to aging mice can alleviate different deleterious characteristics of immunosenescence and age-inflicted oxidative stress, thereby, augmenting general healthy aging. Strain specific immunomodulatory responses of probiotic bacteria were highlighted. Probiotics also resisted pathogenic *E. coli* colonization in organs and peritoneal fluid of the animals. Thus, improvements in several immune functions, ability to resist infection and oxidative clearance were observed on consumption of Lactobacilli fermented milk, indicating their multi-faceted effects on aging physiology. Thus, these probiotics may find applications as immune-stimulants in elderly or in otherwise immune-compromised conditions.

Conference Highlights

Our last young researcher Mr. Kumar Siddharth Singh deliberated on “Muco-adhesive potential in domains of mucus binding protein (Mub) of *Lactobacillus plantarum*” highlighting the importance of surface proteins to serve as a potential target for disrupting host-pathogen interaction. He presented effect of architecture of *Lactobacillus plantarum* Mub domains on the recombinant expression, their binding and affinity with mucins, human gut cell line and intestinal tissue. He reported that recombinant S5S6 was expressed in Lemo strain of *E. coli* in soluble form which was purified to homogeneity. Rec-S5S6 protein could bind with human intestinal tissue lining and extracellular matrix, as well as with HT-29 cell line. Binding affinity of Rec-S5S6 towards Mucin-III was also studied. Thus, biologically active S5S6-Mub protein has the potential to be used as a diagnostic tool or as prophylactic agent against pathogen invasion.

Young investigators Awardees

- Dr. Rashmi H Mallappa
- Dr. Rohit Sharma
- Dr. Kumar Siddharth Singh

First Plenary Session on the theme of “Gut feeling and food for thought” was chaired by Prof. N. K. Ganguly and addressed by John Bienenstock, Director, Body Brain Institute, Canada as the key note speaker. In his address, he advocated the importance of gut microbiome in maintaining homeostasis of the mammalian immune system and regulation of glucose metabolism. He emphasized on the function of microbiome in the differentiation and maturation of the nervous system as well as many aspects of behavior.

The first technical session titled “Probiotics and Gut Brain Axis- Food For thought” was chaired by Dr. John Bienenstock and two invited talks were delivered. In the first presentation on “Neuroimmunomodulation of the young brain : microbiome–gut immune brain axis”, Dr. Aletta D. Kraneveld, Utrecht Institute for Pharmaceutical Sciences, The Netherlands informed that accumulating data indicate that the gut microbiota communicates with the Central Nervous System and influences brain function and behavior. She emphasized the importance of gut-immune-brain axis in various psychiatric disorders, including neurodevelopmental disorders such as autism spectrum disorder (ASD). Dr. Marina Lynch, Professor of Cellular Neuroscience Trinity College Institute of Neuroscience, Dublin, Ireland deliberated on the role of probiotics in resetting the intestinal microbiota and in attenuating the deficit in long term potentiation in aged rats as a second speaker in this session.



In the second technical session on the topic “Metagenomics of human gut” under the chairmanship of Dr. G. Balakrish Nair, Executive Director, Translational Health Science and Technology Institute, Gurgoan, two presentations were made on metagenomics. Dr. Manimozhiyan Arumugam, University of Copenhagen, Denmark deliberated on “Elucidating the role of human gut microbiome in diseases using metagenomics”. He informed that bioinformatics tools with the advent of next generation sequencing technologies and metagenome-wide association studies (MGWAS) are becoming increasingly important in setting a new trend to elucidate the role of host-associated microbiota in diseases. The second lecture in this session was delivered by Dr. Yogesh Shouche, National Centre for Cell Science, Pune who talked about human gut microbiome in Indian perspective and need for indigenous probiotics and emphasized about the difficulties being faced in understanding of human microbiome in the Indian population due to vast diversity in genetics, dietary habits, and geographic distribution etc.

