

Optical activity-dependent single neuron tagging in behaving animals: Linking single cell properties to behavior

Initiative: Freigeist-Fellowships

Bewilligung: 28.06.2016

Laufzeit: 5 Jahre

Projekt-Website: <http://eecr-bonn.de/ewell-group/>

One pressing question in modern neuroscience is how neuron diversity impacts brain function. Answering this question is difficult because techniques that allow researchers to study the functioning brain are typically disconnected from techniques for studying individual neurons at a fine scale. The applicant proposes a new technique that will allow her to bridge the gap between these two parallel lines of research. She will develop an innovative technique that allows her to permanently label (or 'tag') neurons in freely behaving animals that have specific activity patterns, in order to then study those individual neurons in detail. This will be accomplished by using a genetic tag that can be switched on only when an active neuron is illuminated with ultraviolet light. In other words, individual cells will be illuminated at the precise times at which their firing is recorded in-vivo, thus allowing to tag neurons that have activity patterns essential for brain function. Once these neurons have been tagged, the applicant will be able to perform many follow-up experiments that employ cellular techniques to understand what makes them unique. For the first time, it will be possible to connect brain function to cellular properties, which will be especially important for treating and curing diseases, such as epilepsy, that are rooted in cellular dysfunction.

Projektbeteiligte

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Open Access-Publikationen

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