Alpha-7 nicotinic acetylcholine receptor physically interacts with sigma-1 receptor

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Alpha-7 nicotinic receptor (α7 nAChR) is widely distributed in mammalian brain and expressed not only in neurons but also in astrocytes and microglia. Sigma-1 receptor (Sig1R) modulates functions of membrane protein such as ion channel and G-protein coupled receptors via physical interaction. Recent study reported that co-stimulation of both α7 nAChR and Sig1R synergistically induces neuroprotective effect. However, the mechanisms underlying the neuroprotective effects are unclear. Therefore, current study examined whether α7 nAChR can physically interact with Sig1R. HEK293T cells were transfected with plasmids (EYFP, Sig1R-EYFP, Sig1R (1-60)-Halo, Halo-Sig1R (61-223) and α7 nAChR-Myc-Cerulean) by using lipofection. After transfection, the α7 nAChR was immunoprecipitated with Myc antibody. The immunoprecipitants were analyzed by western blotting. The α7 nAChR-Myc-Cerulean can co-precipitated with Sig1R-EYFP, but not EYFP. Moreover, both truncated forms of the Sig1R such as Sig1R (1–60)-Halo and Halo-Sig1R (61–223) can interact with α7 nAChR. Theses results suggested that α7 nAChR can physically interact with some amino regions of Sig1R, and this physical interaction might be important to exert the synergistic effects.