Position: Several Postdoc positions

Subject: To study neural circuits of pain

The Collaborative Research Centre SFB 1158 ‘From nociception to chronic pain: Structure-function properties of neural pathways and their reorganisation’ is newly established in Heidelberg, Germany. Nineteen multidisciplinary projects spanning diverse top-class clinical and basic research institutions make this a remarkably vibrant and comprehensive collaborative centre.

Research in this consortium promises to deliver a structural and functional understanding of circuits and networks underlying sensory and affective components of pain and their modulation by circumstances which induce structural reorganization and functional plasticity, including disease states, negative emotions and stress. A mechanistic analysis of chronic neuropathic pain of peripheral and central origin in rodent models and in human patients will be a strong focus.

Application material: Interested candidates should submit their application to a specified project including CV, 2 references, and a mission statement explaining how the conceptual and methodological background of the applicant matches the specified project.

How to apply: Please send the application material to sfb1158office@pharma.uni-heidelberg.de mentioning the Job ID of the particular position. A candidate can maximally apply for 2 projects.

Salary: Fully-funded postdoctoral position as per German regulations (TVL-13)

Contract length: 2-4 years depending on the project duration.

Website of the Collaborative Research Centre: http://www.sfb1158.de/index.php/en/career-eng

In vivo imaging of cortical structural plasticity in chronic pain

Job ID: SFB1158postdoc_TK

Project leader: Thomas Kuner

Email: kuner@uni-heidelberg.de

Website of the institute: http://www.ana.uni-heidelberg.de/?id=164

Project description:

The cingulate cortex has been suggested to function as a major hub of circuits underlying chronic pain. Alternative to functional plasticity, activity-dependent adaptive changes of neuronal communication and network function can arise from structural plasticity. We hypothesise that structural plasticity is a strong candidate cellular mechanism for the expression of chronic pain in the cingulate cortex and that thalamocortical projections involving the cingulate cortex undergo critical
structural remodelling in chronic pain states. We aim to transcend correlational analysis and address causal mechanisms.

Own key publications:


Key words for methods that will be used:

In vivo two photon microscopy, chronic window implantation, viral molecular perturbations, cell type-specific expression, pain behavior, 3D image analysis

Desired profile of an applicant:

Experience with fluorescence imaging methods, image analysis and animal surgery advantageous. Strong background in neuroscience required.

hES/hiPS-derived sensory neurons - a new model system to study nociception

Job ID: SFB1158postdoc_JS

Project leader: Jan Siemens

Email: jan.siemens@pharma.uni-heidelberg.de

Website of the institute: www.siemenslab.de

Project description:

We are looking for a post-doctoral fellow with an interest in sensory neuroscience and expertise in electrophysiological recording techniques.
We recently developed a protocol to generate sensory neurons from human embryonic stem (hES-) cells and hiPS cells. We now want to use this new model system to study sensory transduction, in particular mechano-nociception.

A second goal is to gain mechanistic insight into TRPV1 sensitization. We are particularly interested in identifying and characterizing mechanisms that inhibit and counteract sensitization of TRPV1.

**Own key publications:**

- Nature Neuroscience, 2015; 18: 10-16
- Cell, 2015; 160: 759-770

**Key words for methods that will be used:**

hESC cultures and differentiation, DRG cultures from mouse models, electrophysiology

**Desired profile of an applicant:**

Expertise in Electrophysiology

**Visualization and functional interrogation of cortico-limbic circuits in pain**

**Job ID:** SFB1158postdoc_RK

**Project leader:** Rohini Kuner

**Email:** rohini.kuner@pharma.uni-heidelberg.de


**Project description:**

The identity and importantly, potential specificity, of cortical circuits for pain-related functions as compared to functions unrelated to pain is not well-understood. Although human studies implicate a central role for several brain regions in mediating and modulating pain, functional contributions and underlying circuits have not been studied in vivo in detail. This proposal focuses on studying structure-function of cortico-cortical and cortico-limbic circuits in awake, behaving mice using *in vivo* techniques, such as optogenetics, for specifically manipulating neuronal activity and afferent function. Moreover, *in vivo* imaging and electrophysiology will be employed in mice to visualize and analyse cortical activity patterns.

