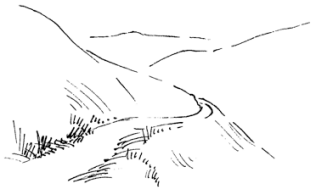
LEMANIC NEURO SCIENCE ANNUAL MEETING

PROGRAM

LNAM 2013: Celebrating the 10th meeting anniversary



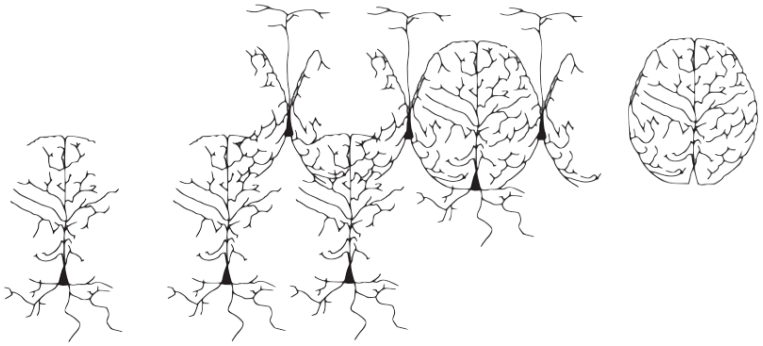
Fonds Jean Falk-Vairant

Association Amicitia

Les Diablerets, Switzerland

September 20-21, 2013

Organizing Committee:
Anthony Holtmaat, Petra Hüppi and Denis Jabaudon (UNIGE)
Students' Committee:
Nicolas Burra, Alina Ciobanu, Kimberly Doell, Kirsten Emmert, Giannarita Iannotti, Emilie Qiao, Gil Sharvit
Coordinator: Ulrike Toepel



Friday, September 20- Morning Session

Chair: Petra Hüppi

09:08 Train arrives at Les Diablerets

09:15-09:45 Registration & coffee

09:45-10:10 Opening remarks and anniversary wrap-up

10:10-11:00 **PLENARY LECTURE**

Elizabeth Engle (Harvard University, Boston, USA)

Cranial motor neuron guidance in development and disease

11:00-11:20 Coffee break

11:20-12:20 **SHORT TALKS by Lemanic PhD students** (10min each*)

- **Sandra Da Costa (#5)**
  "Functional mapping of human auditory cortex at 7T"
- **Laura Frangeul (#57)**
  "Input-Dependent Molecular Pathways Controlling Somatosensory Thalamocortical Neuron Development"
- **Katalin Sari (#80)**
  "Mechanisms underlying the synaptic alterations produced by the cognitive disability protein PAK3"
- **Michael Boitard (#65)**
  "The role of Wnt signaling in regulating radial migration and positioning of late-generated pyramidal neurons"
- **Antonia Thelen (#3)**
  "Predicting benefits of multisensory memories"
- **Roberta Tatti (#100)**
  "VGLUT3 neurons gate output pathways of the mouse olfactory bulb"

12:20-12:50 **TALKS by Lemanic PI's**

Anne-Lise Giraud (Unige)

Oscillation- based predictive mechanisms in audio-visual speech

12:50-14:00 Lunch

* Abstract numbers as in separate LNAM abstract book

Friday, September 20- Afternoon Session

Chair: Denis Jabaudon

14:00-14:50 **PLENARY LECTURE**

Franck Polleux (Scripps Research Institute, La Jolla, USA)

The LKB1 kinase pathway as a master regulator of axon morphogenesis in mammalian neurons in vivo

14:50-15:50 **SHORT TALKS by Lemanic PhD students** (10min each*)

