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GRK 2576 Guest Lecture

Title: **Direct regulation of receptor transmembrane signaling by lipid-protein interactions**

Speaker: **Ünal Coskun, Prof. Dr. rer. nat.**
Director of the Center of Membrane Biochemistry and Lipid Research, Technical University Dresden, Germany

Date: **24. January 2024**
Time: **14:00 h CET**
Location: **Oskar Minkowski-Hall & Paul Langerhans-Hall, DDZ**

Zoom: https://us06web.zoom.us/j/81072041999?pwd=0P2vgkdTsdbV2FTRmxXtWoyUffc8It.1
Meeting-ID: 810 7204 1999; Kenncode: 001120

Biography

Ünal Coskun studied biology at the University of Osnabrück. He received his doctoral degree from the University of the Saarland in 2005. After his postdoctoral period from 2005 – 2012 at the Max Planck Institute of Molecular Cell Biology and Genetics in Dresden he became a research group leader at the Paul Langerhans Institute Dresden of the Technical University Dresden. Since July 2021 he is full professor and director of the Center of Membrane Biochemistry and Lipid Research. Ünal Coskun is member of the Dresden/Bangalore Max Planck Lipid Research Center since 2012, and Max Planck Fellow of the Max Planck Institute of Molecular Cell Biology and Genetics Dresden since October 2023.
The overarching theme of his research group is “Membrane Biochemistry of Cell Signaling”. The group challenges the mutual interdependence of lipid-protein interactions by an interdisciplinary approach, combining cell biology and synthetic biology as well as protein biochemistry, structure biology and biophysics. Their strong expertise allows them study lipid-protein interaction based phenomena at different scales, from the organ and cellular systems down to minimal synthetic systems in which they can control the proteins as well as the lipid, for instance to monitor the allosteric effects of specific lipids on fundamental receptors such as the EGF receptor and the insulin receptor. For more insight please visit: https://tu-dresden.de/med/mf/zml/forschung/coskun-group

Selected recent publications

- Xiong X, Blakely A, Kim JH, Menting JG, Schäfer IB, Schubert HL, Agrawal R, Gutmann T, Delaine C, Zhang YW, Artik GO, Merriman A, Eckert D, Lawrence MC, Coskun Ü, Fisher SJ, Forbes BE, Safavi-Hemami H, Hill CP, Chou DH. *Symmetric and asymmetric receptor conformation continuum induced by a new insulin* (**2022**) **Nat Chem Biol** 18(5):511-519. DOI: 10.1038/s41589-022-00981-0
- Ansarullah, Jain C, Far FF, Homberg S, Wißmiller K, von Hahn FG, Raducanu A, Schirge S, Sterr M, Bilekova S, Siehler J, Wiener J, Oppenländer L, Morshedi A, Bastidas-Ponce A, Collden G, Irmler M, Beckers J, Feuchtinger A, Grzybek M, Ahlbrecht C, Feederle R, Plettenburg O, Müller TD, Meier M, Tschöp MH, Coskun Ü, Lickert H. *Inceptor counteracts insulin signalling in β-cells to control glycaemia* (**2021**) **Nature** 590(7845):326-331. DOI: 10.1038/s41586-021-03225-8
- Gutmann T, Schäfer IB, Poojari C, Brankatschk B, Vattulainen I, Strauss M, Coskun Ü. *Cryo-EM structure of the complete and ligand-saturated insulin receptor ectodomain* (**2020**) **J Cell Biol** 219(1). DOI: 10.1083/jcb.201907210
- Gutmann T, Kim KH, Grzybek M, Walz T, Coskun Ü. *Visualization of ligand-induced transmembrane signaling in the full-length human insulin receptor* (**2018**) **J Cell Biol** 217(5):1643-1649. DOI: 10.1083/jcb.201711047

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Talk teaser

Guest lecture with Prof. Dr. Ünal Coskun

Direct regulation of receptor transmembrane signaling by lipid-protein interactions

An important and obvious aspect of lipids is the formation of biological membranes, were the collective behavior of lipids controls the physicochemical properties of membranes (e.g., fluidity, lipid packing, curvature). The other, less studied aspect is whether and how lipids and specific lipid-protein interactions are able to regulate the structure and function of membrane proteins. This is a quintessential question, because in addition to membrane receptors also the vast majority of concomitant downstream signaling events are directly dependent on lipid binding. At the level of receptors, Ünal Coskun will be presenting data on how lipid-protein interactions directly regulate transmembrane coupling and signaling of the human EGF and Insulin receptors. To showcase the importance of lipid recognition for downstream signaling, he will present novel data on how lipid selectivity may encode cell signaling fate decisions.