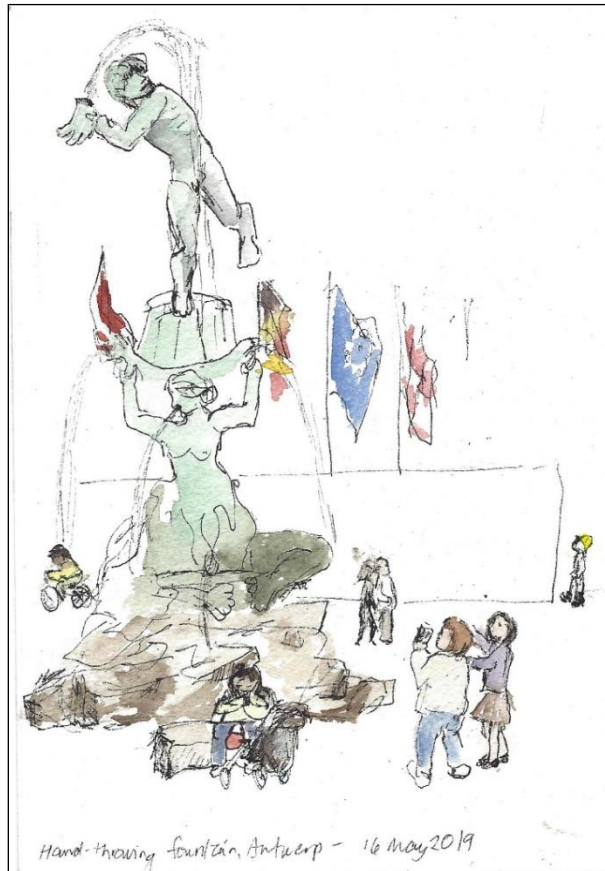


INTERNATIONAL
SCIENTIFIC ASSOCIATION
FOR
PROBIOTICS AND PREBIOTICS



Original art by Laurel Beckett, Davis CA

2019 Meeting Report

May 14-16th, 2019

Antwerp, Belgium

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Executive Summary



ISAPP Plenary Sessions – Radisson Blu Hotel, Antwerp, Belgium

ISAPP held its 18th annual meeting in Antwerp, Belgium May 14-16th 2019. The meeting brought together 175 scientists from 32 countries. In attendance were 72 industry representatives, 55 invited experts, and 48 members of the ISAPP Students and Fellows Association. The meeting program included several different types of sessions, including:

- An exchange between the industry advisory committee (IAC) and board of directors regarding the ISAPP's past year's accomplishments and goals for the future.
- An IAC-organized Learning Forum on the topic of "How do different formulations of probiotic and prebiotic products affect activity and clinical outcomes?"
- An interactive "Springboard" session brainstorming ideas about facilitating evidence-based use of probiotics and prebiotics in health management.
- Plenary lectures featuring probiotics and prebiotics in nutrition, brain function and stress, the gut, human milk oligosaccharides, and vaginal microbiota.
- Five breakout discussion groups, each taking a deep-dive into a pertinent topic.
- A poster session featuring 49 posters detailing state-of-the-art research from around the world

At this meeting, ISAPP participants also enjoyed a cruise of the Antwerp Harbor; a few lucky scientists got the opportunity to drive the boat.



Slides and abstracts for the meeting are available to meeting participants on the ISAPP website under “[Annual Meetings - 2019](#)”. ISAPP gratefully acknowledges the support of the record 50 [member companies](#), who supported the mission of ISAPP in 2019.

The meeting program was developed and executed by the 2019 ISAPP Board of Directors: Seppo Salminen PhD, Finland, President; Dan Merenstein MD, Vice President, USA; Robert Hutkins PhD, Secretary, USA; Karen Scott, PhD, Past-President/Treasurer, UK; Mary Ellen Sanders PhD, USA, Executive Science Officer; Members at Large: Colin Hill, PhD, Ireland; Gregor Reid PhD, Canada; Glenn Gibson PhD, UK; Hania Szajewska PhD, Poland; Maria Marco PhD, USA; Eamonn Quigley PhD, USA; Sarah Lebeer PhD, Belgium.

