

Propagation of Cortical Spreading Depression: Frequency and Velocity by Daniel E. Rivera | Jorge Riera

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Cortical Spreading Depression (CSD) is a wave of complete neuronal depolarization that usually lasts for one to two minutes and can silence brain activity for a certain time after its occurrence. In this research project, changes in LFP during CSD are measured using an A4x8 silicone based planar probe. To perform this experiment, two burr holes and two craniotomies are made in the skull of the rat. A screw is placed in each of the burr holes to serve as a reference and a ground electrode and the planar probe is inserted in the anterior craniotomy, 2mm above the bregma, in the right hemisphere of the rat's skull to record changes in electric potential. To induce CSD propagation, 20-40 μ L of various concentrations of potassium acetate (0.5M, 1M, 1.5M, 2M) are dropped on the posterior craniotomy. Results show that increases in [CH₃CO₂K] concentration cause not only increases in the frequency of CSD, but also nontrivial changes in their propagation speed, which decreases as the CSD events are repeated. These results provide a greater insight into the nature of the propagation of CSD and will assist in creating computational models and techniques to further understand this phenomenon.