

Name of session: Food and Nutrition Proteomics**Date: September 29, 2015****Session Chairs: Paola Roncada, Italy****Names of Speakers/Presenters:****Paola Roncada**, Istituto Sperimentale Italiano L. Spallanzani, Milano, Italy**Mark Baker**, Department of Biomedical Science, Faculty of Medicine and Health Science, Macquarie University, New South Wales, Australia**Lennart Martens**, VIB Medical Biotechnology Center, Ghent University, GENT, Belgium.**Loïc Dyon** Molecular Biomarkers Core, Nestlé Institute of Health Sciences, Lausanne, Switzerland.**Number of attendees: 38**

The central role of food proteins in nutritional science are indisputable, the well known affirmation that 'we are what we eat' and that food can be our medicine is not just philosophy but a sustainable strategy to effectively tackle the large increase on non-communicable diseases (NCDs). In fact, it is clear that the food after ingestion is transformed releasing proteins that our body uses in a complex direct relationship with the microbiota. Investigating the proteome of a given food provides the fundamental knowledge to understand this transformation process. Furthermore, every nutritional functional process involves huge number of proteins that are expressed at different levels, from cell to whole organism. Moreover, the global composition of diet, from microbiome to nutrient, including life style, can affect every step from gene expression to protein synthesis until degradation, leading to profound modulation of metabolic functions. Proteomics can help the development of a novel sustainable personalized medicine through nutritional intervention. These studies will play an important role in solving major nutrition problem in human and animals, on the verge of one health approach, (www.onehealthinitiative.com/) including obesity, metabolic and cardiovascular disease, cancer, ageing, allergy and fetal health and development. Profiling food, microbiome, and biomarkers of nutritional status from a proteomics point of view will potentially lead to a new pillar of personalized medicine. This include also a special focus to food safety, security and quality issues, providing new insights and technologies to grant safety, from microbiome and consortia, detection of animal species in the food, identification of food allergens to food authenticity.

Paola Roncada, from Italy, gave an introduction on the relevance of Nutrition and Food in Public Health; underlying the implication of 'good style of eating' in non communicable disease. She also discussed the proteins associated disorders from allergy to foodborne pathogens, including prions. In particular, she focused the discussion on large European initiative about Food Allergens and New food Allergens (COST ACTION IMPARAS: www.imparas.eu) and finally she mentioned that global food economics (4.1 T€), has, every years a great impact on total market and economy.

Mark Baker, from Australia, present a speech about the proteomics of what we eat, He, after a brief introduction regarding the philosophy of eat well, and also the impact of health, gave highlights of how is important proteomics of food and investigations. He presents some proteomics data about truffles, as a 'model food' in particular to demonstrate how is the best way to translate research into optimization of food production. This aspect can be analyzed, through advanced proteomics tools, also in term of influence of premium price of quality products.

Lennart Martens, bioinformatician from Belgium and EuPA Protein Pioneer Scientist 2015, gave his speech titled: Metaproteomics data-analysis: charting War and Peace in a microbiome. He described an overview through bioinformatics approaches and pipelines, especially focused on tools for metaproteomics complementary to metagenomic analysis to analyze microbial community and their dynamics. He also

explored fundamental research on the technological advancement of proteomics to potentially chart the functional role of microbiota during the onset of obesity, hot topic in last couple of years.

Loïc Dayon from Switzerland (Nestlé), presented huge work about biomarker discovery related to diet. In particular, his study focused on MS-based biomarker diagnostic in 1'000 human plasma sample that reveals candidates for personalized nutrition. He presented part of the results of the past EU project Diogenes (<http://www.diogenes-eu.org/>), that aimed targeting the obesity problem from a dietary perspective to search new routes of prevention. . In this light, there is also very clear the effort of a big company, like Nestlé to collect fundamental evidences to develop tailored functional food.

The discussion has highlighted new possibilities to develop proteomics research into the large field of personalized nutrition. The unmet global needs of food safety and security can significantly benefit from an action of the proteomics scientific community in targeting some of the specific topic such as the evaluation of protein modification in the elicitation of food allergy.