SPECIAL SESSION

The Development of a Diverse Battery of Behavioral Tasks Using Touchscreen Equipped Operant Boxes for the Study of Cognition in the Rodent

Chair: John Talpos

Janssen Research and Development, Beerse, Belgium. jtalpos@its.jnj.com

The use of touchscreen equipped operant boxes for the study of cognition in rodents has grown in popularity since the mid-1990s, when the first publications using the method appeared. The combination of numerous stimuli types and the large number of response rules that may be implemented when using a touchscreen equipped operant box affords the user the flexibility of a maze-based hand testing approach, with the consistency and throughput associated with operant testing. Accordingly, touchscreen technology is currently being used by a growing number of academic and industrial research groups. These groups are reinventing existing approaches, and creating the next generation of behavioral tasks to study cognition in the rodent.

This session will provide a general overview of the touchscreen approach, and demonstrate how it is making a unique contribution to the study of basic cognitive function and central nervous system disorders. Four areas will be discussed in additional detail. First is use of the touchscreen approach to study spatial "cognition" and neurogenesis using the trial unique non-match to location (TUNL) and spatial reversal learning paradigms, as well as a test of spatial reversal learning. Moreover this session will bridge the species boundary by also discussing how spatial cognition is studied in non-human primates using the touchscreen-based self-ordered spatial search paradigm. Secondly, because one of the most frequently used tasks within the touchscreen apparatus is the "visual discrimination", the utility of visual discriminations in studying animal models of schizophrenia will be discussed, as will the cross-site validation of pharmacological manipulations that is occurring within the NEWMEDS academic-industrial collaboration as part of the IMI (www.newmeds-europe.com). Next (3), the use of the touchscreen approach in studying cognitive flexibility will be considered with a focus on reversal learning and other novel developments. Finally (4), an overview of a touchscreen based paired associates learning (PAL) paradigm will be presented with a focus on its utility in the study of schizophrenia. This presentation will discuss the influence of specific brain regions on behavior in PAL, pharmacological sensitivity, as well steps that have been taken towards developing an acute model of schizophrenia for drug discovery. Through this diverse combination of topics and speakers, we hope to provide a firsthand practical account of how this technology is being applied in academic and industrial settings to enhance research methods for the study of cognition and novel treatments for disease.

The session will close with a dedicated question and answer period where attendees will have the chance to ask speakers questions of a practical and theoretical nature regarding their research using the touchscreen approach, and to allow a more thorough discussion of ongoing touchscreen activities with various IMI consortia (www.imi.europa.eu).

SPECIAL SESSION CONTENTS (sorted by paper ID)

Pharmacological Manipulation of a Rodent Paired Associates Learning (PAL) Paradigm, and Other Tasks for Use in Disease Research

John Talpos (Janssen Research and Development, Belgium)

How Can a Touch-Screen Based Visual Discrimination Help to Better Characterize Rodent Models of Schizophrenia?

Laetitia Fellini (Janssen Research and Development, Belgium)

Assessment of Behavioural Flexibility and Executive Function Using Novel Touch Screen Paradigms

Adam Mar, J. Alsiö, A. Haddenhorst, C.U. Wallis, L.M. Saksida, T.J. Bussey, T.W. Robbins (University of Cambridge, UK) and A. Trecker (Heinrich-Heine Universitaet Duesseldorf, Germany)