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See list of themes and topics, pp. 17–18. Indicate below a first and second choice appropriate for programming and publishing your paper.

1st theme title: Sensory Systems theme letter: F
1st topic title: Visual Cortex: Striate topic number: 88

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SENSITIVITY OF AREA V1 NEURONS TO APPARENT BRIGHTNESS IN AWAKE BEHAVING MACAQUE MONKEYS. J.A. Mazer*, D.C. Somers and E.H. Adelson, Dept. of Brain and Cognitive Sciences, M.I.T, Cambridge, MA 02139.

Gray regions, when viewed against a dark background appear brighter than when viewed against a light background. The region's apparent brightness can be further enhanced by incorporating inducer elements into the figure which generate X-junctions consistent with object transparency or layering (Somers and Adelson, 1997). We studied the sensitivity of 19 V1 neurons to the apparent brightness of stimuli in an awake behaving monkey. The response of each neuron to a probe stimulus positioned against a solid light or dark background was compared to the response of the same neuron when the probe and background contained the ellipitical inducer elements. The probe stimulus was a stationary bar of optimal orientation and size located at the center of each neuron's classical receptive field. The background consisted of four alternating light/dark bands (each subtending 6.4°x 25.6°), with the probe centered vertically in the middle of one band. Dark and light hemi-elliptical patches were positioned along band boundaries in X-junction configurations which make the bands appear transparent. Probe stimuli were presented for 600–1000ms while the monkey maintained fixation. 11/19 (58%) neurons exhibited sustained firing rate modulations inversely correlated with the perceived brightness of the probe stimulus; this decrease in firing rate developed with a latency of about 100ms. Of the remaining neurons, three (16%) showed a sustained increase in response to the inducer elements, two (11%) a transient decrease followed by a transient increase and in three (16%) the inducer elements caused no change in response. In all, 84% of the neurons exhibited some degree of firing rate modulation positively or negatively correlated with the perceived brightness of the probe stimulus, independent of the photometric contrast of the elements contained within borders of the classical receptive field.

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Key Words: (see instructions p. 4)

1. VISION
2. STRIATE CORTEX
3. SURFACE PERCEPTION
4. TRANSPARENCY

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James A. Mazer — Society for Neuroscience member's signature
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