1. No.
   2017G013

2. Title
   Entrainment of the circadian rhythms by nicotinic acetylcholine receptors Molecular Mechanism of Nicotinic Receptors in the Biolgical Clock

3. Period
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4. Summary
   We generated knockout mice of two nicotinic acetylcholine receptor subtypes that are strongly expressed in the suprachiasmatic nucleus (SCN), which is the center of circadian rhythm. The SCN-specific conditional knockout mice generated by the Cre-loxP system, we found these mice demonstrated a larger phase-shift after dark-pulse stimulation. We also analyzed the effect of carbachol, an unsubstituted carbamoyl ester that acts as an agonist for nicotinic and muscarinic acetylcholine receptors, on the circadian expression of Per1-luc in the SCN by the slice culture system. We found the large phase-shift of the rhythm was inhibited by the pharmacological application by atropine, but enhanced by α-conotoxin, suggesting that the contradictory action of muscarine and nicotinic receptors in the phase-shift of clock oscillation in the SCN. In diurnal primate common marmosets, a phase-advancing effect of ketamine was observed. More detailed non-photic stimulation effect should be examined in diurnal primate models for understanding the circadian rhythm sleep disorders of human.