

## **Searching for physiological HFOs and combining two fields of research - A study proposal.**

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### **Background:**

High frequency oscillations are mainly investigated as possible markers for epileptogenicity. HFOs are also generated during memory consolidation and sensory information processing. However, when it comes to the interpretation of HFOs, there is no clear distinction between physiological and pathological HFOs. The ability to distinctively detect pathological and physiological HFOs would also be of interest for another field of research. Especially due to their nature of highly confined location, HFOs might be interesting markers of plastic changes that occur after spinal cord injury. A better understanding of neuroplasticity in that context is desirable in order to improve treatments or brain-computer interfaces.

### **Methods:**

In order to investigate the occurrence of physiological HFOs we propose to record high density EEGs during sensoric stimulation in healthy subjects and SCI patients and to detect HFOs in these recordings. To simulate a lack of afferent information we suggest a local anesthesia using ischaemic nerve blockade in healthy participants. Further we want to compare these physiological HFOs to previously detected HFOs in epilepsy patients.

### **Expected results:**

We expect anesthetized participants as well as SCI patients to generate a smaller amount of HFOs and that these physiological HFOs differ in characteristics like spectral frequency, spatial extent or morphology from pathological (epileptogenic) HFOs.

### **Discussion:**

The possibility to detect plastic changes using HFOs as a marker is promising and the documentation of the features of physiological HFOs might also be helpful for further HFO research with respect to the interpretation of findings in epilepsy patients.

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