International Yakult Symposium 2024

THE GUT, CONDUCTOR OF OUR HEALTH:

putting the microbiota in the spotlight

10th – 11th October 2024
Eye Filmmuseum
IJpromenade 1, 1031 KT
Amsterdam, The Netherlands

Yakult
Science for Health

SCIENTIFIC COMMITTEE

Prof. Stephan Bischoff
University of Hohenheim, Germany

Prof. Patrizia Brigidi
University of Bologna, Italy

Prof. Sarah Lebeer
University of Antwerp, Belgium

Prof. Ger Rijkers
University College Roosevelt, The Netherlands

Prof. Karen Scott
Rowett Institute, University of Aberdeen, UK

Dr. Bruno Pot
Yakult Europe B.V., The Netherlands

Dr. Olaf Larsen
Yakult Nederland B.V., The Netherlands

Dr. Nikoletta Vidra
Yakult Europe B.V., The Netherlands

CONFERENCE VENUE

Eye Filmmuseum, IJpromenade 1,
1031 KT Amsterdam, The Netherlands

CONTACT AND INFORMATION

Ms. Chiyuki Kajita
& Ms. Karin Schaareman
Yakult Europe B.V.
e-mail: info@yakultsymposium.com

Ms. Lidwien Franke
& Mrs. Martine van der Velde
Yakult Nederland B.V.
e-mail: info@scienceforhealth.nl

ORGANIZER

Yakult Europe B.V.
Schutsluisweg 1
1332 EN Almere
The Netherlands

WEBSITE

https://www.yakultsymposium.com/

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Preface

International Yakult Symposium 2024

Some of you may remember the Milan 2022 International Yakult Symposium in the wonderful National Science Museum Leonardo da Vinci.

In October 2024 we like to welcome you in the Amsterdam Eye Film Museum. This majestic architectural building is a real Eye-catcher in Amsterdam. It represents an unforgettable experience from the outside as well as from the inside. We promise you again this year an interesting event where we can exchange and discuss ideas, visions and future plans. As a theme this year we have chosen to put forward 'The Gut, as Conductor of our Health'! Again, spotlights are on the microbiota and the role that our trillions of microorganisms have in maintaining health, preventing (and sometimes causing) disease. How do we maintain the right balance, as a child, an adult, or an elderly person? Can the gut also impact our brain, lungs or vaginal microbiota? And if so, how do we manage this in an optimal way? Can we really influence our gut (co-)metabolism and infection risks, simply through better nutritional choices?

In this abstract book you will find some answers to these questions. But we are pretty sure that reading these abstracts will raise even more questions, so be welcome in Amsterdam on October 10th and 11th to ask them yourself to our speakers!

Yakult Europe BV
Yakult Nederland BV
The full European Yakult Science Team!

Scientific Programme

Day 1: Thursday 10th October

08:00 **Registration and Poster Assembly**

09:00 OPENING AND WELCOME WORDS
Mr. Piet Dekkers, Managing Director, Yakult Nederland

09:10 PROGRAMME / SESSION INTRODUCTION AND HOUSEHOLD MESSAGES
Dr. Emily Prpa, Yakult UK

KEY NOTE LECTURE I
Chair: Dr. Nikoletta Vidra, Yakult Europe
09:15 **The role of gut microbiome and its interaction with diet in health and disease**
Prof. Konstantinos Gerasimidis, University of Glasgow, UK

10:00 **Tea & coffee break / Poster viewing**

SESSION 1. THE INFANT GUT
Chair: Prof. Ger Rijkers, University College Roosevelt, The Netherlands
10:30 **Human milk microbiota and beneficial effect on health**
Prof. Flavia Indrio, University of Salento, Italy
11:00 **Establishment of the gut microbiota in 1-year-aged infants: from birth to family food**
Prof. Christine Edwards, University of Glasgow, UK
11:30 **One Health. Exposome and xenobiome: new ongoing research**
Assoc. Prof. Silvia Turroni, University of Bologna, Italy

12:00 **Lunch / Poster viewing**

SESSION 2. WOMEN'S HEALTH
Chair: Prof. Flavia Indrio, University of Salento, Italy
13:00 **A balanced view on interplay between gut microbiota, hormones and fertility**
Prof. Max Nieuwdorp, Amsterdam University Medical Center, The Netherlands
13:30 **How to advance women's health with microbiome research and citizen science: The Isala study**
Prof. Sarah Lebeer, University of Antwerp, Belgium
14:00 **Immune system, microbiome and endometriosis**
Assoc. Prof. Ludivine Doridot, Université Paris Cité, Institut Cochin, France

14:30 **Tea & coffee break / Poster viewing**

SESSION 3. BRAIN HEALTH
Chair: Dr. Olaf Larsen, Yakult Nederland
15:00 **Microbiota gut-brain axis and mental health**
Assoc. Prof. Alejandro Arias-Vasquez, Radboud University Medical Center, The Netherlands
15:30 **Lifestyle factors and the gut-brain axis: relevance to Alzheimer's**
Prof. Yvonne Nolan, University College Cork, Ireland
16:00 **Effects of *Lacticaseibacillus paracasei* strain Shirota on daytime performance in healthy office workers**
Mr. Kazunori Suda, Yakult Honsha European Research Center for Microbiology, Belgium

SESSION 4. POSTERS FLASH TALKS
Chair: Prof. Stephan Bischoff, University of Hohenheim, Germany
16:30 Five poster flash talks selected by the Scientific Committee (5 min each)

17:15 **End of sessions Day 1**

Symposium Dinner on Oceandiva boat
19:00 Pre-dinner drinks & appetizers
19:30 Welcome address: Mr. Hiroyasu Matsubara, Managing Director, Yakult Europe
20:00 Boat trip + symposium dinner + dancing
22:00 Return to dock, time to dance and network

23:00 **End of the dinner and party**

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Day 2: Friday 11th October

08:00 **Registration and Poster viewing**

09:00 PROGRAMME / SESSION INTRODUCTION AND HOUSEHOLD MESSAGES
Dr. Emily Prpa, Yakult UK

KEY NOTE LECTURE II
Chair: Prof. Karen Scott, University of Aberdeen, UK

09:05 **Fermented foods: An update on evidence based health benefits and future perspective**
Prof. Paul Cotter, Teagasc Food Research Centre and APC Microbiome Ireland, Ireland

09:50 **Tea & coffee break / Poster viewing**

SESSION 5. LcS STUDIES
10:05 Chair: Dr. Osamu Chonan, Yakult Honsha Co., Ltd., Japan

10:10 **Effects of habitual intake of fermented milk products containing *Lacticaseibacillus paracasei* strain Shirota on health maintenance in older people**
Dr. Yukitoshi Aoyagi, Tokyo Metropolitan Institute of Gerontology, Japan

10:40 **Unique cell wall polysaccharide of *Lacticaseibacillus paracasei* strain Shirota and importance of intestinal mucosal phagocytes in its immunomodulatory effects**
Mr. Masatoshi Morikawa, Yakult Honsha European Research Center for Microbiology, Belgium

SESSION 6. ROUNDTABLE DISCUSSION
11:10 **Clinical trials in the nutrition field: a solution or a nightmare?**
Dr. Gwen Falony, Prof. Wendy Hall, Prof. Flavia Indrio, Prof. Hans Verhagen, Dr. Bruno Pot and Dr. Emily Prpa

11:55 **Lunch / Poster viewing**

SESSION 7. GUT HEALTH: THE OTHER 'AXES'
Chair: Prof. Sarah Lebeer, University of Antwerp, Belgium

12:45 **The gut-lung axis: unveiling microbiota-mediated strategies to combat severe infections**
Dr. Bastiaan Haak, Wellcome Sanger Institute, UK & Amsterdam UMC, The Netherlands

13:15 **Mouth – A mirror of systemic health**
Prof. Egija Zaura, Vrije Universiteit Amsterdam, The Netherlands

SESSION 8. GUT METABOLISM
Chair: Dr. Gwen Falony. University Medical Center of the Johannes Gutenberg University Mainz, Germany

13:45 **Gut microbiome and its intercation with host metabolic and neurological functions?**
Prof. Marie- Christine Simon, University of Bonn, Germany

14:15 **Host-microbe co-metabolism in human health and disease**
Prof. Jingyuan Fu, University Medical Centre Groningen, The Netherlands

14:45 **Poster Prize awards**
Chair: Prof. Patrizia Brigidi, University of Bologna, Italy

14:55 **Closing remarks**
Dr. Bruno Pot, Science Director, Yakult Europe

15:00 **End of the 11th International Yakult Symposium**

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Scientific committee

Prof. Stephan Bischoff
Direktor, Institut für Ernährungsmedizin University of Hohenheim, Germany.

Stephan Bischoff studied human medicine at the Johannes Gutenberg University Mainz and the Université Louis Pasteur Strasbourg. 1989 license to practice medicine and doctorate, scientific assistant at the Institute for Clinical Immunology, University Hospital Bern/Switzerland. 1992 Resident in the Department of Gastroenterology & Hepatology, Hanover Medical School, 1997 Specialist qualification in internal medicine and additional title “Allergology”, 1998 Habilitation in internal medicine, sub-specialty title “Gastroenterology”, 2001 Specialist qualification “Nutritional Medicine”. 2002-2003 Visiting Professor at Columbia University, New York. 2004 Appointed Full Professor and Chair of Nutritional Medicine and Prevention at the University of Hohenheim in Stuttgart. 2006 Chairman of the German Society for Nutritional Medicine. 2009 Medical Director of the Center for Nutritional Medicine at the University Hospital of Tübingen and the University of Hohenheim. 2010 Editor of the journal Aktuelle Ernährungsmedizin. 2012 President of the German Society for Nutritional Medicine.

Clinical-scientific focus:
- Obesity and obesity-associated diseases.
- Disease-associated malnutrition and artificial nutrition
- Gastrointestinal barrier, mucosal immunology & neurogastroenterology
- Probiotics and functional food
- Food allergies and intolerances, mast cell research
- Health prevention through nutrition, gender research

Prof. Patrizia Brigidi
University of Bologna, Italy

Patrizia Brigidi is Full Professor of “Fermentation Biotechnology” at the Department of Medical and Surgical Sciences of the University of Bologna, where she leads the Human Microbiomics Unit. She is involved as Expert in the Italian Delegation in Horizon Europe Programming Committee, Cluster VI. Her research activity is documented by over 250 papers on peer-reviewed international journals, focused on the study of human microbiome, in the perspective of its modulation to promote the host’s health. She leads and participates a number of European and National projects aimed at studying, by omics approaches, the role of microbiome in healthy aging and non-communicable diseases.

Prof. Sarah Lebeer
University of Antwerp, Belgium

Sarah Lebeer is a research professor (ZAP BOF) at the Department of Bioscience Engineering of the University of Antwerp. She is heading the Laboratory for Applied Microbiology and Biotechnology of the ENdEMIC research group. The major research topics within this lab are all driven by a passion for beneficial bacteria and microbiome research (www.lebeerlab.com). Fundamental, frontier research is combined with applied research oriented towards human and animal health, fermented foods and bioremediation. Sarah & her team study host-microbe interaction mechanisms in order to develop microbiological alternatives for antibiotics, such as probiotics and live biotherapeutic products. As such, Sarah has played a fundamental role during the start-up of YUN, a European biotech company that develops probiotherapy for the skin (www.yun.be). In 2017, Sarah won the European LABIP (Industrial Platform Lactic acid bacteria) award for mid-career scientists with "Outstanding Excellence in Lactic Acid Bacteria Research with an Industrial Relevance". Since 2017, Sarah was also elected as academic board member of the International Scientific Association on Probiotics and Prebiotics (ISAPP) (www.isappscience.org). In 2020, Sarah and her team have launched a new citizen science project on women's health and the vaginal microbe (isala.be/en), thanks to funding via an ERC Starting grant Lacto-Be. This project has been honoured with a Science Communication Award by the Royal Flemish Academy of Belgium for Science and the Arts and the Grand EY prize for citizen-science.

