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2. Title
   Nicotine-related Molecules and Neural Circuits Regulated with Stress and Resilience

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4. Summary
   In the present study, we investigated the effects of α7 nicotinic acetylcholine receptor (α7nAChR) agents on the social or social cognitive behaviors of stressed mice and whether their effects are involved in nAChR subunits or molecules related to nAChR-PI3K-Akt or MAPK signaling pathways and serotonin transporter (SERT)-regulated systems. The swimming stressed mice showed the impairment of social cognition, the decrease of α7nAChR expression, of Akt/CaMK Ⅱ/ERK phosphorylations, or of the hippocampal PKCβI phosphorylation/ubiquitinated SERT. They also showed the decrease of the hippocampal pyramidal neuronal layer thickness. These abnormalities were attenuated by repeated treatment with α7nAChR agonist. While, the social defeat stressed mice showed the impairment of social behaviors, the increase of the cortical nAChR α7, α4 and β2 subunit expressions at 7 days after the last stress exposure. Acute or repeated treatment with nicotine-related agents attenuated the behavioral impairment and/or the increased of nAChR subunit expressions. These results suggest that the impairments of social and social cognitive behaviors in stressed mice are related to the decrease in nAChR-PI3K-Akt or MAPK signaling pathways, followed by hippocampal neural morphological abnormalities. The nAChR-, but not serotonin-related agents may be vulnerable to stress and one of new therapeutic targets for the impairment of social cognition in stress-related disorders.