We offer 2 fixed-term positions (3 years) with a salary of TV-L E13 (65%) commencing 01/10/2020 (earlier also possible) until 09/2023. The positions are part of a conjoint DFG-funded project at the Friedrich-Alexander University (FAU) in Erlangen-Nuremberg and the Leibniz-Institute for Neurobiology (LIN) in Magdeburg.

The central aim of this project is to understand how the brain’s extracellular matrix (ECM) is regulated by dopamine during learning in adult rodents. This conjoint project combines state-of-the-art molecular techniques (proteomic, RNAi, optogenetics, in vivo recordings and behavior). Please find more information on recent publications and the project here: https://cloud.lin-magdeburg.de/s/A7XNEmlHaAyBF3Z

At the FAU Erlangen, the position is situated in the research group of Dr. Renato Frischknecht within the Animal Physiology/Neurobiology (Department of Biology). At the LIN Magdeburg, the position is in the CortXplorer research group headed by PD Dr. Max Happel.

We offer
- Long-standing experience with supervision of doctoral thesis and personal scientific development
- Integration into state-of-the-art graduate training at the host institutions (FAU and LIN)
- Young & enthusiastic team with a supportive and friendly working atmosphere
- Modern state-of-the-art molecular, cellular and systems neuroscience methods (proteomic, RNAi techniques, stereotactic surgeries, in vivo multichannel recordings, optogenetics, behavior)
- Fully equipped neuroscience environment and a vivid collaborative scientific network
- Participation in international conferences
- High-standard career development (FELASA certification, workshops, programs for female scientists)

Your profile
- M.Sc./equivalent in Biology, Biochemistry, Biomedical engineering, Neuroscience, Life Sciences, or related
- Keen interest in molecular and systems neuroscience and mechanisms of learning & memory
- Enthusiasm to learn & develop
- Independent, self-reliant and dedicated style of work
- Strong organizational and communication skills
- Native ability to cooperate and to work in a team
- Very good written and oral communication skills in English
- Knowledge & experience in molecular or cellular techniques are a plus
- Programming experience (preferably MATLAB or Python) are advantageous for the position at LIN

Your tasks
- FAU: proteomic, generation of RNAi constructs, Western blotting, immunohistochemistry, fluorescence microscopy; LIN: stereotactic surgeries, in vivo multichannel recordings, optogenetics, behavior. Frequently exchange between both laboratories
- Experimental work, data analysis, presentation of results on scientific conferences, publication of results in international peer-reviewed journals

The FAU Erlangen/Nuremberg offers a research-centered environment and the ECM group in the Animal Physiology/Neurobiology section has a strong focus on the molecular and cellular role of the extracellular matrix. The LIN Magdeburg is an internationally renowned center for learning and memory research. The CortXplorer group focuses on cortical mechanisms of learning and memory in rodents.

Please find more information about our research groups here:
https://www.lin-magdeburg.de/forschung/forschungseinheiten/ag-cortxplorer

Employment, salary and employee benefits comply with the collective pay agreement (German TV-L). Equal opportunities as well as compatibility of family and work are part of our HR policy. Disabled applicants with equivalent occupational aptitude will be considered preferentially. We are looking forward to your electronic application in English that should include a cover letter stating research interests and previous experience, a CV, and contact information of two referees. Please send one PDF file comprising your motivation, CV and copies of relevant certificates to Renato Frischknecht (renato.frischknecht@fau.de) at FAU Erlangen; or Max Happel (muhappel@lin-magdeburg.de) at LIN Magdeburg for systems neuroscience part of the project. Interviews will be conducted via video conferencing, followed by a possible on-site visit at the host institutions.

Applications are considered until the position is filled.

By submitting your application, you consent to the processing of your personal data for the purpose of the application process. Our detailed privacy policy for applicants (m/w/d) acc. Art. 13 DSGVO on data processing in the application process will be sent on request. Your attention is drawn to the fact that no application or interview expenses can be paid. Documents will be deleted after 6 months.
Abstract

We have shown that experimental degradation of the ECM within the sensory cortex enhances cognitive flexibility during reversal learning. Recently, we further described that initial training leads to transient downregulation of the ECM protein brevican. Thus, our main hypothesis is that initial downregulation of the ECM promotes synaptic plasticity that is fundamental for acquisition learning. We speculate that in the adult brain, such learning-dependent regulation of the ECM needs concomitant action of reinforcing dopaminergic neuromodulation coding the behavioral relevance of events. In this proposal we therefore want to investigate the so far elusive molecular and neuromodulatory mechanisms leading to ECM downregulation during initial training and its role for learning and memory formation. In particular, we are interested in 1) the localization and timing of ECM regulation during learning in the brain 2) the molecular mechanisms that control ECM regulation and its impact on learning and memory recall, and 3) the particular role of the learning-relevant neuromodulator dopamine. We will investigate expression and proteolysis of specific ECM proteins using biochemistry and immunohistochemistry in the mouse auditory cortex and other learning relevant brain areas (hippocampus, prefrontal cortex) immediately after acquisition learning. In order to manipulate potential key mechanisms of ECM remodeling that interfere with initial learning, we derived a set of behavioral experiments with different perturbation approaches: we will use 1) Inhibition of initial proteolysis by microinjections of central metalloproteinase-blockers in learning-relevant brain areas, 2) targeted silencing of ADAMTS4 and 5 via small-hairpin RNA interference and 3) blockade or enhancement of the learning-related neuromodulator dopamine by optogenetic control of the ventral tegmental area (VTA). By chronic multichannel recordings of cortical circuit activity, we want to link adult cortical map plasticity and ECM regulation induced by classical conditioning.

With our complementary expertise, we aim to identify ECM regulation as a fundamental prerequisite for acquisition learning and the subsequent formation of long-term memories. Our goal is to portend an understanding of the underlying molecular and neuromodulatory control mechanisms of this regulation on a molecular, physiological and behavioral level and to thereby endorse the unification of two current research areas. Our findings may further have high translational impact for innovative approaches to guide therapies of neurological disorders, as for instance Alzheimer's disease or posttraumatic-stress disorders.

Key publications


