1. No.
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2. Title
   Regulation of melatonin production by pineal nicotinic receptors and ion channels

3. Period
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4. Summary
   The pineal glands regulate circadian rhythm through the synthesis and secretion of melatonin. Activation of nicotinic acetylcholine receptors (nAChRs) under the parasympathetic innervation causes an increase in cytosolic Ca^{2+} concentration and eventually inhibits the melatonin production. Our previous reports showed that pineal Ca^{2+} oscillations were regulated by the voltage-dependent Ca^{2+} channels and large-conductance Ca^{2+}-activated K+ channels and results in the inhibitory mechanism of melatonin production. In the present study, the contribution of small- and intermediate-conductance Ca^{2+}-activated K+ (SK_{Ca} and IK_{Ca}) channels to the regulation of spontaneous Ca^{2+} oscillations was examined in rat pinealocytes. The amplitude of spontaneous Ca^{2+} oscillations was enhanced by a SK_{Ca} channel blocker (100 nM apamin) but not an IK_{Ca} channel blocker (1 μM TRAM-34). On the other hand, it was reduced by a SK_{Ca} channel opener (100 μM DCEBIO) but not an IK_{Ca} channel opener (1 μM DCEBIO). Expression analyses by quantitative real-time PCR, immunocytochemical staining, and Wester blotting revealed that $SK_{Ca}2$ channel subtype was abundantly expressed in rat pinealocytes. These findings suggest that the activity of $SK_{Ca}2$ channels regulates cytosolic Ca^{2+} signaling during the parasympathetic activation in pineal glands.