

## **Influence of sleep on HFOs**

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High frequency oscillations (HFOs) are influenced by sleep. Following the distribution of epileptic spikes, rates are highest during NREM sleep and lowest during REM sleep. This influence was confirmed for different brain regions. Of note, the sleep-related activation of HFOs is not uniformly distributed across NREM sleep, but is enhanced by high amplitude widespread slow waves  $<1$  Hz. In contrast, HFOs are even more suppressed during phasic compared to tonic REM sleep (EEG desynchronization is highest during phasic REM sleep). This suppression during REM sleep was less evident inside compared to outside the seizure onset zone. Interestingly, a different coupling of HFOs from epileptic brain areas compared to normal brain areas was found with respect to the state of the slow waves ("up" or "down" state) as well as phasic versus tonic REM sleep. Whether these differences in coupling will aid to separate between physiological and pathological HFOs awaits future investigation.