

# Targeting Topics: Recent Scientific References

Reviewed by **Matthew Kohls**

## Photostimulation of retrotrapezoid nucleus phox2b-expressing neurons in vivo produces long-lasting activation of breathing in rats

Abbott SB, Stormetta RL, Fortuna MG, Depuy SD, West GH, Harris TE, Guyenet PG *J Neurosci* 29(18):5806-5819, 2009.

The retrotrapezoid nucleus (RTN) contains a subpopulation of cells that are thought to function as central respiratory chemoreceptors. The authors used bilateral 22-ng injections of anti-DBH-SAP (Cat. #IT-03) into the lateral horn of the second thoracic segment to investigate this hypothesis. Coupled with data generated by lentivirus-driven transgenic expression of a light-activated cationic channel, it is demonstrated that noncatecholaminergic neurons in the RTN function as central respiratory chemoreceptors.

## Anti-amnesic properties of (+/-)-PPCC, a novel sigma receptor ligand, on cognitive dysfunction induced by selective cholinergic lesion in rats

Antonini V, Prezzavento O, Coradazzi M, Marrazzo A, Ronsisvalle S, Arena E, Leanza G *J Neurochem* 109(3):744-754, 2009.

Sigma-1 receptors are found throughout the central nervous system, and are thought to be a target for regenerative therapy in Alzheimer's disease. Rats received 3.0  $\mu\text{g}$  or 5.0  $\mu\text{g}$  of 192-IgG-SAP (Cat. #IT-01) injected intracerebroventricularly. The lesioned animals displayed dose-dependent deficits in water maze performance. Treatment with the sigma-1 receptor agonist ( $\pm$ )-PPCC significantly improved both reference and working memory performance in treated animals, indicating that ( $\pm$ )-PPCC-mediated positive effects are probably a function of the sigma-1 receptor.

## Cholinergic deafferentation of the neocortex using 192 IgG-saporin impairs feature binding in rats

Botly LC, De Rosa E *J Neurosci* 29(13):4120-4130, 2009.

It has been hypothesized that the nucleus basalis magnocellularis (NBM) is the source of cholinergic input to the neocortex that is responsible for incorporating different features of an object into a unified neural representation of said object. Rats received

0.04- $\mu\text{g}$  bilateral injections of 192-IgG-SAP (Cat. #IT-01) into the NBM. In lesioned animals modes of learning requiring feature binding were impaired, while processes not using feature binding were left intact.

## Severe Scene Learning Impairment, but Intact Recognition Memory, after Cholinergic Depletion of Inferotemporal Cortex Followed by Fornix Transection

Browning PG, Gaffan D, Croxson PL, Baxter MG *Cereb Cortex* [Epub], 2009.

In this work the authors investigated the link between connections carried by the fornix and cholinergic input to the inferotemporal cortex in scene learning. Monkeys received 56-64 0.02- $\mu\text{g}$  injections of ME20.4-SAP (Cat. #IT-15) into the inferotemporal cortex, and entorhinal cortices. There was a marked impairment in memory for lesioned animals that also received a fornix transection, indicating a synergistic interaction between connections carried by the fornix and cholinergic input to the inferotemporal cortex for episodic memory.



## Substance P neurotransmission and violent aggression: the role of tachykinin NK1 receptors in the hypothalamic attack area

Halasz J, Zelena D, Toth M, Tulogdi A, Mikics E, Haller J *Eur J Pharmacol* 611(1-3):35-43, 2009.

Stimulation of the hypothalamic attack area elicits biting attacks in rats. The authors eliminated NK1 receptor-expressing neurons in this area with bilateral 6.25-ng injections of SP-SAP (Cat. #IT-07). Violent attacks were dramatically reduced while milder

forms of aggression remained unchanged, indicating that these two forms of aggression are controlled via different pathways. Lesioned animals also displayed reduced anxiety-like behavior in the elevated plus-maze, suggesting a connection between the hypothalamic attack area and brain areas controlling anxiety.

## Partial ablation of mu-opioid receptor rich striosomes produces deficits on a motor-skill learning task

Lawhorn C, Smith DM, Brown LL *Neuroscience* [Epub], 2009.

The functional role of basal ganglia striosomes is not well understood. In order to examine these cells in the context of motor behavior the authors injected 8.5 ng of dermorphin-SAP (Cat. #IT-12) into several areas of the striatum of mice (saporin, Cat. #PR-01, was used as a control). The animals were then evaluated in complex motor tasks involving the use of striatal circuitry. Animals receiving dermorphin-SAP showed deficits in specific motor tasks corresponding to the extent of the lesion.

## Targeted ablation of cardiac sympathetic neurons reduces resting, reflex and exercise-induced sympathetic activation in conscious rats

Lujan HL, Palani G, Chen Y, Peduzzi JD, Dicarlo SE *Am J Physiol Heart Circ Physiol* 296(5):H1305-1311, 2009.

Excessive sympathetic activity contributes to most cardiovascular diseases. Thoracic sympathectomy is a non-specific treatment that can alleviate some sympathetic activity, but produces undesirable side effects. The authors lesioned a subset of sympathetic preganglionic neurons with 10  $\mu\text{g}$  of CTB-SAP (Cat. #IT-14) into the left and right stellate ganglion of rats. Treated animals displayed several types of reduced cardiac sympathetic neuronal activity indicating that this may be a useful approach for treating these types of conditions.

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