SEMINAR in NEUROSCIENCE
THE JOHNS HOPKINS UNIVERSITY,

ZANVYL KRIEGER MIND/BRAIN INSTITUTE

338 Krieger Hall
3400 N. Charles Street
Baltimore, MD

Ichiro Fujita, PhD

Osaka University Graduate School of Frontier Biosciences
Osaka, Japan

Host: Ed Connor, PhD

Thursday, 10 November 2005

Proposed Itinerary

Wednesday, November 9

3:00pm Eric Fortune *(225 Ames)*
3:30pm Veit Stuphorn
4:00pm Steve Hsiao
4:30pm Takashi Yoshioka
6:00pm Dinner

Thursday, November 10

9:45am Eric Young *(Traylor 505)*
10:15am Kechen Zhang *(Traylor 426)*
11:00am Connor lab
Noon Lunch *(MBI library)*
1:00pm Alfredo Kirkwood
1:30pm Rudiger von der Heydt
3:00pm Ed Connor
3:30pm Refreshments
4:00pm **Seminar**
6:00pm Dinner

"Stereopsis and the ventral visual pathway"

Horizontal binocular disparity, an important visual cue for the perception of depth and 3-D scene, was widely believed to be processed mainly in the occipitoparietal or dorsal visual pathway. Recent studies, however, show that a large population of neurons in cortical areas in the monkey occipitotemporal or ventral visual pathway, such as area V4 and the inferior temporal cortex (IT), are selective for binocular disparity. We addressed how binocular disparity signals are transformed along the ventral pathway, and whether neurons in V4 and IT differ from neurons

in dorsal pathway areas such as MT and MST in terms of the processing of binocular disparity. We found that (1) when a random-dot stereogram (RDS) is contrast-reversed between the left and right eye images, the majority of disparity-selective V4 neurons attenuate their disparity selectivity, a decrease in sensitivity also reflected in depth perception; (2) a large portion of V4 neurons encode relative disparity between two surfaces in a visual stimulus; (3) trial-to-trial fluctuations of IT-neuron responses to a given stimulus correlate with the animal's behavioral report of fine-depth judgment. These results indicate that activity in V4 and IT surpasses the local filter-like processing of V1, and correlates more with binocular depth perception than that in areas MT and MST. We suggest that V4 and IT contribute to fine-grade disparity discrimination.

Two recent papers

Tanabe, S., Umeda, K., Fujita,I. (2004) Rejection of false-matches for binocular correspondence in macaque visual cortical area V4. *J. Neurosci.* 24: 8170-8180.

Uka, T., Tanabe, S., Watanabe, M., Fujita, I. (2005) Neural correlates of fine depth discrimination in monkey inferior temporal cortex. *J. Neurosci.*, in press.

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