Targeting Topics: Recent Scientific References

Reviewed by Matthew Kohls

Targeted toxins in pain.

Wiley RG, Lappi DA
Adv Drug Deliv Rev 55(8):1043-1054, 2003

The authors discuss the use of 'molecular neurosurgery' in the study of nociception. Applications using targeted toxins, which include immunotoxins, protein-toxin conjugates, or peptide-toxin conjugates, are illustrated. The authors describe the use of these molecules as research tools, as well as their potential for therapeutics. A helpful table is included that lists neuronal surface markers and class of cells targeted for each targeted toxin. Reagents discussed: CTB-SAP (Cat. #IT-14), IB4-SAP (Cat. #IT-10), OX7-SAP (Cat. #IT-02), 192-Saporin (Cat. #IT-01), ME20.4-SAP (Cat. #IT-15), Anti-DBH-SAP (Cat. #IT-03), Anti-DAT-SAP (Cat. #IT-25), SP-SAP (Cat. #IT-07), Dermorphin-SAP (Cat. #IT-12), Orexin-SAP (Cat. #IT-20), CRF-SAP (Cat. #IT-13), and acetylated LDL-SAP (Cat. #IT-08).

Neurokinin-1 receptor-expressing neurons in the amygdala modulate morphine reward and anxiety behaviors in the mouse.

Gadd CA, Murtra P, De Felipe C, Hunt SP
J Neurosci 23(23):8271-8280, 2003

Mice lacking the neurokinin-1 (NK-1) receptor are insensitive to opiates in models of drug abuse. To assess what areas of the brain may be involved in this process, the authors used 1.0-µl injections of 1.0 µM SP-SAP (Cat. #IT-07) to eliminate NK-1 receptor-positive neurons in the nucleus accumbens, dorsomedial caudate putamen or amygdala of mice. Only mice with amygdala lesions displayed behavior comparable to NK-1 receptor knockout mice--increase in anxiety-like behavior, reduction in stimulant effect of morphine. These data suggest that the amygdala plays an important role in anxiety behaviors and the response to opiates.

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Role of subplate neurons in functional maturation of visual cortical columns.

Kanold PO, Kara P, Reid RC, Shatz CJ
Science 301(5632):521-525, 2003

Subplate neurons play a role in the development of connections between the thalamus and cerebral cortex. The authors used 0.5-µl injections of 0.25-1.0 mg/ml of ME20.4-SAP (Cat. #IT-15) to eliminate p75 receptor-positive neurons in the subplate of cats to investigate whether these neurons are involved in the organization and maturation of the visual cortex. This study also uses mouse IgG-saporin (Cat. #IT-18) as a control. (see cover article “Subplate Neurons and Functional Maturation of Thalamocortical Synapses.”)

Behavioral patterns under cholinergic control during development: lessons learned from the selective immunotoxin 192 IgG saporin.

Ricceri L
Neurosci Biobehav Rev 27(4):377-384, 2003

The author reviews the effects of 192-Saporin (Cat. #IT-01) neonatal lesions (0.42 µg in each hemisphere) on the cholinergic basal forebrain system in rats. Short-term effects are seen in pups in learning tasks, as well as ultrasound vocalizations. Longer term effects are seen in task-specific behaviors. Data suggest that the extent of these effects are linked to the attentional load of the task. The age of the animal when lesioned may also play a role in the extent of the deficits caused by 192-Saporin; studies show that early in the first week of life is a particularly vulnerable period.

Subtypes of substance P receptor immunoreactive interneurons in the rat basolateral amygdala.

Levita L, Mania I, Rainnie DG
Brain Res 981(1-2):41-51, 2003

SP-SAP (Cat. #IT-07) has been used to lesion substance P receptor (SPr)-expressing neurons in the basolateral amygdala (BLA), but the interneuron subgroups targeted by SP-SAP in the BLA have not yet been defined. The authors used dual-labeling immunofluorescence to examine SPr colocalization with calbindin-D28K, parvalbumin, calretinin, somatostatin, and neuropeptide Y (NPY). All neurons in the BLA that express NPY also express the SPr and therefore SP-SAP, which specifically eliminates SP receptor-positive neurons is a useful tool to study the role of NPY in the BLA.

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