

7th International Conference and Expo on

Metabolomics

November 14-16, 2016 Orlando, Florida, USA

Lipidome and skin health

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The lecture will educate and decode the vital role of various lipids on skin health. The composition of the skin lipids is unique and intriguing; (two key words characterize the uniqueness of skin lipids: complexity and perversity-Nikolaides 1971). Elevated sebum excretion is a major factor involved in the pathophysiology of acne. The sebaceous gland synthesizes lipid species that are not found in other cells and tissues of the body. Complexity and uniqueness are characteristics of the sebaceous lipids. $\Delta 6$ desaturation, wax ester synthesis and squalene accumulation is manifesting the uniqueness of sebaceous lipid metabolism. Recent studies documented the importance of these unique sebaceous lipids for normal skin functions. Genetic knockout animal models of lipid synthesis demonstrated major changes in skin pathophysiology. Skin and fur abnormalities are the common denominator once a surface lipid gene is functionally impaired. In addition, essential fatty acids and their metabolites are proven to be fundamental for barrier function and involved in the pathology of eczema. Cutting edge LC-MS/MS has been used to dissect subtle but physiological meaningful differences in the composition of skin ceramides. These are structural components of the stratum corneum (SC) and impart essential barrier properties to this thin outer layer of the epidermis. They differ in structure and diversity from ceramides found in other body parts and tissues. Their unique chemistry is distinct since the most prevalent characteristic is that the fatty acid chain is extremely long and instead of 16-18 carbons long it could be 20-34 carbons or more. In addition, essential dietary fatty acids and their metabolites which are fundamental for barrier function, healthy or diseased skin could also be a part of the skin ceramide biosynthetic pathways. Impairment of several ceramide pathways in animal models resulted in severe skin barrier defects. Variations in the ceramide species within this layer have been linked to several skin diseases in humans as atopic dermatitis. Understanding the roles of skin surface, lipids is fundamental for decoding the skin physiology and homeostasis.

Biography

Apostolos Pappas has started his professional career as a Research Biochemist at Skin Research Center, Johnson & Johnson in 1999 and later served as a Group Leader at Munich Biotech, where he worked on cancer research. Thereafter, he returned to Johnson & Johnson, where he is currently a Research Manager and Fellow, focusing on lipid metabolism research. He has authored more than 40 peer-reviewed scientific publications, patent applications and four books. Recently, he became Adjunct Faculty in Department of Food Science at Rutgers University and a Member of Rutgers Center for Lipid Research. He has also been appointed as a Member of Scientific Advisory Board of Directors of CARF Society.

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