

IGSN - SYMPOSIUM

Monday, November 24th 2025 • 15.00 (3 pm)

FNO – 01 / 117

Novel Approaches for Behavioral Assessment of Rodents

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Deciphering socio-affective communication through ultrasonic vocalizations in rodents: Improving translational research models for human mental disorders

There is an ongoing need for animals to advance brain research. Mice and rats have been the leading model organisms used in biomedical research for well over a century and recent numbers from the European Union show that about 75% of all experimental animals are rodents. Modelling human mental disorders in rodents, however, is a daunting challenge, given the subjective nature of many symptoms, the lack of objective diagnostic measures and biomarkers, together with a limited understanding of the underlying genetic and neurobiological factors.

In my talk, I will argue that a deeper understanding of the natural rodent behavior repertoire and its relevance for modeling human mental disorders is needed to overcome current limitations of translational research. Key elements of the natural behavior repertoire of mice and rats are social behavior and socio-affective communication through ultrasonic vocalizations not audible to us humans. For example, young rat pups emit isolation-induced 40-kHz calls when separated from mother and littermates during the first two weeks of life. Older rats emit aversive 22-kHz calls in potentially life-threatening situations, such as predator exposure, whereas appetitive 50-kHz calls occur in rewarding situations, such as social play or in response to drugs of abuse, most notably the psychostimulant d-amphetamine. Importantly, all call types lead to prominent behavioral changes in the receiver. For example, isolation-induced 40-kHz calls emitted by pups are known to stimulate maternal caregiving behavior. Aversive 22-kHz calls, in contrast, evoke behavioral inhibition associated with increased amygdala activity, while appetitive 50-kHz calls induce social approach behavior linked to phasic dopamine release in the nucleus accumbens.

I will provide examples how we can improve translational research models for human mental disorders by deciphering socio-affective communication through ultrasonic vocalizations in rodents. We need to listen to our animal models.

Host:

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