1. No.
   2019Y010

2. Title
   Whether the differentiation inhibition of pituitary stem cells by nicotine is the short- or long-term

3. Period
   2019-2021

4. Summary
   We have recently demonstrated that a transient nicotine exposure to young rats causes a reduced expression of the pituitary cell differentiation-related factor PRRX1 and a decrease in the number of growth hormone (GH)-producing cells. In other words, nicotine-induced abnormalities in the supply of GH-producing cells were suggested, but the short-term *in vivo* experiments did not reveal any effects on other hormones or any relationship to a cell differentiation. Therefore, the present study examined the long-term effects of the transient nicotine exposure (*in vivo* experiments) and the effects of nicotine on pituitary stem cell differentiation (*in vitro* experiments). Long-term *in vivo* experiments over an 8-month period showed that nicotine reduced the number of thyroid-stimulating hormone-producing cells and increased the body weight. In addition, *in vivo* experiments using pituitary stem cells confirmed that nicotine does not affect the expression of the stem cell marker *Sox2*, but suppresses the expression of the progenitor cell marker *Prrx1*. Furthermore, an application of nicotine to the differentiation induction system revealed that nicotine reduced the number of cells differentiating from pituitary stem cells into hormone-producing cells. Therefore, our results suggest that nicotine acts directly on pituitary stem cells to suppress the supply of multiple hormone-producing cells.