The 2019 ISAPP Board of Directors

Back row: Eamonn Quigley, Colin Hill, Gregor Reid, Hania Szajewska, Bob Hutkins, Glenn Gibson, Karen Scott

Seated: Mary Ellen Sanders, Dan Merenstein, Seppo Salminen, Sarah Lebeer, Maria Marco



Discussion Groups (Summaries Submitted by Group Chairs)

Group 1: Probiotic applications for skin and urogenital health: potential versus pitfalls

Chairs: Sarah Lebeer University of Antwerp, Belgium and Gregor Reid, University of Western Ontario, Canada



In the first part of the discussion, we discussed potential skin applications of probiotics. Three different skin conditions were considered in detail, because features of each differ with regard to target patient population, target pathogens, and disease process. These skin conditions were acne vulgaris, atopic dermatitis and psoriasis. For acne, *Cutibacterium acnes* (formerly known as *Propionibacterium acnes*) and *Staphylococcus aureus* are the pathogens to target with a potential anti-pathogenic probiotic. Further, as skin inflammation also characterizes this disease, a probiotic expressing anti-inflammatory activity might alleviate symptoms. Most discussion participants agreed that live bacteria formulated in a cream could be a valuable approach, provided the selected potential probiotics show the desired antimicrobial and anti-inflammatory capacities and have documented safety. A suitable probiotic for this application would not need to originate from the skin environment. A challenge is optimizing the probiotic formulation in the cream. An example was presented by the Belgian start-up Yun.be who are able to keep

lactobacilli alive in a facial cream and presented promising results in a proof of concept trial with acne patients (clinicaltrials.gov reference = NCT03469076). In addition, combinations of probiotics with vitamin A or proteins that can improve skin barrier function seem worth considering. It was also discussed that the regulatory category of such a product could be either a drug bearing medical claims or a cosmetic bearing only appearance claims.

Atopic dermatitis (AD) is a different skin condition than acne and thus treatment requires a different probiotic approach. Because the skin barrier is weakened in this disorder, combined with inflammation, topical application with live bacteria may not be the safest approach. An alternative is the use of microbial lysates or dead bacteria formulated in a topical cream. However, the lysates have no active metabolism and do not produce antimicrobials in situ. They also do not fall under the definition of probiotics, because they are not alive. Nevertheless, a *Lactobacillus*-derived product is meeting with some success in a human trial as a medical device. Because the long history of safe use of lactobacilli in various applications and the unavailability of suitable animal models, it was discussed that animal studies have not much added value under these conditions.

Finally, it was discussed that more serious skin conditions, such as psoriasis with an underlying immune disorder, might be difficult to target with only a topical probiotic application. There, oral supplementation with probiotics could have an adjuvant effect combined with biologicals or other medical care.

The second part of the discussion focused on urogenital and vaginal applications of probiotics. The main goal of many of these applications is to maintain homeostasis or prevent recurrence of infections/problems, such as in bacterial vaginosis, aerobic vaginitis, *Candida* infections, and urinary tract infections and in this way reduce antimicrobial use. An interesting case was presented that gut fecal microbial transplantation was apparently able to help UTI. More research is definitely needed on the orofecal link with the urogenital tract and it was proposed that women with a stoma could be interesting targets for investigation. In addition, it was also

discussed that we currently do not know enough about the relationship between microbiota and health. More longitudinal and population-based studies are needed on the vaginal and UTI microbiome in different parts of the world, including women who never experience problems. In addition, although many disorders seem to have an underlying microbial cause, host immunity may be an important factor to consider.

Related to the most interesting probiotic species for vaginal applications, *L. crispatus*, *L. fermentum* and *L. rhamnosus* were all considered options for different reasons (antimicrobial, anti-inflammatory, but also neurological modulation). Various formulations for topical versus oral applications were discussed, including co-formulation with bacteriophages and prebiotics. Another underexplored aspect is how diet and prebiotics can modulate the vaginal microbiome. Other ideas for future research include real-time imaging to follow microbes especially in various sites during pregnancy (e.g., blood, gut, placenta, breast) and metabolomics.

