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Representation of steady-state visual evoked potentials in sensorimotor cortical areas of a nonhuman primate.

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Title: Steady-state visual evoked potentials in monkey somatosensory and motor cortical areas

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Abstract: Previously we have demonstrated visual responses in monkey somatosensory (S1) and motor (M1) cortical areas during a rubber hand illusion (Shokur et al. 2013). Here we explored whether steady-state visual evoked potentials (SSVEPs) could be recorded in the same areas and whether they would be modulated by visual attention. SSVEPs were incorporated into a two-alternative reaching task. In each trial two circular targets were presented on the computer screen. Each target flickered at a unique frequency (e.g. 9Hz or 13Hz). Non-flickering targets were displayed in 30% of the trials to establish a baseline. Rhesus monkeys manipulated a hand held joystick to reach targets with a computer cursor. Spikes and local field potentials (LFPs) were recorded simultaneously using chronically implanted multielectrode arrays. The neural data were processed using a non-parametric multitaper spectral estimation method to assess frequency modulations at a single trial resolution. Spectral peaks at the flicker frequency were found in both spike and LFP data. These results for the first time show that intracranial recordings from S1 and M1 can be utilized to continuously record visual responses, which are relevant to motor behavior, incorporation of avatar arm, and visual attention. As such, this approach can be useful to build better neural prostheses.

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Poster

522. Neuroprosthetics for Limb Control

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