

10TH WORLD CONGRESS

Targeting Microbiota

→ towards clinical revolution

October 19-20, 2023

Paris ◦ France



 INTERNATIONAL SOCIETY OF
ICROBIOTA

Ladies and Gentelman, dear Colleagues,

Our annual meeting of **International Microbiota Society** took place on October 19-21th 2022 in beautiful Paris.

One day before our congress, the gut microbiota workshop was organized **Carole Nicco** from Institut Cochin. The attendees had the possibility to learn how to study and manipulate microbial communities and how to analyze the beneficial effects of bacterial strains for food and food supplements.

The most important topics of our conference included: 1) the modulation of gut microbiota with nutrition, prebiotics, probiotics or fecal microbiota transplantation (FMT); 2) the involvement of gut microbiota in the extraintestinal diseases (cardiovascular, psychiatric, metabolic and others); 3) impact of microbes on brain-gut axis; 4) microbiota as underexplored contributor to interindividual variation in the efficacy and toxicity of the drugs 5) role of gut microbiota in the cancer treatment , 6) microbiota and nutritional disorders.

The whole program of our Congress is now available on our website.

During the first day of the congress, the scientific sessions were devoted to recent advances in the microbiota research. **Marvin Edeas** presented the latest advances in the understanding of microbiota either in mediating and preventing diseases. Microbiota , especially gut microbiota plays a fundamental role in health and disease. It is of great importance to shift the research from associations to causality.

Benoit Chassaing from Institut Cochin presented important consequences of the disturbed interactions between host and microbiota at the mucosal surface induced by ultra-processed food leading to intestinal dysbiosis, metabolic dysregulations and induction of intestinal inflammation.

In the next speech **Carmen Gonzalez-Bosch** presented important data on short chain fatty acids (SCFA). SCFA are important modulators of redox signaling and play a crucial role in the cytoprotection, suppression of inflammation and carcinogenesis and slowing down the aging process.

Jean –Paul Motta from Toulouse spoke about the effect of epithelial-derived proteases on the alteration of gut biofilm that may contribute to chronic inflammation in gastrointestinal tract .

Finally, Lei Dai from Shenzhen Institute of Advanced Technology presented an array of novel methods to study dynamic response, spatial structure and strain level diversity of microbial communities.

The role of the gut microbiome in stroke pathophysiology is still not fully understood. **Liedos Miquel** have studied the compositions of gut microbiota after ischemic stroke in 156 patients and compared them with a control group. The scientist identified taxa associated with higher risk of stroke severity such as *Robinsoniella*, *Clostridioides difficile*, *Staphylococcus aureus*. These observations indicate that gut microbiome may be involved in the pathophysiology of ischemic stroke and may affect the long term outcome of this disease. The future studies should concentrate on the modulation of gut microbiota as a therapeutic option to prevent or reduce the severity of ischemic stroke.

Microbial composition in the gut plays a central role impacting the course of respiratory tract infections (RTI). **Claire Woodall** demonstrated a number of important biomarkers to predict RTIs. In patients with an RTI compared to controls the researcher found a depletion of the family Ruminococcaceae which includes the genus Ruminococcus and Faecalibacterium. These bacteria produce SCFAs through the fermentation of dietary fibre and resistant starch. SCFAs play a key role in neuro-immunoendocrine regulation and are an important fuel for intestinal epithelial cells strengthening the gut barrier function

Type 1 diabetes mellitus (T1D) is an autoimmune disease characterized by pancreatic β -cells being destroyed. Autoimmunity is heterogeneous in the pathogenesis of T1D, and the presence of autoantibodies is considered a potential feature for classification. **Emrah Altinidis** presented interesting data showing the possible role of insB:9-23 peptide from the human gut commensal Parabacteroides distasonis in the pathophysiology of this disease. The

colonization of female NOD mice with *P. dostasonis* accelerated the development of T1D. More clinical studies are needed to confirm this hypothesis,

G. Birkenmeier presented the naked mole-rat as an important and fascinating model to study the impact of gut microbiota on aging process.

