Virtual DANDRITE Lecture

Thursday 25 June 2020

15.00 – 16.00

Online via Zoom

Please find Zoom link via the Outlook calendar invitation. If you have not received this, please write an e-mail to Kathrine: kh@dandrite.au.dk

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Testing social behavior of mice under ecologically-relevant conditions

Social interactions are difficult to study because even small changes in experimental conditions can produce significant modifications of the behavioral outcome. Conventional behavioral tests of mouse sociability allows for observation animals' behaviour for short periods of time and their results are confounded by anxiety caused by unfamiliar environment and presence of an experimenter. To overcome these problems we have developed Eco-HAB. Eco-HAB is an automated system tailored to continuously track social behavior in group living mice. The system closely follows murine ethology. In Eco-HAB, group-housed animals live in a spacious, four-compartment apparatus with shadowed areas and narrow tunnels, resembling natural burrows. Eco-HAB allows for assessment of the tendency of mice to voluntarily spend time together in ethologically relevant mouse group sizes. In the first part of my talk I will explain how Eco-HAB works and show how we can use it to phenotype mouse models of impaired social interactions. In the second part I will focus on social learning in Eco-HAB.

Social learning – learning by observation of others or in interaction with others – helps to adapt to environmental challenges, allowing for avoiding predation and other threats without costly first-hand experience and for localizing food sources in a more efficient way. Different social learning strategies have been observed across diverse animal groups, however, their phylogenetic development and underlying neural mechanisms remain largely unknown. In particular, we do not know much about social learning in mice, a species providing a valuable model system for studying underlying neural mechanisms. Using Eco-HAB we developed a paradigm for studying transfer of knowledge from knowledgeable demonstrators to other mice in the group. We show that, using olfactory cues, mice learn from others about rewards in the environment. Further, we demonstrate that neuronal plasticity within the prelimbic cortex plays a key role in social learning. Thus, we both traced the behavior of social learning and revealed the role of the relevant neural circuits.