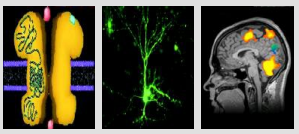

EXTINCTION LEARNING

April, 23rd – 24th 2024

Session 1 **Neural aspects of associative learning: Mechanisms and methods**

SARAH AYASH

Leibniz Institute for Resilience Research, Mainz, Germany

Neural basis of resilience to social stress

My work aims at uncovering the neural mechanisms underlying resilience to social stress. When exposed to overwhelming stress, some individuals become chronically ill, while others show resilience and rapidly recover from adversity. This is particularly true for chronic social defeat (CSD) stress, where mice models serve to unravel the underlying mechanisms. In our published work, we have refined the current CSD model by showing that some mice, when avoiding conspecifics, could still discriminate between individuals from the aggressors' strain (discriminating-avoiders; DA). In contrast, others generalised fear, even avoiding mice of a safe strain (indiscriminate-avoiders). Our social threat-safety test (STST) also showed that the two groups segregated with extinction learning (i.e., when facing the aggressors from a safe distance, only DAs showed extinction). The STST thus has enhanced face validity by quantifying discrimination and extinction, two critical features of human resilience. We now posit that the activity of the mesolimbic dopamine system underlies social stress resilience in the STST model. This hypothesis is based on the established role of the mesolimbic dopamine in associative learning and the observation that CSD alters the firing of dopamine neurons in the ventral tegmental area. However, the temporal constraints of the dopamine signal for threat-safety discrimination and extinction as well as the causal relationships remain elusive. Our preliminary work strongly implicates the mesolimbic dopamine circuit in threat-safety discrimination and extinction responsiveness. Our timely work offers translational insights, greatly enhancing resilience investigations. Given the global mental disorder impact, the emphasis on resilience, complementing disease-focused research, holds significant promise.