The new insights in the role of gut microbiota in arterial thrombosis were presented by **Christoph Reinhardt**. Gut microbiota may promote the atherosclerotic inflammation and interfere with the atherosclerotic lesion development. The authors found that the dysbalance in tryptophan (Trp) metabolism promotes atherosclerosis.

Circadian rhythms play a crucial role in the regulation of physiological functions of all human organs. Circadian disruption is a well known risk factor for the development of diseases of civilisation such as T2D, hypertension, obesity or cardiovascular diseases. **Frank Scheer** found that microbiota may be involved in the circadian misalignment. Both environmental and genetic circadian rhythm disruption perturbs microbiota communities and cause a hyperpermeability of intestinal barrier.

Annalisa Terranegra presented a number of important studies showing the impact of precision nutrition on the modulation of gut microbiota in reproductive health and pregnancy.

Not only nutrition, but also natural mineral water may positively alter the gut mucosa associated microbiota leading to suppression of intestinal inflammation in the colitis model in mice (**Nicolas Barnich**).

Moya Andres studied the gut microbiota in Mediterranean cohort in infants, adults and the elderly. There is an array of plausible mechanisms through which adhering to this diet can help to maintain healthy body weight and prevent obesity.

At the end of the first day several interesting short oral presentations focused on diet interaction with gut microbiome, impact of phenolic compounds on human gut microbiota, gut host cross talk between microbial metabolites, role of fibers in blood glucose regulation, impact of parasitic infections on gut microbiota, role of polyphenol rich diet in older subjects, changes in GM in patients with colonic polyps and altered bile acids profiles in patients with Alzheimer's disease

The day 2 of our conference was devoted to advances in the targeting of gut microbiota. **Cristina Giaroni** discussed an important issue such as interaction between microbiota and drug metabolism. The recent studies indicate that gut microbes have a huge capacity to metabolize drugs and this may influence their efficacy or toxicity. Importantly, this interaction is bidirectional. Drugs affect the composition and function of gut microbiota and these alterations may have an impact on drug metabolism. These interactions play a specially important role in the oncology. **Maria Cecilia Giron** presented data showing that the gut microbiota composition affects the efficacy and toxicity of chemotherapy through a variety of mechanisms. All these observations highlight the need to distinguish the relative contributions of human and microbial cells to drug efficacy and side-effect profiles.

Peter Konturek presented an overview to the fecal microbiota transplantation (FMT). FMT represents an important method to modulate gut microbiota. It involves the transfer of gut microbes from the donor to modulate

the a recipient's microbiome for therapeutic purposes. This method is well established in the treatment of recurrent *Clostridioides difficile* colitis. In the recent years we have gained a new insights in the mechanisms of FMT involving the role of SCFA, other than bacteria microbial components such as fungi or viruses, changes in microRNA profiles or changed secretion of IgA. This powerful method for the modulation of gut microbiota is being investigated in functional (irritable bowel syndrome) and inflammatory bowel diseases. Further therapeutic option represent patients receiving immunotherapy. The modulation of gut microbiota with FMT improves immunotherapy efficacy in patients with malignant diseases due to changes of the tumor microenvironment and activation of host immunity.

The main challenge of FMT efficacy is the engraftment of beneficial and displacement of detrimental microbes. FMT deserves further exploration as a potential therapeutic option against other dysbiosis-driven diseases such as NAFLD/steatohepatitis, slow transit constipation, food allergy, GvHD-induced colitis, check-point induced-colitis and neuropsychiatric disorders.

Jan Bilinski demonstrated his own data on the role of FMT in patients with acute graft-versus-host disease (aGvHD)- a common life-threatening complication of allogenic hematopoietic stem cell transplantation. The published data indicates the efficacy of FMT to prevent this complication in more than 50% of patients.

