Functional characteristics of caboxylate transporters in central nervous system

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Na^+-coupled carboxylate transporters (NaCs) mediate the uptake of TCA cycle intermediates in mammalian tissues. Of these transporters, NaC2 and NaC3 have been shown to be expressed in brain. In this symposium, we investigated the functional characteristics of Na^+-dependent succinate or citrate transport in rat primary cultured astrocytes and neurons. Uptake of succinate in rat astrocytes was Na^+-dependent, Li^+-sensitive and saturable with the K_t value of 29 μM. Although uptake of citrate in astrocytes was also Na^+-dependent and saturable, its K_t value was significantly higher compared with succinate. Interestingly, *N*-acetyl-L-aspartate (NAA), which is the second most abundant amino acid in CNS, also completely inhibited Na^+-dependent succinate transport in rat astrocytes. RT-PCR and immunocytochemical analyses revealed that NaC3 and NaC2 are expressed in cerebrocortical astrocytes and neurons, respectively. These results are good agreement with our previous reports for brain distribution pattern of NaC2 and NaC3 mRNA using in situ hybridization. These transporters might play important roles in the trafficking of TCA cycle intermediates and related metabolites between glia and neurons.