1. **No.**

   FP01807095

2. **Title**

   Effect of nicotine on migration of pluripotent stem cells to the brain lesions

3. **Period**

   2017-2019

4. **Summary**

Glioblastoma is one of most lethal tumors in adult central nervous system with a median survival of a year and half and effective therapeutic strategy is urgently needed. Stem cell-based suicide gene therapy, in which stem cells are used as cellular vehicles for delivering anti-tumor agent to the tumor cells, is one of the most feasible therapeutic strategies for glioblastoma because of intrinsic tumor tropism of the stem cells. One of the most attractive features in suicide gene therapies is the "bystander effect" where tumor cells that were not transduced with the therapeutic gene were eliminated along with the gene-transduced cells. The bystander effect is known to be attributed to gap junctional intercellular communication (GJIC) function between effector cells and tumor cells. In the present study, we investigated the effect of nicotine on tumor tropism and GJIC function of the stem cells. Mouse induced pluripotent stem cell-derived neural stem cells (iPS-NSCs) and human dental pulp mesenchymal stem cells (DPSCs) were used. Nicotine at the concentrations equivalent to habitual smoking (1 μM), which was also non-cytotoxic for glioma and stem cells, did not affect tumor tropism of iPS-NSCs toward GL261-CM and DPSCs toward U251-CM assessed with the matrigel invasion assay. Nicotine also did not suppress GJIC of iPS-NSC/GL261 and DPSC/U251 and GJIC among each glioma cells, assessed with the scrape loading/dye transfer assay and the parachute assay, respectively. The study demonstrated that non-cytotoxic concentrations of nicotine did not significantly change the stem cell properties requisite for stem cell-based suicide gene therapy.