

COLLOQUIA IN MEMBRANE TRANSPORT

Venue: Medical University Vienna, Center for Physiology and Pharmacology,
Institute of Physiology, Schwarzspanierstraße 17, 1090 Vienna,
"Big Lecture Hall Physiology".

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Thursday 06.06.2013 14:00 s.t. **Tibor Harkany** (host: H. Sitte)
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"Molecular diversity of retrograde signaling at cortical synapses"

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Synaptic neurotransmission relies on precisely timed neurotransmitter release from the pre-synapse, which is followed by effective signal transduction in the postsynapse. Feedback mechanisms involving the production and release of "retrograde messengers" from the postsynapse effectively contribute to scaling presynaptic activity. Here, I will review data to show that "retrograde signaling" is increasingly appreciated as a general rule at cortical synapses. Nevertheless, the molecular identity of retrograde messengers and their metabolism are synapse specific. I will focus on dendritic glutamate and endocannabinoid release to discern vesicular (glutamate) and non-vesicular (endocannabinoid) forms of retrograde signaling, and their distinct circuit contributions. I will highlight a non-canonical role for vesicular glutamate transporter 3 (VGLUT3) in dendritic glutamate release. Moreover, I will use vesicular neurotransmitter transporters (particularly the vesicular GABA transporter) as selective markers of nerve cells, and show that recent advances in this research arena led to the development of "targeting tools" for the selective identification (labeling) or disruption (lesioning) of molecularly uniform neuronal subnetworks, allowing a fresh look at neuronal circuit assembly and functions. Finally, I will discuss the versatility of "targeting tools" developed towards vesicular neurotransmitter transporters to dissect how certain neurons might contribute to the pathogenesis of neuropsychiatric disorders.