Targeting Topics: Recent Scientific References

Summarized by Matthew Kohls

Impaired acquisition of a Morris water maze task following selective destruction of cerebellar Purkinje cells with OX7-saporin.

Gandhi CC, Kelly RM, Wiley RG, Walsh TJ.
Behav Brain Res 109(1):37-47, 2000.

The cerebellum has been associated with the control of motor activity and voluntary movements. Recent data have shown the cerebellum may also play a role in "higher order" processes such as learning, language, and cognition. Using 2 µg OX7-SAP (Catalog #IT-02) by i.c.v.. injection, Gandhi *et al*. selectively eliminated Purkinje cells in rat cerebellum in order to examine the ability of treated animals to complete a water maze task. Elimination of these cells significantly impaired the ability of the rats to complete the task, suggesting the cerebellum is involved in learning.

Ectopic noradrenergic hyperinnervation does not functionally compensate for neonatal forebrain acetylcholine lesion.

Pappas BA, Nguyen T, Brownlee B, Tanasoiu D, Fortin T, Sherren N.
Brain Res 867(1-2):90-99, 2000.

Removal of cholinergic forebrain neurons in the neonatal rat causes an ingrowth of hippocampal material to the affected area. The behavioral effect of this treatment increases working, but not reference memory errors on the radial arm maze. Pappas *et al*. used 300 ng 192-Saporin (Catalog #IT-01) by i.c.v. injection to lesion the forebrain of 1- to 3-day old rats coupled with a 6-OHDA lesion to remove hippocampal ingrowths in order to investigate whether these neurons can compensate for cholinergic function in memory. Their results indicate noradrenergic neurons from the hippocampus do not functionally compensate for loss of CBF neurons even though losses of these neurons did not drastically affect the behavior of these animals.

NGF-mediated alteration of NF-κB binding activity after partial immunolesions to rat cholinergic basal forebrain neurons.

Gu Z, Toliver-Kinsky T, Glasgow J, Werrbach-Perez K, Perez-Polo JR.
Intl J Dev Neurosci 18(4-5):455-468, 2000.

After injecting 1.3 µg 192-Saporin (Catalog #IT-01) into the lateral ventricle of rat brain, followed by infusion of NGF antibody, Gu *et al*. report changes in the activity of the transcription factor NF-κB. Aged rodent brains show an increase in NF-κB activity. This model creates a tool to investigate decreased cholinergic function that is often associated with memory loss and cognitive deficits in the elderly and particularly in patients with Alzheimer's disease.

Preferential destruction of cerebellar Purkinje cells by OX7-saporin.

Angner RT, Kelly RM, Wiley RG, Walsh TJ, Reuhl KR.
Neurotoxicology 21(3):395-403, 2000.

Purkinje cells function as inhibitors and are the sole output of the cerebellar cortex. Angner *et al*. eliminate these cells in rats with 1-2 µg OX7-SAP (Catalog #IT-02), an immunotoxin that binds the Thy 1.1 antigen. The treated rats show effects of loss of inhibitory control, including a time-dependent increase in motor activity and decreased motor coordination.

Sustained visual attention performance-associated prefrontal neuronal activity: evidence for cholinergic modulation.

Gill TM, Sarter M, Givens B.
J Neurosci 20(12):4745-4757, 2000.

Preliminary evidence suggests that demands on attention levels are associated with changes in levels of cortical acetylcholine. Gill *et al.* used .05 µg 192-Saporin (Catalog #IT-01) by intracortical infusion to demonstrate the role cholinergic neurons play in the ability of rats to pay attention. The researchers monitored medial prefrontal cortex (MPC) activity in the rat brain before and after elimination of cholinergic neurons with 192-Saporin. The results suggest that the cholinergic inputs to the MPC influence the increases of neuronal activity associated with paying attention.

Immunolocalization of the cocaine- and antidepressant-sensitive 1-norepinephrine transporter.

Schroeter S, Apparsundaram S, Wiley RG, Miner LH, Sesack SR, Blakely RD.
J Comp Neurol 420(2):211-232, 2000.

Norepinephrine transporters are involved in the response to multiple antidepressants and psychostimulants, but the expression of these proteins has not yet been characterized in the central nervous system. Schroeter *et al*. used an antibody to a cytoplasmic epitope of norepinephrine transporters to map the transporters to noradrenergic neuronal somata, axons, and dendrites. To verify the specificity of the antibody the researchers injected 10 µg of anti-DBH-SAP (Catalog #IT-03) in the left lateral ventricle of rats to destroy the noradrenergic neurons, confirming the specificity of the norepinephrine transporter antibody. Treatment with anti-DBH-SAP completely removed norepinephrine transporter immunoreactivity.

(continued on page 4)