Expression profile of xenobiotic efflux transporters in mouse neural stem cells

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Neural stem cells (NSCs) play important roles in neurogenesis since they have self-renewal ability and pluripotentiality to differentiate into neurons and glial cells. Recently, it has been reported that differentiation of NSCs is regulated by endogenous metabolites. Therefore, we hypothesized that efflux transporters such as ATP-binding cassettes (ABCs) may regulate function of NSCs via excretion of metabolites. We first examined mRNA expression of ABCs in primary cultured NSCs derived from murine embryonic cortex: Quantitative PCR was performed at 3, 6, and 9 days after the primary culture. Abcb1b, Abcg2, Abcc1, Abcc4, and Abcc5 were expressed in the NSCs. Among them, expression of Abcc5 was the highest and increased in a culture period-dependent manner, whereas that of other ABCs was decreased. We also characterized the NSCs by evaluating mRNA expression of basic helix-loop-helix (bHLH) transcription factors which regulate neuronal differentiation. Especially, expression of Math1 and Mash1, activators of neuronal differentiation were increased, whereas that of Hes1 and Hes5, suppressors of neuronal differentiation were decreased during the culture period. Thus, some of the xenobiotic efflux transporters may be associated with differentiation of NSCs, and further studies are required to understand detailed regulatory mechanisms.