

Abstract

The definition of anaesthesia care is substantially changing. Formerly restricted to a short time window around surgery, it now includes postoperative quality of life to prevent the occurrence of postoperative delirium (POD) after surgery. Preoperative risk factors might include affective and stress-related disorders, which also disturb cognitive functions. Dysregulated stress responsiveness may contribute to the pathophysiology of affective disorders and may develop POD in patients. Disturbances of sleep architecture are another core symptom frequently observed in depressed patients. Particularly the overdrive of the neuronal stress (HPA) axis found in depression is linked to a shorter rapid eye movements sleep (REMS) latency, increased REMS density and decreased slow wave sleep (SWS). The primary goal of our project is to investigate whether the perioperative EEG can serve as a predictive biomarker for the identification of anaesthesia-induced POD i.e., anaesthesia-related stress effects with impacts on brain activity and memory-related mechanisms. We will use stress reactivity (SR) mouse lines, with differences in HPA axis reactivity, allowing a stratification of subjects into vulnerable or resilient against the stress effects of anaesthesia on the behavioural and electrophysiological level. Since the SR mouse lines have been shown to differ in terms of behavioural functions and sleep EEG characteristics, including the amount of REMS and SWS, this model is ideally suited to address the mechanism underlying the interaction of general anaesthesia and stress responsiveness. On the cellular level in the brain of the animals, we will assess parameters reflecting neurophysiological functioning, neurotoxic states and synaptic pruning-related mechanisms. We will employ a broad spectrum of methods from behavioural testing for cognition to molecular and cell biological monitoring of the activity of neurons and astrocytes. Since it is still largely debated whether in patients surgery or general anaesthesia is producing effects on cognition, our experimental approach is highly valuable to tease apart these factors. The present proposal intends to scrutinize preoperative EEG analysis as a clinical predictor for individual differences in stress responsiveness and hence postoperative cognitive alterations induced by general anaesthesia. Our findings can contribute towards implementing a personalized anaesthesia decreasing the risk for POD.

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Hintergrund: siehe Abstract

Projektziel: Ziel des Vorhabens ist es, die Wechselwirkungen verschiedener Stresszustände und einer Allgemeinanästhesie auf die kognitive Leistungsfähigkeit am Tiermodell festzustellen.

Durchführung

- Chronische EEG-Ableitungen
- Verhaltensexperimente
- EEG-Datenanalyse
- Erhebung quantitativer und qualitativer Daten
- Regelmäßige Teilnahme an Seminaren

Voraussetzungen

- Interesse an in vivo Experimenten
- Feinmotorik
- Dauer (Vollzeit): 12 Monate
- Strukturierte und eigenständige Arbeitsweise
- Teamfähigkeit, Zuverlässigkeit, Lernfähigkeit
- Sehr gute Englischkenntnisse

Angebot

- Monatliche Bezahlung (800€) im Rahmen der Translationalen Medizin der medizinischen Fakultät der TUM
- Intensive Betreuung mit regelmäßigen Besprechungen
- Einarbeitung und Anleitung durch erfahrene Naturwissenschaftler
- Wissenschaftliche Publikation(en) als Co-Autor (bei besonderem Engagement ggf. als Erstautor)
- Bewerbung und Entscheidung bis spätestens Ende Februar 2024
- Ein Beginn ist ab April 2024 möglich.

Bei Interesse bitte Bewerbung (inkl. Motivationsschreiben, Lebenslauf, Transcripts) an:

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