Targeting Topics: Recent Scientific References

Summarized by Matthew Kohls

Focal Inhibitory Interneuron Loss and Principal Cell Hyperexcitability in the Rat Hippocampus After Microinjection of a Neurotoxic Conjugate of Saporin and a Peptidase-Resistant Analog of Substance P

Martin JL, Sloviter RS
Journal Comp Neurol 436:127-152, 2001.

The authors used SSP-SAP (0.4 ng/10 nl; Cat. #IT-11). See Cover Story.

Selective Cholinergic Denervation Inhibits Expression of Long-Term Potentiation in the Adult but not Infant Rat Hippocampus

Motooka Y, Kondoh T, Nomura T, Tamaki N, Tozaki H, Kanno T, Nishizaki T
Devel Brain Res 129:119-123, 2001.

The authors studied the possible role of cholinergic systems in long-term potentiation (LTP), which is one of the most intensively studied models of learning and memory. 192-Saporin (4.2 µg/5 µl, Cat. #IT-01) injections were made in both infant and adult rats and the probability of LTP development was studied in hippocampal slices from animals treated 2 weeks or 2 months before. Cholinergic denervation by 192-Saporin did not affect LTP expression in the infant brain, however, the results strongly suggest that cholinergic systems in the adult brain participate in an LTP pathway.

Effects of Hypocretin-Saporin Injections into the Medial Septum on Sleep and Hippocampal Theta

Gerashchenko D, Salin-Pascual R, Shiromani PJ
Brain Res 913:106-115, 2000.

Hypocretin, also known as orexin, neurons are located only in the lateral hypothalamus. Recently, the loss of these neurons was shown to be associated with narcolepsy. The authors used orexin-SAP (100 ng/0.5 µl; Cat. #IT-20) to eliminate parvalbumin and cholinergic neurons (orexin B receptor-expressing) in the rat medial septum. They used 192-Saporin (1 µg/ 1 µl; Cat. #IT-01) to contrast the effect and eliminate only cholinergic neurons (NGF/p75 receptor-expressing). Hippocampal theta activity was completely eliminated in orexin-SAP treated rats by day 12, suggesting that orexin neurons influence cognitive processes critical for survival.

Transneuronal Tracing from Sympathectomized Lumbar Epaxial Muscle in Female Rats

Daniels D, Miselis RR, Flanagan-Cato LM
J Neurobiol 48(4):278-290, 2001.

The authors use pseudorabies virus (PRV) to study central neural networks such as the one controlling the lordosis reflex (increased curvature of the spine). To aid in the separation of the sympathetic nervous system and higher order systems, rats were treated with lumbar injections of anti-DBH-SAP (156 ng to 5 µg; Cat. #IT-03), then labeled with PRV. PRV labeling in the brain was absent in areas associated with vasomotor tone, but persisted in areas implicated in control of the lordosis response.

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Hippocampal Sympathetic Ingrowth Occurs Following 192-IgG-Saporin Administration

Harrell LE, Parsons D, Kolasa K
Brain Res 911:158-162, 2001.

Electrolytic lesions of the medial septal region in rats cause peripheral sympathetic fibers from the superior cervical ganglia to grow into the cholinergically-denervated areas of the hippocampus. This lesioning method is non-specific and disrupts several other cell types in the area of the lesion. The authors infused 192-Saporin (1 µg/10 µl saline into medial septum; Cat. #IT-01) to eliminate only the cholinergic neurons, leaving other cell types intact. Hippocampal sympathetic ingrowth still occurs when only the cholinergic neurons are eliminated, indicating that this occurrence is in response to the loss of cholinergic projections from the medial septum.

Selective Antibody-Induced Cholinergic Cell and Synapse Loss Produce Sustained Hippocampal and Cortical Hypometabolism with Correlated Cognitive Deficits

Browne SE, Lin L, Mattsson A, Georgievska B, Isacson O
Exp Neurol 170:36-47, 2001.

The authors used 192-Saporin (two 2.5-µg bilateral injections of 1 µg/µl; Cat. #IT-01) to eliminate cholinergic neurons in the rat, then measured cerebral rates of glucose utilization. The findings show sustained reduction in glucose utilization in the brain regions showing loss of cholinergic neurons, specifically the frontal cortical and hippocampal regions. These same animals demonstrated impaired performance in a Morris water maze. The results reinforce the theory that cholinergic systems influence metabolism and cognition in the cortex and hippocampus.

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