3 classified qualitatively, one had an increase in activity at the time the visual stimulus appeared and was considered a visual neuron. Figure 3 shows two schematics of sections through the midbrain of a rhesus monkey (Mikula et al. 2007). The black squares represent locations from which electrode tracts were reconstructed from 4 hemispheres of 2 monkeys (8 in 1 monkey and 22 in the second). The other 31 sites come from a monkey that is still participating in experiments but the electrode path targeting the SNr was confirmed using MRI.

One possible outcome of electrical stimulation effects on SNr and eye movements is shown schematically in Figure 1b-e. When electrical stimulation is introduced in cortex it is believed that the stimulus train mimics a train of action potentials activating the underlying neuronal tissue (Bruce et al. 1985a; Salzman et al. 1990; Schiller and Stryker 1972), therefore we reasoned that trains of electrical stimulation to the SNr may mimic the occurrence of action potentials in SNr (Figure 1b). Because SNr neurons are tonically active and often pause for saccades, electrical stimulation might introduce action potentials during a time when none would normally occur. Due to the direct projections of SNr to SC, electrical stimulation of the SNr should influence the activity of SC neurons (Figure 1c). If the influence of the SNr is on memory rather than visually-guided saccades preferentially, then the influence of electrical stimulation should be maximal for memory saccades (cf., Figure 1d and e).

To test the hypothesis that manipulation of SNr neuronal activity would preferentially influence non-visually-guided eye movements, we presented trains of electrical stimulation to the SNr during performance of delayed-saccade tasks