

## **DEPENDENCE ON METABOTROPIC GLUTAMATE RECEPTOR ACTIVATION BUT NOT $Ca^{2+}$ ENTRY IN THE GENESIS OF NOVEL CONVULSANT-INDUCED BURSTING IN RAT SPINAL CORD.**

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Using the isolated *in vitro* rat spinal cord, Dougherty et al (2001; SFN Abst) showed that spike broadening following application of the convulsants TEA & 4AP resulted in the emergence of novel forms of synchronous bursting throughout the spinal neuraxis: (1) bursting mediated via electrical transmission, independent of ionotropic receptors, and (2) bursting mediated chemically in the absence of external  $Ca^{2+}$  but requiring release from internal  $Ca^{2+}$  stores. The present study further characterized these bursting patterns. Motor activity was recorded from various ventral roots in the isolated neonatal rat spinal cord.

(1) Synchronous activity induced by bicuculline/strychnine/5-HT but blocked by the glutamate receptor blockers CNQX/APV re-emerged after applying TEA/4AP. Activity block by carbenoxolone implicated electrical coupling. Here, we support this conclusion by showing that blockade of all known voltage-gated  $Ca^{2+}$  channels does not block the TEA/4AP evoked synchronous activity. This bursting was blocked with the broad-spectrum mGluR antagonist MCPG (n=3/3) & the group I mGluR subtype 1 antagonist AIDA (n=3/4).

(2) Synchronous activity induced following application of TEA/4AP in nominally  $Ca^{2+}$ -free saline initiates an intracellular  $Ca^{2+}$  store and CNQX/APV-sensitive bursting. Here we show that extracellular  $Ca^{2+}$  is not required since block of cell surface  $Ca^{2+}$  receptors does not alter bursting. Thus, epileptiform activity via chemical synaptic transmission occurs in the absence of external  $Ca^{2+}$  entry. Interestingly this bursting was blocked with the metabotropic glutamate antagonist MCPG implicating mGluRs in the  $Ca^{2+}$  release from internal stores.

Thus, 2 novel forms of spinal epileptiform activity are expressed independent of extracellular  $Ca^{2+}$  but require activation of metabotropic glutamate receptors.

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