Group 2: Probiotics and prebiotics as adjuncts to drugs and facilitators of disease recovery

Chair: Eamonn Quigley, The Methodist Hospital and Weill Cornell School of Medicine, Houston, Texas, USA



The goal of this workshop was to explore how prebiotics and probiotics interact with pharmaceuticals and other therapeutic strategies to treat or prevent human disease. In addressing this topic, a broad range of diseases and disorders was referenced: from allergy and asthma to obesity and the metabolic syndrome, from inflammatory bowel disease (IBD) to irritable bowel syndrome (IBS) and from depression to schizophrenia. The stage was set for the discussion of prebiotics and probiotics by considering how the microbiome interacts with drugs and other therapeutic agents. The ability of certain bacteria to metabolize drugs, and in so doing either inactivate them or potentiate their effects or contribute to their side effect profile has been amply demonstrated. In some instances, the metabolic basis for such interactions is well described; in many others, while an association between a certain microbial signature and drug response or adverse event has been well described [e.g. *Faecalibacterium prausnitzii* abundance predicting response to tumor necrosis factor- α (TNF- α) or certain profiles of volatile organic compounds as a response to a low fermentable oligosaccharide, disaccharide, monosaccharide and polyol (FODMAP) diet], it's precise molecular basis has not.

In discussing interactions between management strategies and “biotics”, a broader view that included pasteurized organisms (such as *Akkermansia muciniphila*), genetically modified organisms, bacterial components (such as exopolysaccharide, MAM protein) and bacterial products or metabolites (such as short chain fatty acids, histamine and tryptophan metabolites) was taken. In so doing, an exciting range of putative bacterially-derived adjunctive therapeutics was revealed. In certain areas, such as the role of probiotics in the prevention of adverse events related to antibiotic use (e.g. in relation to *Helicobacter pylori* eradication therapy or reducing the risk of *Clostridium difficile* infection), the ability of a probiotic to preserve bifidobacterial abundance among those on a low FODMAP diet, or the positive impact of probiotics on inflammatory tone and vitamin D absorption after gastric bypass surgery), prebiotics and probiotics have already been used as adjunctive therapies alongside more established therapies. In many areas, such as allergy and asthma, IBD, IBS, diabetes, obesity, depression and other psychiatric illnesses, while therapeutic potential has been revealed in the laboratory, these benefits have yet to be translated into tangible gains in the clinic.

Laboratory studies have, indeed, detailed how probiotics and prebiotics can modulate inflammatory responses and metabolic pathways and even influence brain development, cognition, mood and behavior. In these same studies target bacterial strains or prebiotic molecules for given indications have been identified.

These observations are certainly tantalizing but many challenges lie ahead; including selecting the appropriate strain(s) or prebiotic molecule for a given clinical indication in a population deemed to be likely to respond and employing validated endpoints in studies which are not only appropriately powered but of a duration that is appropriate for the natural history of the target disease or disorder. The possibility that a prebiotic or probiotic could impair the response to an adjunctive therapy or increase to rate of adverse events must be considered – only well conducted clinical trials will produce the answers that we need.

Group 3: Prebiotic applications in children.

Chairs: Michael Cabana, University of California San Francisco, California, USA and Gigi Veereman, University Hospital, Brussels, Belgium



Although there have been many clinical applications for prebiotics for adults, less is known about the potential clinical benefits of prebiotics for children with specific clinical conditions. The focus of Workgroup #3 was to review and summarize the current literature on evidence-based clinical applications of prebiotics for infants, children and adolescents. The topics included applications

in prevention, treatment and general childhood development. We also discussed the current state of evidence regarding the use of human milk oligosaccharides in pediatric clinical trials. The topic list was not meant to be exhaustive, but was meant to highlight different areas of clinical study. Each topic review was led by a group member followed by a group discussion.

In our review, the majority of clinical trials focused on different combinations of fructo-oligosaccharides (FOS) and galacto-oligosaccharides (GOS). There was limited evidence regarding the use of prebiotics for prevention of asthma, rhinitis or diabetes. Of the handful of studies examining eczema as an outcome, there was little evidence of any preventive effect.

In terms of the treatment of colic, there were no studies that evaluated prebiotic interventions exclusively. There were several lower quality studies of combined interventions that showed no effect or some reduction in crying time. We found no data that adding a prebiotic to oral rehydration solution (ORS) would change outcomes for acute gastroenteritis infections; however, it is possible that adding a prebiotic may shorten duration dysbiosis after an acute gastroenteritis event. There was insufficient evidence that prebiotics are effective in the treatment of regurgitation or constipation; however, there may be an effect on the softening of stool consistency.

In terms of studies focused on development, we found a dozen clinical trials focused on the effect of prebiotics on calcium absorption and bone growth. There seems to be moderate evidence in favor of childhood fiber or prebiotic consumption to help improve calcium absorption and bone development for growing pre-adolescents and adolescents. In terms of the current addition of prebiotics to infant formula, a review suggests that there does not seem to be any increase in safety concerns with regard to growth or adverse effects for healthy infants. However, the literature on infant formula safety is limited to specific combinations of prebiotics and specific clinical outcomes. Finally, we found that the current clinical trial literature on human milk oligosaccharides in childhood was limited, with most studies focused on safety and tolerance (and designed as non-inferiority studies).