Prof. Ger Rijkers
University College Roosevelt, The Netherlands

Ger Rijkers is Emeritus Professor in Biomedical and Life Sciences, Department of Sciences, University College Roosevelt (UCR), Middelburg, The Netherlands. At UCR he has been head of the Science Department and coordinator of the premedical program. During the academic year 2024-2025 he teaches Introduction of Life Sciences and Mechanisms of Disease.

Ger Rijkers has studied biology at the Agricultural University of Wageningen, the institute where he also completed his PhD in 1980 (on the immune system of cyprinid fish). He next specialized as medical immunologist at the Wilhelmina Children's Hospital and the Faculty of Medicine of Utrecht University. He has worked as head of the laboratory of pediatric immunology, senior researcher in the field of mucosal immunology at the Department of Gastrointestinal Surgery of Utrecht University and of Radboud University. In the St Antonius Hospital in Nieuwegein he has supervised studies on vaccination of patients with respiratory diseases. During the corona pandemic he worked as medical immunologist and senior scientist at the Laboratories of Medical Microbiology and Immunology of the St Elizabeth Hospital in Tilburg, and the Admiral De Ruyter Hospital in Goes, The Netherlands. As a researcher and academic, Ger Rijkers studies the interaction between the human immune system and micro-organisms of the respiratory and gastrointestinal tract, in immunoregulation, and healthy ageing (at the beginning and end of life).

He has supervised over 40 PhD students and published over 350 papers in peer-reviewed scientific journals, as well as a textbook on Immunology (3rd edition published in August 2023). He is section editor of Frontiers in Immunology and has served as guest editor for Vaccines.
Ger Rijkers has been married to Riky Lievendag for 46 years. He has 3 adult sons and 4 grandchildren.

Prof. Karen Scott
Rowett Institute, University of Aberdeen, UK

Karen Scott is Professor in Gut Microbiology at the Rowett Institute, University of Aberdeen. She leads a research team investigating how obligately anaerobic gut bacteria interact with the diet and human host, throughout life. Products of gut bacteria are important for health, sending signals all round the body, and what we consume within our diet has huge effect on these important host-bacterial interactions. In vitro bacterial growth studies utilising our large culture collection of gut anaerobes and genome sequencing and bioinformatic analyses are used to investigate niche-specific processes and bacterial interactions, identifying key species as targets for enrichment through dietary manipulation or development as bacterial supplements or probiotics.

Dr. Bruno Pot
Yakult Europe, The Netherlands

Bruno Pot graduated at the University Gent, Belgium. In subsequent postdocs he performed research on lactic-acid-bacteria. In 1997 he joined Yakult as science manager Benelux. Between 2001–2016 he worked as Research Director at Institut Pasteur de Lille and as Director Business Development at the bioinformatics company Applied Maths. Since 2016 Bruno is back with Yakult as Science Director Europe. He is member of the Taxonomic Subcommittee for *Lactobacillus* and *Bifidobacterium*, Vice-President of the Pharmabiotic Research Institute and Board Chair of ILSI-Europe. Professor at the Vrije Universiteit Brussel since 2001 for courses in food microbiology. Research profile on https://www.researchgate.net/profile/Bruno-Pot

Dr. Olaf Larsen
Yakult Nederland, The Netherlands

Olaf Larsen studied chemistry at the VU University Amsterdam and obtained a PhD in physics there as well. Following postdoctoral research in New York City and Amsterdam, he continued his career within industry. Olaf worked for ASML, TNO and as a consultant life sciences within various organizations. Since 2012 he is heading the Science department at Yakult Nederland B.V., and member of the Management Team. Since 2016, he is also part time Asst. Professor at the VU University focusing on One Health in relation to microbiota management, using various research techniques like computational modeling.

Dr. Nikoletta Vidra
Yakult Europe, The Netherlands

Nikoletta Vidra has studied Human Nutrition and Dietetics with a MSc specialization in Clinical Nutrition, at Harokopio University of Athens in Greece. She obtained her PhD from the University of Groningen and her thesis focused on: 'The obesity epidemic in Europe'. She has worked as a researcher in the WHO Collaborating Centre of Nutrition in Medical School of Athens, Greece, at the Department of Nutrition Science of Harokopio University, and as postdoctoral researcher at the Radboud University Medical Center in Nijmegen, while she was awarded fellowships and grants for her research. Moreover, she has worked in healthcare practice, non-governmental organization and food industry. She has joined Yakult in November 2022 as Science Manager Europe.

Her main research interests are in the area of probiotics, nutrition and cancer and obesity.

Chairs

Prof. Stephan Bischoff, *University of Hohenheim, Germany.* ***See scientific committee p. 6***

Prof. Patrizia Brigidi, *University of Bologna, Italy.* ***See scientific committee p. 6***

Dr. Gwen Falony
University Medical Centre of the Johannes Gutenberg-Universität Mainz, Germany

Gwen Falony received his PhD in 2009 from the Vrije Universiteit Brussel (VUB, Belgium), where he studied cross-feeding interactions between bifidobacteria and colon butyrate producers. As a postdoc in the Raes Lab (VUB-KU Leuven, Belgium), he contributed to the development of bioinformatics tools facilitating functional analysis and interpretation of metagenomic data. Later on, as a staff scientist working at the Flemish Institute for Biotechnology (VIB, Belgium), his work focused on defining the boundaries of a health-associated gut microbiota. He was one of the architects of the Flemish Gut Flora Project (FGFP). He identified transit time as a main contributor to microbiota variation and described a dysbiotic microbiome configuration with high prevalence among individuals suffering from a broad range of inflammation-associated conditions. His current research targets modulation of the colon microbiota away from this potentially deleterious Bact2 enterotype through dietary interventions, drug repurposing, and fecal microbiota transplantation. Since 2022, Gwen Falony works as senior research manager in the recently founded Viera-Silva Lab at the University Medical Centre of the Johannes Gutenberg-Universität Mainz (Germany).

Dr. Osamu Chonan
Yakult Honsha Co.,Ltd., Executive Officer of Yakult Central Institute, Japan

Osamu Chonan, PhD is the Executive Officer of the Yakult Central Institute. Dr. Chonan was a Director of the Yakult Honsha European Research Center for Microbiology in Belgium during 2005 and 2006. His Professional interests include nutrition, intestinal functioning, and human health. He was a Member of the Macronutrients Panel for the Dietary Reference Intakes in the National Institute of Health and Nutrition in Japan from 2002 to 2004, and from 2008 to 2009.

Prof. Flavia Indrio, *University of Salento, Italy.* ***See p. 13***

Dr. Olaf Larsen, *Yakult Nederland.* ***See scientific committee p. 9***

Prof. Sarah Lebeer, *University of Antwerp, Belgium.* ***See scientific committee p. 7***

Prof. Ger Rijkers, *University College Roosevelt, The Netherlands.* ***See scientific committee p. 7***

Prof. Karen Scott, *University of Aberdeen, UK.* ***See scientific committee p. 8***

Dr. Nikoletta Vidra, *Yakult Europe, Belgium.* ***See scientific committee p. 9***

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Day 1
Oral Presentations

Day 1, 10th October
KEYNOTE LECTURE I
09:15 – 10:00

THE ROLE OF GUT MICROBIOME AND ITS INTERACTION WITH DIET IN HEALTH AND DISEASE

Prof. Konstantinos Gerasimidis
Professor of Clinical Nutrition, University of Glasgow

The human gut is home to a complex ecosystem which plays a crucial role in the maintenance of host health and development of disease. In certain diseases, the composition of the microbiota is shifted from the "normal" status, that we observe in healthy people, to an unbalanced state commonly known to us as dysbiosis. Dysbiosis has been implicated in the aetiology of non-communicable disease, including cardiovascular diseases, mental illness and diseases of the gastrointestinal tract.

Diet is a major modifier of gut microbiota composition and its function. Diet provides nutrients to the gut microbiota for their survival and growth, and in turn the gut microbiota reciprocate this courtesy by producing metabolites for host health. There is now good data to show that food industrialisation and a western diet is associated with the development of a dysbiotic microbiota and production of harmful microbial products, and in reverse, a plant-based diet promotes the growth of fibre fermenting organisms and the production of beneficial short-chain fatty acids. Not all individuals host the same type of microbes and accordingly it is possible that the effects dietary components have on the host will vary too.

Nonetheless, in the causal pathway between microbiota causing disease, diet can have several roles. Diet can confound the association between microbiota and development of disease; microbiota may modify (promote or prevent) the effect diet has on disease development and even more important, microbiota may comprise a target for dietary manipulation in order to improve disease outcomes or to enhance response to concomitant drug therapy.

There are various microbiota-modifying dietary treatments and supplements which can influence the microbiota composition and/or its function and by extension disease development or treatment. Several of these microbiota-modifying therapies may be used as adjunct to pharmacological agents to improve overall patient treatment outcomes and their quality of life.

Prof. Konstantinos Gerasimidis
Konstantinos Gerasimidis is Professor of Clinical Nutrition and Dietitian by training. Professor Gerasimidis leads a laboratory and clinical team which explores the role of gut microbiota and its interaction with diet in the onset, propagation and management of acute and chronic conditions. He is particularly interested in how to manipulate the gut microbiota of people with chronic gastrointestinal diseases with food and other microbial therapeutics in order to improve their disease outcomes. He leads a large research team of post-doctoral scientists, clinical fellows and PhD students. He has a publication record of more than 150 peer-reviewed articles.

Day 1, 10th October
SESSION 1. THE INFANT GUT
10:30 – 11:00

HUMAN MILK MICROBIOTA AND BENEFICIAL EFFECT ON HEALTH

Prof. Flavia Indrio
University of Salento, Italy

Breast milk is a distinctive nourishment that possesses a distinct and ever-changing composition tailored to each individual baby, including diverse nutritional and bioactive components.

The presence of bioactive compounds is believed to have a significant impact on the beneficial benefits of breast milk on the health of both infants and mothers.

The human milk (HM) harbors its own microbiome, which can affect the development of the infant's gastrointestinal microbiome through breastfeeding.

Metagenomic analysis indicated that the HM includes bacteria, viruses, fungi, and archaea, as a complex body fluid, in addition to their other bioactive components.

Some factors affect the establishment of the HM and infant gut microbiome

Most of the bacteria isolated from human milk are Staphylococcus and Streptococcus, Propionibacterium followed by Lactobacillus and Bifidobacterium spp.

Gut-associated strictly anaerobic microbes belonging to Blautia, Clostridium, Collinsella, and Veillonella and also some butyrate-producing bacteria such as Coprococcus and Faecalibacterium, as well as Roseburia have also been isolated in human milk .

The origin of HM microbiota is basically from:

1. **Retrograde Flow:** from the transfer of oral and skin bacteria which enter the mammary ducts during suckling in a process called retrograde flow.
2. **Gut–Mammary-Axis:** The entero-mammary pathway where non-pathogenic, intestinally derived bacteria may be transported to other locations.
3. **Mammary Gland Bacteriome:** The human breast tissue bacteriome has recently been determined from breast tissue biopsies.

Prof. Flavia Indrio
Full Professor of Pediatric University of Salento Lecce Italy
Responsible for the Project First 1000 days Italian Minister of University
Member of the IPA's Program Area Working Group on Food Safety
Secretary of ESPGHAN Working Group on Gut Microbiota
President of World Scientific Association of Prebiotic Probiotic in Pediatrics.

