BRAIN DISEASES & GUT MICROBIOTA

4 April 2017 | 1:30-7:30 pm
Campus Biotech, Geneva
9, Chemin des Mines
Stools is not a terrific subject of discussion at dinner parties and only slightly less so in medical conferences. However, better understanding of the composition and function of the trillions of bacteria and viruses hosted in the guts of each human (a.k.a. the gut microbiota) and their cross-talk with the host's body organs may allow figuring out the pathophysiology of diseases of yet unknown ethology.

Evidence is mounting that a specific composition of the gut microbiota (GMB), i.e. one or some bacterial strains, may affect brain function and human behaviour in patients affected by Alzheimer’s disease and autism, among others. The mediators of the gut-brain cross-talk are circulating mediators, either produced by microbes themselves or induced on the immune-inflammatory system, and activated B- and T- cells.

The therapeutic perspectives are extremely attractive, given the ease of access of the digestive system and modification of the composition of the gut microbiota. However, challenges are huge due to the complexity of a dynamic eco-system comprising up to 4x10^{13} microorganisms from 1,000 bacterial strains with 3x10^8 genes and metabolic functions relatively de-coupled from taxonomy.

In November 2015, the conference was held in Geneva entitled “Gut Feelings & Gut Thoughts” where current knowledge and trends on the effect of gut bacteria on the brain, Alzheimer’s and brain amyloidosis was addressed by a panel of national and international experts.

AIMS
To update physicians and scientists on the latest discoveries on the role of the GMB in neuropsychiatric and neurodegenerative diseases.
To promote the study of the effect of the human microbiota in brain diseases by Swiss scientists.

ORGANISERS
Giovanni B. Frisoni and Jacques Schrenzel

SCIENTIFIC BOARD
Tristan Bolmont, Stefano Cappa, Annamaria Cattaneo, Roberto Coppari, Jean François Démonet, Stephan Eliez, Maria Teresa Ferretti, Panteleimon Giannakopoulos, Gabriel Gold, Osman Ratib, Mirko Trajkovski

POST GRAD CME
Association des médecins du canton de Genève (4 credits), FAMH Medical Laboratories of Switzerland (4 credits), Swiss Neurological Society (4 credits), Swiss Professional Society of Geriatrics (4 credits), Swiss Society of Gastroenterology (4 credits), Swiss Society of General Internal Medicine (4 credits), Swiss Society of Psychiatry and Psychotherapy (5 credits)
Programme

WELCOME ADDRESS
Giovanni B Frisoni and Jacques Schrenzel
Benoît Dubuis, Chairman, Campus Biotech
Nicolas Demaurex, Vice Dean, Faculty of Medicine, University of Geneva

CURRENT THERAPEUTIC CHALLENGES IN BRAIN DISEASES
Chair: Stefano F. Cappa, Brescia

13:45 Pharmacological Treatment of Alzheimer Disease in the Year 2027
Ezio Giacobini, Geneva, Lecture

14:05 The pharmacology of autism
Stephan Eliez, Geneva, Lecture

14:25 DISCUSSION

GUT MICROBES, THE IMMUNE SYSTEM, AND NEUROINFLAMMATION
Chair: Jean François Démonet, Lausanne

14:45 Neuroinflammation: upstream or downstream to protein misfolding?
Michael Heneka, Bonn, Lecture

15:20 Peripheral markers of inflammation and immune system dysregulation in Alzheimer’s disease pathology
Alison Baird, Oxford, Lecture

15:55 Protective roles of intestinal microbiota in Alzheimer’s disease through mechanisms involving short chain fatty acids and phenolic acids
Giulio M. Pasinetti, New York, Lecture

16:30 COFFEE BREAK

SCIENTIFIC COMMUNICATIONS
Chair: Maria Teresa Ferretti, Zurich

17:00 Bacterial seeding of protein aggregation in the brain
Robert P. Friedland, Louisville

17:20 Gut bacteria profile and peripheral cytokines in amyloid positive Alzheimer’s disease
Annamaria Cattaneo, Brescia

17:40 Routes of delivery of bacteria to cure brain diseases
Taoufiq Harach and Tristan Bolmont, Lausanne

MICROBIOTA-RELATED THERAPEUTIC TARGETS
Chair: Gabriel Gold, Geneva

18:00 Antimicrobial peptides from human Apolipoprotein E
Katia Pane, Naples, Lecture

18:35 A microbial role in driving behavioural deficits in animal models of autism
Gil Sharon and Sarkis Mazmanian, Pasadena, Lecture (Vconf)

19:10 CONCLUSIONS
Giovanni B. Frisoni and Jacques Schrenzel

19:25 CLOSING COCKTAIL
Participants

INTERNATIONAL

**ALISON BAIRD** (University of Oxford, Oxford, UK)
AB is a Senior Postdoctoral Researcher, working within Professor Simon Lovestone’s team at department of Psychiatry, University of Oxford. Her research is focused on the discovery and validation of plasma protein biomarkers related to Alzheimer’s disease (AD) pathology and disease progression. AB’s work uses a range of mass spectrometry, immunocapture and aptamer-capture based approaches to investigate how quantitative changes in plasma proteins may be predictive of AD-related measures including neocortical amyloid burden, cerebrospinal fluid tau/Aß protein levels and cognitive decline.

