PhD position

Title of the position:

Desensitizing trauma-induced plasticity using psychotherapy-like treatments in female mice

Job position: Phd

Deadline of the application: 31.03.2024

Starting date: as of now

Contract length: till 06/2027

City: Heidelberg

Country: Germany

Institute: Institute for Anatomy and Cell Biology

Department: Department for Functional Neuroanatomy

Contact details:

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Website of your institute/department:
https://www.medizinische-fakultaet-hd.uni-heidelberg.de/einrichtungen/institute/anatomie-und-zellbiologie/abteilungen/funktionelle-neuroanatomie-1/ag-wieland

Description:

1. Project Summary:
   Adverse childhood experiences (ACE) facilitate pain chronification and comorbidity with mental disorder. Human-rodent tandem project B04 previously found that ACE-dependent thalamolimbic circuit plasticity drives chronic pain and mental comorbidity and will now address whether non-invasive bilateral stimulation (a psychotherapy-mimicing treatment of rodents) can desensitize thalamolimbic circuits using in-vivo fiber photometry, electrophysiology, opto-/chemogenetics in a mouse PTSD model. In the long term, these insights will be translationally put to use to optimize bilateral stimulation e.g. during EMDR psychotherapy towards improved pain relief in chronic pain patients.

2. References (3-5):
   Jauch I, Kamm J, Benn L, Rettig L, Friederich HC, Tesarz J, Kuner T, Wieland S. 2MDR, a Microcomputer-Controlled Visual Stimulation Device for Psychotherapy-Like Treatments of Mice. **eNeuro**. 2023 Jun 2;10(6):ENEURO.0394-22.2023.

   Gan Z, Gangadharan V, Liu S, Körber C, Tan LL, Li H, Oswald MJ, Kang J, Martin-Cortecero J, Männich D, Groh A, Kuner T, Wieland S, Kuner R. Layer-specific pain

relief pathways originating from primary motor cortex. **Science**. 2022 Dec 23;378(6626):1336-1343.

Oettl LL, Scheller M, Filosa C, Wieland S, Haag F, Loeb C, Durstewitz D, Shusterman R, Russo E, Kelsch W. Phasic dopamine reinforces distinct striatal stimulus encoding in the olfactory tubercle driving dopaminergic reward prediction. **Nat Commun**. 2020 Jul 10;11(1):3460.

3. Methods that will be used:
    - Multi-color in-vivo fiber photometry
    - In-vitro patch-clamp recordings
    - Multiplexed chemogenetic and multi-color optogenetic manipulations
    - Bilateral stimulations of mice via 2MDR
    - Facial mimic recordings
    - Stereotaxic injections and implantations
    - Fear conditioning
    - Pain measurements (von Frey test, Gait analysis)
    - Anxiety tests (novelty-suppressed feeding, light-dark box, open field)

4. Cooperation partners:
   Prof. Dr. Thomas Kuner, Prof. Dr. Rohini Kuner, Dr. Amit Agarwal, Prof. Dr. Dennis Kätzel, Prof. Dr. Andreas Draguhn, Prof. Dr. Valery Grinevich

5. Eligible qualifications:
   FELASA test can be acquired in the lab

6. Desirable skills:
   Programming skills (e.g. Python) necessary (can be acquired in the project) , experience in in-vivo and in-vitro recordings helpful

7. Key words:
   Bilateral stimulation, rodent psychotherapy-like treatments, optophysiology, electrophysiology, fear conditioning, chronic pain, gender specificity

8. Enclosures: The following documents must be enclosed with your application as a **single pdf file**: updated CV with publications, motivation letter, copies of degree certificates

Information for the applicant: For any updates and further information (for e.g: change of deadline of the application), please visit the consortium website career section: https://www.sfb1158.de/index.php/career-eng