Day 1, 10th October
SESSION 1. THE INFANT GUT
11:00 – 11:30

ESTABLISHMENT OF THE GUT MICROBIOTA IN 1-YEAR-AGED INFANTS: FROM BIRTH TO FAMILY FOOD

Prof. Christine Edwards
University of Glasgow, UK

Colonisation of the infant gut is an important event in the first year of life that could have lifelong consequences. There are many potential factors influencing colonisation and key stages from birth to establishment of full family foods. Delivery mode, early antibiotics, breastmilk and formula milk feeding and changes, timing of weaning and feeding practices are all major influencers. It is well established that breastfed infants have higher levels of bifidobacteria and more acidic propionate dominant colonic content. Formula feeding promotes more mature microbiota at an earlier age. Exposure to medication especially antibiotics, sources of bacterial transfer, geography and childcare environment may also be important influences on colonisation. There have been many studies considering the early colonisation process including potential placental transfer, the role of the composition and microbiota of breastmilk over the first year and the influence of maternal BMI and other characteristics. It is difficult to prove transfer of microbiota between mother and child without details and tracking of bacterial strains rather than just species. This has not been considered in most studies. In addition, the potential for sample contamination during collection, DNA extraction and sequencing has been explored revealing the importance of process controls especially on low biomass environments. Contamination may confuse understanding of the colonisation process. This has been a key in evaluation of the suspected placental microbiome, the importance of which is now in doubt for healthy mothers. The role of breast milk microbiota is also controversial and may actually originate from the infant during breastfeeding rather than a maternal bacterial transfer which colonises the infant gut. Maternal diet and milk composition may be more important. Weaning is a key stage in the development of a mature gut bacterial population and the importance of mixtures of fermentable carbohydrates in weaning foods needs to be considered.

Prof. Christine Edwards
Christine Edwards is Professor of Nutritional Physiology at the University of Glasgow. She gained her BSc (Biochemistry & Physiology) and PhD (modelling the human colonic microbiome) from the University of Sheffield and is a registered nutritionist with the Association for Nutrition (AfN). Her research explores interactions between food, the gut and its microbiome including the impact of dietary fibre, polyphenols and their resultant bioactives on health and gut disease. Her research has been funded by EU (co-ordinator of two previous projects on infant microbiota), MRC, BBSRC and industrial sponsors. She is the current Editor in Chief of Nutrition Research Reviews.

Day 1, 10th October
SESSION 1. THE INFANT GUT
11:30 – 12:00

ONE HEALTH. EXPOSOME AND XENOBIOME: NEW ONGOING RESEARCH

Assoc. Prof. Silvia Turroni
University of Bologna, Italy

The exposome is recognised as a major driver of host-associated microbiome variation. In particular, diet, lifestyle, geography, environmental exposure and medications are among the host and environmental factors that contribute most to shaping the human gut microbiome across the lifespan. With specific regard to xenobiotics (e.g., pollutants, food additives and drugs), the existence of a bidirectional relationship with gut microbes is now established, with the former capable of promoting or conversely inhibiting the growth of certain taxa, thereby influencing their features (including virulence), with cascading effects on the mutualistic relationship with the host, and the latter capable of activating, inactivating, bioaccumulating xenobiotics or somehow interfering with their toxicity. In this scenario, recent evidence from the European H2020 CIRCLES project also points to the role of the human microbiome as the main route of dissemination of antibiotic resistance genes in food systems, posing a serious threat to public health. It goes without saying that any risk assessment for human health and the development of preventive/therapeutic strategies should include microbial ecosystems as essential components. Equally important, these assessments should be made from a One Health perspective, i.e., addressing human, animal, plant and environmental health through transdisciplinary collaboration for a truly integrated, unifying approach.

Assoc. Prof. Silvia Turroni
Silvia Turroni is Associate Professor in Chemistry and Biotechnology of Fermentation, at the Unit of Microbiome Science and Biotechnology, Department of Pharmacy and Biotechnology, University of Bologna (Bologna, Italy). She has over 15 years of experience in the compositional and functional profiling of the human microbiome and the exploration of its impact on health. She has strong expertise in next-generation sequencing technologies, including 16S rRNA gene sequencing and omics approaches, i.e., metagenomics, metatranscriptomics and, more recently, culturomics, as well as in microbiome-host interaction studies in ex vivo models. Her research activity is documented by >200 publications in international peer-reviewed journals and >140 participations in national and international congresses (>60 as invited speaker).

Day 1, 10th October
SESSION 2. WOMEN'S HEALTH
13:00 – 13:30

A BALANCED VIEW ON INTERPLAY BETWEEN GUT MICROBIOTA, HORMONES AND FERTILITY

Prof. Max Nieuwdorp
Amsterdam University Medical Centre, the Netherlands

Our hormones play a major role in many everyday matters – from the moment we are conceived to the second we take our last breath. For example, they regulate our development during puberty, ensure a successful pregnancy and guide the aging process. Scientific knowledge about the way hormones perform their function in our body has increased enormously over the past seventy years. At the same time, many insights have remained underexposed, such as the major influence of our gutbacteria on our energy balance, the developments that the female body undergoes during fertility and menopause and the decrease in male hormones during andropause. But also the role of hormones in relation to stress. During his lecture, Prof Max Nieuwdorp will take you on a historical and biological search for the role of our hormones from the cradle to the grave.

Max Nieuwdorp, M.D., Ph.D., *Professor in Internal Medicine-Diabetes, Chair department of (experimental) Vascular medicine, Amsterdam UMC, Amsterdam, the Netherlands.*
Max Nieuwdorp (1977) studied Medicine at Utrecht University and received his Ph.D. in diabetes at the Academic Medical Center of the University of Amsterdam (AMC-UvA; under supervision of Professor John Kastelein). After a residency in Internal Medicine and fellowship in Endocrinology at the AMC-UvA he performed a postdoctoral fellowship on glycobiology at University of California, San Diego in the department of Cellular and Molecular Medicine under Professor Jeff Esko. Professor Nieuwdorp is currently chair of the AmsterdamUMC Diabetes Center as well as chair of (Experimental) Vascular Medicine department; 36 Ph.D. students have already defended their thesis under his stewardship, currently he has 30 Ph.D. students, 6 postdoctoral fellows as well as 4 bioinformaticians in his group. His research focuses on translational research aimed at dissecting the causal role of (small) intestinal bacterial strains in development of type 1/type 2 diabetes mellitus, NAFLD-NASH and cardiometabolic disease with a special interest in the gut-brain axis. Prof Nieuwdorp has published > 370 peer reviewed articles including papers in Nature Medicine, Science, Cell Host Microbes, NEJM, Cell Metabolism, Gut and Gastroenterology. He also recently published his book for the laypublic entitled "We are our hormones", which is currently translated in 10 languages including an English version at Simon and Schuster publishers.

Day 1, 10th October
SESSION 2. WOMEN'S HEALTH
13:30 – 14:00

HOW TO ADVANCE WOMEN'S HEALTH WITH MICROBIOME RESEARCH AND CITIZEN SCIENCE: THE ISALA STUDY

Prof. Sarah Lebeer
University of Antwerp, Belgium

The Isala study, named after the first female physician, started as a Belgian citizen science project on the female microbiome. It exemplifies how advancing women's health can be achieved through the synergistic efforts of microbiome research and citizen science. By empowering women to self-collect vaginal samples and actively participate in shaping research questions, the study aims to decode intricate details of the vaginal microbiota composition, linking it closely with various aspects of female health and lifestyle. The pioneering phase of this citizen-science project involved 3,345 women aged 18 to 98 in Belgium, utilizing self-sampling techniques, 16S amplicon sequencing, and comprehensive questionnaires to establish a detailed understanding of the vaginal microbiome.

The first analyses revealed that the overall composition of the vaginal microbiome is significantly influenced by factors such as age, childbirth, and menstrual cycle phase. *Lactobacillus* species were found to dominate 78% of the samples. Through network correlation analysis, we also identified specific bacterial taxa that co-occurred in distinct modules or guilds. For instance, the module containing *Lactobacillus crispatus*, *Lactobacillus jensenii*, and *Limosilactobacillus* taxa was positively associated with estrogen levels and contraceptive use, while negatively associated with childbirth and breastfeeding. Other bacterial modules, named after taxa like *Gardnerella*, *Prevotella*, and *Bacteroides*, showed correlations with variables such as multiple sexual partners, menopause, menstrual hygiene practices, and contraceptive use.

The extensive dataset generated from this study provides an invaluable resource, offering unique insights into the interplay between vaginal microbiota and various health, life-course, lifestyle, and dietary factors. This dataset paves the way for new diagnostic and therapeutic opportunities, underscoring the critical role of the vaginal microbiome in reproductive and overall health. By incorporating citizen science, the Isala study not only advances scientific understanding but also empowers women across the world, fostering greater engagement and input in health research.

Prof. Sarah Lebeer

Sarah Lebeer is a research professor (ZAP BOF) at the Department of Bioscience Engineering of the University of Antwerp. She is heading the Laboratory for Applied Microbiology and Biotechnology of the ENdEMIC research group. The major research topics within this lab are all driven by a passion for beneficial bacteria and microbiome research (www.lebeerlab.com). Fundamental, frontier research is combined with applied research oriented towards human and animal health, fermented foods and bioremediation. Sarah & her team study host-microbe interaction mechanisms in order to develop microbiological alternatives for antibiotics, such as probiotics and live biotherapeutic products. As such, Sarah has played a fundamental role during the start-up of YUN, a European biotech company that develops probiotherapy for the skin (www.yun.be). In 2017, Sarah won the European LABIP (Industrial Platform Lactic acid bacteria) award for mid-career scientists with “Outstanding Excellence in Lactic Acid Bacteria Research with an Industrial Relevance”. Since 2017, Sarah was also elected as academic board member of the International Scientific Association on Probiotics and Prebiotics (ISAPP) (www.isappscience.org). In 2020, Sarah and her team have launched a new citizen science project on women’s health and the vaginal microbe (isala.be/en), thanks to funding via an ERC Starting grant Lacto-Be. This project has been honoured with a Science Communication Award by the Royal Flemish Academy of Belgium for Science and the Arts and the Grand EY prize for citizen-science.

Day 1, 10th October
SESSION 2. WOMEN'S HEALTH
14:00 - 14:30

IMMUNE SYSTEM, MICROBIOME AND ENDOMETRIOSIS

Assoc. Prof. Ludivine Doridot
Université Paris Cité, Institut Cochin, France

Endometriosis is a hormone-dependent and inflammatory complex gynecological disease estimated to affect the lives of >10% of women of reproductive age. The disease is defined by the presence of functional endometrial-like tissue (lesions) outside the uterus. Symptoms include severe dysmenorrhea (menstrual pelvic pain), chronic pelvic pain and dyspareunia (pain related to sexual intercourse). Furthermore, around 40% of affected patients will suffer from infertility. While 60-80% of patients have their disease managed by hormonal treatment, this treatment is not curative and is contraceptive. Due to a global lack of awareness, both in patients and primary care health professionals, as well as a lack of validated diagnostic tools, there is a long diagnostic delay (4-10 years). Surgery remains the best option for long term pain relief, but the recurrence rate is high (20%), and multiple surgeries are not recommended. Endometriosis etiology remains incompletely understood. The most accepted mechanism for endometriosis establishment is retrograde menstruation, a reflux of menstrual blood through the fallopian tubes. But as this phenomenon occurs in 90% of menstruating women and only 1 in 10 develop endometriosis, other mechanisms are at play. Amongst those, immune dysfunction and dysbiosis are strongly suggested. Indeed, epidemiological data suggest that both inflammatory bowel disease and auto-immune diseases are associated with endometriosis. Furthermore, gut and vaginal dysbiosis have been described in endometriosis. We and other recently showed that therapeutic strategies targeting the immune system and/or the microbiome are interesting for the treatment of endometriosis. These different approaches will be presented and discussed.

