Abstract View

Another look at the impact of bursting in the lateral geniculate nucleus (LGN) of awake behaving monkeys

O. Ruiz[1*]; D.W. Royal[4]; X. Chen[1]; J. Schall[3,4]; V.A. Casagrande[1,2,3]

1. Dept. Cell & Dev. Biology, 2. Dept. Ophtal. & Vis.Sci., 3. Dept. Psych., 4. Ctr. Integr. & Cogn.Neuro., Vanderbilt University, Nashville, TN, USA

Bursting within the thalamus is considered an important indicator of an animal's level of arousal (Swadlow and Gusev, 2001). According to Sherman (2000), bursting within the LGN could also be considered as a visual "wake-up" call to direct attention to relevant stimuli. This study examined the incidence of LGN cell bursts in three awake behaving macaque monkeys under 5 stimulus conditions presented for 7 seconds each: (1) complete darkness, (2) blank grey screen (3 cd/m^2), (3) blank light grey screen (18 cd/m^2), (4) novel pictures, and (5) familiar pictures. Ninety-three ON-center cells were examined. Bursts were defined as two or more spikes having interspike intervals of 4 ms or less preceded by a period of silence lasting at least 100 ms. Bursts were observed in 100% of cells in all behavioral conditions and were seen in all three LGN relay cell classes (magno-, parvo- and koniocellular). Burst rate was, on average, quite low in all conditions (0.13 bursts/second) which is much lower than reported in monkeys during slow wave sleep (~1 to 2 bursts/second; Fig.1 of Ramcharan, Gnadt and Sherman, 2000). The burst rate tended to correlate with the spike rate and was highest when the blank field or the pictures were present. The proportion of spikes in bursts, however, was highest in the dark. These data do not support the idea that LGN bursts occur more often when monkeys view novel or natural scenes (Lesica and Stanley, 2004). This result, and our previous observations on the rate of bursts during various visuomotor tasks (Royal et al., 2003, SFN Abs.), argue against a privileged role for bursting in visual information transfer to cortex.

Support Contributed By: EY01778 (VAC), IBN-0234646 (VAC), EY08890 (JDS), NS44691 (DWR) and core grants EY08126, HD1505.

SFN ID: 3608 Submitted 5/10/05