V GRAFOB

2020

Quinta Reunión del Grupo Argentino de Fotobiología

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Heinrich-Heine-Universität Düsseldorf, Germany

16 de Septiembre, 11:00 hs

Optogenetic control and understanding of cellular processes in animal and plant systems

The engineering of neurons with light-regulated ion channels has enabled the non-invasive study of neuronal networks *in vivo* at unprecedented spatio-temporal resolution. This experimental breakthrough has revolutionized neurosciences, with hundreds of applications contributing key insights into nervous system function having taken root within only few years. The success of optogenetics in neurobiology is followed by the more generalized used of light as stimulus to remote control a wide range of cellular processes, from gene expression up to cell viability and function. Our synthetic biology research focuses on engineering bacterial and plant photoreceptors sensitive to different wavelengths of the white light spectrum (UV-B, blue, green, orange, red/far-red) into synthetic photoswitches rewired to control molecular processes with high precision, quantitative and high spatio-temporal resolution, in a non-invasive way and with minimized toxicity. We implement these molecular tools into microbial, mammalian and plant cells, and *in vivo* in animals and plants for selectively manipulating signaling networks and metabolic pathways. This synthetic biology approach opens up unforeseen perspectives in fundamental and applied research, as exemplified hereby in the study of signalling pathways, biomedical field, crop design as well as for the production of high value biopharmaceuticals.