Speaker information

General Information

Name	Sebastiano Banni	
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Affiliation	Department of Biomedical Sciences, University of Cagliari	
Education Background	Ph.D. on Molecular and Experimental Pathology at the University of Torino, Italy.	
Professional Appointment	Full Professor	
Research Interest	The primary focus of my research is the physiological role of dietary fat. This involves both a qualitative and quantitative examination, considering its relation to other macronutrients and its impact on body composition through lipid and energy metabolism, metabolic flexibility, feeding behavior, and brain neuroinflammation. Special emphasis is placed on the potential role of specific dietary fatty acids, such as conjugated linoleic acid (CLA), n-3 fatty acids, and saturated fatty acids, which are examined in various dietary forms. These specific fatty acids may influence the biosynthesis of eicosanoids and bioactive lipids, as well as their physiological activities, through modulating the endocannabinoid system and nuclear receptors such as PPARs. Our research encompasses a range of experimental models and include human subjects under both physiological and pathophysiological conditions. The ultimate aim is to gain a deeper understanding of how dietary fat influences the homeostatic control of body composition.	

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Speech Topic and Abstract

Title:
Metabolic Flexibility Unveiled: Novel Nutritional Insights

Abstract:
Metabolic flexibility (MF) is the body's ability to efficiently use and switch between different energy substrates, such as glucose and lipids. This capacity is crucial for adapting to various physiological states, including fasting, changes in dietary composition, physical activity, and environmental conditions. With aging, metabolic flexibility typically decreases, leading to impaired regulation of lipid and glucose metabolism. This impairment can result in hyperglycaemia, insulin resistance, ectopic fat accumulation, and is associated with age-related diseases.

In our recent study, we introduce a novel method for assessing MF in humans through indirect calorimetry. This technique measures metabolic responses during graded exercise tests, offering insights into substrate utilization dynamics. We have developed a new Metabolic Flexibility Index (MFI), which quantifies the efficiency of fat utilization as an energy source during these tests.

Our analysis shows a positive correlation between the MFI and biomarkers of nuclear receptor activation, particularly PPAR alpha. PPAR alpha promotes the use of fatty acids as energy substrates, suggesting enhanced lipid metabolism efficiency and thus, improved MF. Conversely, a negative correlation was found with the endocannabinoid 2-AG, which enhances the motivation to consume food high in carbohydrates and fat. This suggests 2-AG's role in modulating energy balance by promoting energy consumption and limiting MF.

Our findings indicate that metabolic flexibility can be influenced by the interplay between PPAR alpha and the endocannabinoid system. Given the regulatory capabilities of these pathways, especially through dietary interventions, we propose that personalized dietary strategies targeting these pathways could enhance MF. This approach could be an effective measure for mitigating age-related declines in metabolic health.

Authors:
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