Assoc. Prof. Ludivine Doridot, *Université Paris Cité, Institut Cochin, France*
Ludivine Doridot is a researcher at INSERM (French National Institute of Health and Medical Research) and an Associate Professor at Université Paris Cité (Paris, France). She obtained her PhD in Genetics from Université Paris Descartes in 2013 for her studies on preeclampsia, a hypertensive disease of pregnancy. She then performed a postdoc in Beth Israel Deaconess Medical Center, a Harvard-affiliated hospital in Boston (USA), where she studied genetic-environment interaction in the context of metabolic syndrome. Since 2017, she is focusing her research on endometriosis and reproductive immunology. She is using single cell transcriptomics, primary 2D and 3D cell model and mouse models to better understand the physiopathology of endometriosis. She recently obtained a European Starting Grant to study endometriosis (MultiMENDo project), using menstrual blood, a relevant and easily accessible yet overlooked biological fluid.

Day 1, 10th October
SESSION 3. BRAIN HEALTH
15:00 – 15:30

MICROBIOTA GUT-BRAIN AXIS AND MENTAL HEALTH

Assoc. Prof. Alejandro Arias-Vasquez
Radboud University Medical Center, The Netherlands

In this presentation, I will delve into the fundamentals of the gut-brain axis within the context of neurobiology, exploring its profound implications for mental health. We will examine the relationship between gut microbiota and mental health, emphasizing the bidirectional communication network that links the gut and brain and plays a crucial role in modulating brain function and behavior, influencing conditions such as anxiety, depression, and neurodevelopmental disorders.

Current research underscores the significant role of gut microbiota in producing neuroactive compounds and modulating immune responses. These interactions open promising avenues for microbiota-targeted therapies aimed at improving mental health outcomes. Our studies reveal notable impacts of gut microbiota on ADHD, autism, and depression. In ADHD, specific microbial compositions are associated with symptoms of hyperactivity and inattention. Autism research highlights gut microbiota imbalances that correlate with social and behavioral challenges. In depression, distinct variations in gut bacteria are linked to mood regulation and depressive symptoms.

These findings emphasize the potential of the gut-brain axis in understanding and addressing neuropsychiatric conditions. We will explore how dietary interventions can ameliorate ADHD symptoms, considering the gut-brain interplay's role in influencing behavior and cognition. In autism, gut-brain interactions impact social behavior and gastrointestinal health, suggesting that probiotics and dietary modifications could serve as viable therapeutic strategies. Depression studies indicate that gut dysbiosis can affect mood and cognitive function, with nutritional adjustments such as increased fiber intake showing potential in alleviating depressive symptoms.

This presentation aims to engage neuroscientists, (micro)biologists, and industry partners from the food sector by highlighting the transformative potential of targeting the gut-brain axis, via "Nutritional Psychiatry", in mental health treatment. By understanding and manipulating gut microbiota, we can pave the way for innovative therapies and improve mental health outcomes.

Assoc. Prof. Alejandro Arias-Vasquez
Alejandro Arias Vásquez, Associate Professor of Translational Neurobiology at Radboudumc, leads the pioneering Bacteria, Brain, and Behaviour (B3) research group. With dual expertise in biology and genetic epidemiology, Dr. Arias Vásquez's team investigates the gut-brain axis, exploring how gut bacteria influence mental health. Their work uncovers robust associations between bacterial variation and neurobiological outcomes, including brain structure, function, behavior, and neurodevelopmental and psychiatric disorders. The group's innovative research also seeks nutritional drivers that, through the microbiota gut-brain axis, have the potential to modulate behavior, offering promising avenues for mental health interventions.

Day 1, 10th October
SESSION 3. BRAIN HEALTH
15:30 – 16:00

LIFESTYLE FACTORS AND THE GUT-BRAIN AXIS: RELEVANCE TO ALZHEIMER'S

Prof. Yvonne Nolan
University College Cork, Ireland

Summary: Cognitive impairment in the form of dementia and Alzheimer's disease is currently a leading cause of disability worldwide. Prolonged exposure to different lifestyle factors such as stress, toxins, an unhealthy diet, sedentary behaviour negatively affects brain plasticity and cognitive function while positive factors such as exercise, cognitive stimulation, and healthy diet may mitigate/halt the progression of cognitive decline. A brain structure that is particularly vulnerable or receptive to lifestyle factors is the hippocampus. The hippocampus is responsible for learning, memory and regulation of emotion and it is also one of the first and primary brain regions to be affected in Alzheimer's. Much evidence now shows that the gut microbiota are also extremely responsive to lifestyle factors. In the context of disease, Alzheimer's patients display a decrease in diversity of microbiota, which is recognised as a potential hallmark of healthy ageing. Thus, determining associations or causal roles between gut microbiota, hippocampal function and Alzheimer's disease is becoming an area of interest. To determine if a gut microbiota signature in Alzheimer's played a role in cognitive symptoms and neuroplasticity, we transplanted faecal microbiota from Alzheimer's patients into microbiota-depleted young adult rats. We found impairments in behaviours reliant on adult hippocampal neurogenesis, an essential process for certain memory functions and mood, resulting from Alzheimer's patient transplants. The severity of impairments correlated with clinical cognitive scores in donor patients. Results suggest that symptoms of Alzheimer's can be transferred to a healthy young organism via the gut microbiota and thus that symptoms of the disease may be, in part, caused by alterations in microbiota in the gastrointestinal tract.

Prof. Yvonne Nolan
Yvonne Nolan is Professor in Neuroscience, a Science Foundation Ireland Investigator and an Investigator in APC Microbiome Ireland, University College Cork (UCC). She leads a research team investigating the impact of inflammation and lifestyle influences such as exercise, stress and diet on brain plasticity, gut health, mental health and memory, especially during adolescence, middle and older age. She is a cell, animal model and translational neuroscientist.

Yvonne is Vice Head of Graduate Studies in Medicine and Health at UCC, where she has strategic oversight of education for doctoral degrees in the health sciences.

Yvonne graduated from NUI, Galway with a BSc in Biochemistry and a PhD in Neuropharmacology. She was a visiting fellow at McGill University Montreal, Canada and held postdoctoral positions in Trinity College, Dublin before joining UCC as academic staff.

Day 1, 10th October
SESSION 3. BRAIN HEALTH
16:00 – 16:30

EFFECTS OF *LACTICASEIBACILLUS PARACASEI* STRAIN SHIROTA ON DAYTIME PERFORMANCE IN HEALTHY OFFICE WORKERS: A DOUBLE-BLIND, RANDOMIZED, CROSSOVER, PLACEBO-CONTROLLED TRIAL.

Mr. Kazunori Suda
Yakult Honsha European Research Center for Microbiology VOF, Belgium

Lacticaseibacillus paracasei strain Shirota (LcS; formerly named *Lactobacillus casei* strain Shirota) intervention in medical students attenuated the stress response and maintained the sleep quality under academic examination stress condition. Sleep disturbances can cause fatigue, drowsiness, decreased alertness, and lack of motivation, affecting daytime performance. Additionally, occupational stress and sleep disorders are associated with presenteeism, which refers to productivity losses from employees working with poor health conditions.

To explore possible efficacy of LcS for improving daytime performance, we conducted a double-blind, randomized, crossover, placebo-controlled study of 12 healthy office workers with sleep complaints. The participants received fermented milk containing LcS (daily intake of 1×10^11 cfu/100 mL) and placebo milk, each for a 4-week period, and underwent assessments of their subjective mood and physiological state indicators via electroencephalogram (EEG) and heart rate variability.
The attention score in the afternoon assessed by visual analogue scale was higher in the LcS intake period than in the placebo. Theta power on EEG measured in the afternoon was significantly lower in the LcS period than in the placebo. The change rate of theta power was associated with the change in the attention score. Treatment-associated changes were also observed in sympathetic nerve activity index. These results indicate that LcS has possible efficacy for improving daytime performance, supported by observations of the related physiological state indicators.

Mr. Kazunori Suda
Kazunori Suda, MSc, is a Senior Researcher of Yakult Honsha European Research Center for Microbiology (YHER), Belgium. He obtained Bachelor degree in Division of Biological Science at the Nagoya University, Japan and Master in Master's Program in Medical Sciences at the University of Tsukuba, Japan. He started working at Yakult Central Institute in 2006, where he studied the effects of probiotics on intestinal epithelial cells and on stress-related gastrointestinal dysfunctions. Subsequently, his major research interest has focused on the interaction between microbiome and neuroendocrine systems. Since 2023, he is working at YHER.

Day 2
Oral Presentations

Yakult
Science for Health

Day 2, 11th October
KEYNOTE LECTURE II
09:05 – 09:50

FERMENTED FOODS: AN UPDATE ON EVIDENCE BASED HEALTH BENEFITS AND FUTURE PERSPECTIVE

Prof. Paul Cotter
Teagasc Food Research Centre and APC Microbiome Ireland, Ireland

A considerable variety of fermented foods are produced by all societies globally. However, there are still many fermented foods that have yet to undergo in-depth analysis to reveal the microbes, metabolites and nutrients present. An even smaller subset of fermented foods have been the focus of pre-clinical/clinical studies. Despite this, the studies that have taken place show a huge untapped potential. This potential can be achieved through the creation of communities of fermented food microorganisms designed to capture key health promoting, and other, features of fermented foods in a manner that also ensures that highly consistent products can be generated at scale.

Prof. Paul Cotter
Paul Cotter is the Head of Food Biosciences at Teagasc, is a Principal Investigator with the large Irish Research Centres, APC Microbiome Ireland, VistaMilk and Food for Health Ireland and CTO/co-founder of SeqBiome, a microbiome sequencing and bioinformatics service provider. He is a molecular microbiologist, with a particular focus on the microbiology of foods (especially fermented foods), the food chain and of humans, as well as probiotics and postbiotics. Prof Cotter is the author of >400 peer-reviewed, was included in the Clarivate list of highly cited researchers for 2018-2023, received an honorary doctorate from the University of Antwerp in 2024 and is the Field Chief Editor of Frontiers in Microbiology.

Day 2, 11th October
Session 5. LcS STUDIES
10:10 – 10:40

EFFECTS OF HABITUAL INTAKE OF FERMENTED MILK PRODUCTS CONTAINING *LACTICASEIBACILLUS PARACASEI* STRAIN SHIROTA ON HEALTH MAINTENANCE IN OLDER PEOPLE

Dr. Yukitoshi Aoyagi
Tokyo Metropolitan Institute for Geriatrics and Gerontology, Japan

Population aging is an urgent issue not only for developed countries but also for developing countries. In particular, Japan has the world's highest population aging rate; nearly 30% of the population is aged 65 or older. As the elderly population increases, the prevalence of diseases increases, along with the annual medical expenses. Therefore, developing an innovative strategy for health promotion and disease prevention in older people is essential.
Lacticaseibacillus paracasei strain Shirota (LcS, previously known as *Lactobacillus casei* strain Shirota) has been used in the production of fermented milk for more than 85 years, and approximately 40 million bottles are currently consumed in 40 countries and regions. Clinical trials have shown its benefits, including regulation of intestinal motility, protection against infection, immunoregulation and prevention of carcinogenesis. However, the impact of LcS on major lifestyle-related diseases and gastrointestinal health in the elderly has not been clearly defined, and further epidemiological studies are needed.
Since 2014, we have been conducting an epidemiological study (the Nakanojo Study) to evaluate the relationship between the frequency of consumption of fermented milk products containing LcS (LcS products) and health status in people aged 65 years and older. The main topics for today will be the two representative results regarding the intake of LcS products and the risk of hypertension[1] and infrequent bowel movements[2], which are typical symptoms in the elderly. We have investigated community-dwelling elderly Japanese participants and found that the risk of developing hypertension or infrequent bowel movements in the elderly was inversely associated with the frequency of intake of LcS products. It has also been shown that a combination of LcS products intake and physical activity may further decrease the risk of infrequent bowel movements than a single implementation. We would like to continue to clarify the contribution of lactic acid bacteria to a healthy and long life.

