Medical Xpress

Obedient sensory neurons

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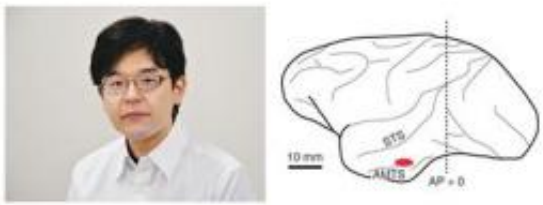

Dr. Koida and Fig.1: Schematic illustration of the recording site (red) within a lateral view of the monkey cerebral cortex. Copyright : Toyohashi University of Technology

Using monkey electrophysiology, Dr. Koida and Dr. Komatsu (Toyohashi University of Technology, Japan) found that task demand altered the response of the inferior temporal neurons.

In the cerebral cortex of the primate, color information is transmitted from the occipital lobe to the temporal lobe, and ultimately reaches the inferior tempora (IT) cortex.

There are two different functions in visual perception, namely categorization and fine discrimination, both of which are clearly apparent in color vision. Human, and presumably primates, can switch between these two functions depending on task demands. The question arises as to whether task changes affect the response of the IT neurons.

Using monkey electrophysiology, Kowa Koida now at the Electronics-

Inspired Interdisciplinary Research Institute (EIIRIS) in collaboration with and Hidehiko Komatsu of the National Institute for Physiological Sciences, Okazaki, Japan found that task demand altered the response of the inferior temporal neurons.

In their experiments, researchers recorded the activities of color-selective neurons in the IT cortex, whilst the animal performed two different tasks: A color categorization task, which required the animal to classify sample colors into two color categories—reddish or greenish; and a fine color discrimination task, in which the animal selected one of two choice stimuli that was the same color as the sample stimulus.

The experiments clearly showed the color categorization task to enhance the response, and the fine color-discrimination task to suppress it.

These results suggest that the flow of color information from the IT cortex is strongly controlled by top-down signals representing the ongoing task rule presumably sent from the prefrontal cortex.

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