- **Aline Pichon (#21)**
  "Odor-induced emotions: behavioral and neural aspects"
- **Marine Krzisch (#60)**
  "Effects of altered expression of SynCAM1 and Neuroligin-1B on adult-born neuron integration and survival"
- **Moritz Jacobshagen (#53)**
  "The 5-HT6 receptor regulates pyramidal neuron migration through a Cdk5-dependent mechanism"
- **Aurélien Bernheim (#29)**
  "Adolescents vulnerability to drug addiction: a preclinical focus on compulsive behaviors"
- **Francesco La Spada (#73)**
  "Impaired sleep homeostasis in Period 2 knock-out mice"
- **Sahana Murthy (#54)**
  "The 5-HT3A receptor regulates the migration of interneurons into the cortical plate"

15:50-16:20 Coffee break

16:20-16:50 **TALKS by Lemanic PIs**

Dirk Fasshauer (Unil)

Structural and evolutionary studies on the vesicle fusion machinery

16:50-17:00 Closing remarks

17:00-19:00 **Poster session & Apéro**

17:00 - Odd, black numbers

18:00 - Even, red numbers

20:00-22:00 Dinner at the Hotel Victoria

22:00-... Party at your favourite bar in town

* Abstract numbers as in separate LNAM abstract book

Trains leave Les Diablerets at 19:04, 20:47 and 21:47

Saturday, September 21

Chairs: Anthony Holtmaat and Jean-Pierre Hornung

09:00-09:45 **Doctoral School Consultation**

- Time for questions on courses etc.

09:45-10:00 **The SSN Junior Committee presents itself**

10:00-11:00 **SHORT TALKS by Lemanic PhD students** (10min each*)

- **Ruifang Niu (#110)**
  "Signal processing in the lateral amygdala after strong activation"
- **Noé Dumas (#49)**
  "Small animal SPECT imaging of the brain serotonergic systems in wild type and Mdr1a knockout rats"
- **Ines Khadimallah (#67)**
  "MicroRNAs involvement in cortical plasticity"
- **Aline Monin (#93)**
  "Relation between glutathione and myelin in humans and rodents: relevance for schizophrenia"
- **Géraldine Mang (#11)**
  "Contribution of microRNAs to sleep homeostasis"
- **Christian Pfeiffer (#6)**
  "Vestibular Effects on Somatosensory and Visual Cortical Processing in Humans: An Electroencephalography Study on a Human Centrifuge"

11:00-11:30 Coffee break

11:30-12:15 **SHORT TALKS by Lemanic PhD students** (10min each*)

- **Christine Savary-Massonnet (#78)**
  "Sensory stimulation leads to a modified gene expression after whisker stimulation in the adult mouse barrel cortex"
- **Nicolas Burra (#38)**
  "Gaze contact activate the amygdala despite a cortical blindness"
- **Anantha Sivasubramaniam (#99)**
  "Molecular and neuronal organisation of Ionotropic Receptor (IR) taste pathways in Drosophila"
- **Anne-Laure Wenger (#84)**
  "Study of layer 6b cortical neurons in vitro"

12:15-12:30 **Amicitia Excellence Prize**

12:30-13:00 Presentation of the **Jean-Falk-Vairant** foundation (and one laureate)

13:00-13:30 **Jean-Falk-Vairant prizes for the best basic and the best clinical neuroscience poster or presentation**

13:30-15:00 BBQ Lunch

15:00- **Social Activities:** volleyball, hike etc.

* Abstract numbers as in separate LNAM abstract book

Trains leave Les Diablerets at 12:48, 13:47, 15:06, 15:47, 17:06 and 17:48

PLENARY LECTURE (Friday, September 20, 10:10-11:00)

Elizabeth Engle (Harvard University, Boston, USA)

Cranial motor neuron guidance in development and disease

The human brain is highly organized and contains a myriad of axon tracts that follow precise pathways and make predictable connections. Model organism research has provided tremendous advances in our understanding of the principles and molecules governing axon growth and guidance. Remarkably, however, few human disorders resulting from primary errors in these processes have been identified. Using clinical data and genetic approaches in humans, we have identified the genetic basis of a series of congenital eye and facial movement disorders, and found that the mutations disrupt specific steps in the development of ocular cranial motor neurons and their connectivity to cranial musculature.

