

第7回 埼玉大学脳科学セミナー

主催：埼玉大学脳科学融合研究センター

Backpropagating Spikes Enable Detection of Network Activity by Extrasynaptic N-methyl-D-aspartate Receptors.

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日時： 2009年 5月29日（金曜日）
16:00 ~ 17:00

場所： 大学会館 2階 小集会室

本セミナー修了後に簡単な懇親会を予定しております
(参加費300円、学生無料)

問い合わせ先 坂井貴文 (内線 4308)

脳科学融合研究センターは定期的に脳科学セミナーを開催します。誰でも自由に参加出来るセミナー
ですので、奮ってご参加下さい。

セミナー要旨

Glutamatergic synaptic transmission underlies the bulk of rapid excitatory signaling in the brain. Outside synapses, high-affinity N-methyl-D-aspartate receptors (NMDARs) can also sense glutamate molecules which either escape the synaptic cleft or are released extrasynaptically. However, in resting conditions these receptors are blocked by Mg^{2+} , and the extent and role of their activation is poorly understood. We show that NMDARs in dendritic shafts of hippocampal pyramidal cells contribute substantially to dendritic Ca^{2+} transients generated by backpropagating action potentials (bAPs). In contrast, NMDARs on dendritic spines show no such contribution unless glutamate uptake is blocked. Local transient rises of extracellular glutamate through two-photon spot-uncaging or synaptic activation enhance bAP-evoked Ca^{2+} entry in dendritic shafts. Our results suggest that extrasynaptic NMDARs unblocked by bAPs could act as detectors of ambient glutamate elevation and thus report excitatory activity in the local network.