Abstract View

THE DISTRIBUTION OF KONIOCELLULAR LATERAL GENICULATE NUCLEUS (LGN) CELLS IN MACAQUE MONKEY

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Primates possess three pathways from retina to visual cortex: the parvocellular (P), magnocellular (M) and koniocellular (K) pathways. The popular view is that the P channel is responsible for detail and color vision and the M channel is responsible for motion vision. This "double duty" hypothesis for the P cell channel has been challenged by evidence that some K cells carry S cone signals (Solomon et al., 1999), and by the proposal that detail and color channels are segregated at the first retinal synapse (Calkins and Sterling, 1999) with detail carried by the P pathway and all color carried by other (K?) channels. These models predict different distributions of LGN K cells since achromatic spatial acuity is higher than that for red/green (M/L cones) which is much higher than that for yellow/blue (S cones). To estimate the distribution of K LGN cells we immunostained sections to reveal K cells using anti-αCaMII kinase. K cell density was measured at three eccentricities according to the map of Malpeli et al. (1996): 0-5 deg (fovea & parafoveal), 5-10 deg (paracentral), and 10-17 deg (peripheral). Results show that the average density of K cells in these areas is 143.3±38.1 cells/mm^2, 100.5±28.6 cells/mm^2 and 74.2±14.9 cells/mm^2, respectively. Extending this analysis to estimate the number of K cells per unit area of visual space should indicate whether the density of K cells is sufficient to support the chromatic acuity reported for separate M/L and S cone channels.

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