1. No.
   2022G022

2. Title
   The Role of Nicotinic Acetylcholine Receptors on Human Stem Cells and Tumorigenesis

3. Period
   2022-2024

4. Summary

In this study, we aimed to investigate the effect of nicotine administration on the process of differentiation of undifferentiated ES/iPS cells into the three germ layers. we first investigated the effect of nicotine addition on the differentiation process into the neuroectoderm lineage. As a result, the cell number tended to increase with nicotine addition on the 4th day of culture, but the significant difference disappeared by the 9th day. No significant change was observed in the neuroectoderm marker genes due to nicotine.

Next, using a differentiation system from human ES/iPS cells into adrenocortical cells, we investigated the effect of adding nicotine on the differentiation process. No significant change in cell number was observed with the addition of 10^{-6} mol/L nicotine, but the expression of ARMC5 increased during culture period, and the expression showed a tendency to decrease with the addition of 10^{-6} mol/L nicotine.

As clinical research, we used medical checkup data to examine whether there is an association between smoking and adrenal tumors in the general population. Multivariate analysis suggested an association between the Brinkman Index and having "adrenal disease." A Brinkman Index of >1200 was identified as an independent factor increasing the odds of having an adrenal adenoma in a reanalysis that accurately calculated the MRI findings. Smoking has been thought to be correlated with tumor development in the adrenal glands in adult humans. The link between the effects of nicotine on stem cells and clinical tumor development is intriguing.