

IN BRIEF

NEUROTRANSMISSION

Ectopic vesicular neurotransmitter release along sensory axons mediates neurovascular coupling via glial calcium signaling

Thyssen, A. *et al. Proc. Natl Acad. Sci. USA* **107**, 15258–15263 (2010)

Neurotransmitter release can occur along axons, but the mechanisms of such ectopic release were not known. Here, the authors showed that stimulation of olfactory receptor axons induced ATP and glutamate release from vesicles. Axonal release was dependent on Ca^{2+} influx. It also caused Ca^{2+} increases in glial cells that are closely associated with the neurons, which led to vasoconstriction in adjacent blood vessels, indicating that these cells mediate neurovascular coupling.

MOTOR SYSTEM

The spinal substrate of the suppression of action during action observation

Stamos, A. V., Savaki, H. E. & Raos, V. J. *Neurosci.* **30**, 11605–11611 (2010)

In monkeys, action execution and action observation induce activity in neurons in cortical areas, including the motor cortex. To investigate whether action observation also activates downstream components of the motor system, the authors measured local metabolic activity in monkeys that were observing or executing a grasping action. Action observation and execution induced a bilateral decrease and an ipsilateral increase, respectively, in glucose use in the spinal cord segments containing the motoneurons that innervate the forelimb. Action observation might suppress spinal cord activity to prevent the observer from executing observed actions.

METABOLISM

AgRP neurons mediate Sirt1's action on the melanocortin system and energy balance: roles for Sirt1 in neuronal firing and synaptic plasticity

Dietrich, M. O. *et al. J. Neurosci.* **30**, 11815–11825 (2010)

Sirtuin 1 (SIRT1) has been implicated in the life-extending actions of caloric restriction. Here, the authors showed that SIRT1 inhibition alters the activity of the hypothalamic melanocortin system and, like selective knockout of *Sirt1* in hypothalamic Agouti-related protein neurons, reduced food intake. SIRT1 inhibition had no effect in mice with impaired mitochondrial redox adaptation. These findings indicate that SIRT1 acts directly on the hypothalamic system that regulates energy metabolism.

DEMENTIA

A noncompetitive BACE1 inhibitor TAK-070 ameliorates A β pathology and behavioral deficits in a mouse model of Alzheimer's disease

Fukumoto, H. *et al. J. Neurosci.* **30**, 11157–11166 (2010)

The β -site amyloid precursor protein (APP) cleaving enzyme 1 (BACE1) is a rate-limiting protease for the generation of amyloid- β peptides that cause Alzheimer's disease. Fukamoto and colleagues identified a nonpeptide, orally available BACE1 inhibitor — TAK070 — that lowered levels of soluble amyloid- β , increased levels of neurotrophic soluble APP, inhibited cerebral disposition of insoluble amyloid- β and normalized behavioural impairments when given prior to amyloid- β accumulation in a transgenic mouse model of Alzheimer's disease.