IJAE
Vol. 116, n. 1 (Supplement): 42, 2011
ITALIAN JOURNAL OF ANATOMY AND EMBRYOLOGY

Expression, distribution and glutamate uptake activity of excitatory aminoacid transporters in vitro cultures of embryonic rat dorsal root ganglia cells

Guido Cavaletti, Valentina Carozzi, Gabriella Nicolini, Giovanni Tredici, Paola Marmiroli

Dipartimento di Neuroscienze e Tecnologie Biomediche, Unversità di Milano-Bicocca, Monza, Italia

Glutamate is the major mediator of excitatory signalling in the mammalian central nervous system, but it has recently been shown to play also a role in the transduction of sensory input at the periphery and in peripheral neuropathies. New advances in research have demonstrated that rat peripheral sensory terminals and dorsal root ganglia (DRG) express molecules involved in glutamate signalling, including high-affinity membrane-bound glutamate transporters (Excitatory Aminoacid Transporters, EAATs) and that alterations in their expression and/or functionality can be implicated in several models of peripheral neuropathy, neuropathic pain and hyperalgesia.

Since EAATS might represent an interesting target for pharmacological intervention, the knowledge of their distribution and functionality deserves to be improved.

Here we describe, through immunofluorescence assays, immunoblotting and beta-counter analysis of (H3) L-glutamate uptake, the expression, distribution and activity of the EAATs in in vitro cultures of embryonic DRG sensory neurons, sensory neurons+satellite cells and satellite cells.

In this study we demonstrated that EAATs are expressed in all cultures, but that their distribution recognizes a peculiar pattern for each of them, since EAATs immunolabelling was differentially expressed in the cytoplasm of neuronal or satellite cells. This result was further confirmed by immunoblotting. Moreover, both cell types showed a strong sodium-ATP-dependent (active) glutamate uptake activity. However, the net (i.e. active transport minus passive diffusion) glutamate transport was more marked in neuronal cultures when cells were grown and maintained without satellite cells.

These results, that demonstrate that functionally active EAATs can be studied in DRG cell cultures, provide further evidence for a role of glutamatergic transport in the peripheral nervous system and will be useful for testing whether any change occurs in in vitro models of peripheral nervous system damage.

This work was supported in part by an unrestricted research grant from the "Fondazione Banca del Monte di Lombardia".