Gut microbiota communicates with different extraintestinal organs. One of the new fascinating axis is the gut-retina axis. The data presented by **Dimitra Skondra** provide new insights in this interaction and shows that distinct microbial composition are associated with retinal diseases. Further preclinical and clinical studies are necessary to establish causation and delineate the precise relationship of the gut microbiome with retinal disorders.

Marcin Sikora presented the recent data on the link between gut dysbiosis and dysfunction of gut barrier in patients with psoriasis. Patients with this disease show altered permeability of gut barrier and increased concentration of bacterial metabolite TMAO.

Gut microbiota as an important integral part of the brain gut axis is postulated to be involved in the pathogenesis of neurologic and psychiatric diseases. Depression represents a highly prevalent and burdensome psychiatric disorder that is closely associated with intestinal dysbiosis. **Andre Schmidt** investigated the role of FMT and probiotic supplementation in patients with depression. The preliminary data indicates that both probiotic supplementation and FMT significantly ameliorated depressive symptoms and these clinical effects lasted up to 8 weeks, These findings highlights the importance of the modulation of the microbiota gut brain axis in the treatment of depression and open the doors for new treatment modalities.

The oral cavity houses the second largest set of bacteria in the body. The oral microbiome is an important constituent of human microbiome, playing a pivotal role in human health. Oral microbial dysbiosis is the major causative factor of oral diseases such as dental caries and periodontal diseases, and it is also closely associated with systemic diseases such as cardiovascular diseases, diabetes, and gastrointestinal diseases. **Xin Xu** presented new approaches involving probiotics or arginine to modulate oral microbiota in order to prevent different oral diseases such as dental caries or oral mucositis.

Following epidemiological observations that associate periodontitis with systemic diseases it is of great importance to explore further links between oral microbiota dysbiosis and chronic inflammatory, malignant or autoimmune diseases,

Intestinal dysbiosis is closely related to different nutritional disorders such as obesity, malnutrition or anorexia. Obesity is a global epidemic characterized by energy disequilibrium, metabolic disorder, fat mass development, and chronic low-grade inflammation, which significantly affects the health state of individuals of all ages and strains the socioeconomic system. The prevalence of obesity is rising at alarming rates. The altered gut microbiota and

associated metabolites contribute to the progression of the obesity by disrupting energy homeostasis, promoting lipid synthesis and storage, modulating central appetite and feeding behavior, as well as triggering chronic inflammation. The manipulation of gut microbiota with probiotics, prebiotics, and fecal microbiota transplantation represent a promising method to treat the obesity and its complications.

Pierre Dechalette presented the results of a double blind, randomized clinical study in overweight subjects treated with probiotic strain *H. alvei* HA4597 showing an improved weight loss response as compared to placebo group. This study underlines the importance of further studies involving gut microbiota manipulation in the treatment of the obesity.

The rising incidence of obesity and associated comorbidities such as diabetes mellitus type 2 (T2DM) represents a huge challenge for the health care systems worldwide. **Koji Hosomi** presented a cross-sectional study of Japanese adults that identified the *Blautia* genus, especially *B. wexlerae*, as a commensal bacterium has potent effects for reducing obesity and T2DM. This study revealed unique regulatory pathways of microbial metabolism that may control the host metabolism.

At the end of the second day of the conference, the participants had the opportunity to listen to a number of interesting short oral presentations. Important topics were changes of gut microbiota after chemotherapy, protective effect of *Faecalibacterium prausnitzii* (Fp) against influenza infection, role of gluten in the leaky gut, changes of gut microbiota after FMT in patients with ulcerative colitis and irritable bowel disease, role of probiotics in allergic diseases.

The main goal of our Meeting was to keep you updated with the latest advances in microbiota basic and clinical research. In my opinion, the conference was after almost 3 years of COVID-19 pause a great networking opportunity. I hope our meeting was inspiring and unique for you.

Thanks to all the speakers and attendees coming from 25 different countries and hope to see you next year during our 10th Meeting of International Microbiota Society.

Sincerely yours,



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