

Inhibitory interactions inferred from Utah-array recordings in human and monkey cerebral cortex

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In long-term recordings with Utah arrays, it is possible to formally identify excitatory (regular spiking or RS) and inhibitory (fast spiking, or FS) neurons based on functional interactions. In such recordings from human temporal lobe and monkey motor cortex, we show that inhibitory neurons balance with excitatory neurons, except during fast (beta and gamma) oscillations, where FS cells are dominant. They are in general more correlated than RS cells, and sometimes show high correlations over large distances (several millimeters), while RS cells only correlate locally and never show long-distance correlations. Such patterns can be explained by strong afferent excitatory input onto inhibitory cells. Such a strong feedforward inhibition is also consistent with the dynamics of RS and FS cells during seizures.