SPECIAL SESSION

Social Behavior and Communication – From Mice to Primates

Chair: Markus Wöhr[1], Marcel van Gaalen[2]

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Abstract

Social interactions and communication are among the most complex forms of behaviors. Analyzing these behaviors remains a time consuming challenge which requires practice, skills and patience. However, new techniques became available to speed up analysis and standardize methods. This is particularly relevant as social behaviors are a very prominent part of the behavioral repertoire in many species. In humans, a variety of social behaviors are disturbed in neurological and psychiatric disorders such as schizophrenia, Alzheimer's disease and autism. The speakers of this symposium will present methods that allow reliable assessment of social behavior and communication – from mice to primates. They will demonstrate improved techniques for analysis, but also give examples of behaviors that can so far only be analyzed by human observations.

Marcel van Gaalen will give examples of measurement of dominant submissive behavior and various forms of aggression in mice and rats. He will show that an increased understanding of the pharmacology of these behaviors is relevant for drug discovery for CNS disorders. In addition, he will give examples of experimental compounds that may have potential for treating social interaction and communication disruptions in CNS disorders.

Louk Vanderschuren will show that social play is the most characteristic component of the social repertoire of young mammals, which is of great importance for the development of physical, cognitive and social capacities. Social play is highly rewarding and an incentive for maze learning, lever pressing and place conditioning in rats and primates. It is modulated through neurotransmitters implicated in the motivational and hedonic properties of food and drug rewards, such as endogenous opioids, dopamine and endocannabinoids.

Michael Lukas will describe how behavioral assays like the social recognition/discrimination and the social preference paradigms can be used to study elementary social abilities that are essential for functioning social communication such as social preference and individual social memory. Such social behaviors are regulated by highly conserved neuropeptides, like vasopressin, oxytocin, and the newly described neuropeptide S. Michael Lukas will present examples showing how social recognition/discrimination and the social preference can be combined with central pharmacological manipulations and in vivo microdialysis to investigate the involvement of relevant neuropeptides.

Markus Wöhr will show how measuring ultrasonic vocalizations and scent marks can be applied to study communication deficits in mouse models of autism. Autism is a severe neurodevelopmental disorder characterized by three core symptoms: 1) abnormal reciprocal social interactions, 2) deficits in social communication, and 3) repetitive behaviors. While reliable behavioral assays for abnormal reciprocal social interactions and repetitive behaviors are available since several years, relevant behavioral assays in the field of communication became available only very recently. Ultrasonic vocalizations and scent marks are particularly interesting as they may help to detect acoustic and olfactory communication deficits, respectively. Markus Wöhr will describe under which conditions ultrasonic vocalizations and scent marks can be recorded and what equipment is needed.

Dominik Seffer will give examples how playback experiments can be used to study social behavior and ultrasonic communication in rats. Different types of rat ultrasonic vocalizations serve distinct communicative functions, eliciting opposite behavioral and neural responses. Dominik Seffer will present a recently developed behavioral paradigm to study social approach behavior elicited by appetitive high-frequency ultrasonic vocalizations and will provide experimental data showing that the paradigm is sensitive for detecting differences in social experience during early life.

Hans Slabbekoorn will address how standardized behavioral tests on temporary captive animals can provide an index of personality. He will argue that such a quantification of personality traits can help in the interpretation of avian playback results in natural territories.

Finally, **Kurt Hammerschmidt** will present a description of the vocal repertoire of nonhuman primates, which consists of a limited number of call types that vary substantially within these categories. One can find all variation from highly graded to more or less distinct vocal repertoires, and it may be unavoidable that call variants at category boundaries are difficult to categorize. This must not be a problem for animals which grew up in the same community, because the efficiency of categorical perception allows the receiver to respond correctly even in graded signaling systems. However, to understand the evolution of acoustic communication and to compare studies in bioacoustics it is necessary to have comparable units, or to know how different categorization levels influence the outcome of an acoustic analysis. Kurt Hammerschmidt will discuss different ways to establish a reliable categorization.

SPECIAL SESSION CONTENTS (sorted by paper ID)

Studying the Neurobehavioral Mechanisms of Social Behavior in Adolescent Rats

Louk .J.M.J. Vanderschuren, E.J.M. Achterberg (Utrecht University, The Netherlands), P.J.J. Baarendse, R. Damsteegt, L.W.M. Van Kerkhof (UMC Utrecht, The Netherlands), V. Trezza (University "Roma Tre", Italy).

Ultrasonic Communication in Mouse Models of Autism

Markus Wöhr (Philipps-University of Marburg, Germany)

Ultrasonic Communication in Rats: Insights from Playback Studies

Dominik Seffer, Rainer K.W. Schwarting, Markus Wöhr (Philipps-University of Marburg, Germany)

Categorizing Vocal Repertoires of Nonhuman Primates

Kurt Hammerschmidt, Philip Wadewitz (German Primate Center Göttingen, Germany)

Central Neuropeptides Social Recognition, Social Preference and Social Fear in Rodents

Michael Lukas, Iulia Toth, Inga D. Neumann (University of Regensburg, Germany)

Individual Differences in F0 Imitation: Causes and Effects

Marie Postma, Eric Postma (Tilburg University, The Netherlands)

Measuring Behavioural Changes to Assess Anthropogenic Noise Impact on Singing Birds

Hans Slabbekoorn (Leiden University, The Netherlands)

Measuring Social Behavior in Drug Discovery

Marcel van Gaalen, Thomas Appl, Anton Bespalov (Abbott, Ludwigshafen, Germany)