1. **No.**

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2. **Title**

   Analysis of Gut-brain Axis in a Mouse Model of Anorexia: Role of alpha7 Nicotinic Acetylcholine Receptor (α7nAChR)

3. **Period**

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4. **Summary**

Patients with eating disorders show a significantly higher smoking rate compared to healthy controls, which was shown to be associated with impulsivity in the illness. Thus, smoking is generally known to have a negative impact on psychological symptoms, however several reports have shown that certain types of nicotinic receptor signaling have beneficial effects on cognitive function, attention and eating behavior in addition to improving gastrointestinal motility and anti-inflammatory effects. BTBR mice exhibit obesity caused by excessive eating, and some behavioral abnormalities characterized by anxiety, hyperactivity, obsessive-compulsive symptoms, decreased sociability, and self-injurious behavior. Therefore, BTBR mice may be a useful model to investigate the nicotinic effects on the pathophysiology of eating disorders. In this study, we chronically administered nicotine to BTBR mice to assess the roles of nicotinic receptor signaling on body weight, behavioral characteristics, and brain-gut interactions. Our analyses revealed that the nicotine group with BTBR (N-BTBR) had no significant effect on body weight and total locomotor activity compared to the saline group (C-BTBR). However, working memory and social cognition were significantly improved in N-BTBR mice compared to C-BTBR mice. The microbiome analysis failed to show significant changes in terms of total bacterial abundance or bacterial composition, however IL-1 signaling in the prefrontal cortex of N-BTBR was significantly altered, potentially leading to influence the function of prefrontal cortex. Further study should be required to determine the role of IL-1 signaling on psychiatric disorders such as eating disorder.