

Publication**AMPA receptors regulate dynamic equilibrium of presynaptic terminals in mature hippocampal networks****JournalArticle (Originalarbeit in einer wissenschaftlichen Zeitschrift)****ID** 156098**Author(s)** De Paola, Vincenzo; Arber, Silvia; Caroni, Pico**Author(s) at UniBasel** [Arber, Silvia](#) ;**Year** 2003**Title** AMPA receptors regulate dynamic equilibrium of presynaptic terminals in mature hippocampal networks**Journal** Nature neuroscience**Volume** 6**Number** 5**Pages / Article-Number** 491-500**Keywords** Animals; Hippocampus/cytology/drug effects/*physiology; Mice; Transgenic; Nerve Net/cytology/drug effects/*physiology; Presynaptic Terminals/drug effects/*physiology; Receptors; AMPA/agonists/antagonists & inhibitors/*physiology

The formation and disassembly of synapses in mature neuropil could provide a substrate to encode experience in the brain. Although there is evidence for postsynaptic spine dynamics in mature systems, contributions to circuit rearrangements by presynaptic terminals have remained unclear. We used hippocampal slice cultures from mice expressing spectral variants of green fluorescent protein (GFP) that are targeted to the membrane and/or synaptic vesicles in neuronal subsets to image identified presynaptic terminals. In mature tissues with no net change in synapse numbers, subpopulations of presynaptic terminals appeared and disappeared within 1-3 days. The three terminal types established by mossy fibers had distinct properties. High-frequency stimulation increased the fraction of dynamic terminals for 1-2 days, a process mediated by activation of AMPA receptors, protein kinase A (PKA) and protein synthesis. Thus, synaptic activity can make stable presynaptic terminals become dynamic, providing a candidate mechanism to convert experience into changes in network connectivity.

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