살아 있는 마우스에서 시냅스, 글리아, 신경세포 칼슘의 생체내 투포톤 이미징법

김 선 광
경희대학교 한의과대학 생리학교실

In vivo two-photon imaging of synapses, glia and neuronal calcium in living mice

Sun Kwang Kim, KMD, PhD
Department of Physiology, College of Korean Medicine, Kyung Hee University

Recent advances in two-photon microscopy, fluorescence labeling techniques and genetically encoded calcium indicators have enabled us to directly record the structural and functional changes in neurons and glia, and even at synapses, in the brain of living animals. Long-term *in vivo* two-photon imaging studies have shown that some postsynaptic dendritic spines in the adult cortex are rapidly eliminated or newly generated, in response to altered sensory input or synaptic activity, resulting in experience/activity-dependent rewiring of neuronal circuits. *In vivo* two-photon Ca^{2+} imaging studies have revealed the distinct, input-specific response patterns of neurons and astrocytes in the brain. These updated *in vivo* approaches are now being widely used for the study of pathophysiological mechanisms of neurological diseases. In this talk, I will introduce my previous and ongoing works in the last decade, focusing on *in vivo* two-photon microscopy imaging of synaptic structures, glia, and neuronal calcium in living mouse brain for research in various fields of neuroscience.

Key Words: Two-photon microscopy, Synapse, Glia, Neuron, Calcium, Brain, Mice

Sun Kwang Kim, KMD, PhD
Department of Physiology, College of Korean Medicine, Kyung Hee University
E-mail: skkim77@khu.ac.kr (Tel: +82-2-961-0491)