

Electrophysiological study of tuberous sclerosis lesions with an intracranial micro-macroelectrode

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We report the case of MFR who suffers from a Bourneville's tuberous sclerosis, a rare multi-systemic genetic disease that causes benign tumors in the brain and on other vital organs. It usually affects the central nervous system and results in a combination of symptoms including seizures. This female patient was 38 years old at the time of this study. She also suffers from drug-refractory epilepsy (first seizures at the age of 3). She was explored using StereoElectroEncephalography (SEEG) in the University Hospital of Toulouse to identify the brain areas where epileptic seizures originate.

The implantation was mainly right temporo-frontal and 14 electrodes were implanted (12 in the right hemisphere). Among these electrodes, 10 were regular clinical macroelectrodes (\emptyset 800 μ m) and 4 were newly designed hybrid micro-macroelectrodes from DIXI Medical (classical macroelectrodes with 2 or 3 tetrodes, each including 4 microelectrodes of \emptyset 20 μ m). 3 of these were located in the right hemisphere (one in the presumed seizure onset zone, in a tuber; one anteriorly; one posteriorly, at the periphery of the tuber).

During SEEG, fast activities (high gamma) but also high frequency oscillations like Ripples (> 80Hz) and Fast Ripples (FRs, > 250Hz) can be recorded. FRs are candidates to be new biomarkers of the seizure onset zone. The literature suggests that FRs are not recorded in tubers. However, FRs are recorded more easily from micro- than from macroelectrodes. We will test the hypothesis that no FRs are recorded in tubers using a comparison between our micro and macroelectrodes.