Abstract View

DOES FEEDBACK FROM THE MIDDLE TEMPORAL (MT) VISUAL AREA INFLUENCE MAPS OF ORIENTATION AND TEMPORAL FREQUENCY IN V1?

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The visual system of primates is represented by an interconnected network of visual areas. Although it is acknowledged that visual networks are complex and dynamic, the visual system is often modeled as a feedfoward hierarchy. The role of a dense system of feedback connections is less understood. In this study, using optical imaging, we examined the strength of signals and the organization of temporal frequency maps in V1 of anesthetized, paralyzed bush babies (*Otolemur garnetti*) before and after inactivating area MT with the GABAa agonist, Muscimol. Visual stimuli were moving square wave gratings of 4 orientations and 4 temporal frequencies (1, 2, 4 and 8 Hz), presented randomly for 8 sec, followed by a 17sec interstimulus interval. Muscimol was locally injected or applied to the surface using gelfoam. Before and after images were collected without moving the camera. In agreement with our previous electrophysiological study in bush baby V1 (DeBruyn et al., 1993), we observed the strongest optical response in V1 at the 2 Hz temporal frequency and the weakest at 8 Hz; no clusters of preference for specific temporal frequencies were identified. Our preliminary data suggest that inactivation of MT results in decreased overall activation in V1 but that map features, such as presence and number of orientation pinwheel centers remains unchanged. Blocking feedback from MT also appeared to differentially lower the response to higher temporal frequencies indicating that this feedback may facilitate responses to rapidly moving objects. Taken together with the results of others, our data support the conclusion that the MT to V1 feedback may be important for enhancing the visibility of moving objects.

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