Conference Highlights



The third and the last Technical Session on “Food Matrix as the centre of probiotics” was chaired by Prof. (Dr.) A.K.Srivastava, Director and Vice Chancellor, ICAR-National Dairy Research Institute, Karnal. Before inviting the key-note speaker, the chairman also reiterated the importance of probiotics in the context of global market, and various issues pertaining to functionality of probiotic dairy foods. Dr. Nagendra P. Shah, Professor and team leader, Food and Nutritional Science, School of Biological Sciences, University of HongKong, delivered a talk on “Food matrix and efficacy of probiotics” as the second guest speaker of the session. He spoke about general characteristics of probiotics like their survival, dosage, different strategies for selection of strains and health benefits.

The deliberations continued on the second day (04.11.2014) also and the second plenary session was focused primarily on “Probiotics and mucosal immunity interactions in early life” where Professor Bruno Pot Centre for infection and immunity of Lille at Institut Pasteur de Lille, France (speaker sponsored by ISAPP), as the key note speaker emphasized the importance of gut microbiota and their interaction with the immune and nervous systems at different stages of life which may be influenced by distinct cultural and socioeconomic factors. He opined that the gut ecosystem can be programmed by dietary and epigenetic means through supplementation with prebiotics, probiotics or other food ingredients. He explained that pregnancy induced microbiota changes that are associated with host physiological and immunological adaptations needed for a successful pregnancy.

The fourth technical session on “Gut Microbiota and the Host –Crosstalk” was chaired by Dr. Bruno Pot from France and there were two invited speakers. Dr. Santasabuj Das of National Institute of Cholera and Enteric Diseases, Kolkata delivered his presentation entitled “Indian Probiotic Strains: An untapped therapeutic Goldmine”. He highlighted the importance of indigenous strains in the treatment of inflammatory diseases due to their strong regulatory effects than available western counterparts. He explained that Lipoteichoic acid (LTA) isolated from the probiotic strains mimicked the anti-inflammatory and regulatory role, which depends on the activation of ERK MAP kinase pathways in the host cells. The second speaker, Dr. Palok Aich from School of biological sciences, NISER, Odisha, spoke on role of probiotics in intervening bacterial and viral infections. He explained probiotics as a new promising paradigm for the treatment of infectious diseases through activation of the innate immune system rather than direct attack on the microbes. This strategy harnesses the natural power of immune responses and may minimize the likelihood of bacterial resistance as the attack is indirect, multi-faceted and evolutionarily successful.

Conference Highlights

The fifth technical session on “Probiotic regulatory perspective: Reaching Consumers and other stakeholders” was chaired by Dr. B. Sesikera, Former Director, National Institute of Nutrition, Hyderabad. Prof. Lorenzo Morelli, Dean of Faculty of Agriculture, Food and Environmental Sciences, Università Cattolica del Sacro Cuore, Piacenza, Italy and Dr. Partha Das Gupta, ExDCGI, New Delhi participated in this session pertaining to regulations in probiotic market. Prof. Lorenzo Morelli delivered a talk on probiotics between science and regulation : a European view. He opined that innovation in the food sector is a particularly complex process, involving not only research but also the consumers’ attitudes and the regulatory bodies. Probiotics represent a case history of this tight cross-linking between science and regulation. He emphasized that the major limitations in claim approval are lack of solid evidence and poor strain identification. Most of the strains were identified by phenotypic characters or up to genus level without their claimed attributes validated by suitable biomarkers of health status. As a second speaker Dr. Partha Das Gupta, deliberated on the topic “Probiotic formulations: clinical trial and registration”. He explained the essential requirements for conducting clinical trials with beneficial microbes under Indian regulations would be to establish safety, strain identification and efficacy of the dosage form. Later in the session Industry Academia Interaction took place which was moderated by Dr. Sesikera and the panelists included Drs. Sesikera, Lorenzo Morelli, Bruno Pot, Partha Dasgupta, V.K. Batish, Neerja Hajela and Andrian Pollard. Number of key issues related to probiotics research, regulation, species of origin, efficacy tests, mass awareness and geographical origin etc. were discussed at length.