Group 4: The future of probiotics and prebiotics for human health.

Chairs: Glenn Gibson, The University of Reading, UK and Marla Cunningham, Metagenics, Australia



The aim of this discussion group was to create a vision of what probiotic and prebiotic scientists and industry need to ready themselves for the next 10 years. The group also considered applicability for key opinion leaders, government and healthcare services. The workshop began with a discussion of the evolutions of the status for prebiotics and probiotics over the last 10 years. This looked at factors that have emerged over this time – health outcomes, consumer perception, expansion of applications, and development of methodologies.

We then listed several predictions for the next decade and debated these under the following headings:

New discovery and research methodologies will facilitate:

- Development of enhanced next generation sequencing methods allowing higher throughput, deeper sequencing, longer reads

- Development of new bioinformatic tools (to delve deeper into taxonomy into species/strain level, databases that can couple taxonomy to function), machine learning techniques to interrogate data more thoroughly
- Improvement of quality and size of databases
- Other omics, building on genomics (metabolomics, metatranscriptomics, etc.)
- Instruments for functionality (comparative genomics and functional genomics)
- Identification, differentiation and tracking of individual probiotic strains
- Genomic stability (IS elements and prophages)
- Microbiota markers
- New technologies (single cell sequencing, organoids, microfluidics, advanced isolation/cultivation techniques are needed “culturomics”)
- Testing “*in situ*” and sample “*in situ*”
- Management of the current bottleneck of bioinformatics/biostatistics
- Possibilities for personalised and/or population level prebiotics

New probiotic species

- Microbiome-derived, soil-derived, fermented food-derived
- *Roseburia intestinalis*, *Faecalibacterium* sp., *Bacteroides* sp., *Akkermansia muciniphila*, eubacteria are examples
- New species and non-gut microbial niches? e.g. vaginal, skin (*Staphylococcus epidermidis*, *Staphylococcus hominis*), nose, mouth.
- What are the challenges and prospects of getting new species or genera into products?
 - Safety and efficacy need consideration
 - Antibiotic resistance genes
 - GMO as novel probiotics – safety/perception

New prebiotic compounds and targets

- Virulence attenuation

- Distal colon targeting
- Encapsulation
- Waste-stream use
- Anti-adhesive influences
- Synbiotics, including species changes
- Food quality aspects and functionality
- Whole food-derived, complex compounds, novel, exotic sources, biological mimics – e.g. HMOs

New probiotic applications

- Whole range of novel applications
- Probiotic-“viagra”, oral, skin (acne), animals, hair, mattresses etc.
- Strange products undermining credibility of good pro(e)biotic industry
- Companion animals:
 - “Probiotic” spray to inhibit growth of pathogens in factory
 - Food processing kills bacteria, so probiotics delivered via sachet or capsule
- Antibiotic resistance a problem in intensive farming, so probiotics as a replacement

Quality assurance

- Structural integrity of prebiotics
- Viability of probiotics
- Physical challenges of new formats
- Functional validation
- Clinical validation
- Phage contamination
- Compliance with regulations/laws
- Protection of the end user
- Guarantee desired effect and its consistency

- Consumer driven preferences worth contemplating (FODMAP, gluten free)

Interface with Government Agencies (UK All-Party Parliamentary Groups used as an example)

- Educate opinion leaders and politicians (e.g., APPG), by taking message of robust science into parliament and encourage evidence-based usage from within
 - Message can be to highlight the role of the gut microbiome in human health
 - How evidence-based usage of pro/prebiotic can lead to cost savings
- Need to use a variety of innovative ways to communicate to parliamentarians:
 - Celebrity speakers, success stories, increase presence of concept in parliament
- The UK could be used as a “case study” of success in educating government agencies that could be used by other countries
- Target audiences – NHS and treasury decision makers to incorporate the roles of the gut microbiome in their thinking
- APPG plans: (heart and mind approach)
 - A series of meetings in parliament
 - Incorporate into NHS policy
 - GI conditions acute and chronic, obesity, gut-brain, diet, regulations
- Link to other APPGs (mindfulness, obesity, infant nutrition)
- Other methods of communication – newsletters, briefings, etc.
- Find ways to make the science interesting to parliament: tasting friendly menus/celebrity chefs; dietary analysis; gut friendly foods

Group 5: RDA for live microbes.

