Print this Page

Presentation Abstract

Program#/Poster#:	445.13/F51
Title:	Calcium-permeable acid-sensing ion channels in NG2 glia of rat hippocampus
Location:	Halls B-H
Presentation Time:	Monday, Nov 15, 2010, 1:00 PM - 2:00 PM
Authors:	***Y.-C. LIN**, Y.-C. LIU, C.-C. LIEN; Inst. of Neurosci. and Brain Res. Ctr., Natl. Yang-Ming Univ., Taipei, Taiwan
Abstract:	NG2 cells, a fourth type of glial cell in the mammalian CNS, are thought to be multipotent cells with lineage plasticity and play multiple roles in development and repair of the CNS. Recent studies show that NG2 cells undergo reactive changes following brain injury. Acid sensing ion channels (ASICs), members of the amiloride-sensitive degenerin/epithelial Na^+ channel superfamily, are widely expressed in central neurons and have been implicated in cerebral ischemia, seizures and many neurological disorders. The linkage of both NG2 cells and ASICs to brain injury prompts the following questions: Do NG2 cells express ASICs? If so, what are the subunit composition and functional significance? Here, using a combination of immunocytochemistry, electrophysiology and Ca^{2+} imaging, we provide the evidence for homomeric ASIC1a channel expression in NG2 cells of rat hippocampus. First, immunocytochemistry showed co-localization of ASIC1a and NG2 proteins in the hippocampal *stratum radiatum*. Second, whole-cell and nucleated patch recordings from NG2 cells showed that ASIC currents were sensitive to amiloride and psalmotoxin 1, a specific blocker for homomeric ASIC1a channels. The magnitude of ASIC currents depended on extracellular pH values. The pH value for half-maximal activation was 6.3. Analysis of current-voltage relationship of ASICs revealed a reversal potential of +85 mV, close to the Nernst equilibrium potential for sodium. Finally, Ca^{2+} imaging showed that activation of ASICs increased

$[Ca^{2+}]_i$. Thus the acid chemosensor, the ASIC1a channel, may serve for inducing membrane depolarization and Ca^{2+} influx, thereby playing a crucial role in the NG2 cell response to injury following ischemia.

Disclosures: **Y. Lin:** None. **Y. Liu:** None. **C. Lien:** None.

Keyword(s): ASICs

NG2 cells

calcium imaging

Support: Ministry of Education (Aim for The Top University Grant)

NHRI Grants NHRI-EX97-9720NC

NSC Grant 98-2321-B-010-001

[Authors]. [Abstract Title]. Program No. XXX.XX. 2010 Neuroscience Meeting Planner. San Diego, CA: Society for Neuroscience, 2010. Online.