**STEFANO F. CAPPA** (IRCCS Fatebenefratelli Centro San Giovanni di Dio, Brescia and IUSS Institute in Pavia, Italy)
SFC is Professor of Neurosciences at the IUSS Institute in Pavia and Scientific Director of the IRCCS Centro S. Giovanni di Dio, Fatebenefratelli, Brescia, Italy. He is a neurologist and cognitive neuroscientist with an extensive experience in the development and application of behavioural testing and advanced neuroimaging to neurodegenerative disorders. His main areas of expertise are disorders of language, memory and social cognition. He is the past president of the Federation of European Neuropsychological Societies and president of the Italian Neurological Society for the study of dementia (SINDEM).

**ANNAMARIA CATTANEO** (IRCCS Fatebenefratelli Centro San Giovanni di Dio, Brescia, Italy)
Head of the laboratory of Biological Psychiatry, AC is a biologist who has been leading works in the field of inflammation in psychiatric and neurodegenerative disorders. She is coordinating several national, European and international projects aimed at the identification of inflammatory and immune related peripheral signatures associated with the pathogenesis of illness and the treatment response. She has received several prestigious awards, including the Rafaelsen Young Investigator Scientist, 28th ECNP Congress, Amsterdam (2015) and the Young Investigator Award, Society of Biological Psychiatry Meeting, Atlanta (2016).

**ROBERT P. FRIEDLAND** (University of Louisville, Kentucky, USA)
RP is Professor of Neurology at the University of Louisville, USA. He is a clinical neurologist with an interest in the biology of the ageing brain and neurodegeneration. His work has attended to the influence of environmental factors on disease risk. Recent studies have focused on oral, nasal and intestinal exposures to the microbiota, including plant viruses and bacterial amyloid proteins. Professor Friedland has authored or co-authored over 200 scientific publications and has current research funding from the National Institutes of Health (National Institute of Aging), as well as several Foundations, Institutes, Corporations and Families.
MICHAEL HENEKA (University of Bonn, Bonn, Germany)
MH holds the Chair of Clinical Neuroscience at the University of Bonn and is the Director of the Dept. of Neurodegenerative Disease and Gerontopsychiatry. MH is interested in mechanisms of neurodegeneration and neuroimmunology on a clinical and molecular level. Michael Heneka and his team have a long-standing interest in the analysis of neurodegenerative mechanisms. They were in the lead to discover the contribution of locus ceruleus degeneration to Alzheimer’s disease, identified the NLRP3 inflammasome activation in neurodegenerative disease and test the possible use of nuclear hormone receptor modulation as therapeutic intervention.

SARKIS MAZMANIAN (California Institute of Technology, Pasadena, CA, USA)
SM is Luis B. and Nelly Soux Professor of Microbiology at the California Institute of Technology and Investigator at the Heritage Medical Research Institute. SM’s work focuses on the study of beneficial gut bacteria and their molecules as probiotic therapies for various human diseases, including inflammatory bowel disease (IBD), multiple sclerosis (MS), microbial infections and autism. This work has led to the discovery of novel drug candidates that are being developed as pharmaceuticals for the treatment of IBD and MS. While SM continues to study how the microbiome impacts immune-mediated diseases, his laboratory has initiated research to understand the intriguing connections between gut bacteria and behavioral and neurodegenerative disorders. Investigating how the microbiome regulates the gut-immune-brain axis may lead to novel therapies for enigmatic neurological diseases based on revolutionary biological principles.

KATIA PANE (University of Naples Federico II, Naples, Italy)
KP is a Postdoctoral Researcher at the University of Naples Federico II, department of Biology. KP’s areas of expertise are biochemistry and microbiology and her recent interests are the identification of novel host defence (antimicrobial) peptides from other human proteins, not apparently related to innate immunity. She has contributed to develop a new method for toxic peptides expression and purification in bacterial hosts and a new bioinformatic tool to localise cryptic antimicrobial regions in protein precursors. These two methods have allowed to deep characterise a novel peptide derived from ApoE in the laboratory of Professor R.E.W. Hancock, University of British Columbia, Canada.

GIULIO MARIA PASINETTI (Icahn School of Medicine at Mount Sinai New York, NY, USA)
GMP is The Saunders Family Chair, a Professor of Neurology, Psychiatry, and Geriatrics, and Director of the Neurodiagnostic and Neurotherapeutic Division of the Friedman Brian Institute at the Icahn School of Medicine at Mount Sinai. He is also the Program Director of the NIH funded P50 Center on Molecular Integrative Neuroresilience focused on understanding the molecular mechanisms of stress-induced mood and neuropsychiatric disorders, and their influence on cognitive dysfunction. GMP is the recipient of several academic awards and more than 30 NIH federal, industry and non-profit organization research grants and has published over 300 groundbreaking manuscripts.

