1. No.
   2022G012

2. Title
   Elucidation of the Mechanism of Alzheimer's Disease Prevention through the Regulation of Microglial Function by Choline

3. Period
   2022-2024

4. Summary
   The purpose of this study was to clarify the possibility that the α7 type nicotinic receptor (α7 nAChR), which is involved in neuroprotection by microglia, localizes and functions in mitochondria. In primary cultured microglia, transmembrane protein 35A (TMEM35A), which is important for plasma membrane translocation of α7 nAChR, was not expressed and α7 nAChR was localized to mitochondria. Treatment of primary cultured microglia with choline increased intracellular ATP levels and this response was inhibited by α7 nAChR blockade. In addition, microglial fractions isolated from mouse brain by Fluorescence activated cell sorter (FACS) showed expression of microglial marker genes, but not astrocytic or neuronal markers. Furthermore, α7 nAChR gene expression was observed in microglial fractions, but TMEM35A expression was barely observed. Membrane permeabilization of the isolated microglial fractions and FACS with the α7 nAChR antibody showed that approximately 98% of the total cells were isolated. These results suggest that in microglia, α7 nAChR is localized to intracellular mitochondria rather than the plasma membrane and may be involved in the regulation of mitochondrial function.