peripheral target appeared (black spot). Monkeys were required to remain fixating the center, indicated by the square around the fixation spot, for a delay (800-1200ms). When the fixation spot was removed, a saccade to the peripheral spot occurred. In the memory version, the peripheral spot appeared transiently, for 200ms. d. Black spots indicate the target position used. e. Time line of the memory guided saccade task. f Time line for the visually-guided saccade task. The red filled bar is the fixation point. The black filled bar is the target. The cyan filled bar indicates the time during the tasks when SNr stimulation occurred. The lines marked 'eye' are schematics of the eye position trace.

Figure 3. Schematic sections through the midbrain of a rhesus monkey. AP levels are approximate and sections were obtained from www.brainmaps.org (Mikula et al. 2007). The infundibulum and lateral geniculate nucleus were used as landmarks to reconstruct electrode tracts on these standardized sections using Horsley-Clark stereotaxic coordinates. Each square represents multiple penetrations from two monkeys. Reconstructions were all reflected to the left hemisphere. There were 8 sites from 1 monkey and 31 sites from a second monkey. The 22 sites come from a third monkey that is still participating in experiments. abbreviations: STN = subthalamic nucleus, VTA = ventral tegmental area; SNr = substantia nigra pars reticulata, ZI = zona incerta.

Figure 4. SNr stimulation alters memory-guided eye movements. a. Recording from an SNr neuron during performance of the delayed-saccade task. Saccades