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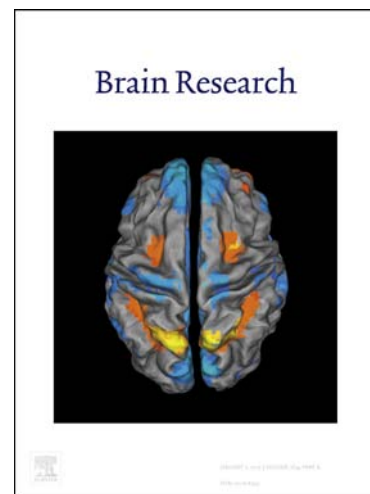
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Multisynaptic cooperation shapes single glutamatergic synapse response

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Abstract

The activity of thousands of excitatory synapse in the dendritic tree produces variations of membrane potential which, while can produce the spike generation at soma (hillock), can also influence the output of a single glutamatergic synapse. We used a model of synaptic diffusion and EPSP generation to simulate the effect of different number of active synapses on the output of a single one. Our results show that, also in subthreshold conditions, the excitatory dendritic activity can influence several parameters of the single synaptic output such as its amplitude, its time course, the NMDA-component activation and consequently phenomena like STP and LTP.

Keywords: Synaptic Model, STP, LTP, AMPA, NMDA, Glutamatergic Synapse, Dendritic activity

1. Introduction

Glutamatergic (Glut) synapses are the most powerful system of information transfer and elaboration in the brain being the 80 – 90% of the total

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