1. Aoyagi Y, et al. Habitual intake of fermented milk products containing *Lactobacillus casei* strain Shirota and a reduced risk of hypertension in older people. *Benef Microbes*. 2017; 8: 23-29.
2. Aoyagi Y, et al. Independent and interactive effects of habitually ingesting fermented milk products containing *Lactobacillus casei* strain Shirota and of engaging in moderate habitual daily physical activity on the intestinal health of older people. *Front Microbiol.* 2019; 10: 1477.

Dr. Yukitoshi Aoyagi
Born in Nakanojo, Gunma, Japan (1962). Completed a Ph.D. course at the Graduate Department of Community Health, University of Toronto, Canada (1996). Researcher (Postdoctoral Fellow) at the Thermal Physiology Research Group, Defense and Civil Institute of Environmental Medicine, Canada (1996-1997). Assistant Professor at the Faculty of Human Life and Environment, Nara Women's University, Japan; and Part-time Lecturer at the Faculty of Medicine, Osaka University, Japan (1997-1999). Head at the Exercise Sciences Research Group, Tokyo Metropolitan Institute of Gerontology, Japan (1999-present).

Day 2, 11th October
Session 5. LcS STUDIES
10:40 – 11:10

UNIQUE CELL WALL POLYSACCHARIDE OF *LACTICASEIBACILLUS PARACASEI* STRAIN SHIROTA AND IMPORTANCE OF INTESTINAL MUCOSAL PHAGOCYTES IN ITS IMMUNOMODULATORY EFFECTS

Mr. Masatoshi Morikawa
Yakult Honsha European Research Center for Microbiology, Belgium

Ingestion of *Lacticaseibacillus paracasei* strain Shirota (LcS) activates immune cells and reduces the risk of viral infections and colorectal cancer. Our study aims to elucidate the specific sites and mechanisms by which LcS influences immune cells in the digestive system. Under normal physiological conditions, phagocytic cells in the intestinal mucosa engulf gut microbes. A previous study demonstrated that the terminal ileal lumen is filled with LcS following the consumption of LcS-fermented milk, suggesting that the immunomodulatory effects of LcS originate from phagocytes in the intestinal mucosa.
The cell wall of LcS is thicker than that of other lactic acid bacteria owing to its unique cell wall polysaccharide. In an *in vitro* study, LcS uptake activated phagocytes and subsequently stimulated lymphocytes. Clinical trials confirmed the activation of phagocytic cells and lymphocytes after the consumption of LcS-fermented milk. Therefore, we believe that phagocytes in the intestinal mucosa are the entry points for LcS, with its unique cell wall polysaccharide playing a key role in its immunomodulatory effects.

Mr. Masatoshi Morikawa
Masatoshi Morikawa, M. Eng., is an Associate Senior Researcher of Yakult Honsha European Research Center for Microbiology VOF (YHER), Belgium, since June 2024. He received Master Degree of Engineering in Department of Bioengineering at Tokyo Institute of Technology, Japan. He started working at Yakult Central Institute, Japan in 2011, where he studied the effects of gut microbiota and probiotics on immune cells. His major interest is phagocytes, such as macrophages and dendritic cells, and he focuses on how phagocytes are regulated by the gut microbiome and probiotics, and how phagocytes elicit immune responses against viral infection and cancer.

Day 2, 11th October
Session 6, ROUNDTABLE DISCUSSION
11:10 – 11:55

CLINICAL TRIALS IN THE NUTRITION FIELD: A SOLUTION OR A NIGHTMARE?

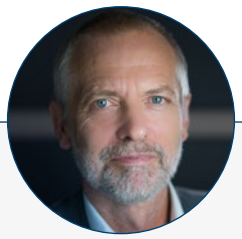
Dr. Gwen Falony, Prof. Wendy Hall, Prof. Flavia Indrio, Prof. Hans Verhagen, Dr. Bruno Pot and Dr. Emily Prpa.

Dr. Gwen Falony, *University Medical Center of the Johannes Gutenberg University of Mainz, Germany*
Gwen Falony received his PhD in 2009 from the Vrije Universiteit Brussel (VUB, Belgium), where he studied cross-feeding interactions between bifidobacteria and colon butyrate producers. As a postdoc in the Raes Lab (VUB-KU Leuven, Belgium), he contributed to the development of bioinformatics tools facilitating functional analysis and interpretation of metagenomic data. Later on, as a staff scientist working at the Flemish Institute for Biotechnology (VIB, Belgium), his work focused on defining the boundaries of a health-associated gut microbiota. He was one of the architects of the Flemish Gut Flora Project (FGFP). He identified transit time as a main contributor to microbiota variation and described a dysbiotic microbiome configuration with high prevalence among individuals suffering from a broad range of inflammation-associated conditions. His current research targets modulation of the colon microbiota away from this potentially deleterious Bact2 enterotype through dietary interventions, drug repurposing, and fecal microbiota transplantation. Since 2022, Gwen Falony works as senior research manager in the recently founded Viera-Silva Lab at the University Medical Centre of the Johannes Gutenberg-Universität Mainz (Germany).

Prof. Wendy Hall, *King's College London, UK*
Wendy Hall is a Professor of Nutritional Sciences at King's College London and Deputy Head of the Department of Nutrition & Dietetics, Departmental Postgraduate Research Co-ordinator, besides Academic Lead for the Metabolic Research Unit in the Department of Nutritional Sciences. Her PhD was on physiological mechanisms mediating the effects of dietary amino acids on appetite at the University of Surrey (2001). Following postdoctoral appointments researching Vitamin E biokinetics at the University of Surrey, and cardio-metabolic effects of dietary isoflavones and fatty acids at the University of Reading, she took up her first academic appointment at King's College London in 2005.
Prof Hall's broad research interests relate to the nutritional modulation of lipid metabolism, postprandial glycaemia and lipaemia, inflammation, and vascular function. Specific interests include investigating effects of dietary fatty acids (omega-3 fatty acids, saturated fatty acids), polyphenols, whole dietary patterns, and sleep/diet quality interactions on cardio-metabolic risk markers, and the role of diet in management of skin disorders such as psoriasis, funded through a number of sources including BBSRC, Innovate UK, Almond Board of California, Psoriasis Association and the British Skin Foundation. In 2016, Prof Hall received the Nutrition Society's Silver Medal for her contribution to nutritional science, and in 2018 she was appointed to the role of the Nutrition Society's Theme Leader in Whole Body Metabolism, later Nutrition & Optimum Life Course. In 2023 she became Honorary Programmes Officer and Trustee of the Nutrition Society.

Prof. Flavia Indrio, *University of Salento, Italy*
Full Professor of Pediatric University of Salento Lecce Italy
Responsible for the Project First 1000 days Italian Minister of University
Member of the IPA's Program Area Working Group on Food Safety
Secretary of Espghan Working Group on Gut Microbiota
President of World Scientific Association of Prebiotic Probiotic in Pediatric

Prof. Dr. Hans Verhagen, *Owner and Consultant, Food Safety & Nutrition Consultancy*
Hans Verhagen has over 41 years of experience in foodsafety and nutrition. He is a certified toxicologist and nutritionist. He worked at Universities (Nijmegen, Maastricht,Ulster, Copenhagen), in contract research (TNO), in industry (Unilever), for the national government (RIVM), and EFSA from 2015-2020. From 2006-2015 he was a member of the EFSA-NDA panel, working on health claims and novel foods. He is a professor at the University of Ulster (Northern Ireland) and at the Technical University Denmark (DTU, Denmark). Since 2020, he is owner and consultant of Food Safety & Nutrition Consultancy in the Netherlands (https://www.fsnconsultancy.nl/).



Dr. Bruno Pot, *Yakult Europe, The Netherlands*
Bruno Pot graduated at the University Gent, Belgium. In subsequent postdocs he performed research on lactic-acid-bacteria. In 1997 he joined Yakult as science manager Benelux. Between 2001–2016 he worked as Research Director at Institut Pasteur de Lille and as Director Business Development at the bioinformatics company Applied Maths. Since 2016 Bruno is back with Yakult as Science Director Europe. He is member of the Taxonomic Subcommittee for *Lactobacillus* and *Bifidobacterium*, Vice-President of the Pharmabiotic Research Institute and Board Chair of ILSI-Europe. Professor at the Vrije Universiteit Brussel since 2001 for courses in food microbiology.
Research profile on https://www.researchgate.net/profile/Bruno-Pot

Dr. Emily Prpa, *Yakult UK*
Emily Prpa is an award-winning nutritionist, with a PhD in Nutritional Sciences from King's College London. Her research has focused on the therapeutic effects of plant-based foods and more recently on advancing our understanding of how the gut microbiome influences various aspects of health and wellbeing. Her research has been presented internationally and helped inform UK Food Policy. Today she is the Science Manager at Yakult UK & Ireland, a Visiting Lecturer at King's College London and known as The Nutrition Reporter on Instagram where she is recognised as a trusted voice in wellbeing. Emily is considered one of the leading experts in her field and is frequently featured in the media, including Sky News and the BBC.

Day 2, 11th October
Session 7. GUT HEALTH: THE OTHER 'AXES'
12:45 – 13:15

THE GUT-LUNG AXIS: UNVEILING MICROBIOTA-MEDIATED STRATEGIES TO COMBAT SEVERE INFECTIONS

Dr. Bastiaan Haak
Wellcome Sanger Institute, UK & Amsterdam UMC, The Netherlands

Respiratory tract infections stand as the leading cause of death from infectious diseases worldwide, demanding urgent attention for novel treatment approaches to reduce morbidity and mortality rates. While the human microbiome represents a significant source of biological variation among patients, they have been largely overlooked in understanding the complexities of these diseases. Recent research, however, sheds light on how disruptions of the gut microbiome contribute to the pathophysiology and outcomes of respiratory tract infections. This presentation will delineate both preclinical and clinical evidence, along with the underlying mechanisms supporting the protective role of the microbiome in susceptibility to and outcomes of severe infections. Additionally, it will examine the impact of medical interventions, such as antibiotics and other medications, on gut microbiota composition and the subsequent predisposition to infectious diseases. These insights into the gut-lung axis open doors to therapeutic modulation of the microbiome, laying a foundation for innovative strategies in combating severe infections.

Dr. Bastiaan Haak
Bastiaan Haak is an Infectious Diseases physician in training with a special interest in translational microbiome science. He conducted doctoral research at the Amsterdam UMC and Memorial Sloan Kettering Cancer Center in New York City, focusing on the immunomodulatory role of the intestinal microbiota in the protection against respiratory tract infections. He was recently awarded a Niels Stensen Fellowship, which allowed him to pause his clinical training and work as a senior scientist at the Wellcome Sanger Institute in Cambridge, United Kingdom. Here, he aims to identify novel microbiota-derived therapies that might benefit patients most vulnerable to severe outcomes from infectious diseases.

Day 2, 11th October
Session 7. GUT HEALTH: THE OTHER 'AXES'
13:15 – 13:45

MOUTH – A MIRROR OF SYSTEMIC HEALTH

Prof. Egija Zaura
Vrije Universiteit Amsterdam, The Netherlands

Although it is a start of the gastrointestinal tract, mouth is frequently neglected when it comes to general health. Oral cavity is a complex ecosystem where multiple host and microbial factors interact in maintaining a healthy balance. While host provides a stable, nutrient-rich habitat for its microbes, a healthy oral microbiome fine-tunes and trains the immune system, prevents the establishment of exogenous microorganisms in the oral cavity and maintains a healthy gastrointestinal and cardiovascular system of the host. Once this balance is lost, as during frequent sugar intake or prolonged neglect of oral hygiene, dental caries or periodontal diseases may develop. Epidemiological studies have demonstrated that periodontitis (inflammation of periodontal tissues and alveolar bone resorption) is associated with systemic conditions such as diabetes and pre-eclampsia. From the other side, treatment of periodontal disease improves glycemic control and status of diabetics. In this talk, the scientific evidence on the establishment and maintaining a healthy oral ecosystem as well as the link between the oral and systemic health will be discussed.

