Supplemental Figures

Local neural processing and the generation of dynamic motor commands within the saccadic premotor network

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Supplemental figure 1. Average correlation coefficients estimated between the duration of the LFP modulation and saccade duration (dark gray histograms), between the peak of the LFP response and the peak radial eye velocity (black histograms), as well as between the area of the saccade induced LFP (i.e., time integral) and saccade amplitude (light gray histograms) for the population of (A) MNs, (B) SBNs and (C) OPNs in both ipsilateral and contralateral directed saccades.
**Supplemental figure 2.** Additional examples of the time varying profiles of the LFPs for three OPNs (left) and three SBNs (right). Examples are shown for both monkeys to illustrate that the time varying LFP profile matched eye velocity (superimposed on the LFP trace for comparison) during typical and atypical saccades in both animals.
Supplemental figure 3. (A) Distribution of saccade amplitudes that were used to estimate the LFP and firing rate. (B) To confirm that the robustness of fit was not influenced by an oversampling of large or small saccades we broke the data recorded for MNs into large (>20deg) and smaller saccades (4-10deg). We then predicted the LFP response based on the parameters estimated for the entire data set. A comparison of the VAFs across the two groups of saccades revealed no significant differences (P>0.05).
Supplemental figure 4. Average coding fractions (A1) MNs and (A2) SBNs when the LFP signal was reconstructed from the corresponding spike train (open bars) or firing rate (filled bars). (B) The optimized filters were monophasic and narrow for (B1) MNs and (B2) SBNs.
**Supplemental figure 5.** Average spectrogram corresponding to an (A) OPN and (B) SBN during the ipsilateral direction, as shown in Fig. 8 and 9, plotted using a semi-log scale to illustrate that no additional power is seen in the higher frequencies. The x and y axes represent time and frequency, respectively, while LFP power is color coded and normalized to baseline activity.
Supplemental figure 6. Distributions of the amplitudes (A), means (B), and widths (C) of tuning curves (respectively) for LFP activity recorded from saccadic burst neurons during ipsilaterally-directed (gray bars) and contralaterally-directed saccades (white bars). The tuning curves for ipsilateral and contralateral saccades were approximately equal in amplitude but in opposite directions (i.e. positive for ipsilateral and negative for contralateral). (B) The tuning curves for ipsilateral and contralateral saccades were centered around 0 and 180deg, respectively. (C) the distributions of the tuning curve widths for ipsilateral and contralateral saccades were identical.