

# Targeting Topics: Recent Scientific References

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significant increase in mechanical hypersensitivity, and a smaller increase in thermal hypersensitivity. This and other results suggest that spinally projecting noradrenergic pathways are necessary for normal recovery from surgical incision, and possibly other types of pain.

## Denervation of the Lacrimal Gland Leads to Corneal Hypoalgesia in a Novel Rat Model of Aqueous Dry Eye Disease.

Aicher SA, Hermes SM, Hegarty DM

*Invest Ophthalmol Vis Sci* 56(11): 6981-6989, 2015.

One result of functional disruption of the tear gland is dry eye disease (DED), which represents a group of disorders rather than a singular one. DED manifests itself in altered responses to noxious corneal stimulation, but many of these patients do not actually have dry eyes or tear gland dysfunction. In order to investigate what circuits are involved in DED the authors created two models, one of which used the ablation of p75 receptor-expressing neurons innervating the extraorbital lacrimal gland. Rats received 2.5 µg of 192-IgG-SAP (Cat. #IT-01) directly into the left extraorbital lacrimal gland. Tear production in the lesioned animals was normal, and responses to noxious cold stimuli were impaired. This accompanied by unchanged fiber density indicates that the nociceptive signaling was affected on a molecular level.

## Cholinergic deafferentation of the hippocampus causes non-temporally graded retrograde amnesia in an odor discrimination task.

Koppen JR, Stuebing SL, Sieg ML, Blackwell AA, Blankenship PA, Cheatwood JL, Wallace DG

*Behav Brain Res* 299: 97-104, 2015.

The memory impairments experienced in neurodegenerative disorders such as Alzheimer's disease have been well documented. One theory attributes these impairments to the loss of cholinergic basal forebrain neurons, a hallmark of Alzheimer's disease. Some patients experience a retrograde amnesia, in which older memories are relatively stable and more recent memories are frequently lost. The temporal relationship of memories to disease onset



has not been definitively established. In this work the authors administered either 150 ng or 200 ng of 192-IgG-SAP (Cat. #IT-01) into the medial septum of rats. Using a string-pulling task, a model for temporal learning was established. The results indicate that cholinergic projections originating in the medial septum are involved in long-term memory retrieval, and that loss of these neurons does not create a temporal type of amnesia.

## Selective inhibition of dopamine-beta-hydroxylase enhances dopamine release from noradrenergic terminals in the medial prefrontal cortex.

Devoto P, Flore G, Saba P, Frau R, Gessa GL  
*Brain Behav* 5(10): e00393, 2015.

Dopamine-beta-hydroxylase (DBH) is a neuronal enzyme that is a potential target for the treatment of cocaine abuse, alcohol dependence, and eating disorders. Here the authors administered 5 µg of icv Anti-DBH-SAP (Cat. #IT-03) to rats, and assessed the effect of the dopaminergic lesion on levels of extracellular dopamine. Mouse IgG-SAP (Cat. #IT-18) and saporin (Cat. #PR-01) were used as controls. Extracellular levels of dopamine were significantly increased in both lesioned animals and those treated with the DBH inhibitor nopicastat. Clonidine could reverse the nopicastat effect, but not the effect of Anti-DBH-SAP treatment. The data demonstrate a mechanism for the synergistic effect of cocaine on nopicastat-induced dopamine release.

## Treatment Efficacy of NGF Nanoparticles Combining Neural Stem Cell Transplantation on Alzheimer's Disease Model Rats.

Chen Y, Pan C, Xuan A, Xu L, Bao G, Liu F, Fang J, Long D

*Med Sci Monit* 21: 3608-3615, 2015.

NSC (neural stem cell) transplants into animals have been shown to compensate for the loss of cholinergic cells in the basal

forebrain, a hallmark of Alzheimer's disease. One hurdle to overcome is the actuation of NSC differentiation into the specific replacement cells needed. In this work the authors administered 5 µL of icv 192-IgG-SAP (Cat. #IT-01) to rats, followed by a graft of NSCs in the presence of NGF nanoparticles with a polymer coating. Rats receiving both NSCs and NGF nanoparticles showed significantly improved memory and learning functions as compared to control animals.

## Basal Forebrain Cholinergic Deficits Reduce Glucose Metabolism and Function of Cholinergic and GABAergic Systems in the Cingulate Cortex.

Jeong da U, Oh JH, Lee JE, Lee J, Cho ZH, Chang JW, Chang WS

*Yonsei Med J* Jan;57(1):165-72, 2016.

A common result of cholinergic neuron loss in the hippocampus and cortical regions due to Alzheimer's disease is a reduction in glucose metabolism. The authors examine the interaction between the cell loss and metabolic changes. Rats received 5-µg bilateral cortical injections of 192-IgG-SAP (Cat. #IT-01), were subject to water maze testing, and analyzed by 18F-2-fluoro-2-deoxyglucose positron emission tomography. Lesioned animals displayed decreased learning performance and reduced metabolic activity in the cingulate cortex.

## Method for Confirming Cytoplasmic Delivery of RNA Aptamers.

Dickey DD, Thomas GS, Dassic JP, Giangrande PH

*Methods Mol Biol* 1364: 209-217, 2016.

In this work the authors describe a protocol involving combining biotinylated aptamers and Streptavidin-ZAP (Cat. #IT-27) at a 4:1 molar ratio, then testing the conjugates in an *in vitro* cytotoxicity assay. FGF-SAP (Cat. IT-38) was used as a control. This is a method to confirm delivery of a payload by RNA aptamers to the cytoplasm of cells.

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