These disorders are now referred to as the congenital cranial dysinnervation disorders (CCDDs). Among the CCDDs, we have identified human disorders that result from recurrent heterozygous missense mutations that alter specific amino acid residues in the tubulin isotypes TUBB3 and TUBB2B, and in the kinesin motor protein KIF21A. Through animal modeling, we have established that these mutations alter axon growth and guidance and are now studying how each alters transport, the cytoskeleton, and its associated proteins.

TALKS by Lemanic PI's (Friday, September 20, 12:20-12:50)

Anne-Lise Giraud (Unige)

Oscillation- based predictive mechanisms in audio-visual speech

That feed-forward and top-down propagation of sensory input use separate frequency channels is an appealing assumption for which evidence remains scarce. I will present neurophysiological data suggesting that the brain uses both frequency- and time-division multiplexing to optimize directional information transfer.

PLENARY LECTURE (Friday, September 20, 14:00-14:50)

Franck Polleux (Scripps Research Institute, La Jolla, USA)

The LKB1 kinase pathway as a master regulator of axon morphogenesis in mammalian neurons in vivo

The developmental mechanisms underlying axon morphogenesis of specific populations of mammalian neurons *in vivo* are still poorly understood at the cellular and molecular levels. Operationally, axon development can be divided in three major steps: (1) axon specification during neuronal polarization, (2) axon growth and guidance towards their final targets and (3) terminal axon branching and presynaptic development. A few years ago, we and others identified that the serine/threonine kinase LKB1 (also called Par4 and STK11) is required for axon specification in the developing cortex *in vivo* (Barnes et al *Cell* 2007; Shelly et al. *Cell* 2007). We recently discovered that at later time point, LKB1 is also required for axon branching in vivo. Interestingly, these two functions of LKB1 required two separate sets of downstream kinases (SAD-A/B kinases for axon specification vs. NUAK1 for axon branching). Furthermore, we demonstrated that LKB1-NUAK1 kinase pathway regulate terminal axon branching by controlling mitochondrial capture at nascent presynaptic sites (Courchet, Lewis et al., *Cell* 2013). Some of the central unresolved questions raised by our recent results are: (1) what are the cellular and molecular mechanisms anchoring mitochondria presynaptically?, (2) how do presynaptic mitochondria regulate axon branching? and (3) more generally what is the function of mitochondria once captured presynaptically? I will summarize these recently published results as well as some preliminary data demonstrating that, beyond being important for ATP production, presynaptic mitochondria play a critical role in calcium clearance through a unique calcium channel called the Mitochondrial Calcium Uniporter (MCU) which in turn plays a critical role in specifying presynaptic release properties in neurons. Interestingly, LKB1 seems to regulate axon branching through regulation of MCU abundance in mitochondria, affecting presynaptic accumulation during neurotransmitter release and presynaptic release properties.

TALKS by Lemanic PI's (Friday, September 20, 16:20-16:50)

Dirk Fasshauer (Unil)

Structural and evolutionary studies on the vesicle fusion machinery

Rapid communication between neurons is mediated by neurotransmitters that are released from presynaptic nerve endings by Ca2+-dependent exocytosis of synaptic vesicles. Although the protein network that catalyzes this process is studied intensively, it has been surprisingly difficult to arrive at a unified picture of the molecular sequence of events from vesicle docking to calcium-triggered membrane fusion. The core of the neuronal release machinery is composed of the three SNARE proteins syntaxin 1, SNAP-25, and synaptobrevin that zipper into a tight complex between synaptic vesicle and plasma membrane. The central SNARE engine is regulated by a variety of other factors such as Munc18, synaptotagmins, complexins, and Munc13. Our primary goal is, by combining a variety of biochemical approaches, to embark on a detailed molecular description of the underlying protein-protein interactions. In addition, we attempt to correlate the in vitro protein activities with secretory phases. Moreover, as it is becoming increasingly clear that the protein families involved in vesicular trafficking are not only highly conserved among all eukaryotes but also throughout the transport steps in the cell, we explore the structural and functional conservation of the involved proteins.