1. No.
   2021G023

2. Title
   Nicotinic acetylcholine receptor-induced synapse-to-nucleus signaling and thereby genetic output in brains

3. Period
   2021-2023

4. Summary

Neuronal activity-dependent gene expression is a flexible and appropriate mechanism for supplying proper molecules in response to the extracellular stimuli and is essential for the expression of higher brain functions. Transcription factors play a fundamental role in this process. The transcription factor serum response factor (SRF) and its activator myocardin-related transcription factor (MRTF) are activated in calcium signal-dependent manner. We hypothesized that the nicotinic acetylcholine receptor, a Ca^{2+} channel, may be involved in its activation. To test the hypothesis, we examined nuclear translocation of MRTF by nicotinic receptor activation and the expression of its target genes.

There was no significant change in terms of nuclear translocation of MRTF by stimulation of three nicotinic receptor agonists, nicotine, imidaclopride, and acetylcholine. Next, we investigated whether nicotinic receptors are involved in inducing gene expression by cooperating with other receptors such as dopamine receptors The Here, results showed that *c-fos,* which encodes a transcription factor, tendsto be enhanced by co-stimulated nicotinic and glutamate receptors at the cellular level, and that this phenomenon was also induced *in vivo*.