GIL SHARON (California Institute of Technology, Pasadena, CA, USA)
GS is a post-doctoral fellow at the Mazmanian’s laboratory, with a background in microbiology and microbial ecology of host-associated microbiomes. Recently, he has been studying various aspects of role gut microbes play in animal models of Autism spectrum disorders.
SWISS

TRISTAN BOLMONT (Stemedica, Lausanne and Faculty of Medicine, University of Geneva) As Stemedica International’s Chief Scientists, TB leads the team in preparing scientific research data and supporting clinical trials that apply stem cells and factors to treat Alzheimer’s diseases, vascular dementia and related disorders. He has previously been research scientist at the École Polytechnique Fédérale de Lausanne (EPFL), has served as a post-doctoral researcher for the University of Tubingen’s Hertie Institute in Germany, and was a doctoral researcher at the University of Basel’s Institute of Pathology. TB has contributed to high-profile papers in journals like Science and PNAS.

JEAN FRANÇOIS DÉMONET (Faculty of Biology and Medicine, CHUV, Lausanne) JFD is Professor of Neurology at the University Hospital of Lausanne and Research Director at INSERM (France). His research domains cover mainly neuropsychological and neuroimaging studies of language, memory and perception, in patients suffering from vascular focal lesions, degenerative diseases and developmental disorders. From 2011, he has taken the direction of the Leenaards Memory Centre-CHUV.

STEPHAN ELIEZ (Faculty of Medicine, University of Geneva) SE is child psychiatrist and General Director of Child Psychiatry and Special Education at the Office Médico-Pédagogique of Geneva. SE did his medical studies and began his clinical training in child psychiatry in Geneva. To complete his training in the field of neuroscience, he went to Stanford University in California. He is specialised in the use of new brain imaging techniques in order to better understand the link between structure and cerebral functioning, difficulties in learning and psychological disorders in children, particularly children with 22q11 deletion syndrome and autism.

MARIA TERESA FERRETTI (Institute for Regenerative Medicine, University of Zurich) MTF is a senior biomedical researcher working in the field of Alzheimer’s disease. Her recent activities are focused on diagnostic and prognostic biomarker discovery via high-dimensional immunophenotyping of blood and CSF samples from patients. In the past ten years, she has contributed to the understanding of the role of the innate and adaptive immune system in the progression of Alzheimer’s pathology, using both animal models and clinical samples.

GIOVANNI B. FRISONI (Faculty of Medicine & University Hospitals of Geneva) GBF is a clinical neurologist with a background in translational neuroscience of Alzheimer’s and associate diseases. His recent interests encompass the use of imaging and CSF diagnostic biomarkers in clinical practice and the development of e-infrastructures for big imaging data analysis. In the past 15 years, he has taken active part to the major European and global initiatives in the field.

EZIO GIACOBINI (Faculty of Medicine & University Hospitals of Geneva) EZ is Associated Professor of Psychiatry and Neurology. His major research interest is the pre-clinical and clinical development of drug therapy for Alzheimer’s disease. Together with R. Becker he has developed, pre-clinically and clinically, two new cholinesterase inhibitors (metrifonate and pentastigmine) and participated in the clinical development of E20-20 (donepezil), rivastigmine and phenserine. His present research is the area of a-beta oligomers, their origin, localisation and relation to Alzheimer pathology. He received the Life Time Achievement Award in Alzheimer’s Diseases Research from the Alzheimer’s Association (USA) at the 8th International Conference on Alzheimer’s Disease in Stockholm, July 2002.
GABRIEL GOLD (Faculty of Medicine & University Hospitals of Geneva)
GG is a geriatrician and Head of the Geriatrics Service. His research activities are primarily focused on dementia and cognitive impairment, an area where he is mainly known for his work on diagnostic criteria, vascular dementia and clinicopathological correlations.

TAOUFIQ HARACH (EPFL, Lausanne)
TH is Scientific Collaborator at the Laboratory of Biomedical Optics of the École Polytechnique Fédérale de Lausanne (EPFL) where he works on the role of gut microbiota on Alzheimer’s disease. He has been initially trained in molecular biology and energy metabolism. He obtained a PhD in molecular pharmacology at the University of Basel. During his first postdoctoral fellowship at the Nestlé Research Center, he studied the impact of probiotics on weight management and overall metabolism. He then joined Johan Auwerx’s lab where he worked on the role of the gut microbiota-modulated bile acids receptors function and their role on metabolic syndrome. TH is one of the pioneer in revealing the role of gut microbiota on amyloid pathology.

JACQUES SCHRENZEL (Faculty of Medicine & University Hospitals of Geneva)
JS is Head of the Bacteriology and of the Genomic Research Laboratories (www.genomich.ch). He is recognised for his work to translate molecular technologies to clinical microbiology.