The sixth and last technical session on “Probiotic intervention : From a clinical perspective” was chaired by Prof. G.P. Talwar, Talwar Research Foundation, New Delhi. Dr. Sourabh Dutta, Division of Neonatology, Department of Pediatrics PGIMER, Chandigarh spoke on “Role of prophylactic probiotics in the prevention of neonatal necrotizing enterocolitis, sepsis and mortality”. He reiterated the fact that normal colonization in breastfed term babies starts with gut colonization by *E. coli* and *Streptococcus*. These create an anaerobic environment in the gut lumen, which allows subsequent colonization primarily by Bifidobacteria and to a lesser extent by lactobacilli. He explained that the gastrointestinal mucosa is generally in a state of controlled inflammation as both commensal and pathogenic bacteria coexist in the gut at all the times. He discussed the findings of the meta analysis evaluating the effect of prophylactic probiotics on the prevention of neonatal necrotizing enterocolitis (NEC) and neonatal sepsis. Later, Dr. Kanwal Preet Kochhar, from Department of physiology, AIIMS, New Delhi delivered a talk on “Probiotics and Cognitive Functions: New Frontiers in Gut Brain Axis”. She explained a close evolutionary relationship between the gut and the brain by the presence of similar neuro peptides and transmitters they contain. She reviewed the evidences of improvement of neuro degenerative, neuropathic as well as loss of neural plasticity, loss of memory and impaired cognitive and psychometric functions with aging by probiotics and discussed the various key points where probiotics can work.

Conference Highlights

Best Poster Awardees

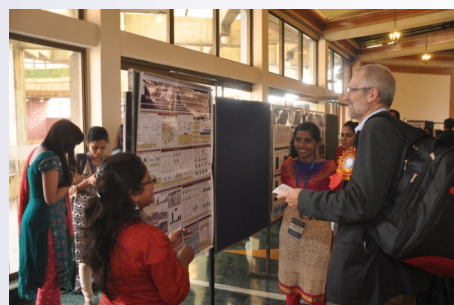
- Prevention of intestinal inflammation by indigenous Lactobacillus strains is associated with generation of regulatory T cells***
 Saha P, Thakur B.K, Kumari R, Grover S, Batish V.K and Das S*.
 1National Institute of Cholera & Enteric diseases (ICMR), Clinical Medicine, P-33,
 CIT Road, Scheme XM,Beliaghata, Kolkata-700010, West Bengal, India.
 2 National Dairy Research Institute, Karnal – 132001 (Haryana).
- Amelioration of Cadmium induced liver and kidney damage in rats by genetically engineered probiotic Escherichia coli Nissle 1917 producing 2-ketogluconic acid***
 Raghuvanshi R., Chaudhari A.S. and Nareshkumar G.
 Department of Biochemistry, Faculty of Science, The Maharaja Sayajirao University of Baroda,
 Vadodara-390002,Gujarat.
- A Non Invasive Technique to Assess Gut Immunity in Healthy Population by Measuring Immunoglobulin Receptor Expression on Viable Colonocytes***
 Samanta P, Bamola V D, Sharma N and Chaudhry R
 Department of Microbiology, All India Institute of Medical Sciences, New Delhi, India
- Lactobacillus rhamnosus (MTCC 5897) fermented milk administration to mothers and offspring during suckling-weaning transition alleviates ovalbumin induced allergy in newborns***
 Saliganti V. Kapila R., Sharma R.,Dass G. and Kapila S
 Animal Biochemistry division, N.D.R.I, Karnal, Haryana, India-132001
- Differential Proteome Study of Lactobacillus fermentum BIF 19***
 Panicker, A. Behare, P. V*. and Mohanty, A. K.
 National Dairy Research Institute, Karnal-132001, Haryana, India
- Modulation of intestinal barrier function to alleviate Salmonella infection in mice by oral administration of fermented milks produced with Lactobacillus plantarum Lp91***
 Rokana N., Singh R., Mallapa R.H., Batish V.K., Grover S.*
 Molecular biology unit, Dairy Microbiology Division,
 National Dairy Research Institute, Karnal - 132001, India.
- Folate fortification by probiotic Lactococcus lactis***
 Divya J B and Madhavan Nampoothiri K
 Biotchnology Division, CSIR- National Institute for Interdisciplinary Science and Technology (NIIST),Thiruvananthapuram
 695019, Kerala.
- Antagonistic potential of indigenous bacterial probiotics of North-Western Himalayas against anaerobic bacterial pathogens***
 Sharma S, Kanwar S.S.
 Department of Microbiology, CSK Himachal Pradesh Agricultural University, Palampur-176062,
- Improving vitamin B12 status through vitamin B12 producing probiotic fortified yoghurt***
 Advani KH, Mudaliar GV, Lubree HG, Joglekar CV, Bhat DS, Dhadge SN, Sanap AP, Wagh VV,
 Memane NS, Raut DA, Gangulikar SB, Ramdas LV, Zalke PM, Yajnik PC, Kumaran K, Tomar KS, Yajnik CS.
 Diabetes Unit, KEM Hospital Research Center, Pune

