1. No.

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2. Title

Identification of Acetylcholine Transporter and Effects of Nicotine

− Novel Regulatory Systems for Acetylcholine Release in Rat Striatum

3. Period

2016-2020

4. Summary

Central cholinergic nerves have been involved in important cognitive processes, such as learning, memory and other cognitive functions. Recently, we have reported that acetylcholine (ACh) released from cholinergic nerve terminals acts on not only synaptic surface but also intracellular muscarinic receptors. In the present study, we tried to establish a new axis of cholinergic transmission associated with ACh transporter (AChT) and intracellular muscarinic receptors. [^{3}H]ACh was effectively taken up into neurons in central nervous system, suggesting the presence of ACT on neuronal membrane. In the screening study, we could identify a candidate of AChT. In non-neuronal cells co-expressed the AChT candidate with M1-muscarinic receptor, exogenous ACh acted on the intracellular M1-receptors. In addition, using micro-superfusion system, we found that synaptic ACh concentrations were regulated by not only synaptic ACh esterase (AChE) but also the intracellular AChE within cholinergic terminals, presynaptic M2 autoreceptor and postsynaptic ACh uptake through AChT. The present results provided useful clues in Alzheimer's disease therapy.