Abstract View

ARE THERE SIGNIFICANT ONSET LATENCY DIFFERENCES BETWEEN LGN CELLS THAT CARRY S CONE SIGNALS COMPARED TO THOSE THAT CARRY M OR L CONE SIGNALS?

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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 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 (possibly K) channels. If all color signals pass through the K channel one would predict, based upon anatomy, that onset latencies for both color channels would be the same. If, however the blue channel is sent through K LGN cells whereas the red/green channel is sent through P LGN cells, one would predict differences in onset latencies in LGN cells that prefer blue versus those that are selective for red/green: K cells should exhibit longer onset latencies. In this study we examined LGN cell visual response latencies using optimized colored stimuli. Five percent of the cells showed a blue ON-center response, 8.6% a blue-OFF center response, 64.4% were selective for either red or green, and 22% showed no color preference. On average the onset latency for blue-ON or blue-OFF LGN cells was significantly longer (106 ± 25ms) than the onset latency for LGN cells preferring red or green (61± 11ms) which, in turn, was longer than LGN cells with no color preference (27± 7ms). The results support the hypothesis that the blue channel is carried by the K pathway while the red/green channel is carried by the P pathway.

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