Chairs: Colin Hill, APC, Cork, Ireland and Bob Hutkins, University of Nebraska, Lincoln NE, USA



Group 5 began with the hypothesis that live microbes, such as those associated with fermented foods, form a critical part of the human diet by contributing to overall health. Although some populations consume foods containing high numbers of microbes, the so-called western diet is often devoid of microbes. This may account, in part, for the observed increase in contemporary, non-infectious diseases. Thus, our group asked the question: should dietary guidelines include a recommendation for regular consumption of safe microbes - a so-called microbial RDA? The discussion soon led the group to modify this proposal and instead consider the fiber path in the 1990s. Based primarily on epidemiological evidence, Adequate Intake levels for dietary fiber were developed in the U.S. and are now well-accepted and included in dietary guidelines throughout the world. The same model could be followed for “dietary microbes”.

Action items from this group are:

1. To develop suitable project description, definitions, doses, and methods of data analysis. This will be conducted via email with invited experts. Expected completion: August 15

2. Members of the panel will examine U.S. (and European) dietary data bases, estimate consumption data relative to foods containing live microbes, and ultimately model consumption with disease risk. Expected completion: August 15
3. Reconvene invited experts by phone to determine next steps. Target date: August 30



Late Breaking News

This session offers participants the ability to give 5-minute presentations on late-breaking news in an informal, interactive atmosphere. The presentations range from 'hot' off-the-bench news to controversial or important issues on the science, politics, funding, business, or humorous aspects of the field of probiotics or prebiotics.

1. Third party verification of probiotic quality. Mary Ellen Sanders, USA
2. Compositional nature of microbiome datasets. Dan Tancredi, USA
3. A program to increase consumption of probiotic yoghurt by school children in Uganda. Wilbert Sybesma, Switzerland
4. Impact of Japanese bathing tradition in the transmission of gut microbe among Japanese families. Jinzhong Xiao, Japan
5. Bacterial mythology: the probiotic pantheon. Jesse TerHaar (ne Younes), IPA, Canada
6. Why the study of probiotics needs philosophy. Kristina Campbell, Canada
7. More information needed on probiotic supplement product labels. Dan Merenstein, USA
8. Can lactobacilli block extracellular ATP virulence in the bladder? Jeremy Burton, Canada
9. Could plant polyphenols be considered candidate second generation synbiotics? Rohit Sharma, SFA, India

Posters

49 authors from the Student & Fellows Association and industry from around the world presented posters at the 2019 Annual Meeting in Antwerp.



<u>Author</u>	<u>Title</u>
H.B. Dodiya	Sex-specific effects of microbiome perturbations on cerebral amyloidosis and microglia phenotypes
Dieter Vandenneuvel	Using a CRISPR-Cas based mutagenesis system for the functional characterization of “genomic dark matter” in novel <i>Lactobacillus</i> isolates
John Leech	The Fermented Food Microbiome
Melisa A. Puntillo	Probiotic potential of lactic acid bacteria isolated from plant material
Wannes Van Beeck	Exploring carrot fermentation as a novel carrier for probiotic strains
Natasha Leeuwendaal	Probiotic potential of <i>Lactobacillus</i> isolates from Irish Cheddar Cheese
Feitong Liu	Fructo-oligosaccharides and inulin induce specific changes on

	gut microbiota with decreased butyrate in Chinese healthy adults: a randomized, double-blind, placebo-controlled trial
Anna-Ursula Happel	Adherence, acceptability and preference of an oral/vaginal probiotic to treat bacterial vaginosis (BV) in South Africa
Irina Spacova	<i>Lactobacillus rhamnosus</i> GG cell surface molecules contribute to its probiotic action against <i>Staphylococcus aureus</i> in the skin niche
Caitlin S. M. Cowan	A probiotic formulation (<i>Lactobacillus rhamnosus</i> & <i>L. helveticus</i>) reverses the effects of maternal separation on neural circuits underpinning fear expression and extinction in infant rats
Sineaid Collins	Investigating the impact of chronic consumption of inulin blended with arabinoxylan on markers of appetite regulation, in healthy weight men
Ludwig Lundqvist	Correlations between production parameters and the bioactivity of <i>Lactobacillus reuteri</i> DSM 17938
Cathy Lordan	Prediction and assessment of a variety of digested substrates on the growth of health-promoting gut bacteria
Marianne van den Broek	<i>In vitro</i> and <i>in vivo</i> probiotic potential of <i>Lactobacillus</i> spp. for otitis media
Wilian Marcondes	Study on the relationship between structural properties of xylooligosaccharides and their prebiotic activity
Ivan Sugrue	Defensin-like bacteriocins, a previously undiscovered group of class II bacteriocins
Stijn Wittouck	Reconciling species taxonomy with public genome data for the <i>Lactobacillus</i> Genus Complex
Emiley Watson	Potential beneficial attributes of vaginal <i>Lactobacillus crispatus</i>