RECOMMENDATIONS OF THE CONFERENCE

1. Modulation of gut-brain axis and communal gut microbiota through probiotic interventions is an emerging area of considerable human health significance. The initial leads that emerged from some preliminary studies using animal models have clearly indicated the prospects of probiotic therapy in restoring the normal brain functioning. Hence, in the back drop of growing incidences of depression and other mental illnesses due to changes in life style, it is the need of the hour to take more intensive and systematic R&D initiatives on priority to explore the clinical efficacy of probiotics and gut microbiota against common neurological disorders to enable the target population to lead a normal life.
2. The rich microbial diversity and metagenome of Indian gut from both health and diseased human ethnic populations located at the different geographical regions need to be fully explored in search of novel probiotic strains having strong therapeutic and health promoting functions for management of chronic diseases through collaborative research mode.
3. More in-depth studies are required to be undertaken to establish the mechanism and clinical efficacy of probiotics and gut microbiota along with their structural components and metabolites at molecular level for the effective management of common life style diseases such as diabetes (type 1 & 2), obesity and CHDs.
4. As per the probiotic guidelines, designating a new microbial strain as 'probiotic' is based on the battery of biochemical tests and safety parameters wherein the metabolic activity of a specific test has not been clearly defined in quantifiable terms with minimum or maximal cut off limits. Hence, there is a need to suitably modify these guidelines for judicious selection of the potential probiotic strains for conferring consistent and optimal health benefits to the consumers. It was also pointed out by the experts that probiotic strains should be able to adequately adhere to the intestinal epithelial cells to colonize human gut with a minimum transit time so that they could express their desirable metabolic functions optimally.
5. After extensive discussions on the human origin of the probiotic strains as one of the desirable pre-requisites to qualify their probiotic status based on the recommended probiotic guidelines in the Conference, it was finally agreed upon that human origin of probiotic strains should not be mandatory for their use amongst the consumers. Even probiotic strains originating from foods such as milk and other fermented foods (food-grade) with GRAS status, should also be allowed as probiotics in the form of their food formulations for human consumption.
6. Although, presently *Lactobacilli*, *bifidobacteria* and *Saccharomyces*, the key members of Probiotics have been used extensively across the world for promoting human health and well-being, they represent only a fraction of the gut microbiota. Hence, it would be appropriate to explore the more predominating members of the gut microbiota as probiotics also to get the best health benefits out of them besides their therapeutic potentials.
7. As a result of the outcome of several studies carried out at different centers in the country, quite a sizeable number of new indigenous probiotic strains with diverse novel and unique functional properties has been discovered and characterized at molecular level. In order to protect the novelty of these strains and their molecular signatures, they need to be properly catalogued, preserved and deposited in a national and international microbial culture collections for long term applications. In this context, based on the conference deliberations, it was highly recommended in the conference to establish at least four national repositories specifically meant for maintenance and cataloguing of the new potential strains with proven health claims based on *in vitro* and *in vivo* animal models catering to the needs of different geographical regions in the country to properly explore the rich microbial diversity of Indian gut.
8. It was also agreed upon during the discussions in the conference that appropriate initiatives need to be taken immediately for establishing the clinical efficacy and safety of these promising probiotic strains as such or their food formulations by systematically carrying out well organized multi-centric Phase-1 and Phase-2 human placebo controlled double blind studies on the target human subjects (both healthy and diseased). Since lot of funding is required to undertake such clinical trials at the national level, both public and private funding agencies along with industry will be approached to support this important initiative on priority from a holistic national perspective to enable the launch of the proven probiotic strains in the market for the benefit of the local consumers.
9. Since dairy food matrix is recognized as the most ideal carrier for the delivery of probiotic strains in stable, viable and metabolically active form, development of cost effective consumers, indigenous fermented dairy foods like Dahi, Yoghurt, Srikhand and drinks (Lassi/ buttermilk) supplemented with proven probiotic strains could turn out to be extremely valuable food formulations due to their easy access and acceptability to the common man as functional foods or nutraceuticals to express the health benefits attributed to probiotic strains optimally in the gut. Development of such value added products on large scale can be easily launched to the market for wide spread consumption amongst the vast Indian population and hence could be of considerable commercial value and significance from consumers health perspectives.

