Teaching Lab opened

On November 11, 2013, the Teaching Lab at the Max Planck Institute for Brain Research was officially opened. Around fifty participants, including supporting members of the Max Planck Society, high-school students and their teachers, were present and received a tour through the Lab.

The Teaching Lab was funded by the Supporting Members of the Max Planck Society and offers various techniques, including imaging, electrophysiology and many different neurobiological tools. The Teaching Lab will be used for doctoral students from the Graduate Program (International Max Planck Research School for Neural Circuits) as part of their educational program, for high-school students (internships), as well as for tours and open days. The lab is located in the new Institute’s building at the Max-von-Laue-Strasse 4, Frankfurt am Main.

The first use of the Teaching Lab after its opening was during a visit of a group of high-school students from the Wolfgang Ernst Gymnasium (Büdingen). They received a tour on November 28, 2013 as part of their visit to the Riedberg science campus.

Website
www.brain.mpg.de/teachinglab

Irina Epstein, one of the doctoral students of the IMPRS for Neural Circuits, shows neurobiological techniques at the Teaching Lab’s opening.
Ask a neuroscientist

for each edition of the Newsletter, a scientific question is answered by a member of our Institute. This time, a question by Ryan Griffiths, one of the four high-school students from the Frankfurt International School, participating in the Max Planck Junior Scholars Program, internships which allows excellent young students to actively participate in research at our Institute. His question is: “What is the neuronal basis for consciousness?”. The question is answered by Prof. Wolf Singer, Emeritus Director at the MPI for Brain research and Senior Research Group Leader at the Ernst Strüngmann Institute: “This is one of the most challenging questions in contemporary neuroscience. For decades it was held that this question would not be approachable experimentally at all and remains a philosophical problem. This has changed and now the search for the neuronal correlates of consciousness (the NCC) is a very active field of research and the yearly conferences regularly attract more than a thousand scientists.

There are several strategies to identify the NCC. They have in common that human subjects are presented with stimuli that are manipulated such that some of them are perceived consciously while others –although physically identical– are not. This can be achieved e.g. by presenting two different stimuli to the two eyes, in which case only one of them will be perceived while the other is suppressed, a phenomenon called “binocular rivalry”. In this case perception alternates between the two stimuli. Another way is to present a sequence of identical stimuli and adjust their visibility so that only a fraction of stimuli will be perceived consciously while the others pass undetected. One then measures neuronal responses to these stimuli with non-invasive methods (electroencephalography, magnetoencephalography or functional magnetic resonance tomography) and determines the difference between responses to perceived and non-perceived stimuli. At first hand, neuronal responses evoked only by perceived stimuli are considered as the NCC. The problem is, however, that once a stimulus is perceived consciously, a number of secondary neuronal processes set in, because subjects then pay attention to the stimulus, store it in working memory and usually prepare a response. Thus, care must be taken to distinguish between the neuronal responses that are directly related to conscious processing of a stimulus, the NCC proper, and the neuronal responses that are simply the consequence of having perceived something consciously. This distinction is very difficult and therefore there is still no consensus on the NCC.

Most researchers agree, however, that there is no single structure in the brain that one might consider as the seat of “consciousness”. Rather, it appears that conscious processing involves the coordinated cooperation of a large number of brain regions, in particular of the cerebral cortex. If one of these regions is destroyed, e.g. by a stroke or tumor, the stimuli processed by this region can no longer be perceived consciously but the patients are still conscious and can perceive stimuli processed by the other intact regions. Patients with lesions in regions of the cerebral cortex that analyse the colour of visual stimuli are color blind. They can no longer consciously perceive color but they remain fully conscious and can perceive consciously all other attributes of visual stimuli. Thus, individual regions of the cerebral cortex contribute the contents of conscious experience but the NCC proper appears to be a particular dynamic state of the whole system, that is closely linked to wakefulness and attention. It is only when this specific state is altered, as is the case e.g. in coma or deep sleep, that conscious processing of stimuli is no longer possible.”
News from our Institute

**Tatjana Tchumachenko and Johannes Letzkus join the MPI**

In the last six months, Dr. Tatjana Tchumachenko and Dr. Johannes Letzkus joined the Max Planck Institute for Brain Research as Max Planck Research Group Leaders. Tatjana, previously at Columbia University, New York, USA does computational modeling and mathematical analysis of single neurons, neuronal populations and recurrent networks, whereas Johannes -formerly at the Friedrich Miescher Institute for Biomedical Research in Basel, Switzerland- will use several experimental techniques, including optogenetics and in vivo two-photon imaging to investigate information processing in sensory areas of neocortex during perception and learning.

**Selected recent publications**

**Laurent Department**

**Schuman Department**

**Letzkus MPRG**

**Singer Emeritus Group**
First retreat of the IMPRS for Neural Circuits

In the beginning of December the first retreat for the Graduate Students of the International Max Planck Research School (IMPRS) for Neural Circuits was organized. 19 students from all three generations, as well as the IMPRS coordinator, enjoyed the golden city of Prague. The program consisted of a visit to the Institute for Experimental Medicine, where Lab tours as well as scientific and historical talks were organized. The group also visited various museums. The aim of the retreat was not only scientific exchange as such, but also of ideas and experiences between the first, second and third generation of the IMPRS students.

Website
www.imprs.brain.mpg.de

2014 Upcoming Neuroscience Lectures

08.01.2014 Florian Engert (Department of Molecular and Cellular Biology, Harvard University, Cambridge, MA, USA) Title: „Operant learning in larval zebrafish”
15.01.2014 Ehud Isacoff (Molecular & Cell Biology, University of California, Berkeley, CA, USA)
22.01.2014 Peter Scheiffele (Biozentrum, University of Basel, Switzerland)
05.02.2014 Joel Richter (University of Massachusetts Medical School, Worcester, USA)
19.02.2014 Rainer Friedrich (Friedrich Miescher Institute for Biomedical Research, Basel, Switzerland)
12.03.2014 Valentina Emiliani (Neurophysiology & New Microscopies Laboratory, INSERM, Paris, France)
26.03.2014 Eric Klann (Center for Neural Science, New York University, NY, USA)

Website
www.brain.mpg.de/news-events/lectures-and-other-events.html