Prof. Egija Zaura
Egija Zaura is a full professor of Oral Microbial Ecology in the Department of Preventive Dentistry at the Academic Centre for Dentistry Amsterdam (ACTA), the Netherlands. She holds a degree in dentistry from Karolinska Institutet, Sweden, and Riga Stradins University, Latvia, as well as a Master's degree in General Dentistry from Riga Stradins University. She obtained her PhD in Preventive Dentistry from the University of Amsterdam, the Netherlands. Her current research focuses on understanding oral microbial ecology in both health and disease and translating this fundamental knowledge into clinical practice.

Day 2, 11th October
Session 8, GUT METABOLISM
13:45 – 14:15

GUT MICROBIOME AND ITS INTERACTION WITH HOST METABOLIC AND NEUROLOGICAL FUNCTIONS

Prof. Marie-Christine Simon
University of Bonn, Germany

The gut microbiome, a complex community of trillions of microorganisms residing in the gastrointestinal tract, plays a pivotal role in maintaining host health. This presentation explores the interactions between the gut microbiome and host metabolic and neurological functions, highlighting recent scientific advancements and their implications for health and disease.
The gut microbiome significantly influences host metabolism through various mechanisms. Microbial fermentation of dietary fibers produces short-chain fatty acids (SCFAs) such as butyrate, acetate, and propionate, which serve as energy sources for colonocytes and modulate systemic metabolism. SCFAs also regulate glucose homeostasis, lipid metabolism, and appetite control by interacting with host receptors and signaling pathways. Dysbiosis, or an imbalance in the gut microbiota, has been linked to metabolic disorders such as obesity, type 2 diabetes, and metabolic syndrome. Probiotics and prebiotics have shown promise in restoring microbial balance and improving metabolic health.

The gut-brain axis, a bidirectional communication network between the gut microbiome and the central nervous system (CNS), underscores the microbiome's influence on neurological functions. Gut microbes produce neurotransmitters like serotonin, gamma-aminobutyric acid (GABA), and dopamine, which can affect mood, cognition, and behavior. Additionally, microbial metabolites such as SCFAs and tryptophan derivatives can cross the blood-brain barrier and modulate brain function. Dysbiosis has been associated with neurological and psychiatric disorders, including depression, anxiety, autism spectrum disorders, and neurodegenerative diseases. Emerging research suggests that modulating the gut microbiome through diet, probiotics, and fecal microbiota transplantation (FMT) may offer therapeutic potential for these conditions.

Understanding the gut microbiome's role in host metabolic and neurological functions opens new avenues for therapeutic interventions. By targeting the microbiome, we can potentially prevent and treat a range of metabolic and neurological disorders, enhancing overall health and well-being. Continued research is essential to unravel the complex mechanisms underlying these interactions and to develop effective microbiome-based therapies.

Prof. Marie-Christine Simon
Marie-Christine Simon is a junior professor for nutrition and microbiome at the Institute of Nutrition and Food Sciences at the University of Bonn. She heads the junior research group of the Diet Body Brain competence cluster funded by the BMBF and has several years of experience in nutrition-related microbiome research.
Already during her doctorate at the German Diabetes Center in Düsseldorf, Marie-Christine Simon conducted human intervention studies and investigated, for example, the influence of probiotics on insulin resistance, the incretin effect and the inflammatory status in overweight and slim subjects. She therefore has very extensive knowledge of diabetes-related metabolic and immune changes and brings with her her scientific understanding from her studies in nutritional science.

Day 2, 11th October
Session 8, GUT METABOLISM
14:15 – 14:45

HOST-MICROBE CO-METABOLISM IN HUMAN HEALTH AND DISEASE

Prof. Jingyuan Fu
University Medical Centre Groningen, The Netherlands

Host-microbiome co-metabolism refers to the intricate biochemical interplay between a host organism and its resident microbiota, wherein both parties contribute to and depend on shared metabolic processes. This symbiotic relationship significantly influences the health and disease states of the host, impacting various physiological systems including digestion, immunity, and even behavior. To decipher the metabolic space of the human genome and the gut microbiome, we carried out several analyses by leveraging chemoinformatic prediction, omics-integration in large-scale human cohorts, and in-intro models that aim to mimic the microbe-gut-liver axis in metabolic regulation.

First, we developed the MicrobeRX pipeline, which is enzyme-based metabolites prediction tool. This tool involved combining 13,540 enzymatic reactions from the human genome with 8,638 unique microbial reactions from 6,286 microbial strain-solved genome-scale metabolic models. We applied MicrobeRX predictions to all 1,083 FDA-approved, orally administrated drugs contained in DrugBank, and identified >10,000 metabolites resulting from biotransformation of human and microbial enzymes. Second, we performed systematic association analyses on human genetics, the gut microbiome and diet on plasma metabolites in the LifeLines-DEEP cohort, including over 1,200 metabolites from untargeted metabolic profiling and some focused studies on bile acids and TMAO, whose productions involved both human and microbial enzymes. Finally, my group is devoted to constructing a hiPSC-based liver-on-a-chip model, which will be further linked to hiPSC-based gut-on-a-chip and co-culture of gut microbes to mimic metabolic interactions.

Understanding these co-metabolic pathways opens avenues for novel therapeutic interventions aimed at modulating the microbiome to restore or enhance host health.

Prof. Jingyuan Fu
Jingyuan Fu is a professor of systems medicine in the University Medical Centre Groningen, the Netherlands, with a particular focus on integrative genomics and host-microbe interactions in complex diseases. She obtained a BSc in Biochemistry, a MSc in Biotechnology and Bioinformatics (cum laude), and a PhD in systems genetics (cum laude). Via this route she developed her research line on systems genetics in complex traits and became an expert in integrative genomics and systems biology.
Her research aims to acquire a greater knowledge of how the human genome and the gut microbiome interact with each other and affect human health, in order to create better methods for disease prediction, prevention, and treatment. To accomplish this, her study combines with large-scale genetic and microbial association studies in big groups of individuals with functional studies using advanced bacterial culturing and organ-on-a-chip technologies.
She holds numerous prestigious personal grants (NWO-VENI VIDI VICI, and ERC-CoG) and several (inter)national consortia grants. She is a laureate of AMMODO Science Award in 2023 and is recognized as an “Highly Cited Researcher” by Web of Science since 2020.

Posters

Yakult
Science for Health

POSTER I

COGNITION AND GUT MICROBIOTA

Bitsch MS
Turku School of Economics, University of Turku, FIN-20014 6 University of Turku, Finland

Background/Introduction
More than a decade has elapsed since research in neuroscience[1] pointed towards a new direction: the gut microbiota in brain health and cognition[2,3] or health[4-6]. This article reviews the contributions gut microbiota can make to cognition[7] when one focuses on decision-making and microbiology.

Methods
The conceptual review explains why microorganisms[8] will play a critically increasing role in the ecosystems since time won't stop cycling[9-13] and due to one concerning eutrophication phenomenon[14,15]. Evaluation is an important method for gut microbiota communities' taxonomic diversity[16] establishment, a requirement to make anticipations. Main evaluation criterions are costs, high throughput for reproducibility, or stability[17].

Results
Microorganisms are vital for the functioning of host normal energy flows; especially critical is to understand the role(s) played by one communication pathway: the bidirectional gut-brain axis[18,19]. This research will continue to build on the established strategies for easing social stressful situation effects[20] on host cognition through maintaining an energic life, anchoring the personality, and nurturing stable commensals[21,22].

Discussion and Conclusion
The dynamics[23] of all ecological systems[24] can only be understood through examining jointly exogenous and endogenous[25] influences.

Funding and/or conflict of interest
None

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POSTER 2

THE BUTYRATE AND BETA-HYDROXYBUTYRATE MEDIATED EFFECTS OF INTERVENTIONS WITH PRO- AND PREBIOTIC, FASTING AND CALORIC RESTRICTION ON DEPRESSION

Marian Breuling[1], Elena Tomeva[2], Nevena Ivanovic[3], Alexander Haslberger[1]

1. Department of Nutritional Sciences, University of Vienna, 1090 Vienna, Austria

2. HealthBioCare GmbH, A-1090 Vienna, Austria

3. Department of Nutrition, and Food Chemistry, Faculty of Pharmacy, University of Belgrade, Serbia

To examine the butyrate and beta-hydroxybutyrate (BHB) modulated effects of pre- and probiotic interventions, fasting and caloric restriction interventions, a systematic literature review was carried out with a subsequent meta-analysis. Three pre-and probiotic intervention RCTs were included into the meta-analysis. A significant increase of butyrate (SMD 0,34; [0,02 – 0,67]) and an improvement of depression scores (SMD 0,15, [-0,35 - 0,70]) through the pre-and probiotic interventions could be shown. Beside butyrate, also total SCFAs concentration seems to be positively associated with pre- and probiotic administration (SMD 0,55 [0,15 - 0,95]). Despite of the significant SCFAs and butyrate concentration changes, no significant correlation between either butyrate and depression nor SCFAs and depression could be shown through linear regression models. Nevertheless, the regression coefficient b1 = 1,57; (p = 0,17) for butyrate, suggests a strong, positive connection between butyrate and depression.

Additionally, three studies were qualitatively analyzed examining fasting as intervention, revealing a connection between fasting, BHB and depression. The association between fasting, BHB and depression or mood elevation appeared to be related to BHB concentration, which may be due to similar biochemical properties of BHB and butyrate. Furthermore, caloric restriction as alternative to fasting was proposed as potential long-term intervention.

POSTER 3

MINDFULNESS, GUT-BRAIN AXIS, AND HEALTH RELATED QUALITY OF LIFE: THE PARADIGM OF IBD PATIENTS

Efstratios Christodoulou[1], Tsambika Mpali[1], Maroula-Eleni Dimitriadou[1], Antonios E. Koutelidakis[1]

1. Lab of Nutrition and Public Health, Department of Food Sciences and Nutrition, University of the Aegean, Myrina Lemnos, Greece

Background/Introduction

Health-Related Quality of Life (HRQoL) is a multidimensional measure that captures an individual's overall health and well-being. Mindfulness, a scientifically validated practice for managing anxiety, is known to enhance both physical and mental health. The Gut-Brain Axis (GBA) is the bidirectional communication pathway between the gastrointestinal system and the central nervous system. Understanding the interplay between mindfulness and factors influencing the GBA could provide insights into their impact on HRQoL, particularly in individuals with Inflammatory Bowel Disease (IBD).

Methods

A cross-sectional study was conducted with a sample of 315 adults, including 47 patients diagnosed with IBD. The study utilized validated Greek versions of the following scales: the Mindful Attention Awareness Scale (MAAS-15), the Mediterranean Diet Adherence Screener (14-MEDAS), and the EQ-5D-5L scale for assessing HRQoL. The questionnaire also collected demographic and anthropometric data, alongside lifestyle information relevant to the participants.

Results

In the cohort of healthy individuals, the EQ-5D-5L scale showed a moderate correlation with the MAAS-15 scale (ρ=0.136, $p<0.05$) and a low correlation with the 14-MEDAS (ρ=0.136, $p<0.05$). Comparatively, patients with IBD had significantly lower mean EQ-5D-5L scores than healthy individuals (0.75 vs. 0.85, $p<0.05$). In the IBD group, MAAS-15 exhibited a strong correlation with EQ-5D-5L (ρ=0.551, $p<0.001$). Higher mindfulness levels were predictive of better HRQoL in IBD patients (OR: 1.101, 95% CI: 1.008–1.202, $p<0.05$) compared to those with lower mindfulness levels.

