

## **Microsystems for communication with a brain**

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Investigation and modulation of neural circuits in vivo at the cellular level are essential for communication with a brain. To investigate neural circuits, it is quite important to record various neural signals at multiple brain regions simultaneously. Specifically, there are two representative neural signals such as electrical signals and chemical signals. In this seminar, a multifunctional neural probe for the measurement of both signals will be introduced. Furthermore, cell-type-specific investigation of neural signals plays a key role in dissecting neural circuits. Thus, recently we developed a neural probe integrated with a photodiode which enabled the recording of fluorescence signals. We showed that the cell type-specific fluorescence signals allowed us to record cell type-specific electrophysiological signals. Also, we developed a multifunctional neural probe for accurate stimulation on the target regions of the brain, which is also essential for communication with a brain. We believe that these microsystems will play key roles in investigating and manipulating neural circuits in-vivo.