CDB SEMINAR

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Wednesday, December 16, 2015

~~14:00~15:00~~ A7F Seminar Room **15:00~16:00 (Updated: Dec. 2)**

Two-photon imaging of subthreshold membrane potential dynamics at cellular resolution *in vivo*

Summary

Measuring subthreshold membrane potential dynamics, as well as action potentials, is essential to understand neural computation. Fluctuation of membrane potential can be recorded from single neuron *in vivo* using whole-cell or intracellular recording, but it is hard to record membrane potential dynamics from multiple cells using the conventional electrophysiological methods. Here, we used a genetically-encoded voltage indicator, ArcLight (Jin et al. Neuron, 75:779-85) for multi-cell voltage imaging *in vivo*. Simultaneous two-photon imaging and whole-cell patch-clamp recording revealed that we can detect subthreshold depolarization, called UP state using ArcLight. We successfully recorded response to visual and whisker stimulation in primary visual and somatosensory cortices at single-cell resolution without averaging. We also developed a method to image calcium and voltage simultaneously using ArcLight and red calcium indicator, R-CaMP2 (Inoue et al., Nat. Methods, 12:64-70). This two-color imaging technique could be useful for large-scale mapping of the activity of neural circuits.

Host:
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