**Own key publications:**


**Key words for methods that will be used:**
Optogenetics in cortical slices as well as in mouse brain in vivo, behavioural assays in mice, in vivo electrophysiology, mapping circuits with viral vectors

**Desired profile of an applicant:**
Conversant in at least 2-3 of the above-mentioned methods, conceptually independent, command of brain circuits, aiming for high-profile publications, hard-working and perseverent, ability to write scientific papers, ability to represent the project at international meetings

**Thalamic processing of pain and putative control by cortical feedback**

**Job ID:** SFB1158postdoc_AG

**Project leader:** Alexander Groh

**Email:** alexander.groh@gmail.com

**Project description:**
The thalamocortical system is essential for the sensation of normal and abnormal pain. We found a new circuit mechanism that is effectively changing sensory processing in the thalamocortical system through neuronal feedback loops originating in the cortex. We are now testing how these feedback loops affect pain signaling with the goal to explore possible pain suppressing functions. We are looking for a postdoc who is interested to conduct this work at the interface between circuit neuroscience and clinical neuroscience.

**Own key publications:**


Groh A, Meyer HS, Schmidt EF, Heintz N, Sakmann B, Krieger P (2010) Cell-type specific properties of pyramidal neurons in neocortex underlying a layout that is modifiable depending on the cortical area. Cerebral Cortex
Key words for methods that will be used:
Electrophysiology, optogenetics, circuit analysis, virus mediated gene transfer, functional manipulations of rodent behaviors

Desired profile of an applicant:
Highly motivated applicants with a Ph.D. in neuroscience, life science or medicine who seek to do experimental work are encouraged to apply. Experience in neurophysiological methods to obtain and interpret electrophysiological recordings in animal models is highly desirable. Expertise in behavioral assays and in signal analysis and programming (Matlab) is a plus. The position is for two years with possible extension.

Standardization and development of new pain-related models and methods in rodents

Job ID: SFB1158postdoc_ATT
Project leader: Anke Tappe-Theodor
Email: anke.tappe-theodor@pharma.uni-heidelberg.de
Website of the institute: http://www.klinikum.uni-heidelberg.de/Pharmakologisches-Institut.106595.0.html

Project description:
The primary focus of the project is to develop novel mouse models mimicking clinically-relevant chronic pain conditions, which are not modelled adequately. Amongst these is a model for chronic low back pain, considering comorbidity factors, such as stress. Additionally, cortical reorganization in chronic pain models will be studied in the project. Pain behaviour will be characterized using not only classical stimulus-evoked measures but also novel tests for spontaneous ongoing pain, which will be developed as a goal in the project.

Own key publications:

Key words for methods that will be used:
- Chronic pain mouse models
- Behavioral tests (stimulus-evoked, free-choice, spontaneous, voluntary behavior)
- Stereotactict brain injections
- Mouse surgeries
- Retrograde tracing
- Confocal microscopy

Desired profile of an applicant:
Applicants must have a Ph.D. and/or M.D. degree in neuroscience or related field. A strong background with the described key methods is a prerequisite together with a good publication record in this field.

On the role of silent nociceptors in inflammatory pain

Job ID: SFB1158postdoc_SL

Project leader: Dr. Stefan Lechner

Email: stefan.lechner@pharma.uni-heidelberg.de

Website of the institute: http://www.medizinische-fakultaet-hd.uni-heidelberg.de/Pharmakologisches-Institut.102627.0.html

Project description:
In addition to mechano-nociceptors and polymodal nociceptors, the somatosensory nervous system also comprises a significant proportion of fibers that are insensitive to mechanical stimuli under normal conditions, but become sensitized to mechanical stimuli during inflammation. In humans, these so-called ‘silent’ nociceptors were shown to contribute to primary mechanical hyperalgesia and to induce central sensitization. This project aims at identifying the molecular and cellular identity of silent nociceptors and at deciphering the central and peripheral mechanisms underlying the sensitization of these neurons.

Own key publications:
Key words for methods that will be used:

Patch-clamp (spinal cord slices & primary cultures), optogenetics, pain behavior, DREADDs

Desired profile of an applicant:

The ideal candidate holds a PhD in Neuroscience or a related discipline and has extensive experience with electrophysiological recording techniques both in slice preparations and primary cultures. Additional experience in the field of pain research would be an asset.