



**Karolinska
Institutet**

200
1810 – 2010
Years

S Y M P O S I U M

NEURONAL NETWORK OSCILLATIONS
IN HEALTH AND DISEASE

September 10-11, 2010

Nobel Forum, Nobels v. 1, Karolinska Institutet, Stockholm

Research on the functional properties, transmitter repertoire and molecular biology of the neuron has offered much insight into the building blocks of the brain and spinal cord. However, it is becoming increasingly evident that the properties of the intact nervous system cannot be derived from studies of the single neurone alone; neuronal networks are greater than the sum of its parts. As neurones couple together into circuits, their firing patterns often synchronize, emerging as oscillations, whose frequencies vary according to brain region and consciousness state. Several basic passive and active membrane properties that allow for the generation and termination of rhythmic discharge tend to recapitulate between different neuronal populations, however. Neuronal network oscillations are intimately associated with core CNS functions such as sensory processing, memory, sleep, locomotion and respiration. Moreover, oscillations have been proposed to explain “the binding problem”, *i.e.* how different areas of the brain can contribute to a coherent, conscious experience. Clinically, brain rhythms have long been an invaluable diagnostic tool as registered in the EEG, and normal network discharge can be transformed into pathological oscillations in *e.g.* epilepsy and Parkinson’s disease. In this symposium, experts in different CNS functions and areas will address the mechanisms underlying coordinated network interactions and its functional implications. Subjects that will be covered include; *Oscillations in the thalamocortical circuit and its implications for consciousness; The role of network oscillations in synaptic plasticity and memory; Location and properties of locomotor and respiratory pattern generators; Hypothalamic rhythms in homeostatic and circadian control, Conductances underlying regenerative discharge; The generation of pathogenic rhythms in epilepsy and movement disorders.*

Attendance is free-of-charge, but as seating is limited, please sign up via the following link:

<http://spreadsheets.google.com/viewform?formkey=dHIXVmM0MGQwOkhhRVJLX1R3NWpPRHc6MQ>

Welcome!

The Organizing Committee

(Christian Broberger, Ole Kiehn, Mia Lindskog, Gabriella Lundkvist, Dept of Neuroscience, KI)

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NEURONAL NETWORK OSCILLATIONS IN HEALTH AND DISEASE

Karolinska Institutet, September 10-11, 2010

Funded by the Neuroscience Research Network at the Karolinska Institutet

Friday, September 10

- 9.00-9.10 Organizing Committee
Welcome address
- 9.10-9.45 **David McCORMICK**
Yale University School of Medicine, New Haven, CT, USA
The cortical slow oscillation: a window into cortical recurrent networks
- 9.45-10.20 **Maria V. SANCHEZ-VIVES**
IDIBAPS, Barcelona, Spain
Cortical network modulation during up and down states
- 10.20-10.45 COFFEE BREAK
- 10.45-11.20 **Vincenzo CRUNELLI**
University of Cardiff, UK
Thalamocortical mechanisms of slow oscillations
- 11.20-11.55 **Arthur KONNERTH**
Technical University Munich, Germany
Propagation of thalamo-cortical slow wave activity *in vivo*
- 12.00-13.45 LUNCH BREAK
- 13.45-14.20 **Marie CARLÉN**
Karolinska Institutet, Stockholm, Sweden
Parvalbumin interneurons and gamma oscillations in health and disease
- 14.20-14.55 **André FISAHN**
Karolinska Institutet, Stockholm, Sweden
Title: TBA
- 14.55-15.20 COFFEE BREAK
- 15.20-15.55 **Pascal FRIES**
Ernst Strüngmann Institute, Frankfurt, Germany
Brain-wide networks of neuronal synchronization and their role in attention.
- 15.55-16.30 **Gina POE**
U Michigan, Ann Arbor, MI, USA
Activity during sleep spindles and theta states serve to reorganize neuronal networks

Saturday, September 11

- 9.00-9.35 **Christian BROBERGER**
Karolinska Institutet, Stockholm, Sweden
Novel network mechanisms in the control of lactation and neuroendocrine secretion.
- 9.35-10.10 **Hugh PIGGINS**
University of Manchester, UK
Novel and Unusual Electrical States of Suprachiasmatic Circadian Clock Neurons
- 10.10-10.45 **Ole KIEHN**
Karolinska Institutet, Stockholm, Sweden
Physiological and molecular deciphering of mammalian locomotor networks
- 10.45-11.10 COFFEE BREAK
- 11.10-11.45 **Ken HARRIS**
Imperial College, London, UK
Structure of neuronal population activity in auditory cortex
- 11.45-12.20 **Anders LANSNER**
Royal Institute of Technology, Stockholm, Sweden
Perception, Memory and Oscillations in a Hodgkin-Huxley Model of Neocortical Layers 2/3
- 12.20-12.30 Organizing Committee
Concluding remarks



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