Individual Research Project

ESR 1

THE PROJECT

Psychobiological predictors of comorbid depression and anxiety in chronic pain in multiple longitudinal cohorts: focus on brain-related indicators and cognitive variables.

Objectives

1/ To determine structural/functional magnetic resonance imaging (MRI)-based and cognitive indicators that predict pain comorbid with depression and anxiety in four longitudinal and cross-sectional cohorts of chronic pain patients and those at risk for chronic pain.

2/ To cross-validate the role of these factors in a multivariate approach in iADAPT cohort considering gender as a moderating factor and defining brain-cognition susceptibility and resilience factors.

3/ To analyse the impact of pharmacological and non-pharmacological treatments and their relation to cognition and learning mechanisms.

Methodology

Brain and cognitive data will be integrated based on resting state connectivity, gray matter density, white matter integrity and fMRI of aversive cue and context conditioning as well as cognitive control. These brain measurements will be related to indicators of explicit and implicit memory and executive function as well as genetic and epigenetic data relevant for brain plasticity, memory and learning processes. Multivariate pattern analysis, machine learning approaches and latent class growth analysis to determine the predictive value of the neurobehavioral and psychophysiological signatures and cross-validate the results across cohorts.

Expected Results

Information on multimodal brain imaging and learning/memory-related predictors of differential and common comorbidity factors for depression and anxiety in chronic pain with a determination of the relative weight of these variables in a gender-dependent manner. The recruited researcher will learn about multimodal imaging and brain-based biomarkers, the psychobiology of cognitive processes, genetic and epigenetic factors and integration and cross-validation of large data sets and computational analyse as well as impact of treatments.

Supervisors and host organisations

Main supervisors and recruiting organisation:
Herta Flor[1] and Frauke Nees[2]
[1]Zentralinstitut für Seelische Gesundheit, Institute of Cognitive and Clinical Neuroscience, Heidelberg, Germany

[2]Institute of Medical Psychology and Medical Sociology, University Medical Center Schleswig-Holstein (UKSH), Kiel University, Kiel, Germany

Co-supervisor (clinical unit):
Jack Foucher and Eric Salvat,
University Hospital Strasbourg
France

Co-supervisor (company):
Matthieu Charvériat,
Theranexus, Paris,
France

Planned mobility track and secondments:

ZI, Germany: M5-20, M37-40 *(to be replaced by month and year)*: Compute predictions on brain-related processes and cognitive variables from available cohorts (CBP-PREDICT, PTSDPREDICT, PHANTOMMIND, KFO, IMAGEN) for chronic pain with and without depression and anxiety in males and females.

HUS, France: M24-36 *(to be replaced by month and year)*: Cross-validate data on patients from iADAPT cohort.

Theranexus, France: 21-24 *(to be replaced by month and year)*: Participate in the development of strategies for "bench to bedside" and clinical trials.

Enrolment in Doctoral degrees:

University of Heidelberg and University of Strasbourg / Joint Diploma (upon further discussions).

THE POSITION

Duration

36 mo

Salary

Exact salary will be confirmed upon and will be based on a Living Allowance (salary) of €3171,90 Euros per month brutto. The net salary will depend on taxation and social (including pension) contribution deductions based on national and company regulations that will apply.

Allowance

There is a mobility allowance of €600/month. Additionally, researchers may also qualify for a family allowance of €500/month depending on the family situation.

THE CANDIDATE PROFILE

The applicant must have an MSc degree (obtained at the application date) in areas related with neurosciences (e.g. psychology, biology, computational sciences, etc.).

Knowledge on specific topics

Knowledge of statistics and programming will be valued. Proficiency in English is mandatory

Technical skills

Prior experience with handling of large data sets will be valued in the evaluation.

Exclusion criteria

Nationality is not a criterion: Researchers can be of **any nationality**. Rather the location of the researcher's residence or main activity during the 3 years prior to their recruitment is determining. Indeed, the candidate **must not have resided** or carried out their main activity (work, studies, etc.) **in Germany** (the country of the recruiting beneficiary) for more than 12 months in the 3 years immediately before the recruitment date. Compulsory national service, short stays such as holidays, and time spent as part of a procedure for obtaining refugee status under the Geneva Convention1 are not taken into account.

The candidate shall, at the time of recruitment, be in the **first four years** (full-time equivalent research experience) of their research careers and **have not been awarded a doctoral degree**.

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before the 1st of August 2021