グローバル COE 特別セミナー

演者：Dr. Tiago Branco

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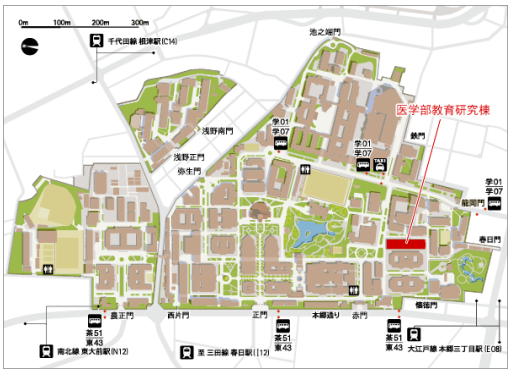
演題：Dendritic computation in cortical pyramidal cells

要旨：

Cortical pyramidal neurons receive thousands of synaptic inputs, arriving at different dendritic locations with varying degrees of temporal synchrony and in different sequences. Using electrophysiological recordings combined with two-photon glutamate uncaging, calcium imaging and compartmental modeling, we tested how different regions along single cortical dendrites integrate excitatory inputs, and whether they are sensitive to the sequence of synaptic activation. We found that basal and apical oblique dendrites have a gradient of non-linear synaptic integration, whereby proximal inputs sum linearly and require precise temporal coincidence for effective summation, whereas distal inputs are amplified with high gain and integrated over broader time windows. The mechanism involves dendritic impedance gradients and non-linear synaptic NMDA receptor activation, and also confers high sensitivity to the temporal input sequence, allowing dendrites to efficiently discriminate different sequences of synaptic activation. Pyramidal cell dendrites can thus exhibit multiple computational strategies in a single branch, and act processing compartments for detection of synaptic sequences, implementing a fundamental cortical computation.

日時：平成23年12月7日（水）14：00～15：00

場所：東京大学医学部教育研究棟2階　第1・第2セミナー室



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