Targeting Topics: Recent Scientific References

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Evaluation of side effects through selective ablation of the mu opioid receptor expressing descending nociceptive facilitatory neurons in the rostral ventromedial medulla with dermorphin-saporin

Cao F, Chen SS, Yan XF, Xiao XP, Liu XJ, Yang SB, Xu AJ, Gao F, Yang H, Chen ZJ, Tian YK
Neurotoxicology [Epub Jun 24], 2009.

Selective ablation of rostral ventromedial (RVM) neurons expressing mu opioid receptors has been suggested as a treatment for pathological pain. This work investigated the side effects of a 0.5-µg injection of dermorphin-SAP (Cat. #IT-12) into the RVM. Saporin (Cat. #PR-01) was used as a control. Lesioned animals experienced a temporary increase in heart rate and systolic blood pressure, and mild microglial responses, but even these soon returned to normal. The data suggest this system has potential as a target for pain therapeutics.

Septal grafts restore cognitive abilities and amyloid precursor protein metabolism

Aztiria E, Cataudella T, Spampinato S, Leanza G
Neurobiol Aging 30(10):1614-1625, 2009.

It is suspected that there is a connection between the loss of cortical cholinergic input and the presence of β-amyloid precursor protein (APP) in Alzheimer's disease. After injecting 5 µg of 192-IgG-SAP (Cat. #IT-01) into the lateral ventricles of rats, the animals were given cholinergic-rich septal tissue grafts. The animals that received the grafts were able to restore APP levels to normal or near-normal, indicating that this type of therapy could at least slow cognitive dysfunction due to the lesion.

NGF is essential for hippocampal plasticity and learning

Conner JM, Franks KM, Titterness AK, Russell K, Merrill DA, Christie BR, Sejnowski TJ, Tuszynski MH
J Neurosci 29(35):10883-10889, 2009.

This work aimed to define NGF modulation of plasticity and function in adults. Rats received 50-ng injections of 192-IgG-SAP (Cat. #IT-01) into the medial septum. Lesioned animals exhibited impaired retention of spatial memory and significantly reduced hippocampal long-term potentiation. These results indicate that NGF modulates neuronal plasticity and behavior by exerting effects on cholinergic projections to hippocampal and cortical targets.

Effects of chronic donepezil treatment and cholinergic deafferentation on parietal pyramidal neuron morphology

De Bartolo P, Gelfo F, Mandolesi L, Foti F, Cutuli D, Petrosini L
J Alzheimers Dis 17(1):177-191, 2009.

Donepezil has been shown to enhance cognitive functioning in both healthy patients and those suffering from dementia. This study examined whether donepezil treatment changes neocortical morphology in healthy or diseased brains. Rats received 4-µg bilateral injections of 192-IgG-SAP (Cat. #IT-01) into the lateral ventricles. Various morphological parameters were analyzed demonstrating that in the absence of cholinergic neurons donepezil prevented the compensatory response rather than enhanced function.

A cholinergic-dependent role for the entorhinal cortex in trace fear conditioning

Esclassan F, Coutureau E, Di Scala G, Marchand AR
J Neurosci 29(25):8087-8093, 2009.

Higher cognitive involvement can be modeled through the use of trace conditioning in simple associative tasks. Rats received several 20-80-ng injections of 192-IgG-SAP (Cat. #IT-01) into the entorhinal cortex (EC) in order to clarify the mechanisms that allow learning through the association of events that occur at different times. Cholinergic depletion of the EC did not result in a training deficit, indicating that these cells are not necessary for trace conditioning.

Neuroprotective effect of testosterone treatment on motoneuron recruitment following the death of nearby motoneurons

Fargo KN, Foster AM, Sengelaub DR
Dev Neurobiol 69(12):825-835, 2009.

Previous work has demonstrated that testosterone treatment can prevent dendritic atrophy due to death of nearby motoneurons. This experiment examined whether this protection extends to motor activation. Rats received a 1-µg injection of CTB-SAP (Cat. #IT-14) into each of the right bulbocavernosus and levator ani muscles. Animals treated with testosterone preserved more of the activity duration than untreated animals, as well as no decrease in motoneuron recruitment.

Effect of voluntary running on adult hippocampal neurogenesis in cholinergic lesioned mice

Ho NF, Han SP, Dawe GS
BMC Neurosci 10:57, 2009.

The act of running can induce hippocampal neurogenesis. In this work the authors investigated whether running can offset the loss of septohippocamal cholinergic neurons caused by a lesion using mu p75-SAP (Cat. #IT-16). Mice received 3.6 µg of the toxin into each lateral ventricle. Although the number of surviving neurons was similar in both lesioned and control animals, most of the progenitor cells in the lesioned animals could not survive without cholinergic input.

Hypocretin-2 saporin lesions of the ventrolateral periaquaductal gray (vlPAG) increase REM sleep in hypocretin knockout mice

Kaur S, Thankachan S, Begum S, Liu M, Blanco-Centurion C, Shiromani PJ
PLoS One 4(7):e6346, 2009.

Not all connections between narcolepsy and orexin are understood, since orexin neurons are located in the lateral hypothalamus and some sleep functions are controlled by the

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