Increased hippocampal expression of the divalent metal transporter 1 (DMT1) mRNA variants 1B and +IRE and DMT1 protein after NMDA-receptor stimulation or spatial memory training.

Haeger, Paola

Alvarez, Alvaro

Leal, Nancy

Adasme, Tatiana

Núñez, Marco Tulio

Hidalgo, Cecilia

Iron is essential for crucial neuronal functions but is also highly toxic in excess. Neurons acquire iron through transferrin receptor-mediated endocytosis and via the divalent metal transporter 1 (DMT1). The N-terminus (1A, 1B) and C-terminus (+IRE, -IRE) splice variants of DMT1 originate four protein isoforms, all of which supply iron to cells. Diverse physiological or pathological conditions induce differential DMT1 variant expression, which are cell-type dependent. Hence, it becomes relevant to ascertain if activation of neuronal plasticity processes that require functional N-methyl D: -aspartate (NMDA) receptors, including in vitro stimulation of NMDA receptor-mediated signaling and spatial memory training, selectively modify DMT1 variant expression. Here, we report for the first time that brief (5 min) exposure of primary hippocampal cultures to NMDA (50 muM) increased 24 h later the expression of DMT1-1B and DMT1+IRE, but not of DMT1-IRE mRNA. In contrast, endogenous DMT1 mRNA l