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Distribution pattern of dendritic mRNAs for protein synthesis in cultured rat hippocampal neurons

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New protein synthesis is required for long-term enhancement of synaptic transmission, which is believed to underlie formation of memory. The protein synthesis for this respect should be synapse-specific because synaptic plasticity is synapse-specific. Recent progress showed that machinery for local protein synthesis such as ribosome, mRNA, tRNA are present in dendrites. However, the kinds of dendritic mRNAs has to be identified. In this study, it is shown that eukaryotic translation factor-1A (eEF1A) is enriched in the excitatory PSD fraction in rat forebrain. Interestingly, in situ hybridization (ISH) using digoxigenin-labeled cRNA probes showed that eEF1A mRNA is also present in dendrites. Combination of ISH and immunocytochemistry with synaptic marker proteins indicated, however, that the RNA is not located at synapses. These results suggest that dendritic mRNAs are not associated with dendritic spines the at normal culture condition.