RECOMMENDATIONS OF THE CONFERENCE

10. Need for identification of appropriate and reliable biomarkers for determining normal health status and medical conditions in the target human population at transcriptional, translational and metabolomics level to shortlist the most effective probiotic strains for expressing their functional efficacy under *in vitro* and *in vivo* conditions in animal models besides replicating their therapeutic effects in clinical human studies.
11. There is a need to apply all the relevant 'Omics' and Bioinformatic tools to generate meaningful data for unraveling the uniqueness of whole genome sequences of the new probiotic strains at transcriptional, translational and metabolomics levels to understand the novelty of bioactive functionality and regulatory genes at molecular level to enable their further improvement by genetic manipulation in terms of enhanced functional efficacy and safety against the targets diseases.
12. Serious efforts with new innovations should also be directed to explore potential probiotic strains against extra-intestinal illnesses affecting the other vital target organs beyond gut to further broaden the domains of probiotic therapy for the benefit of the affected target human populations.
13. Definition of Probiotics has been revisited by introducing a slight change as per the recommendations of a panel of the working group represented by leading scientists from Europe, US and Australia and Japan actively involved in probiotic research and product development. The new definition reads as "Live microorganisms that, when administered in adequate amounts, confer a health benefit on the host".
14. There is a need for harmonization of regulatory standards for the safety, efficacy and quality control of probiotic preparations in food format or as Nutraceuticals during processing, storage and post market surveillance along with the compliance of regulations on their packaging from the perspective of different countries to avoid the entrance of any spurious probiotic products in the country from consumers point of view. In this context, PAi was entrusted the job of submitting a dossier to FSSAI for proper implementation of the regulatory standards on probiotics as foods and nutraceuticals in a meaningful manner.
15. It was further emphasized that although probiotic foods can be safely consumed by all the healthy consumers to maintain the homeostasis of the normal gut microbiota/micrbiome irrespective of their age and sex, their application in diseased and immunocompromised individuals particularly infant babies and elderly persons should be undertaken in consultation with the medical doctor and health care professionals.



