

第45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

Probing integrin function in the brain: from synapses to behavior

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シニアチームリーダー

日時：2013年 7月 24日 (水曜日)
16:00 ~ 17:30

場所：理工学研究科大学院国際セミナー室
(理工学研究科棟7階)

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要 旨

Synapse adhesion proteins regulate the integrity of synaptic junction and synaptic efficacy by coordinating signaling events across the synaptic cleft. Amongst such proteins, the integrins are implicated in synapse maturation and plasticity, and memory formation. We have examined in hippocampal neurons the cellular and molecular basis for integrin function in synaptic transmission and synaptic plasticity. We have identified a requirement for the $\beta 3$ integrin subtype in controlling the abundance and composition of synaptic AMPA receptors under basal conditions and during homeostatic synaptic scaling. Furthermore, $\beta 3$ integrin and GluA2 form a complex in mouse brain. To probe the physiological function for $\beta 3$ integrin-dependent processes in the brain, we have tested if the loss of $\beta 3$ integrin affects fear-related behaviors in mice. Whereas conditioned fear responses are normal in $\beta 3$ integrin KO mice, unconditioned fear or anxiety is significantly compromised in a manner that is dependent on the expression of $\beta 3$ integrin in the ventral hippocampus. Altogether, these findings suggest a novel requirement for $\beta 3$ integrin, at a cellular level, in controlling synaptic AMPA receptors, and at a network level, in hippocampal circuits underlying anxiety.

References:

- Cingolani et al., Neuron (2008)
- Cingolani and Goda, Neuron Glia Biol (2008)
- Pozo et al., PNAS (2012)
- McGeachie et al., Eur J Neurosci (2012)