Targeting Topics: Recent Scientific References

Reviewed by Matthew Kohls

Neurotrophic factors rescue basal forebrain cholinergic neurons and improveperformance on a spatial learning test.

Lee YS, Danandeh A, Baratta J, Lin CY, Yu J, Robertson RT.

Exp Neurol Epub2013.

It is thought that therapeutic treatments of the cholinergic system may be a viable treatment for Alzheimer's disease. In order to examine this hypothesis the authors administered a total of 160 ng of 192-IgG-SAP (Cat. #IT-01) in the form of bilateral injections into the medial septum. The lesioned animals then received 4-week infusions of nerve growth factor, neurotrophin 3, or both into the lateral ventricles. Animals treated with any neurotrophin, either alone or as a combination, retained more ChAT-positive neurons and performed better on a delayed match-to-position task than control animals. The data strengthen the theory that exogenous neurotrophic factors ameliorate the effects of Alzheimer's disease.

Neurotrophin receptor p75 mediates the uptake of the amyloid beta (Abeta) peptide, guiding it to lysosomes for degradation in basal forebrain cholinergic neurons.

Ovsepian SV, Antyborzec I, O'Leary VB, Zaborszky L, Herms J, Oliver Dolly J.

Brain Struct Funct Epub2013.

Accumulation of β-amyloid in the brain is considered one of the main causes of Alzheimer's disease. The increase in β-amyloid is accompanied by a reduction in levels of the high affinity nerve growth factor receptor (trkA) and cognitive impairment. The authors looked at levels of the low affinity nerve growth factor receptor (p75) that do not decline. Using a 0.8-µg injection of 192-Cy3 (Cat. #FL-01) into the medial prefrontal cortex of rats the authors assessed the transport of p75 and β-amyloid by microscopy. The results indicate that the primary destinations of both p75 and β-amyloid were the late endosome and lysosome.

P2Y1 receptors expressed by C1 neurons determine peripheral chemoreceptor modulation of breathing, sympathetic activity, and blood pressure.

Wenker IC, Sobrinho CR, Takakura AC, Mulkey DK, Moreira TS.

Hypertension 62(2):263-273, 2013.

Peripheral chemoreceptor activation response is mediated by catecholaminergic C1 cells in the rostral ventrolateral medulla (RVLM). The authors investigated the molecular mechanisms linking this drive to increased sympathetic activity and hypertension through a variety of methods, including lesioning C1 cells in the RVLM. Rats received 4.2-ng bilateral injections of Anti-DBH-SAP (Cat. #IT-03) into the RVLM. Comparison of lesioned animals to controls demonstrated that P2Y1 receptors on C1 cells in the RVLM are key components in the regulation of breathing, sympathetic nerve activity, and blood pressure.

GABAergic Terminals Are a Source of Galanin to Modulate Cholinergic Neuron Development in the Neonatal Forebrain.

Keimpema E, Zheng K, Barde SS, Berghuis P, Dobszay MB, Schnell R, Mulder J, Luiten PG, Xu ZD, Runesson J, Langel U, Lu B, Hokfelt T, Harkany T.

Cereb Cortex Epub2013.

In this work the authors sought to clarify the role of galanin during brain development. Several different techniques were used including the use of Galanin-SAP (Cat. #IT-34) on primary cell cultures from the fetal forebrains of rats. Cultured basal forebrain neurons were exposed to 5 ng/ml of Galanin-SAP for 8 hours, and cell death was assessed after 72 hours. Cholinergic cells were killed by Galanin-SAP, indicating that these neurons can use extracellular galanin-2 receptors to facilitate development.

Medial Septal Cholinergic Neurons Modulate Isoflurane Anesthesia.

Tai SK, Ma J, Leung LS.

Anesthesiology Epub2013.

General anesthesia is associated with a decrease in cholinergic function. This work examines the effect of volatile anesthetics such as isoflurane or ketamine in the context of cholinergic depletion. Rats received 105-ng bilateral injections of 192-IgG-SAP (Cat. #IT-01) into the medial septum. Anesthetic effects were evaluated using a loss of righting reflex test. There was no difference between lesioned and control groups in the response to ketamine. When treated with isoflurane, lesioned animals were affected for longer periods of time, and hippocampal response was reduced. The results suggest a role for septal cholinergic neurons in the sensitivity to isoflurane.

Epitopes of the Highly Immunogenic Trichomonas vaginalis alpha-Actinin Are Serodiagnostic Targets for Both Women and Men.

Neace CJ, Alderete JF.

J Clin Microbiol 51(8):2483-2490, 2013.

Trichomonas vaginalis is an anaerobic protozoan that is the most common nonviral causative agent for sexually-transmitted infections. The presence of T. vaginalis in men is usually asymptomatic, making it difficult to assess exposure to the organism. The authors examined sera from exposed individuals for reactivity to specific epitopes of trichomonad α-actinin. A recombinant version of trichonomad α-actinin was constructed and detected using Anti-6His (Cat. #AB-213). Some epitopes were reactive with sera from both men and women, making them potential diagnostic targets.

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