Marimuthu Anandharaj	Novel bile salt hydrolase from <i>Lactobacillus gasseri</i> FR4 and its application as an alternative to antibiotic growth promoters
Diwas Pradhan	Surface proteins of three probiotic lactobacilli exhibit strain specific anti-inflammatory effects in TNBS-induced colitis mice
Marie Legein	Modulating the phyllosphere microbiome to improve crop production and crop protection
Stephanie So	Effect of yeast beta-glucan on bile acid signalling and metabolism in healthy and diet-induced obesity mice
Rohit Sharma	Dietary supplementation of green tea epigallocatechin gallate with probiotic <i>Lactobacillus fermentum</i> acts as second generation synbiotic by modulating cellular immune responses and antioxidant capacity in aging mice
Liyanage Geethika	Resistant starch promotes equol production and improves Polycystic Ovary Syndrome (PCOS) symptoms in rats treated with soy isoflavones: A gut microbiota perspective
Camille Nina Allonsius	Selected <i>Lactobacillus</i> taxa inhibit the hyphal morphogenesis of <i>Candida albicans</i> thanks to the chitinase activity of their major peptidoglycan hydrolase
Kait F. Al	<i>Bacillus subtilis</i> 168: a promising probiotic candidate for the treatment of nephrolithiasis
Kang Ooi	Zinc and the gut microbiota
María José Hernández-Granados	Effect of agave fructans on hematological, metabolic parameters and oxidative stress in diabetic mice
Eline Oerlemans	The microbiome in vulvovaginal candidosis during supplementation with lactobacilli with <i>in vitro</i> anti- <i>Candida</i> effects
Sarah C. Donnelly	Magnetic resonance imaging of commensal and pathogenic bacteria

María Florencia Zacarías	Biomass production and spray drying of a potential probiotic strain from human breast milk, <i>Bifidobacterium lactis</i> INL1
Brendan A. Daisley	Design and application of a triple-strain probiotic to improve the health of honey bees
Anastasia Mantziari	Polyamines modulate differentially microbial adhesion to human mucus according to age of mucus donor and bacterial strain
Ilke De Boeck	<i>Lactobacillus casei</i> AMBR2 shows potential as probiotic for chronic rhinosinusitis
Indrani Mukhopadhyaya	Transcriptomics reveals novel insight into co-operative interactions between two human gut symbionts, <i>Ruminococcus bromii</i> and <i>Blautia hydrogenotrophica</i> in co-culture
Daragh Hill	Optimisation of <i>Weissella paramesenteroides</i> for mannitol production in dairy fermentations
Grace Ward	Assessing the ecological role of yeasts in the human gut
Xuedan Wang	The effect of prebiotic oligofructose enriched inulin supplementation on microbiota and protein metabolism in people consuming high protein diets
Sarah Ahannach	Towards better benchmarking of the female microbiome in a Flemish cohort
Astrid Fremau	Non-invasive longitudinal imaging of live fluorescent probiotic <i>Lactobacillus rhamnosus</i> GG in a mouse model of birch pollen-induced allergic asthma
Ged Baltulionis	Bioengineering a synthetic enzyme for the production of authentic human milk oligosaccharides (HMOS)
Andrea Monteagudo-Mera ¹	Effect of prebiotic Synergy-1 during iron supplementation, haem and iron restriction on the human gut microbiota using continuous culture colonic model systems

