1. **No.**

   FP01812191

2. **Title**

   Investigation of cigarette smoke-induced goblet cell hyperplasia mechanism using induced pluripotent stem cells(iPSCs)

3. **Period**

   2017-2019

4. **Summary**

Habitual cigarette smoking leads to destruction of lung tissue due to airway obstruction and excessive mucus production by the goblet cell hyperplasia. However, the mechanism of goblet cell differentiation and mucus production by cigarette smoking is not fully clarified. The aim of this study is to generate goblet cell hyperplasia model in vitro by the use of iPS cell-derived airway epithelium and cigarette smoke solution (CSS) for elucidating the mechanism of goblet cell hyperplasia. Mouse iPS cell-derived airway epithelium treated with CSS strongly expressed goblet cell marker in comparison with control. Moreover, histological examination exhibited that some Muc5ac-positive cells and Alcian Blue-positive cells were appeared in iPS cell-derived airway epithelium treated with CSS. Hence, it is considered that mouse iPS cell-derived airway epithelium treated with CSS showed characteristics like goblet cell hyperplasia. Furthermore, several candidate genes involved in goblet cell hyperplasia were picked up by microarray analysis. Additionally, we could induce human iPS cells foregut endoderm by culturing based on low serum conditions. As a next study, we will induce human iPS cells into airway epithelium, and try to generate human-specific goblet cell hyperplasia model in vitro by the use of human iPS cell-derived airway epithelium and cigarette smoke solution (CSS) for elucidating the mechanism of goblet cell hyperplasia.