1. No.
   2020Y010

2. Title
   Dissecting the Effects of Nicotine on Inflammation Induced by Adverse Childhood Experiences

3. Period
   2020-2022

4. Summary

   This study aimed to investigate if administering nicotine can improve social impairment in mice modeled after neglect and, if so, to uncover the underlying mechanisms. Male C57BL/6J mice were isolated from postnatal day 21 (P21) until P35, and they were housed with other mice raised in the same environment (IS-RE mice). IS-RE mice are known to exhibit social deficits. Mice raised with others from P21 were used as controls (RE mice).

   In the first experiment, we administered nicotine or physiological saline via osmotic pumps from P35. However, unlike previous studies, IS-RE mice did not show social impairment. Given the potential issues with surgical procedures and drug delivery duration, we switched to oral administration. From P35, mice were given oral nicotine (dissolved in saccharin solution) or saccharin solution, and we evaluated their social and cognitive functions and anxiety in adulthood. Nicotine administration did not affect cognitive functions or anxiety. In this procedure, nicotine administration replicated social impairment in IS-RE mice and restored them to normal levels.

   Genetic analysis of the mPFC and microglia did not reveal inflammation involvement. However, RNAseq analysis of microglia suggested that nicotine may have therapeutic effects by altering mTOR pathway regulation in microglia. Further studies are needed, but nicotine may contribute to developing therapies for social impairment.