Car Reen Kok	<i>In vitro</i> enrichment: a method for selection of synergistic probiotic strains
Jennifer Jörissen	Isolation and characterization of upper respiratory tract bacteria from healthy children and their characterization as potential probiotics against classic otopathogens
Ilkay Yilmaz	Effect of administering kefir on the changes in fecal microbiota and symptoms of Inflammatory Bowel Disease: A randomized controlled trial
Conall R Strain	Fish consumption alters the gut microbiome and metabolome in healthy women: A randomised controlled trial
Kuan Wang - Industry	Probiotics could retard the decline of GFR in patients with chronic kidney disease
Pei-Shan Hsieh - Industry	The role of <i>Lactobacillus</i> species in the prevention of alcohol-induced liver injures
Jin-zhong Xiao - Industry	The neonatal oral fluid at delivery is one of the vertical-transmission routes for Bifidobacterium from mother to child



Students & Fellows Association

The SFA's goal is to create an interactive network of graduate students and postdoctoral fellows across the globe working on probiotics, prebiotics, or related fields. They succeeded in this mission in Antwerp this year by assembling a record 48 students from around the world. Students and fellows each shared the focus of their research in rapid, 3-minute talks. In addition, the students and fellows presented their research with posters during the main ISAPP meeting. This year networking and opportunities for knowledge exchange with the main meeting participants was enhanced, and SFA was included in all activities except the discussion groups. Poster abstracts and the conference summary are available [here](#).

Appendix A: 2019 ISAPP Meeting Program



INTERNATIONAL
SCIENTIFIC ASSOCIATION
FOR
PROBIOTICS AND PREBIOTICS

2019 ISAPP MEETING

May 14-16, 2019. Antwerp, Belgium

TUESDAY – MAY 14

- 7:00-19:00 **Registration Desk** FOYER 2ND FLOOR
- 8:15-9:45 **Meeting of Industry Advisory Committee with Board of Directors** ESPERANZA 3+4
All industry members are welcome to attend
Chairs: *Roberta Grimaldi, University of Reading, UK and Marla Cunningham, Metagenics, Northgate, Australia*
- 7:00-9:45 **Poster Setup** FOYER 2ND FLOOR + THE DIAMOND
- 9:00-12:15 **Students and Fellows Association Program** ESPERANZA 2
Irina Spacova, SFA president, University of Antwerp, Belgium, and Gregor Reid, Lawson Research Institute, London, Ontario, Canada
- 9:45-10:15 **Break and Poster Viewing** FOYER 2ND FLOOR + THE DIAMOND
- 10:15-12:15 **Industry Advisory Committee Learning Forum** ESPERANZA 3+4
All industry members are welcome to attend
How do different formulations of probiotic and prebiotic products affect activity and clinical outcomes?
Chairs: *Roberta Grimaldi and Marla Cunningham*
- 12:15-13:15 **Lunch, Poster Viewing** AURORA, FOYER 2ND FLOOR + THE DIAMOND
- 13:15-13:30 **Welcome to ISAPP 2019** ESPERANZA 3+4
Seppo Salminen, ISAPP President and Sarah Lebeer, 2019 Meeting Host
- 13:30-15:30 **The Springboard.** "What can scientists and industry do to spring probiotics and prebiotics into mainstream health management?" A session designed to integrate perspectives in an interactive format.
Chair: *Glenn Gibson, University of Reading, UK*
Facilitators, providing industry, political, medical, clinical and research perspectives: *Marla Cunningham, Alan Barnard, Dan Merenstein, Gregor Reid*
- 15.30-16:00 **Break and Poster Viewing** FOYER 2ND FLOOR + THE DIAMOND + AURORA PRIVATE
- 16:00-16:30 Prebiotics: beyond nutrition and health
Nathalie Delzenne, Université catholique de Louvain, Brussels, Belgium
- 16:30-17:00 Prebiotics, brain function and stress. To what extent will prebiotics replace or complement drug therapy for mental health?
Phil Burnett, Oxford University, UK
- 17:00-17:30 Key Learnings from the Flemish Gut Flora Project
Gwen Falony, KU Leuven, Belgium

- 17:30-18:00 Leveraging political infrastructure to advance important science and public health messaging
Alan Barnard, Campaign It Limited, UK
- 18:00-18:15 **Break**
- 18:15-19:00 **Late Breaking News**
Chair: Gregor Reid
- 19:00-21:00 **Welcome Reception and Poster Viewing** AURORA + AURORA PRIVATE
Drinks and food to be served

