1. No.
   2020G006

2. Title
   Role of Nicotinic Acetylcholine Receptor in Pluripotency and Differentiation of Stem Cells

3. Period
   2020-2022

4. Summary
   It was reported that nicotinic acetylcholine receptor (nAChR)-mediated signaling pathways affect the proliferation and differentiation of pluripotent stem cells. However, detail expression profiles of nAChR genes were unrevealed. Therefore, we comprehensively investigated the gene expression of α subunit of nAChRs (Chrna) during differentiation and induction of pluripotent stem cells. Mouse embryonic stem (ES) cells expressed multiple Chrna genes (Chrna3-5, 7 and 9) in undifferentiated condition. Among them, Chrna9 was markedly down-regulated during the differentiation into mesenchymal cell lineage. In mouse tissues and cells, Chrna9 was expressed in testes, ES cells and embryonal F9 teratocarcinoma stem cells. Expression of Chrna9 gene was acutely reduced during differentiation of ES and F9 cells within 24 h. In contrast, Chrna9 expression was increased in iPS cells established from mouse embryonic fibroblast. It was shown by the reporter assays that T element in the promoter region of Chrna9 gene is important for its transcription in ES cells. Chrna9 was markedly reduced by siRNA-mediated knockdown of Tbx3, a pluripotency-related transcription factor of the T-box gene family. These results indicate that Chrna9 is a nAChR gene that are transcriptionally regulated by Tbx3 in undifferentiated pluripotent cells.