Targeting Topics: Recent Scientific References

Reviewed by Matthew Kohls

Phox2b-expressing neurons of the parafacial region regulate breathing rate, inspiration, and expiration in conscious rats.

Abbott SB, Stornetta RL, Coates MB, Guyenet PG.
J Neurosci 31(45):16410-16422, 2011.

Neurons in the retrotrapezoid nucleus (RTN) are involved in the CO_2-dependent control of breathing in conscious and anesthetized rats. In this work the authors specifically examined Phox2b-expressing glutaminergic neurons in the RTN. Rats received 44 ng of anti-DBH-SAP (Cat. #IT-03) into the lateral horn of the second thoracic segment in order to eliminate C1 neurons that project to the spinal cord. The data demonstrate regulation of lung ventilation by RTN-Phox2b neurons, and also that these neurons are not rhythmogenic in adults.

MAP kinases couple hindbrain-derived catecholamine signals to hypothalamic adrenocortical control mechanisms during glycemia-related challenges.

Khan AM KKL, Sanchez-Watts, Ponzio TA, Kuzmiski JB, Bains JS, Watts AG.
J Neurosci 31(50):18479-18491, 2011.

This work uses *in vivo* and *ex vivo* techniques to clarify how hypothalamic afferent pathways use intracellular mechanisms to modulate glycemia-related adrenocortical responses. Rats received 42-ng injections of anti-DBH-SAP (Cat. #IT-03) into the paraventricular nucleus of the hypothalamus. Mouse IgG-SAP (Cat. #IT-18) was used as a control. The results establish a relationship between neurons from nutrient-sensing regions and intracellular mechanisms in hypothalamic corticotropin-releasing hormone neuroendocrine neurons.

Cholinergic Control in Developing Prefrontal-Hippocampal Networks.

Janiesch PC, Kruger HS, Poschel B, Hanganu-Opatz IL.
J Neurosci 31(49):17955-17970, 2011.

In this work the authors examined the role of acetylcholine in the maturation of cognitive processing due to oscillatory rhythms entraining neuronal networks. Rats received 50 ng of 192-IgG-SAP (Cat. #IT-01) into each lateral ventricle, or 25 ng directly into the medial septum. Among other results, cholinergic input was shown to reach the prefrontal cortex toward the end of the first postnatal week, initially targeting GABAergic neurons. Reduction of this activity by lesioning cholinergic neurons may cause global diminishment of neocortical activity.

Unidirectional Cross-Activation of GRPR by MOR1D Uncouples Itch and Analgesia Induced by Opioids.

Liu XY, Liu ZC, Sun YG, Ross M, Kim S, Tsai FF, Li QF, Jeffry J, Kim JY, Loh HH, Chen ZF.
Cell 147(2):447-458, 2011.

Recent work has begun to define the different pathways used by itch and pain. This study was designed to investigate whether opioids cause the itch sensation by gastrin-releasing peptide receptor activation. Mice received intrathecal injections of bombesin-SAP (Cat. #IT-40) in order to investigate the coexpression of various signaling molecules in the spinal cord. Blank-SAP (Cat. #IT-21) was used as a control. The data suggest that opioid-induced itch is independent of opioid analgesia, and is controlled through a mu-opioid receptor isoform.

Minireview: The value of looking backward: the essential role of the hindbrain in counterregulatory responses to glucose deficit.

Ritter S, Li AJ, Wang Q, Dinh TT.
Endocrinology 152(11):4019-4032, 2011.

This review examines work addressing how particular glucose-sensing cells function in glucoregulation under specific physiological or pathological conditions. There are specific populations of norepinephrine (NE) and epinephrine (E) neurons in the hindbrain that mediate these responses. The use of anti-DBH-SAP (Cat. #IT-03) to eliminate selective NE/E subgroups without disrupting basic functions is discussed.

Recognition of novel objects and their location in rats with selective cholinergic lesion of the medial septum.

Cai L, Gibbs RB, Johnson DA.
Neurosci Lett Epub2011.

This work examined object recognition and object location recognition as specific components of memory. Rats received 0.22 µg of 192-IgG-SAP (Cat. #IT-01) infused into the medial septum followed by testing in novel object recognition (NOR) and object location recognition (OLR) models. Substantial

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