1. No.
   2021T003

2. Title
   Neuronal Mechanisms for the Link Between Nicotine Dependence and Stress-Relieving/Addictive Behaviors

3. Period
   2021-2025

4. Summary
   Wheel-running behavior produced conditioned place preference, suggesting its rewarding effect. In addition, Simultaneous presentation of a running wheel (RW) decreased the time spent in the zone containing food, a novel mouse, or a novel object, indicating that the mice selected the wheel-running behavior even at the expense of feeding and social behaviors, which is the feature of behavioral addiction. These finding suggest that wheel-running behavior is useful as a model of behavioral addiction. To elucidate the neural mechanisms underlying behavioral addiction, we examined neurotransmitter releases in the brain during wheel-running behavior. Similar with the case approaching a novel mouse or food, approaches toward the RW increased dopamine release in the nucleus accumbens (NAc), particularly in the medial shell region, was. Furthermore, as the characteristic feature of wheel-running behavior, it markedly increased acetylcholine release in the ventral tegmental area (VTA) compared to approaches toward a novel mouse or food. Since acetylcholine release in the VTA was also enhanced upon release from physical restraint and during forced exercise on a treadmill, further studies, including behavioral pharmacological studies, are necessary to clarify the relationship between behavioral addiction and acetylcholine neurotransmission in the VTA.