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観察角度普遍的物体再認訓練を施したサルの下側頭葉皮質に見られる視覚反応のマッチ/非マッチ変調  
(Match/nonmatch modulation of neuronal responses to different views of objects in monkey inferior temporal cortex after view invariance training)

To understand neural mechanisms of viewpoint-invariant object recognition, we examined responses of monkey inferior temporal cells to images of objects seen from different views in an object recognition task. We found that some of the TE neurons showed the match/nonmatch modulation even when the sample and match were different views of the same animal-like objects. The result show that a group of TE cells can trace the identity of the objects across changes in viewpoints by the modulation of responses.

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サル下側頭葉皮質細胞の視覚反応におよぼす弁別難易度の違いの影響

Neuronal responses of monkey inferior temporal cortex at different levels of discrimination difficulty

To investigate how the difficulty of discrimination influences the visual information processing, we have recorded neural activity in the inferior temporal cortex (IT) of a macaque monkey while the subject has discriminated animal-like objects in two conditions that were different in terms of the difficulty. The results show that the difficulty of discrimination modulates the behavior of the monkey while it does not change the stimulus selectivity of most IT cells.

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目的指向的な行動決定に関わるサル前頭前野の神経機構 (Neural mechanisms of goal-directed decision of behavior in monkey prefrontal cortex)

To reveal the neural basis of behavioral decision, we examined cell activity in the lateral, medial, and orbital parts of the prefrontal cortex (PFC) of monkeys (n=3) performing a visually cued GO/NO-GO task. We quantitatively analyzed visual, motor, and reward information represented along the trial. The reward information was primarily represented in the 3 parts of the PFC when the visual cue was presented. Then the motor information grew up toward the GO/NO-GO decision in the medial and lateral PFC while the reward information was maintained. These results suggest that the behavioral decision is made goal-directedly in PFC.

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ウィスコンシンカード分類課題遂行中のサル前頭前野から記録された分類規則の作業記憶および行動の誤りを表す神経活動 [Working memory of rule and behavioral errors are represented by prefrontal cells in an analog of Wisconsin Card Sorting Test (WCST)]

Two monkeys were trained to perform a computerized version of WCST with two dimensions. The relevant attribute had to be found by trial and error. Single cell recording was conducted from lateral prefrontal cortex of one monkey. From 153 task-correlated cells, 59% showed differential activity at some periods of the task depending on the relevant rule and 63% showed reward-related activity. 60% of cells responded to error signal and 37% of them fired differentially in perseverative and fixation-error trials. These results suggest that prefrontal cells participate in accomplishing WCST by representing behavioral outcome and the working memory of the rule.