Discussion and Conclusion

The study underscores the crucial role of mindfulness in enhancing HRQoL, particularly among IBD patients. The strong correlation between mindfulness (MAAS-15) and HRQoL (EQ-5D-5L) suggests that mindfulness may help mitigate IBD's impact on quality of life. Additionally, the association between the Mediterranean Diet and HRQoL, though weaker, indicates that dietary habits may also influence the GBA and well-being. While these findings suggest potential therapeutic benefits of mindfulness, the study's cross-sectional design limits causal conclusions. Future longitudinal studies and clinical trials are necessary to validate these results and uncover the mechanisms by which mindfulness and diet affect the GBA and HRQoL, potentially leading to more comprehensive approaches to managing IBD.

Funding and/or Conflict of Interest

None

POSTER 4

PRE- AND PROBIOTICS TO RELIEVE CONSTIPATION-RELATED COMPLAINTS IN IRRITABLE BOWEL SYNDROME

Lonneke Janssen Duijghuijsen[1], Maartje van den Belt[1], Ben Witteman[2,3], and Nicole de Wit[1]

1. Wageningen Food and Biobased Research, Wageningen University & Research, Wageningen, the Netherlands;
2. Division of Human Nutrition and Health, Wageningen University & Research, Wageningen, the Netherlands
3. Gastroenterology and Hepatology department, Hospital Gelderse Vallei, Ede, the Netherlands.

Background

Irritable Bowel Syndrome (IBS) is a disease that affects many people. To date, no adequate treatment is available. This is partially due to the heterogeneity among patients and the complicated pathology that is not fully understood. Dietary interventions are one promising route to relieve IBS-related complaints, such as constipation. The objectives of the NUTRIC study were to determine the effects of a 4-week intervention with either a prebiotic supplement or a probiotic supplement on stool pattern (including stool frequency, consistency, and volume), gastrointestinal (GI) complaints, and quality of life in IBS patients suffering from constipation (IBS-C).

Methods

180 IBS-C patients were included in a randomized double-blinded placebo-controlled human intervention study. The study consisted of two periods; a 4-week observation period (week 1-4), which was similar for all three parallel arms (n=60 per arm), followed by a 4-week intervention period (week 5-8) in which participants received one of three dietary supplements: prebiotic acacia fiber (Inavea™), probiotic Bifidobacterium lactis BLa80, or placebo supplement (maltodextrin). At the start and end of both study periods, study participants completed several online questionnaires on their IBS-related complaints (IBS-SSS, PAC-SYM), their Quality of Life (PAC-QOL, HADS), and their habitual dietary intake (FFQ). During both study periods, study participants also completed short daily questionnaires via an EMA app (LifeData LLC, Marion, IN, USA) asking for their stool pattern, gastrointestinal (GI) complaints, and supplement compliance.

Results

Pre- and probiotic supplementation significantly increased stool frequency as compared to the placebo treatment ($P < 0.001$, $P = 0.02$, respectively). Period's delta (average stools per week during intervention minus average stools per week during observation) was significantly higher for the prebiotic group ($\Delta = 1.3 \pm 1.9$ stools per week, $P = 0.02$), indicating clinical significance with an increase of >1 stools per week. Probiotics induced a significant reduction in IBS symptom severity ($P = 0.03$), for prebiotics only a trend was observed. No significant changes in stool consistency, stool mass or QoL measures were observed between the AF and Probiotic BLa80 compared to placebo.

Conclusion

Daily dietary supplementation with prebiotic and probiotic supplements may significantly relieve IBS-related complaints by increasing the stool frequency and decreasing symptom severity, respectively.

Funding

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POSTER 5

THE GUT-BRAIN AXIS, MICROBIOTA AND PHYSICAL ACTIVITY IN IRRITABLE BOWEL SYNDROME: A SURVEY FROM THE PATIENT'S PERSPECTIVE

Hannah Lindsell[1], Dr Maura Corsetti[2], Dr Ana-Maria Darie[2], Dr Daniele Magistro[1], Dr Gemma Walton[3] and Dr Neil Williams[1]

1. *Nottingham Trent University, Department of Sport, Health and Performance Enhancement (SHAPE) Research Centre, Department of Sport Science, Nottingham, NG11 8NS, UK*
2. *Nottingham Digestive Diseases Centre, School of Medicine, University of Nottingham, Nottingham, United Kingdom, NG7 2UH, UK*
3. *The University of Reading, Department of Food and Nutritional Sciences, Whiteknights, Reading RG6 6AP, UK*

Background

Irritable Bowel Syndrome (IBS) is a common disorder of gut-brain interaction (DGBI), more prevalent in females. Characterised by abdominal pain, altered bowel habits, and psychiatric comorbidities. Its pathophysiology remains unclear, and treatment options are limited, although it is linked to changes in gut microbiota. Routine physical activity (PA) can reduce IBS symptom severity by up to 66% and enhance quality of life (QoL) by 41%. Despite this, many patients are inactive or unaware of PA's role in managing IBS. Precise mechanisms remain unclear but regular PA can modulate the gut microbiota. National PA guidelines lack specificity regarding exercise type, intensity, frequency, and duration, and do not address sex differences, IBS-subtypes, or the role of the gut microbiota or gut-brain axis (GBA). Effective individualised care requires patient involvement; this study aims to develop tailored PA guidelines, considering patient needs and preferences.

Methods

Questionnaires and interviews were administered to IBS patients at Nottingham Treatment Centre, to assess symptom severity, QoL, anxiety, depression, and PA levels, including barriers, preferences and willingness to engage. Findings will guide tailored PA interventions to meet patient needs and address gaps in existing guidelines.

Preliminary Results

50 IBS patients (F:40, M:10; age: 45.92±16.09 years; IBS-Constipation:23, IBS-Mixed:17, IBS-Diarrhea:10) completed questionnaires and 8 interviews. Mean duration since diagnosis was 93.44 ± 109.84 months. Symptoms were severe in 29 patients, moderate in 15, and mild in 6, with increased IBS-SSS correlated with greater pain ($r=-0.556$, $p<0.001$) and reduced physical functioning ($r=-0.464$, $p<0.001$). Anxiety was significantly higher in IBS-D (12.90, moderate) compared to IBS-C (7.52, Mild) and IBS-M (7.71, Mild) ($p=0.044$). Walking was preferred by 96% of participants; 86% were willing to engage in PA for IBS management, and 82% were prepared to meet World Health Organisation (WHO) guidelines by completing 60-minutes of PA 3-times weekly.

Conclusion

Patient-centred data endorses walking (60-minutes, 3/week) as a preferred and viable lifestyle change for IBS management, aligning with WHO-guidelines. Given the higher prevalence of IBS in females and its link to altered gut microbiota, future research should explore how walking impacts IBS symptoms, considering IBS-subtype, sex, and the mechanistic role of the gut microbiota, GBA and metabolites.

Funding and/or conflict of interest

None

POSTER 6

CHANGES IN ENERGY HOMEOSTASIS, GUT PEPTIDES, AND GUT MICROBIOTA IN EMIRATIS WITH OBESITY AFTER BARIATRIC SURGERY

Manal Ali Ahmad[1], KoenVenema[2], Carole Ayoub Moubareck[3], Gabi Wazz[4], Tarek Mahdy[5] and Mirey Karavetian[6]*

1. *School of Nutrition and Translational Research in Metabolism (NUTRIM), Faculty of Health, Medicine and Life Sciences, Maastricht University, Maastricht, The Netherlands*
2. *Centre for Healthy Eating and Food Innovation (HEFI), Maastricht University-Campus Venlo, Venlo, The Netherlands*
3. *College of Natural and Health Sciences, Zayed University, Dubai, United Arab Emirates*
4. *Center of Excellence in Bariatric and Metabolic Surgery, Dr. Sulaiman Al Habib Hospital, Dubai, United Arab Emirates*
5. *Department of Bariatric Surgery, Sharjah University, Sharjah, United Arab Emirates*
6. *Faculty of Kinesiology and Physical Education, University of Toronto, Toronto, ON, Canada*

Background

Obesity is a growing health concern worldwide, including in the United Arab Emirates. Bariatric surgery (BS), particularly sleeve gastrectomy (SG), is an effective treatment for obesity, though its precise mechanisms for promoting weight loss are not fully understood. We explored changes in energy homeostasis, gut peptides, and gut microbiota (GM) in Emirati individuals with obesity following BS.

Methods

Nineteen Emirati adults scheduled for SG were recruited. Energy intake (EI) was assessed through three 24-hour dietary recalls, resting energy expenditure (REE) using indirect calorimetry, and appetite via the Simplified Nutritional Appetite Questionnaire. Body mass index (BMI), waist circumference (WC), waist-to-height ratio (WHtR), and percentage body fat (PBF) were measured. Plasma levels of gut peptides (peptide YY [PYY], glucagon-like peptide-1/2 [GLP-1/2], ghrelin, cholecystokinin [CCK], insulin, and leptin) were analyzed using ELISA. GM composition at the phylum and genus levels, including the Firmicutes/Bacteroidetes (F/B) ratio and alpha (α) and beta (β) diversity, was determined by sequencing the V3-V4 region of the 16S rRNA at baseline and three months post-surgery. Taxa identification and relative abundance were performed using QIIME 2, with subsequent α and β diversity analyses conducted in R. Spearman correlation analyses were used to assess associations between GM genera and various clinical parameters, including EI, fiber intake, REE, BMI, WC, WHtR, PBF, appetite, insulin, leptin, GLP-1, GLP-2, PYY, CCK, and ghrelin.

Results

Three months post-SG, EI, appetite, all anthropometric measures, insulin, leptin, and GLP-1 significantly decreased, while PYY and ghrelin significantly increased; REE remained stable. β-diversity of GM and composition at the phylum and genus levels changed significantly post-surgery, though the F/B ratio remained unchanged. Several taxa that increased post-surgery were negatively correlated with EI, BMI, and appetite.

Discussion and Conclusion

Bariatric surgery is associated with significant changes in gut peptides and GM composition, potentially contributing to weight loss and other positive outcomes. The study did not confirm a higher F/B ratio in obesity. Further research is needed to elucidate the complex interactions between GM, gut peptides, hormones, metabolism, and energy homeostasis after BS. Understanding these changes can inform personalized interventions targeting obesity.

Conflict of interest

The authors declare that the research was conducted without any commercial or financial relationships that could be construed as a potential conflict of interest.

Funding

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POSTER 7

QUANTITATIVE ANALYSIS OF SHORT-CHAIN FATTY ACIDS IN FECAL SAMPLES FROM IN VITRO GUT MODELS

Kai Yang, Megan Pott, and Kieran Tuohy*
School of Food Science and Nutrition, University of Leeds, LS2 9JT, UK
**Correspondence: Kieran Tuohy, k.m.tuohy@leeds.ac.uk*

Background/Introduction
Short-chain fatty acids (SCFAs) are crucial metabolites derived from gut microbiota, playing significant physiological roles in human health. This study focuses on the quantitative analysis of acetic acid, propionic acid, and butyric acid in fecal fermentation supernatants (FFS) collected from in vitro gut models by using GC-MS, with varying protein sources, to assess the impact of different protein types on SCFA production.

Methods
A total of 162 liquid samples were collected from three in vitro gut models simulating different regions of the human large intestine. The models, derived from three different donors, were supplemented with pea protein and whey protein. Samples were collected at three stages: pre-protein addition (Days 12-14), during protein addition (Days 26-28), and post-protein addition (Days 40-42). SCFA concentrations were quantified using a gas chromatography-mass spectrometry (GC-MS) method, validated for sensitivity and reproducibility in detecting SCFAs in the samples.

