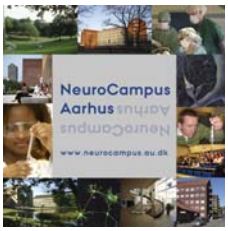
DANDRITE
Danish Research Institute of Translational Neuroscience
Nordic EMBL Partnership for Molecular Medicine
www.dandrite.au.dk/seminar



DANDRITE Lecture

Friday 16 October 2015 at 11:15-12:00

iNANO Auditorium (building 1593, room 013), Gustav Wieds Vej 14, 8000 Aarhus

Dr Sarang Dalal

Neuroelectromagnetic Oscillations Laboratory — NEMOlab
Dept. Psychology
University of Konstanz
Germany

Associating Neuromagnetic Oscillations with Perception and Awareness

Neural activity faster than 50 Hz, often referred to as the “gamma” band, have gained attention in recent years, due to their association with underlying spiking activity and better correlation with fMRI results. Many consider these faster rhythms to be a more reliable marker of attention and perceptual awareness. While this activity can be measured with intracranial EEG, it has been more difficult to observe with MEG and EEG. However, time-frequency beamformer methods that I have developed, together with advanced head modelling techniques, allow us to observe these signals noninvasively with greater fidelity. They may also allow us to observe deeper brain activity, such as from the hippocampus.

My new line of research is examining how the retina interacts with cerebral cortex. The retina is known to substantially preprocess visual stimuli, and some even consider it to be an extension of the brain due to the sophistication of its neural circuitry. The electrical activity of the retina, or the electroretinogram (ERG), can be measured using special electrodes placed on or near the eye. While the ERG is widely used as a clinical diagnostic technique in ophthalmology, it is nearly unknown in human neuroscience research. Studies examining information transfer between retina and cerebral cortex in humans remain especially rare.

Visual stimuli have been shown to induce occipital gamma band activity in visual cortex that is measurable with MEG/EEG. However, they also evoke retinal "oscillatory potentials" in similar frequency bands. We therefore hypothesized that a substantial portion of the visual cortical gamma band response may follow directly from retinal responses.

Our present results suggest that visually induced gamma band activity may in fact arise as a consequence of retinal processing, either in addition to or perhaps instead of local processing within visual cortex. Furthermore, in addition to communicating sensory information to the brain, the retina may receive measurable feedback or modulation from visual cortex. My ERC-funded research project will further investigate the relationship between retinal and cortical oscillations.

ALL ARE WELCOME

Host: Professor Poul Nissen, Dept. Molecular Biology and Genetics, and Keisuke Yonehara, Dept. Biomedicine, Group Leaders at DANDRITE, Aarhus University

AARHUS
UNIVERSITY