

Targeting Topics: Recent Scientific References

Reviewed by Matthew Kohls

Cholinergic modulation of sensory interference in rat primary somatosensory cortical neurons

Alenda A, Nunez A

Brain Res 1133(1):158-167, 2007.

One critical feature of cognition is the ability to focus on selected sensory inputs while ignoring irrelevant inputs. In this work the authors examine basal forebrain participation in sensory interference effects. Following 0.15 μ g bilateral injections of 192-IgG-SAP (Cat. #IT-01) into the basal forebrain of rats, the ability of primary somatosensory cortical neurons to respond in the presence of sensory interference was assessed. A decrease in the number of neurons showed sensory interference in lesioned animals.

Substance P-saporin down-regulates substance P receptor immunoreactive sensory dorsal root ganglion neurons innervating the lumbar intervertebral discs in rats

Ohtori S, Inoue G, Koshi T, Ito T, Doya H, Moriya H, Takahashi K

Spine 31(26):2987-2991, 2006.

Neurokinin-1 (NK-1) receptor expressing neurons that innervate lumbar intervertebral discs may be involved in lower back pain. Here the authors investigate the basic effect of SP-SAP (Cat. #IT-07) on neurons innervating the L5/6 intervertebral disc. Rats were injected with 175 ng of SP-SAP. The number of NK-1 receptor expressing neurons was reduced by over 75% in the treated animals, demonstrating SP-SAP as a useful tool to investigate the mechanism of discogenic low back pain, particularly for investigating behavioral impacts.

Selective lesions of the nucleus basalis magnocellularis impair cognitive flexibility

Cabrera SM, Chavez CM, Corley SR, Kitto MR, Butt AE

Behav Neurosci 120(2):298-306, 2006.

In humans, one aspect of cognitive flexibility is being able to shift attention under a variety of pressures. Here the authors suggest that lesions to the cholinergic nucleus basalis magnocellularis (NBM) will impair cognitive flexibility. The NBM of rats was lesioned with 0.08 μ g of

192-IgG-SAP (Cat. #IT-01). Both lesioned and control animals displayed a similar ability to learn a discrimination task, but lesioned animals displayed perseveration - the uncontrollable repetition of a previously correct response - indicating a loss of cognitive flexibility.



Extensive training in a maze task reduces neurogenesis in the adult rat dentate gyrus probably as a result of stress

Aztiria E, Capodiceci G, Arancio L, Leanza G
Neurosci Lett Feb 3, 2007 [ePub].

Ascending cholinergic inputs from the basal forebrain modulate hippocampal neurogenesis, although it is not clear if the modulation is direct or indirect. In this study rats experienced extended training in a spatial navigation task following 192-IgG-SAP (Cat. #IT-01) lesions. 192-IgG-SAP was injected into the basal forebrain nuclei and the cerebellar cortex. Although the lesioned animals displayed an 80% reduction in neuron proliferation in the dentate gyrus, extended training and learning did not affect proliferation.

Guanidinylated-Neomycin delivers large, bioactive cargo into cells through a heparan sulfate dependent pathway

Elson-Schwab L, Garner OB, Schuksz M, Esko JD, Tor Y

J Biol Chem Feb 20, 2007 [ePub].

The uptake of high molecular weight drugs into cells is a stumbling block for some potential therapeutics. Using a neomycin derivative in which guanidinium groups have

replaced the ammonium groups, the authors show heparan sulfate-dependent uptake of large molecules. The guanidine-neomycin was biotinylated, and incubated with streptavidin-ZAP (Cat #IT-27). This complex was effective in killing CHO cells *in vitro*, but was no more effective than streptavidin-ZAP alone on cells lacking heparan sulfate expression, demonstrating specificity.

Targeted deletion of neurokinin-1 receptor expressing nucleus tractus solitarius neurons precludes somatosensory depression of arterial baroreceptor-heart rate reflex

Potts JT, Fong AY, Anguelov PI, Lee S, McGovern D, Grias I

Neuroscience Feb 8, 2007 [ePub].

Previous work by these authors examined the role of substance P in arterial baroreflex. Here, 1.5 ng bilateral injections of SP-SAP (Cat. #IT-07) into the caudal nucleus tractus solitarius of rats were used to further elucidate the fundamental role of substance P in this system. The depressive effect of somatosensory input by neurokinin-1 receptor-expressing neurons on arterial baroreceptor-heart rate reflex was abolished in lesioned animals. (see Cover Story.)

Selective cholinergic depletion of the hippocampus spares both behaviorally induced Arc transcription and spatial learning and memory

Fletcher BR, Baxter MG, Guzowski JF, Shapiro ML, Rapp PR

Hippocampus 17 (3):227-234, 2007.

The immediate early gene Arc is required for long-term synaptic changes and memory consolidation. The authors lesioned the fornix to examine cholinergic contributions of the medial septum and the vertical diagonal band to spatial learning impairments and behavioral induction of Arc transcription. 0.24-0.36 μ g of 192-IgG-SAP (Cat. #IT-01) was delivered to the fornix of rats. Results from various water-maze tasks indicate that spatial learning deficits and impaired Arc transcription associated with lesions of the fornix are not caused by cholinergic deafferentation.

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