

Nansen Neuroscience Lecture 2021 **“Current advances in G-protein coupled receptors - novel ligands and functions in body and brain disease”**

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**Abstract**

G-protein-coupled receptors (GPCRs) are the largest and most versatile receptor system of the mammalian organism. GPCRs have traditionally been regarded as receptors for hormones, neurotransmitters, and other mediators that are produced solely for the purpose of carrying a signal and to serve cell-cell communication. This view has changed during the last decade, as a growing number of GPCRs are being identified, for which the ligands are energy substrates or metabolic intermediates. Among these ligands are saturated and unsaturated free fatty acids (FFAs) as well as hydroxycarboxylic acids (HCAs), such as lactate and ketone bodies, which exert cellular effects through GPCRs named FFA1-FFA4 and HCA1-HCA3, respectively. These receptors are widely expressed in the human body and regulate cellular functions in different systems to maintain homeostasis under changing dietary conditions. The lecture will focus on general aspects and concepts of GPCR function including novel ligands and activation principles of GPCRs, the role of GPCRs in auto- and paracrine signaling, heterogeneity of GPCR expression based on single cell expression analyses and new physiological, pathophysiological and pharmacological roles of GPCRs.

**Biographical sketch**

Stefan Offermanns is currently Managing Director of the Max Planck Institute for Heart and Lung Research in Bad Nauheim, Germany, and Professor of Pharmacology at the Goethe University Frankfurt. After finishing his medical studies, he carried out his postdoctoral work at the Free University Berlin and at the California Institute of Technology. From 2000 to 2009, he held the Chair of Pharmacology at the University of Heidelberg. He has been Director at the Max Planck Institute since 2008. Offermanns has combined basic science with clinically oriented research to study the

role of various receptor systems including G-protein coupled receptors (GPCRs) and their downstream signalling mechanisms in various physiological and pathophysiological contexts. His laboratory has de-orphanized several GPCRs and has applied complex mouse genetics to study their signalling and function in health and disease. More recently, his laboratory has focussed on understanding pathophysiological processes in in the cardiovascular and metabolic systems as well as on the role of the vascular system in tumor cell metastasis.