1. No.
   2020Y006

2. Title
   Involvement of Immune Cells in the Pathogenesis of Parkinson's Disease and the Effects of Stimulation with Nicotinic Acetylcholine Receptor

3. Period
   2020-2022

4. Summary
   Based on previous reports and our previous experimental results, we hypothesized that α7 nicotinic acetylcholine receptor (α7nAChR)-positive intravascular immunocompetent cells are involved in the pathogenesis of Parkinson's disease (PD) and that α7nAChR agonists have an inhibitory effect on the pathogenesis. To verify this, we generated intrastriatal 6-OHDA-lesioned bone marrow chimeric rats (GFP bone marrow chimeric PD rats) to validate them as PD model rats and histologically examined whether GFP-labeled endovascular immune cells infiltrate the substantia nigra of the midbrain. In this rat model, microglial activity was observed from 1 day after 6-OHDA administration, preceding a decrease in the number of dopamine cells in the substantia nigra, and infiltration of intravascular immunocompetent cells into the substantia nigra region was observed from 7 days after administration, and half of these cells were CD8 positive. Since microglia express 7nAChR, stimulation of α7nAChR during 6-OHDA administration may suppress microglial activity and act as a neuroprotector. In addition, RNA expression analysis of nAChR in the intestinal tract of rats confirmed the expression of α7nAChR. The influence of α7nAChR expression in the intestinal tract on the background of smoking-induced Parkinson's disease risk reduction needs to be examined in the future.