

New developments in recording and analyzing HFOs - depth electrodes

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HFO properties have been described so far using phenomenological analysis of electrophysiological and simulated data. We introduce an analytical model based on the Fourier and wavelet analyses that explains the observed properties of the wavelet in the time-frequency space. The analytical model allows making predictions regarding the properties of the oscillations in the upper frequency bands, beyond HFO. Limitations of the current methods for visualization and analysis of HFOs in the upper frequency bands are being discussed and modified or alternate methods are being proposed.

The HFOs are better evidenced using recordings at mesoscale and microscale. We perform a review of current state and developments in the design of depth electrodes having combined macrocontacts and microcontacts. We highlight the properties of the signals recorded on microcontacts and based on the analytical model we have introduced, we highlight the appropriate methods for visualizing and analyzing recorded HFOs.