WEDNESDAY – MAY 15

- AM Plenary Session** ESPERANZA 3+4
- 8:30-9:00 Unlocking the molecular secrets of a common gut commensal
Douwe van Sinderen, Alimentary Pharmabiotic Center, Cork, Ireland
- 9:00-9:30 Short chain fatty acids as mediators of human health
Kristin Verbeke, KU Leuven, Belgium
- 9:30-10:00 Human Milk Oligosaccharides in Pregnancy: Roles for Maternal and Infant Health
Evelyn Jantscher-Krenn, Medical University of Graz, Austria
- 10:00-10:30 **Break**
- 10:30-10:45 **SFA Feature Talk:** A probiotic formulation (*Lactobacillus rhamnosus* and *L. helveticus*) reverses the effects of maternal separation on neural circuits underpinning fear expression and extinction in infant rats.
Caitlin Cowan, APC Microbiome Ireland and University College Cork, Ireland
- 10:45-11:00 **SFA Feature Talk:** Novel insights into co-operative interactions between two human gut symbionts, *Ruminococcus bromii* and *Blautia hydrogenotrophica* in co-culture.
Indrani Mukhopadhyaya, University of Aberdeen, UK
- 11:00-11:15 **Feature Talk:** Recovery of Vaginal Microbiota After Standard Treatment for Bacterial Vaginosis Infection: An observational study.
Arthur C. Ouwehand^{1}, Ashley Hibberd², Jenni Reimari¹, Nicolas Yeung¹, Johanna Maukonen¹, Gordon Crawford³, Liisa Lehtoranta¹. DuPont Nutrition and Health, Kantvik, Finland¹ and St. Louis MO, USA²; CPS Research, Glasgow, Scotland³*
- 11:15-11:30 Isolation of Bacterial Strains that Produce Short Chain Fatty Acids as Potential Next Generation Probiotics.
Michael Janusz and Anna Plechaty, Procter & Gamble Inc., Mason OH, USA*
- 11:30-11:45 Potential health impact of probiotics from a socioeconomic perspective.
Irene Lenoir, University of Utrecht, the Netherlands

- 11:45-noon Update on global harmonization for regulations for probiotics.
Gabriel Vinderola, UNL-CONICET, Santa Fe, Argentina
- Noon **Working buffet lunch** OUTSIDE EACH MEETING ROOM
- Noon-17:00 **Discussion Groups**
1. Probiotic applications for skin and urogenital health: potential versus pitfalls. ORLOV1+2
Chairs: *Sarah Lebeer University of Antwerp, Belgium and Gregor Reid*
 2. Probiotics and prebiotics as adjuncts to drugs and facilitators of disease recovery. PROMISE1+2
Chair: *Eamonn Quigley, The Methodist Hospital and Weill Cornell School of Medicine, Houston, Texas, USA and Yehuda Ringel, Rabin Medical Center, Beilinson Hospital, Israel*
 3. Prebiotic applications in children. ORLOV3+4
Chairs: *Michael Cabana, University of California San Francisco, California, USA and Gigi Veereman, University Hospital, Brussels, Belgium*
 4. The future of probiotics and prebiotics for human health. ESPERANZA2,3+4
Chairs: *Glenn Gibson and Marla Cunningham*
 5. RDA for live microbes. ESPERANZA1
Chairs: *Colin Hill, APC, Cork, Ireland and Bob Hutkins, University of Nebraska, Lincoln NE, USA*
- 12:00-17:00 **Students and Fellows Association Program**
- 17:45-22:00 **Riverboat Trip and Dinner** BUSES TO HARBOR DEPART SQUARE IN FRONT OF HOTEL AT 17:45

THURSDAY – MAY 16

- AM Plenary Session** ESPERANZA3+4
- 8:15-8:30 Outcomes from ISAPP Synbiotic Consensus Panel
Kelly Swanson, University of Illinois, Champagne-Urbana, USA
- 8:30-9:00 Probiotic use at conception and during gestation
Maria Carmen Collado, Instituto de Agroquímica y Tecnología, Valencia, Spain
- 9:00-9:30 Prebiotics and signaling: Beyond the nutritional impact of oligosaccharides
Andrea Azcarate-Peril, University of North Carolina, Chapel Hill, USA
- 9:30-10:00 To give or not to give probiotics to children with acute diarrhea?
Hania Szajewska, The Medical University of Warsaw, Poland
- 10:00-10:30 **Break**
- 10:30-12:30 **Summary Reports from Discussion Groups and Students and Fellows Association**
Chair: *Karen Scott, University of Aberdeen, Scotland*
- 12:30 **Adjourn**

Appendix B: Acknowledgements

Thank You for Supporting ISAPP in 2019

