Discrimination learning with light stimuli in restrained American lobster *Homarus americanus*

Yusuke Tomina[1], Masakazu Takahata[1]
[1]Biosystems Science Course, Hokkaido University Graduate School of Life Science, Sapporo, Japan.

Discrimination learning is a type of operant paradigm for studying cognitive aspects of brain functions. As a step toward understanding those functions in simple invertebrate microbrains, we tested whether successive discrimination learning could be applied to train American lobster *Homarus americanus*, which was found to possess ability of operant learning with claw gripping. For this purpose, we developed an operant chamber for discrimination learning with light stimulation. This PC-controlled system allowed the animal under restrained condition to perform operant reward learning associated with gripping behavior. Lobsters were first reinforced when they acted on the bar upon light stimulation. After this reinforcement, the animal learnt to grip the bar for food pellets while the light was kept turned on for 1-min. Discrimination learning on light intensity in which the animal was trained to discriminate bright/dim lights was carried out in the next step. The operant behavior tended to occur more frequently occurred when the cue was presented for reward than for nonreward. These data demonstrate that lobsters can be trained with light a cue as a discriminative stimulus under a restrained condition that would allow in vivo application of electrophysiological techniques to the nervous system of behaving subjects.