

FIGURE LEGENDS

Figure 1. Schematic of neuronal activity in the BG-SC pathway during saccades.

a. The vertical lines indicate action potentials. Time (ms) is shown from left to right. The discharge of phasically active caudate neurons occurs around the time of saccades. Because these neurons are GABAergic and project directly to the SNr, their increase in discharge is associated with a pause in SNr tonic activity. The pause in SNr activity releases the SC from inhibition (Hikosaka et al. 1993; Hikosaka et al. 1989a, 1989b; Hikosaka and Wurtz 1983a, 1983d) at which point a saccade is generated. b. The same as in a, except cyan vertical lines indicate hypothetical result if electrical stimulation introduces action potentials to the SNr. The duration of the electrical stimulation used was 400ms (not drawn to scale). c. Schematic of the neural circuitry relating the SNr and the SC. d. Predicted results of stimulation on the onset of memory-guided eye movements. Black lines are schematic eye position traces and cyan lines are schematic eye position traces with SNr stimulation. e. Same as in d for visually-guided saccades. stim = stimulation trial. SNr = substantia nigra pars reticulata; iSC = intermediate layers of the superior colliculus.

Figure 2. Behavioral task. a. A lateral view of the rhesus monkey brain is shown schematically with a stimulating electrode directed at the SNr. b. Memory-guided saccade task. c. Visually-guided saccade task. The boxes are a schematic of the screen at which monkeys looked to perform the task. A fixation spot (red spot) located at the center of the screen appeared for a time (500-1000ms) then a