Targeting Topics: Recent Scientific References

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examining cholinergic basal forebrain input to the primary auditory cortex in cat. Six 0.5 µg injections of ME20.4-SAP (Cat. #IT-15) were made into the putamen/globus pallidus, and cholinergic cell survival was examined by immunohistochemistry. The injected area showed a large reduction in number of AChE-positive fibers in the primary auditory cortex. This provides the evidence of the efficacy of ME20.4-SAP for investigating plasticity in cat auditory cortex.

Susceptibility to seizure-induced injury and acquired microencephaly following intraventricular injection of saporin-conjugated 192 IgG in developing rat brain.

Koh S, Santos TC, Cole AJ

Exp Neurol 194(2):457-466, 2005.

It is thought that one mechanism for resistance to seizure-induced injury in immature animals is an abundance of neurotrophic growth factors. Rat pups were treated with 2 µg of 192-Saporin (Cat. #IT-01) injected into the left lateral ventricle to examine how cholinergic basal forebrain projections might affect this type of injury. The results indicate that these neurons may be critical for normal brain growth, and that they play a protective role in preventing excitotoxic neuronal injury.

Further analysis of the effects of immunotoxic lesions of the basal nucleus of Meynert reveals substantial impairment on visual discrimination learning in monkeys.

Ridley RM, Baker HF, Leow-Dyke A, Cummings RM

Brain Res Bull 65(5):433-442, 2005.

Several studies in marmoset monkeys indicate that cholinergic projections from the NBM to specific portions of the neocortex are necessary for visual discrimination learning. By combining analysis of studies using a total of 1.4 µg of ME20.4-SAP (Cat. #IT-15) into various areas of the brain, the authors show that degeneration of cholinergic projections contributes to the loss of functions dependent on the neocortex.

Acetylcholine in the orbitofrontal cortex is necessary for the acquisition of a socially transmitted food preference.

Ross RS, McGaughy J, Eichenbaum H

Learn Mem 12(3):302-306, 2005.

Cortical involvement in social transmission of food preference (STFP) has not been established, but the importance of the orbitofrontal cortex (OFC) in odor-guided learning is known. The OFC of rats was injected twice with 192-Saporin (Cat. #IT-01), then the rats were trained in STFP. Depletion of cholinergic neurons in the OFC impaired expression of the odor association, indicating that cholinergic function in the OFC is essential for this form of associative learning.

Ablation of vagal preganglionic neurons innervating the extra-thoracic trachea affects ventilatory responses to hypercapnia and hypoxia.

Wu M, Kc P, Mack SO, Haxhiu MA

Respir Physiol Neurobiol [Aug 10 Epub], 2005.

Hypercapnia, an excess of CO_2 in the blood, is thought to stimulate the release of acetylcholine by airway-related vagal preganglionic neurons (AVPNs). AVPNs in the nucleus ambiguus (NA) were lesioned with ten 1-µl injections of CTB-SAP (Cat. #IT-14) into the trachealis muscle of rats. Treated animals maintained rhythmic breathing patterns, but episodes of increased respiratory rate in response to hypercapnia were significantly reduced.

Mu opioid receptor-containing neurons mediate electroacupuncture-produced anti-hyperalgesia in rats with hind paw inflammation.

Zhang RX, Wang L, Liu B, Qiao JT, Ren K, Berman BM, Lao L

Brain Res 1048(1-2):235-240, 2005.

Electroacupuncture has been shown to significantly reduce inflammatory hyperalgesia. To examine whether this effect is modulated by spinal mu opioid receptors, the authors injected 400 ng of dermorphin-SAP (Cat. #IT-12) into the subarachnoid space at the level of the lumbar spinal cord of rats. The anti-hyperalgesic effect of electroacupuncture was blocked by dermorphin-SAP administration, indicating that mu opioid receptor-containing neurons are involved in this pathway.

Spinal-supraspinal serotonergic circuits regulating neuropathic pain and its treatment with gabapentin.

Suzuki R, Rahman W, Rygh LJ, Webber M, Hunt SP, Dickenson AH

Pain. [Sep 6 Epub], 2005.

The anticonvulsant, gabapentin, is thought to modulate calcium channel function. In animals, it also affects abnormal pain function. 10 µl of 1 µM SP-SAP (Cat. #IT-07) was injected into the subarachnoid space of rats. It was found that the effects of gabapentin were blocked when NK-1r expressing neurons in the dorsal horn were eliminated. The results suggest that not only is the NK-1r pathway a determinant of neuronal and behavioral manifestations of neuropathy, it is also involved in the action of gabapentin.