

Symposium: Large and Small Scale Physiological Recordings in Behavioural Context

Gernot Riedel
g.riedel@abdn.ac.uk

Bettina Platt
b.platt@abdn.ac.uk

School of Medical Sciences, University of Aberdeen Foresterhill
Aberdeen, AB25 2ZD, United Kingdom

ABSTRACT

Coordinated rhythmic activity of neural populations gives rise to oscillatory local field potentials and large scale electroencephalograms at a broad range of frequencies. Synchronous rhythms are likely to reflect relevant information and frequency shifts may underlie experience- or behaviour-dependent functional interactions between neuronal assemblies. While the most common mode of synchronisation may be established through the local cohesive discharge of neighbouring cells or neurones with direct synaptic contacts, global synchronisation may also take place to establish widespread assemblies of disparate neural populations. To detect and analyse such global and local electrophysiological traits is one of the current challenges in basic and translational neuroscience.

This aim is made even more difficult when attempting to correlate electrophysiological data with stage- or task-related behaviour or even cognitive processes. It requires cohesive and linked recordings of physiological, spatial and behavioural responses synchronised and time-stamped in real time. Once aligned in the spatio-temporal domain, analysis needs to implement novel sorting strategies for correlational analysis applying linear and/or non-linear algorithms.

In this symposium, we seek to review some methodical progress focussing on large scale (global EEG) as compared to small scale (single unit) recordings in clearly defined behavioural paradigms in rodents. Speakers are selected because they utilise different technical products for physiological measurements (using cable, transmitter or microchip) and video-observation software of differing specification. We seek to generate intense discussion highlighting both the advantages but also the limits of each

system and intend to foster a more intense interaction between manufacturer and scientist for product enhancement.

SYMPOSIUM CONTENT

Epidural EEG Recording Using Microchips in Behavioural Context

Bettina Platt, Andrea Pano, Amar Jyoti & Gernot Riedel (University of Aberdeen, Scotland).

Timed Behaviors in Mice

Valter Tucci & Glenda Lassi (Italian Institute of Technology, Italy) & Patrick M. Nolan (Mammalian Genetics Unit, Harwell, UK).

Route Finding in a Complex Maze in Wild-Type and CA1 NR-1 KO Mice: Hippocampal Local Field Potentials, Single Units and Relationship with Behaviour

Francesco Battaglia (SILS - Center for Neuroscience, Amsterdam, The Netherlands).

Use of Behavioral Outcome to Assess Cognitive State

Robert Hampson (Wake Forest University School of Medicine, USA).

Simultaneous Measurement of Brain Activity, Physiology & Behavior in Large Animals

Nadine Reefmann (Agroscope Reckenholz-Tänikon Research Station, Switzerland), Thomas Muehleemann & Martin Wolf (ETH and University Zürich, Switzerland), Beat Wechsler & Lorenz Gygax (Federal Veterinary Office, Switzerland).

Platform for Ambulatory Assessment of Psycho-Physiological Signals and Online Data Capture

Jürgen Stumpp & Panagiota Anastasopoulou (Karlsruhe Institute of Technology, Germany).

Experimental Design for Sternocleidomastoid Muscle Stress Measurement

CheeFai Tan, Wei Chen & Matthias Rauterberg (Technical University of Eindhoven, The Netherlands).

Permission to make digital or hard copies of all or part of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage and that copies bear this notice and the full citation on the first page. For any other use, please contact the Measuring Behavior secretariat: info@measuringbehavior.org.

Peripheral Arterial Tone as an Index of ANS Trade-Off

Stas Krupenia (Thales Research and Technology, The Netherlands), Eldad Yechiam & Maya Arad (Israel Institute of Technology).

Using EEG Recordings to Examine the Relationships Between Sustained Attention and Types of Background Music in Individuals with ADHD

Chelsea Liang Ru Chew (Nanyang Technological University, Singapore).

Psychophysiological Data Collection in an Organizational Setting: Studying Interaction Between the Manager and Subordinate During Performance Review Discussion

Mikko Salminen, Pentti Henttonen & Niklas Ravaja (Center for Knowledge and Innovation Research, Finland), & Mikael Saarinen (Sensitiva Inc, Finland).

Extracellular Multi Unit Recording in Fear Conditioning in Mice Using a Telemetry Approach in an Automated Home Cage (DualCage) Environment

René F. Jansen, Anton W. Pieneman, Andries Ter Maat, (VU University Amsterdam, The Netherlands) Oliver Stiedl & Manfred Gahr (Max Planck Institute for Ornithology, Germany).