Proceedings of the General Body Meeting

Proceedings of the General Body Meeting (GBM) of Probiotic Association of India (PAi) held on November 4, 2014 after the conclusion of 2nd PAi Conference and International Symposium 'Probiotics and Microbiom: Gut and Beyond' at India Habitat Centre, New Delhi

GBM of PAi was chaired by Dr. A.K. Srivastava, President, PAi accompanied by Dr. V.K. Batish, Secretary, PAi. At the outset, Dr. Srivastava welcomed all the members of PAi present in the auditorium and thanked them for the successful conduct of the 2nd PAi Conference and active participation in the high quality discussions on the key issues related to different domains of probiotic researches that emerged from different scientific, technical sessions deliberated therein. He then briefly introduced participants with the agenda of GBM-2014. To begin with he invited Dr. Sunita Grover, Treasurer, PAi to present the status of audited accounts of PAi. Dr. Grover comprehensively presented achievements of PAi since its birth and then the audited statement of the overall expenditure (debited & credited) of PAi bank accounts and apprised the members with the current status of the balance amount credit in the SBOP saving bank account, its NDRI branch Karnal. She also presented the current status of PAi membership under different categories including the corporate members that has now grown to as many as 11 Local and MNCs, conveyed that some companies of international repute were likely to become corporate members of PAi in the near future.

The next agenda of GBM was on restructuring the editorial board of the PAi Newsletter due to completion of the term of the previous for launching the board's forthcoming issues of the same electronically and their uploading on the PAi official web-site. Henceforth, PAi Newsletter will be managed by the following team of editors:

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|---|---------------|
| 1. Dr. Sunita Grover, NDRI, Karnal | Chief Editor |
| 2. Dr. Rajeev Kapilla, NDRI, Karnal | Assoc. Editor |
| 3. Dr. Prakash Halami, CFTRI, Mysore | -do- |
| 4. Dr. Shalini Sehgal, University of Delhi, New Delhi | -do- |

Henceforth, all the correspondence related to submission of technical articles, News items, clippings, company profile, launch of new probiotic formulations and new breakthroughs on the subject of probiotic science as well as R&D may contact any of the aforesaid members of the editorial team with a copy to Chief Editor.

It was decided to celebrate Metchnikoff Day on May 15 as "Probiotics Day" at all Institutes involved in Probiotic research by seminars/quizzes/debates by students.

PAi would promote and conduct regional seminars for awareness among people about probiotics.

PAi would launch National programmes for creating awareness about the probiotics among consumers

PAi would also initiate a private-govt. initiative to disseminate information on probiotics to consumers, which has not happened till date by involving NGOs working in food, Govt. agencies holding media rights, popular lectures, involvement of school children.

All Corporate members should support the conferences/seminars held by PAi by making equal financial contribution

ACKNOWLEDGEMENTS

On the behalf of organizing committee, and the entire probiotic fraternity, I extend my deep sense of gratitude and heartiest thanks to our honourable Chief Guest Dr. Vishaw Mohan Katoch, Dr. N. K. Ganguly and Dr. John Bienenstock, Guests of Honour. I am also very grateful to Director Dr. A. K. Srivastava who is President PAi also for providing perfect logistic support and guidance. I also extend a very hearty vote of thanks to each and every speaker for presenting their important work and sharing with us their findings and opinions. I also thank Chairpersons of various technical sessions. My heartfelt thanks are also due to Nestle Nutrition Institute, Sarvotham Care Pvt. Ltd., Yakult Danone and C.D.Pharma for their whole hearted support in providing funds for organization of the probiotic meeting. I also express my sincere thanks to our esteemed corporate members for providing us full cooperation. We have been receiving quite a bit of appreciation and compliments from both India and abroad regarding the high quality presentations made by our distinguished invited speakers from both India and abroad and brain storming discussions on the key burning issues related to different domains of probiotic functional efficacy from a broader perspective to manage human health, well being and disease management in different formulations. We give all the credit to our highly esteemed corporate members for the success story of this great mega event. What is strongly desired now is to vigorously carry forward our mission and commitment to take the health benefits attributed to probiotics to the end users with an open mind so that the mainstream Indian population particularly rural background is also covered to avail the health benefits without any discrimination. We strongly believe, it could be achieved with our collated efforts. Once again I express my gratitude to each and every member from NDRI and outside who contributed towards the success of this conference.

(V.K.BATISH)
Secretary, PAi

List of New Members of PAi

LIFE MEMBERS

S. No.	Name	E mail ID	Membership ID
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