1. No.
   2020G023

2. Title
   Significance of Nicotinic Receptor Signaling in Functional Recovery after Stroke

3. Period
   2020-2024

4. Summary
   The present study attempted to elucidate the roles of nicotinic receptor signaling in improved prognosis of intracerebral hemorrhage (ICH), based on out previous findings on beneficial effects of nicotine and nicotinic receptor agonists. Here we added further evidence of neuroprotective actions of nicotine against ICH-induced axon bundle fragmentation and axonal transport dysfunction in mice. In addition, galantamine as an acetylcholinesterase inhibitor was found to alleviate several pathogenic events after ICH. Nurr1 (NR4A2) has been reported to increase in the brain after chronic nicotine treatment, and we showed that administration of several Nurr1 ligands or overexpression of Nurr1 in the motor cortex afford therapeutic effects on ICH, suggesting that protection of the corticospinal tract from ICH-induced injury is important for alleviation of neurological symptoms.

   The present study also found that nicotine prevented occurrence of systemic inflammation-induced microhemorrhage. Sulfur-containing compounds as well as NADPH oxidase inhibitors produced similar preventive effects on microhemorrhage. Elucidation of the detailed mechanisms of action of nicotine requires further investigations, along with elucidation of the mechanisms of pathogenesis of microhemorrhage events.