Dr. Harald Janovjak

Title:
Optogenetic repair in a genetic model of Parkinson's disease

Abstract:
The death of important cell populations underlies of a wide range of human disorders, including Parkinson's disease. Current strategies to counter cell degeneration, such as the injection of growth factors or growth factor gene therapy, lead to the undesired activation of healthy bystander cells or to non-natural modification of neural circuits. I will first introduce new optogenetic methods that we developed to activate cellular signaling pathways, including those driving cell survival and proliferation. I will then demonstrate how one of these optogenetic methods allowed delivering cell type-specific pro-survival signals in a genetic model of Parkinson's disease. In Drosophila and human cells that exhibit loss of the PINK1 gene, akin to autosomal recessive Parkinson's, optogenetics efficiently suppressed disease phenotypes on the mitochondria, tissue and organism levels. This work demonstrates a 'remote controlled' and thus spatio-temporally precise strategy to interfere with degeneration. This strategy may open new avenues towards tissue repair in a variety of disease contexts, including but not limited to disorders of the brain.

Biography:
Harald Janovjak received his undergraduate degree in Biology from the Biocenter of the University of Basel (2002) and his doctorate for research in single-molecule biophysics from the laboratory of Daniel J. Müller at the University of Technology Dresden (2005). After post-doctoral research in the laboratories of Ehud Y. Isacoff at the University of California Berkeley (2006-2010) and Dirk Trauner (2010-2011) at the Ludwig Maximilians University Munich in molecular neuroscience, Harald joined the Institute of Science and Technology Austria near Vienna as an Assistant Professor. Since 2018, Harald is an EMBL Australia group leader based at the Australian Regenerative Medicine Institute and Monash University. His principle research interest is to manipulate animal physiology using synthetic biology with a focus on identifying new approaches for tissue regeneration. Harald has published more

than fifty articles and supervised 20 students at the Honours, Masters, Diploma and PhD level. Harald received the Future Research Leader award of the Juvenile Diabetes Research Foundation, a career integration grant of the European Union framework program, a long-term fellowship of the European Molecular Biology Organization, and young investigator fellowships of the Swiss National Science Foundation and the German Research Foundation. Harald was most recently awarded an ARC Future Fellowship.