

Location and time : Faculty Hall of the FFW, Friday November 14th 2025, from 11:15 am to 12:15 pm.

Description of the activity:

The concept of photopharmacology (i.e. the ability to switch substances using light to change their pharmacological properties) is gaining applications in various fields, quite dominantly in the field of G protein-coupled receptors (GPCRs). Professor Decker will give a lecture about the concept of photoswitchable ligands, discussing the entire process, starting from ligand design and synthesis, photophysical to pharmacological characterization and in vivo testing. Furthermore, the evolving field of photopharmacology will be presented, highlighting the key benefits and possibilities of this technique, while also discussing important limitations. Professor Decker will give a comprehensive overview on the progress made by the Decker lab in photopharmacology, with a focus on ligands for the cannabinoid, muscarinic and serotonergic receptors.

Societal relevance or impact:

The central nervous system (CNS) is a complex signalling network implicated in a wide array of physiological processes and neurological disorders are affecting a considerable share of the worldwide population. In addition, the social and economic impact of diseases such as Alzheimer's disease (AD) is substantial and expected to increase in the future. Therefore, a broader understanding of the key receptors and molecular targets involved in these disorders, as well as the exploration of novel therapeutic possibilities, is essential. Photopharmacology can provide valuable tools in this context, as it can help dissect complex biological pathways by providing a meticulous, on-demand control over the activation of target receptors. Furthermore, light offers a non-invasive way to modulate biological systems, allowing a precise spatiotemporal control over ligands, paving the way for new treatment strategies. In summary, photoswitchable ligands are a promising new research field, both fundamentally (investigation of receptors and their signaling pathways) and more application-driven (development of candidates with improved side-effect profiles).

The speaker:

Professor Decker is the head of the Decker lab, which has ample expertise in the design and synthesis of novel biologically active compounds, followed by their in vitro characterization. Through different research projects, the Decker lab works on various areas of pharmaceutical chemistry, ranging from Alzheimer's disease and neurological disorders to cardiovascular diseases. In particular, photoswitchable ligands (the topic of this talk), as well as hybrid molecules (having a dual target-activation potential) are investigated. Professor Decker has many high-impact publications, with dozens of publications on photoswitchable ligands. Furthermore, the Decker lab is involved in several (inter)national collaborations across different fields and is affiliated with different scientific organizations and consortia.