

Targeting Topics: Recent Scientific References

Reviewed by Matthew Kohls

Anticonvulsant effects of damage to structures involved in seizure induction in rats exposed to soman

Myhrer T, Enger S, Aas P
Neurotoxicology [Epub Apr 24] 2007.

Soman is a nerve agent that irreversibly inhibits acetylcholinesterase, resulting in respiratory dysfunction, seizures, convulsions, coma, and death. In this work the authors investigated whether elimination of cholinergic pathways in the medial septum (MS) or diagonal band nucleus (DBN) would affect the onset of convulsions. 0.3 μ l of 0.5 μ g/ μ l 192-IgG-SAP (Cat. #IT-01) was infused into the MS and/or DBN. Although aspiration lesions of the MS increased time to the onset of convulsions, lesioning with 192-IgG-SAP produced no anticonvulsant effects. This data suggest that the aspiration lesions disrupted more than the cholinergic system of the MS.

Superficial NK1 expressing spinal dorsal horn neurones modulate inhibitory neurotransmission mediated by spinal GABA(A) receptors

Rahman W, Sikander S, Suzuki R, Hunt SP, Dickenson AH
Neurosci Lett 419(3):278-283, 2007.

It has been shown that elimination of lamina I NK1 receptor-expressing neurons affects pain behaviors. The authors investigated whether eliminating these neurons would alter GABAergic spinal inhibitory systems. Rats received 10- μ l injections of 10 μ M SP-SAP (Cat. #IT-07) into the L4-5 regions. Data generated by electrical and mechanical stimuli suggest that although GABAergic transmission is dependent on NK1 receptor-expressing neurons, loss of these cells results in a decrease in spinal cord excitability.

Cholinergic modulation of spindle bursts in the neonatal rat visual cortex *in vivo*

Hanganu IL, Staiger JF, Ben-Ari Y, Khazipov R
J Neurosci 27(21):5694-5705, 2007.

The authors investigated the relationship between cholinergic drive and spindle burst

oscillation driven by retinal waves. 0.5 μ l of 0.2 μ g/ μ l 192-IgG-SAP (Cat. #IT-01) was injected into both ventricles of rat pups. The lesioned animals displayed markedly decreased oscillatory activity. Since this activity may be used as a functional template for cortical networks and architecture, the results suggest a link between cholinergic activity and cortical development.



Immunotoxic cholinergic lesions in the basal forebrain reverse the effects of entorhinal cortex lesions on conditioned odor aversion in the rat

Ferry B, Herbeaux K, Cosquer B, Traissard N, Galani R, Cassel JC
Neurobiol Learn Mem 88(1):114-126, 2007.

The entorhinal cortex (EC) is intimately involved in olfactory learning. Lesioning of this structure produces septo-cholinergic sprouting. Rats that had previously received EC lesions were treated with 5- μ g intracerebroventricular injections of 192-IgG-SAP (Cat. #IT-01). The results point to a role for hippocampal cholinergic neurons in the modulation of memory processes involved with conditioned odor aversion.

Cholinergic lesions produce task-selective effects on delayed matching to position and configural association learning related to response pattern and strategy

Gibbs RB, Johnson DA
Neurobiol Learn Mem 88(1):19-32, 2007.

It has been well established that the cholinergic system of the basal forebrain

plays a critical role in many cognitive processes. This work utilized injections of 192-IgG-SAP (Cat. #IT-01) into the medial septum, the nucleus basalis magnocellularis, or both to examine the lesioning effect on two cognitive tasks in rats. Injections consisted of 0.20-0.40 μ g of the conjugate. The data indicate that cholinergic lesions produce learning deficits that are task specific, and that learning is affected without corresponding deficits in memory.

Anti-nociceptive effects of selectively destroying substance P receptor-expressing dorsal horn neurons using [Sar⁹,Met(O₂)¹¹]-substance P-saporin: Behavioral and anatomical analyses

Wiley RG, Kline RH, Vierck CJ, Jr.
Neuroscience 146(3):1333-1345, 2007.

While lumbar injections of SP-SAP (Cat. #IT-07) produce specific lesions, use of this targeted conjugate in the forebrain has been problematic. The authors investigated the use of SSP-SAP (Cat. #IT-11), a conjugate of saporin with a more stable analog of substance P. The greater stability of SSP-SAP resulted in increased potency as well as better specificity. SSP-SAP is shown to be a highly effective reagent for the removal of NK1 receptor-expressing neurons in the brain and spinal cord.

Olfactory neophobia and seizure susceptibility phenotypes in an animal model of epilepsy are normalized by impairment of brain corticotropin releasing factor

Pascual J, Heinrichs SC
Epilepsia 48(4):827-833, 2007.

Olfactory recognition has been linked to epilepsy in behavioral phenotype models. This work examines the role brain stress neuropeptides play in the manifestation of neurological perturbations. Mice were injected with 2 μ g/5 μ l of CRF-SAP (Cat. #IT-13) into the lateral ventricle. Saporin (Cat. #PR-01) was used as a control. The lesioned mice displayed a temporary reduction in seizure susceptibility, and the reversal of olfactory deficits towards the detection of food.

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