



**COBRE  
Investigators**

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**Title of project:** The Role of Glia in the Development of Synchronized Bursting Behavior in Neuronal Networks in Culture

**Summary:**

Synchronous or burst firing of neurons is a necessary feature of establishing neuronal networks during vertebrate brain development. Synchronous firing in the normal developed brain occurs during sleep or anesthesia. Epilepsy is a condition in which aberrant synchronous firing occurs in the awake brain. The central hypothesis of this proposal is that glial-neuronal interactions during development are crucial for the establishment of synchronously oscillating neuronal networks during normal brain development as well as the development of paroxysmal depolarizing shifts leading to epilepsy. It is further hypothesized that rise in internal  $Ca^{++}$  coupled with astrocyte release of glutamate and/or ATP mediated by the mGluR, P2Y<sub>1</sub> or the GABA<sub>B</sub> G protein coupled receptor (GPCR) pathways plays a role in the effects of astrocytes on the development of synchronous activity in cultured neurons. These hypotheses will be tested with the following specific aims.