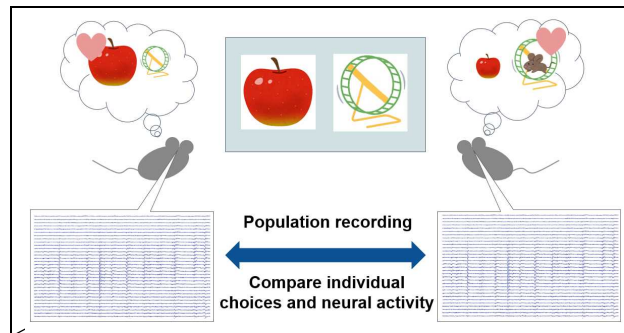


# Comprehensive understanding of subjective reward value representation in rodent brain for interindividual comparison

## Progress until FY2022

### 1. Outline of the project

We record and analyze multi-cellular neural activity from the prefrontal cortex of rats (10 rats) during task execution using high-density integrated electrodes (Neuropixels).

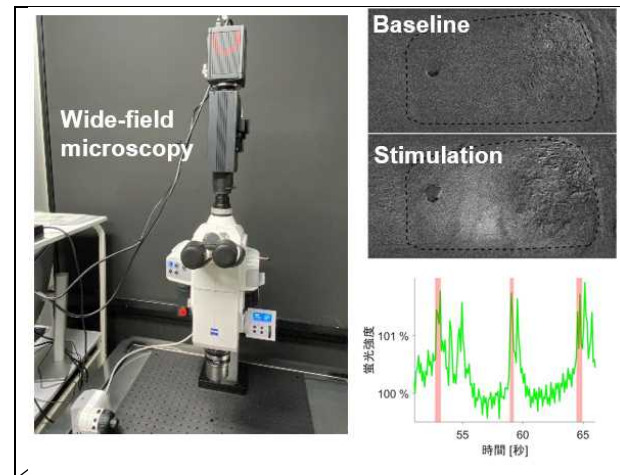


### 2. Outcome so far

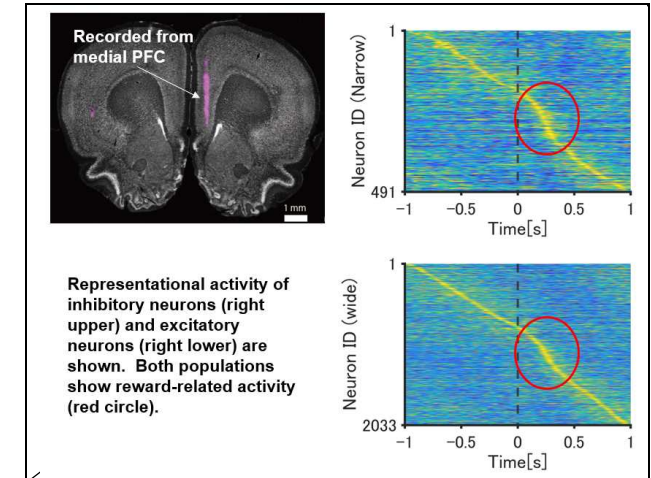
- (1) Implementation of microscopy and start of staffing and optimization of measurement
  - (a) In addition to Neuropixels for deep brain regions, we installed a wide-field microscope for measuring signals from the cerebral cortex.
  - (b) An adeno-associated virus vector expressing GCaMP6, a fluorescent protein for measuring neural activity, was injected into the cerebral cortex, and changes in the brightness of GCaMP6 were successfully measured through

an open window.

(c) A postdoctoral researcher with extensive experience in visual psychological experiments using mice, measurement experiments using optical devices, and task design for animal behavior was hired as of March 1, 2023.



- (2) Physiological data measurement on behavior and desire for reward during operant conditioning  
Neural activity from the medial prefrontal cortex was recorded during performance of the FR1 task, which is immediately rewarded by a button press. Recording was performed across periods in which the subjective value of the reward changed throughout the session. Experiments were conducted on 10 rats, and the analysis is ongoing.



### 3. Future plans

We will investigate how the subjective value of reward is expressed in the rat brain, using tasks that can be easily performed by rats, such as classical conditioning. For this purpose, we will establish methods for transducing genetically encoded fluorescent probes to the whole cortical surface of the rat. We will also continue to analyze data obtained from operant conditioning experiments. Furthermore, we will develop probability search tasks that can be compared to human studies using a virtual reality system.

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