

# Neuroscience Colloquium 2008

**Location:** Virchow-Lecture-Room, Anatomy, CCM **Date:** Tuesday, 6:15 p.m.

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**Yadin Dudai**

Department of Neurobiology, The Weizmann Institute of Science, Rehovot, Israel

## **Rapid erasure of long-term memory associations in cortex by an inhibitor of PKMzeta: The search for the weakest mnemonic link**

Memories may persist for months, years, even a life time, yet it is unclear how they are stored and retained for later use. A prevalent overall account is that memory storage is embodied in use-dependent morphological changes in synapses, but other or complementary possibilities exist, for example, that a persistent alteration in enzymatic activity maintains the use-dependent representation in the appropriate neural circuit (Crick, *Nature* 312, 101, 1984). Protein kinase Mzeta (PKMzeta), a constitutively active isosyme of PKC, might perform such role in memory storage (Pastalkova et al, *Science* 313, 1141, 2006). We have demonstrated that PKMzeta is obligatory for long-term memory in the neocortex, which is assumed to be the ultimate repository of multiple types of memory. Hence a single local application of the cell-permeable PKMzeta inhibitory peptide (ZIP) into the insular cortex of the behaving rat quickly abolishes long-term memory of taste associations, but not taste recognition (Shema et al., *Science* 317, 951, 2007). Memory can be erased that way at least 3 months after encoding. After memory items are erased, they can still be reacquired - and erased again. Our findings indicates that in neocortex, very long-term memory storage is critically dependent on ongoing activity of a protein kinase. The theoretical and practical implications of our findings will be discussed.

Supporters:

**SFB 665** "Developmental Disturbances in the Nervous System"

**GRK 1258** "The Impact of Inflammation on Nervous System Function"

**GRK 1123** "Cellular Mechanisms of Learning and Memory Consolidation in the Hippocampal Formation"

Organized by the Neuroscience Research Center – Dietmar Schmitz

Contact: [katrin.rosswog@charite.de](mailto:katrin.rosswog@charite.de)