Results
The GC-MS method effectively detected three main SCFAs in the FFS samples, with LODs ranging from 9.43 to 31.57 µmol/L and LOQs from 28.55 to 95.61 µmol/L. The study revealed that the addition of pea protein significantly increased propionic acid and butyric acid concentrations, while acetic acid concentrations decreased. Conversely, whey protein had a lesser impact on SCFA production. Variations in SCFA concentrations were observed across different gut regions, reflecting the differential metabolic activity in the simulated colonic sections.

Discussion and Conclusion
The findings suggest that dietary protein type significantly influences SCFA production in the gut, with plant-based proteins like pea protein promoting higher propionic and butyric acid production compared to animal-based whey protein. These results underscore the importance of dietary composition on gut microbiota metabolism and SCFA production, which have implications for gut health and disease prevention.

Funding and/or conflict of interest
None

POSTER 8

DIFFERENCES IN GUT MICROBIOTA, SCFA AND NUTRITIONAL INTAKE IN A CROSS-SECTIONAL STUDY OF STUNTED CHILDREN AND CHILDREN WITH NORMAL NUTRITIONAL STATUS IN EAST NUSA TENGGARA, INDONESIA

Ingrid Suryanti Surono[1], Pratiwi Dyah Kusumo[2], Alpha F. Athiyyah[3] and Koen Venema[4]

1. *Bina Nusantara University, Faculty of Engineering, Food Technology Department, Indonesia*
2. *Universitas Kristen Indonesia*
3. *Universitas Airlangga, Department of Child Health, Indonesia*
4. *Maastricht University, Centre for Healthy Eating & Food Innovation, The Netherlands*

Introduction

Gut microbiota composition in a cross-sectional of 36-45 month old stunted children was different from that of normal children in East Nusa Tenggara, Indonesia.

Method

We compared nutritional intake (as percentage of daily requirement, corrected for age), and we correlated percent macronutrient intake to fecal short-chain [SCFA] and branched-chain fatty acids [BCFA] concentrations, microbiota composition in this cohort.

Results

The concentrations of the SCFA acetate and propionate are significantly lower in feces of stunted children, but butyrate and BCFA show no significant difference. Moreover, percentage fat-intake correlated negatively to fecal propionate (q = 0.007; rho = -0.23) and butyrate (q = 0.041; rho = -0.18) concentrations, while percent fibre-intake, positively correlated with butyrate concentrations (q = 0.0001; rho = +0.30). There was a trend for percent carbohydrate-intake to positively correlate with fecal butyrate concentrations too (q = 0.067; rho = +0.18). In addition, 48 of the 124 taxa present in the dataset show correlations with one or more of the nutritional intake parameters (percent energy, protein, fat, carbohydrate or fibre). Of the three taxa significantly different when compared between stunted and normal nutritional children, only Faecalibacterium shows significance with nutritional intake, particularly positive correlations with percent carbohydrate (q = 0.036; rho = +0.19) and percent fibre-intake (q = 0.038; rho = +0.20).

Discussion and Conclusion

The results add to the insight of role of the gut microbiota in stunting and possibilities to prevent this by modulating the microbiota.

The trial was registered at ClinicalTrials.gov with identifier number NCT05119218.

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No Conflict of interest.

Keywords

Stunted, nutritional status, Indonesian children, SCFA, gut microbiota

POSTER 9

KEY BACTERIAL TAXA AND METABOLIC PATHWAYS AFFECTING GUT SHORT-CHAIN FATTY ACID PROFILES IN EARLY LIFE

Naoki Tsukuda , Kana Yahagi[2], Taeko Hara[2], Yohei Watanabe[2], Hoshitaka Matsumoto[2], Hiroshi Mori[3], Koichi Higashi[3], Hirokazu Tsuji[2], Satoshi Matsumoto[2], Ken Kurokawa[3] and Takahiro Matsuki[1,2]

1. *Yakult Honsha European Research Center for Microbiology, Gent, Belgium*
2. *Yakult Central Institute, Kunitachi, Tokyo, Japan*
3. *National Institute of Genetics, Mishima, Shizuoka, Japan*

Infant gut microbiota development affects the host physiology throughout life, and short-chain fatty acids (SCFAs) are promising key metabolites mediating microbiota-host relationships. Here, we investigated dense longitudinally collected faecal samples from 12 subjects during the first 2 years (n = 1048) to identify early life gut SCFA patterns and their relationships with the microbiota. Our results revealed three distinct phases of progression in the SCFA profiles: early phase characterised by low acetate and high succinate, middle-phase characterised by high lactate and formate and late-phase characterised by high propionate and butyrate. Assessment of the SCFA–microbiota relationships revealed that faecal butyrate is associated with increased Clostridiales and breastfeeding cessation, and that diverse and personalised assemblage of Clostridiales species possessing the acetyl-CoA pathway play major roles in gut butyrate production. We also found an association between gut formate and some infant-type bifidobacterial species, and that human milk oligosaccharides (HMO)-derived fucose is the substrate for formate production during breastfeeding. We identified genes upregulated in fucose and fucosylated HMO utilisation in infant-type bifidobacteria. Notably, bifidobacteria showed interspecific and intraspecific variation in the gene repertoires, and cross-feeding of fucose contributed to gut formate production. This study provides an insight into early life SCFA–microbiota relationships, which is an important step for developing strategies for modulating lifelong health.

POSTER 10

DEVELOPMENT OF A NOVEL CONVENIENT METHOD FOR ANALYSIS OF THE RELATIONSHIP BETWEEN HUMAN SKIN BACTERIA AND SKIN PROPERTIES

Daisuke Niwa[1], Naoki Izawa[2], Akemi Imaoka[2] and Toshiro Sone[2]

1. *Yakult Honsha European Research Center for Microbiology VOF, Zwijnaarde, Belgium (YHER)*
2. *Yakult Central Institute, Tokyo, Japan*

Recently, it is becoming important to relate the skin microbiome to the compounds on the skin to understand the relationship between the microbiome and its host. We evaluated a novel, convenient method for collecting skin samples using polyvinyl alcohol. Samples were prepared by dissolving the formed thin membrane in water after pasting polyvinyl alcohol on the skin. We compared this method with conventional methods. The polyvinyl alcohol samples were fully occupied by stratum corneum in the form of a few piled-up layers compared with conventional tape-stripping samples. The α-diversity of the bacteria and the number of *Cutibacterium acnes* (*C. acnes*) in the polyvinyl alcohol samples were not smaller than those in the other conventional swabs, whereas Propionibacteriaceae were the primary microbes in both samples. In addition, the values of fatty acids, triglycerides and the number of *C. acnes* in the polyvinyl alcohol samples were positively correlated significantly with each other in the study on healthy subjects of different genders and ages, which was consistent with previous findings obtained using different methods. Our results indicate that the polyvinyl alcohol method makes it possible to analyze both sebum components and bacteria from the same sample and is promising for evaluating the relationship between the skin microbiome and its host.

POSTER I I

EXPLORING GENDER-SPECIFIC PATTERNS IN DIETARY FIBRE CONSUMPTION: A FOCUS ON BREAKFAST CEREALS

Anam Wajid[1], Janet Kyle[2], Anne E. Kiltie[1], Karen P. Scott[1], Aladdin Ayesh[3]

1. The Rowett Institute. 2. Institute of Applied Health Sciences. 3. School of Natural and Computing Sciences, University of Aberdeen, Aberdeen, UK.

Introduction

Most UK adults do not meet the 30 g/day fibre recommendation, and females have lower intake compared to men which is a common problem worldwide[1,2]. Differences in the gut microbiome are also evident, driven by hormonal, dietary, and metabolic factors[3]. The role of the gut microbiome in health is well established, particularly in female health conditions like breast cancer and endometriosis[4,5]. Observational studies present a correlation between fibre rich diets and gut microbiota. There is a diverse range of types and amounts of dietary fibres ranging from cellulose, β-glucan, and resistant starch[1] and clinical trials show that specific foods and types of fibre impact the gut microbiota[6]. This highlights the importance of understanding different sources of dietary fibre to personalise dietary recommendations, especially for females.

Methods

Food sources of total fibre were grouped based on the food item's main ingredient. A secondary data analysis of the UK National Diet and Nutrition Survey 2018-2019 was performed. Percentage contribution of food sources to total fibre intake were calculated and ranked, enabling comparison between men and women.

Results

Cereal and cereal based foods provide 40.3 % and 37.3 % of fibre to the total dietary fibre intake of males and females respectively. Breakfast cereals are the most common dietary sources of fibre but there are differences in the types of cereal consumed; multi-grain, wheat and oat-based for men, while for females' cornflakes, bran and wheat-based cereals. Food composition data shows that fibre in breakfast cereals comes from grains, dried fruits, nuts, seeds and added fibre, contributing a wide-ranging fibre content of breakfast cereals consumed in UK from 0.8g to 27g/100g.

Discussion and conclusion

Our study shows that within the cereals' food group, the sources and composition of fibre in diet varies between males and females. This highlights the need to understand and improve the fibre quality of diets from different food sources to gain the benefits of fibre consumption. In the future, we aim to understand the role of different food sources and types of fibre and underlying factors for low fibre consumption in females to develop targeted strategies.

Funding information

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Conflict of interest

None

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POSTER 12

BIOACTIVE COMPOUNDS (POSTBIOTICS) FROM WASTE BY-PRODUCTS OF MICROBIAL FERMENTATION PROCESS, IN FERMENTED MEDIUM, AS NEW FUNCTIONAL INGREDIENTS

Luca Marini[1,3], Laura Manna[2], Eleonora Bafile[2], Federica Federici[2], Erica Costantini[3] and Marcella Reale[3]

1. *NTP Biotech SrL.; Castelnuovo Vomano, Teramo, Italy;*
2. *PNK Farmaceutici SpA.; Castelnuovo Vomano, Teramo, Italy;*
3. *Dipartimento di Tecnologie Innovative in Medicina &Odontoiatria, Sez. Immunopatologia e Patologia Molecolare, Università "G. d'Annunzio" Chieti-Pescara*

Introduction

Industrial fermented broths, a waste by-product of the probiotic production, represent a potential new resource for the manufacturing of value-added final products, with consequent reduction of disposal costs and environmental impact.
This study aims the identification and characterization of bioactive compounds (postbiotics), produced by probiotic strains into fermentation broths, to be used as new functional ingredients for human, animal and environmental formulas.

Methods

Industrial fermented medium samples of five probiotic strains: *L. salivarius* SGL 03, *L. plantarum* SGL 07, *L. kefiri* SGL 13, *L. amylovorus* SGL 14, *B. breve* SGB 01, were analyzed by untargeted metabolomics technology, identifying microbial metabolites with intriguing biological properties. Quantification of the target metabolites, was conducted using HPLC-DAD. The best probiotic strain for target metabolites production was used to manipulate its fermentation conditions in order to enhance the metabolites yield.

Results

Among the identified metabolites, 3-phenyllactic acid (PhLA), and indol-3-lactic acid (ILA) were selected due to their relevance for human health. In fact, PhLA is a broad spectrum antimicrobial compound, active against both bacteria and fungi, and ILA is a well-known metabolite with anti-inflammatory and immunomodulatory activities.
L. plantarum SGL 07 showed the highest metabolites production. The optimal fermentation conditions were determined and the medium composition was also modulated to improve the microbiota-derived indoles yield. In particular, the addition of tryptophan and phenylalanine in medium resulted in an approximately 3.5-fold increase in PhLA yield and approximately 8-fold increase in ILA compared to the non-optimized base medium.

Discussion and conclusion

The present study shows how probiotic fermented medium could be an important source of bioactive compounds for the production of sustainable value-added final products. The enriched fermentation broth of SGL 07, could open the way to the development of microbiota-derived metabolites or targeted "postbiotic" as "green" potential ingredient, to be used in the human, animal and environmental formulations. Future investigations contemplate quantification of more biometabolites and optimization of spray-drying conditions to assure high sensory score and high retention of target metabolites powders.

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