Targeting Topics: Recent Scientific References

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Rat Basal Forebrain Cholinergic Lesion Affects Neuronal Nitric Oxide Synthase Activity in Hippocampal and Neocortical Target Regions

Hartlage-Rübsamen M, Schliebs R
Brain Res 889(1-2):155-164, 2001.

Nitric oxide (NO) mediates a variety of mechanisms in the brain including cortical perfusion, learning and memory, and neuronal plasticity. Cholinergic dysfunction has been associated with some of these same processes, notably reduced cortical cerebral blood flow and impaired performance in learning and memory tasks. The authors use a single intracerebroventricular injection of 192-Saporin (2.8 µg; Cat. # IT-01) to deplete the cholinergic neurons of the basal forebrain. Although total cortical neuronal NO synthase levels are not affected, the activity levels in select neocortical hippocampal neurons are reduced. The data suggest the ratio of catalytically active and inactive cortical NO synthase may be driven in part by basal cholinergic forebrain input.

Behavioural, Histological and Immunocytochemical Consequences Following 192 IgG-Saporin Immunolesions of the Basal Forebrain Cholinergic System

Perry T, Hodges H, Gray JA
Brain Res Bull 54(1):29-48, 2001.

192-Saporin (Cat. # IT-01) has been used extensively as a model for Alzheimer's Disease. The neuronal deficits caused by intraparenchymal forebrain injections (0.3-0.51 µg/µl) are apparent during tasks demanding attentional processing, but not standard tasks of learning and memory. Perry *et al.* compare the testing strategies for each deficit. They find that the water maze may not demand enough attentional processing to demonstrate deficits caused by this lesion. The authors also study long-term effects of 192-Saporin in rats. Although the authors produced very useful data at five to six months, they found evidence of an inflammatory response and non-specific cell death eleven months post treatment, indicating 192-Saporin may be problematic for very long-term experiments.

Septal Cholinergic Neurons Suppress Seizure Development in Hippocampal Kindling in Rats: Comparison with Noradrenergic Neurons

Ferencz I, Leanza G, Nonobashvili A, Kokaia Z, Kokaia M, Lindvall O
Neurosci 102(4): 819-832, 2001.

Kindling can be caused in rats by lesioning forebrain cholinergic or noradrenergic projections. Ferencz *et al.* utilize 192-Saporin (2.5 µg; Cat. # IT-01) to lesion forebrain cholinergic neurons and 6-hydroxydopamine to lesion noradrenergic neurons, administering both compounds by intraventricular injection. Upon comparing various aspects of hippocampal kindling, the authors determine that while both noradrenergic and cholinergic projections to the forebrain exert inhibitory effects, the cholinergic effect is less pronounced and occurs prior to seizure generalization.

Toxin-Induced Death of Neurotrophin-Sensitive Neurons (Review)

Wiley RG
Meth Mol Biol 169(1-2):217-222, 2001.

Wiley discusses some of the specifics of using 192-Saporin (Cat. #IT-01) to eliminate cells expressing the rat p75 low-affinity nerve growth factor receptor. Wiley also describes the sequence of events following treatment with 192-Saporin from binding of the immunotoxin through ribosomal inactivation and cell death. Methods of handling the immunotoxin and injection are also addressed.

Model for Aging in the Basal Forebrain Cholinergic System (Review)

Gu Z, Wortwein G, Yu J, Perez-Polo JR
Antiox Redox Signal 2(3):437-447, 2000.

A wide range of evidence indicates that cholinergic neurons play a role in memory and learning. Loss of these neurons is seen both in aged subjects and Alzheimer's Disease patients. The authors discuss the use of 192-Saporin (Cat. #IT-01) to model this phenomenon. Many lesioning methods have been developed, including fimbria-fornix transections, mechanical lesions with radiofrequency or electrolysis, and intracerebral injections of excitotoxins. Information obtained through these methods suffers because non-cholinergic neurons are depleted as well as the desired cholinergic neurons. 192-Saporin provides a solution by specifically targeting and eliminating cholinergic neurons expressing p75 in the basal forebrain, closely mimicking a key component of aging.

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