

Title:

**EPILEPTIFORM PROPAGATION IN THE UNFOLDED HIPPOCAMPUS AND A MICROMACHINED ARRAY SYSTEM FOR IN-VITRO ANALYSIS**

**ABSTRACT:**

An unfolded hippocampus preparation has been developed which preserves transverse and longitudinal neuronal networks. Propagation experimental data show that a synaptically dependent 4-AP induced epileptiform wave is generated in the CA3 and propagates across the pyramidal cell matrix across CA3 longitudinally and into CA1 transversally. Further, this epileptiform wave propagation can be arrested by a selective local transverse lesion of the CA3. A micro-electrode array system of 8 by 8 recording channels was also developed with high aspect ratio spikes that penetrate into the pyramidal cell layer for recording. Tests carried with the completed array system show it is capable of mapping epileptiform events across the CA1-CA3 in a more robust manner and with lower noise than with traditional voltage sensitive dye RH-414. The results provide new insights in the propagation of neural activity in 2-dimensional neural networks as well as new tools for the analysis of the neural activity in neural networks.

By Andrew Kibler