

Trimodal characterization of structural and functional brain connectivity in focal epilepsy using concurrent EEG-fMRI and tractography

Institution: EEG and Epilepsy Unit, Geneva University Hospitals; Epilepsy and Brain Network group, Faculty of Medicine, University of Geneva

Objective

Whole brain, large-scale functional connectivity networks or connectomes have been characterized on different temporal and spatial scales in humans using EEG and fMRI and diffusion MRI. Our previous work has shown that functional and structural connectivity are more correlated in right temporal lobe epilepsy (rTLE) compared to controls (Wirsich et al. 2016, NeuroImage Clinical). Clinical research in epilepsy could profit from a unified multimodal functional connectome description to better understand the underlying brain function and pathological functional networks to develop new markers to predict e.g. the effect of medical and surgical therapeutic interventions.

Collaborations within FNS SINERGIA grant (CRSII5_170873).

Methods

Epileptic patients scanned during resting state using a concurrent EEG-fMRI acquisition. Electrophysiological activity, BOLD activity and tractography is projected into the same brain atlas to build whole brain connectivity models of structure and function.

In search of

In search of patients with temporal lobe epilepsy with compatible multimodal EEG-fMRI resting state and dMRI recordings. Potential multicentric data sharing.

IRB approval (needed/pending/approved)

Retrospective study: Ethics approved

Time frame/current status

Preliminary data on temporal lobe epilepsy will be presented at the European Congress of Epileptology in Geneva (July 2020). More data of focal epilepsy patients is currently analyzed, and analysis will be finalized in 2020.

Contact

Prof. Serge Vulliemoz Serge.Vulliemoz@hcuge.ch

Dr. Jonathan Wirsich jonathan.wirsich@unige.ch

Last updated: March 2020