UNIKLINIK KÖLN | Zentrum Physiologie und Pathophysiologie | Institut für Vegetative Physiologie

Universität zu Köln
Medizinische Fakultät

Universitätsklinikum Köln (AöR) **| Zentrum für Physiologie und Pathophysiologie | Robert-Koch Straße 39 | E008**
Robert-Koch-Str. 39 · 50931 Köln

Thomas Paß, MSc
AG Rudolf Wiesner
Telefon: +49 221 478-6955
Telefax: +49 221 478-3538
E-mail: thomas.pass@uk-koeln.de

Cologne, January 8, 2021

- BSc / MSc / MD Thesis Available Focusing on Parkinson's Disease -

The Parkinson Disease (PD) is a neurodegenerative disease and concerns about 1 % of the population over 60 years. It is mainly characterized by its motor symptoms due to the progressive and selective loss of dopaminergic neurons (DaNs) in the *substantia nigra pars compacta* (SNc). It is still unclear which mechanisms exactly lead to the death of these cells. Consequently, there are no therapies which could stop the persistent dying of SNc DaNs.

However, mitochondrial dysfunction seems to play a decisive role in the loss of SNc DaNs, as it is shown by the broad spectrum of mitochondria-related gene mutations in familial forms of PD. Furthermore, it has been shown that SNc DaNs accumulate a high number of mitochondrial DNA (mtDNA) deletions during normal aging and particularly in PD. By using mouse models, we examine if and how the manipulation of mtDNA amount and the accumulation of mtDNA deletions, respectively, in DaNs contribute to a PD-like phenotype (Ricke, Paß et al. 2020, *J Neurosci*; Paß et al. 2020, *Mol Neurobiol*). To test if the quality control of mitochondria is of crucial importance in these animals, regarding the threatening mitochondrial dysfunction, we have additionally crossed one of these models with mice lacking Parkin. The loss of this gene is regarded as the most frequent reason of familial, autosomal-recessive cases of PD.

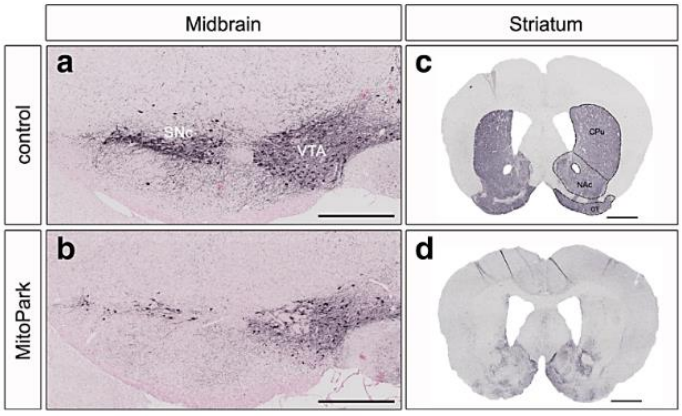

Abb. 1 Immunhistochemische Analyse von DaNs im Mittelhirn sowie deren Projektionen im Striatum von MitoPark Mäusen. Diesen Tieren fehlt der mitochondriale Transkriptionsfaktor A (TFAM) ausschließlich in DaNs, welches einen Parkinson-ähnlichen Phänotypen hervorruft. Auszug aus Paß et al. 2020, *Mol Neurobiol*.

In this project, the loss of DaNs as well as the corresponding neuronal endings in the striatum should be analyzed by immunohistochemical methods. If you are interested or if you have any further questions, don't hesitate to contact me (thomas.pass@uk-koeln.de).