

Development of a novel chemical tag tool for calcium imaging by near-infrared fluorescence

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Ca²⁺ plays important roles as a second messenger in a wide range of biological phenomena including neurotransmission. Near infrared (NIR) fluorescence is suitable for *in vivo* Ca²⁺ imaging because of its high tissue penetration, low light scattering, and minimal autofluorescence. Many types of NIR chemical probes have been developed but they lack selectivity for labeling of particular cell types upon multi-cell bolus loading. We developed DeQODE chemical tag system as a new chemical biology tool, in which a small-molecular QODE probe can visualize Ca²⁺ signals with NIR fluorescence selectively inside the target cells expressing DeQODE tag. In an application of our DeQODE tag system to primary cultures of rat hippocampal neurons, neurons expressing DeQODE tag were selectively labeled by QODE probe. We successfully visualized Ca²⁺ signals of the target neurons in response to electrical stimulation at 10 Hz. We will perform *ex vivo* and *in vivo* application of our chemical tag system.