Print this Page

Presentation Abstract

Program#/Poster#:	633.5/E2
Title:	Using axonal measurements of calcium to explore the role of NKCC1 chloride transporters in the excitation of parallel fibers by GABAA receptors
Location:	Hall A-C
Presentation Time:	Tuesday, Nov 18, 2008, 1:00 PM - 2:00 PM
Authors:	***R. LUO**, T. S. OTIS; Dept Neurobiol, UCLA, Los Angeles, CA
Abstract:	Mossy fiber input into the cerebellar cortex is transmitted to Purkinje cells via granule cell axons, also known as parallel fibers. Previous studies (Stell, et al., 2007) have shown that GABAA receptors on parallel fibers can be activated by GABAA receptor agonists. Activation induces release of glutamate which triggers bursts of EPSCs in Purkinje cells and inhibitory interneurons receiving parallel fiber input. We have directly examined the mechanisms underlying this effect by loading a calcium indicator using a local perfusion technique (Regehr and Atluri, 1995). This presynaptic optical assay shows that various GABAA receptor agonists increase parallel fiber excitability. The increase in stimulus-induced calcium fluorescence at parallel fibers following local application of the GABA agonist muscimol is abolished by the GABA antagonist gabazine. Specific isoforms of chloride cotransporters are known in other systems to be responsible for establishing hyperpolarizing (KCC2) and depolarizing (NKCC1) chloride gradients. We find that muscimol-induced increases in excitability are significantly reduced by application of the NKCC1 transporter blocker bumetanide, implicating compartmental chloride gradients within granule cells and a depolarizing chloride gradient at parallel fibers in adult rats. Our findings may explain why in situ studies (Kanaka et al., 2001; Mikawa et al., 2002) conducted on mature granule cells indicate expression of both chloride transporter isoforms.
Disclosures:	**R. Luo** , University of California - Los Angeles, A. Employment (full or part-time); **T.S. Otis**, University of California - Los Angeles, A. Employment (full or part-time).

Support: NIH NS 35985

[Authors]. [Abstract Title]. Program No. XXX.XX. 2008 Neuroscience Meeting Planner. Washington, DC: Society for Neuroscience, 2008. Online.

2008 Copyright by the Society for Neuroscience all rights reserved. Permission to republish any abstract or part of any abstract in any form must be obtained in writing by SfN office prior to publication.