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Poster Sessions

The role of nicotinic acetylcholine receptors on differentiation of iPSC-derived macrophages and dopaminergic neurons

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Involvement of nicotinic acetylcholine receptors (nAChRs) in differentiation and maturation of microglia and/or dopaminergic (DA) has not been elucidated, and its clarification may greatly contribute to development of cell therapy against brain diseases, such as Alzheimer's disease (AD) and Parkinson's disease (PD). In this study, we analyzed the expression patterns of various nAChR subunits and the effects of nicotine treatment in the differentiation processes of primitive macrophages, which are precursor cells of microglia, and DA neurons using mouse/human induced pluripotent stem cells (iPSCs). Expressions of various nAChR subunits were detected during differentiation processes of primitive macrophages and DA neurons from iPSCs. Although nicotine treatment at the early phase inhibited differentiation of iPSCs into mesodermal hemangioblasts for the induction of macrophages, the treatment during at terminal differentiation stage promoted the expression of CX3CR1 protein on the primitive macrophages, which is a chemokine receptor. On the other hand, nicotine treatment during the differentiation of iPSCs into DA neurons promoted the maturation of DA neurons, especially to A9 subpopulation. These results suggest that nAChRs play pivotal roles in the functional differentiation of primitive macrophages and maturation of DA neurons.