P248 Kenji Yoshiyama, Takanori Uka, Hiroki Tanaka, and Ichiro Fujita (Osaka Univ. Graduate School of Engineering Science, CREST・JST)

Clustering of disparity-selective neurons in monkey inferior temporal cortex

To investigate the distribution pattern of disparity-selective neurons in the inferior temporal cortex (IT), we recorded neuronal responses in the IT of two monkeys performing a fixation task. In each electrode penetration, multiple neuronal activity was recorded at 0.2mm intervals from the brain surface to the white matter. At each recording site, effective stimuli were first determined from 20 shapes presented at 0 disparity. Disparity was then added to the most effective shape. Our results suggest that disparity-selective neurons are clustered, and these clusters are extended vertically to the brain surface.

P249 Keisuke Kawasaki, Hiroshi Tamura, Kenji Miyata, and Ichiro Fujita (Osaka Univ. Graduate School of Engineering Science, CREST・JST)

Integration of interhemispheric and intrahemispheric information in area TE of monkeys

Most receptive fields (RFs) of neurons in area TE extend across the vertical meridian into the ipsilateral visual field, in contrast to those in the earlier areas whose RFs were restricted within the contralateral field. We quantitatively analyzed the responses of TE neurons to stimuli located far-off the two visual hemifields to explore the mechanism how these large bilateral RFs are constructed. Stimulus selectivity was preserved between the responses at 11° ipsilateral and those at 11° contralateral field, although the response magnitude was smaller and the onset latency was longer at ipsilateral presentation. The results suggest that these bilateral responses are produced by specific interhemispheric connections to link TE neurons with similar stimulus preference in the two hemispheres

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Contralateral projection of monkey area TE is patchy and topographical

Neurons in area TE of the monkey inferior temporal cortex have a large bilateral receptive field, within which stimulus preference is preserved. To achieve the translation-invariant stimulus selectivity across the ipsilateral and contralateral visual hemifields, visual information from the two fields, coming from intrahemispheric and interhemispheric routes, must be combined in a stimulus specific way. We here show that callosal projectionsbetween TEs in the two hemisphere are patchy and topographical.

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Neural activation of the macaque inferior temporal cortex during global and local processing of visual images

To identify which brain areas are involved in global and local features of hierarchically organized visual stimuli (large letters made of small letters), we applied positron emission tomography (PET) techniques to behaving macaque monkeys. Regional cerebral blood flow (rCBF) in the posterior part of the inferior temporal cortex was more increased in discriminating the global features than in discriminating the local features. In the contrary, more increase in rCBF was observed in the anterior part of the inferior temporal cortex than in the posterior one. These results suggest a functional difference of the macaque inferior temporal cortex along the anterior-posterior axis in processing global and local features.