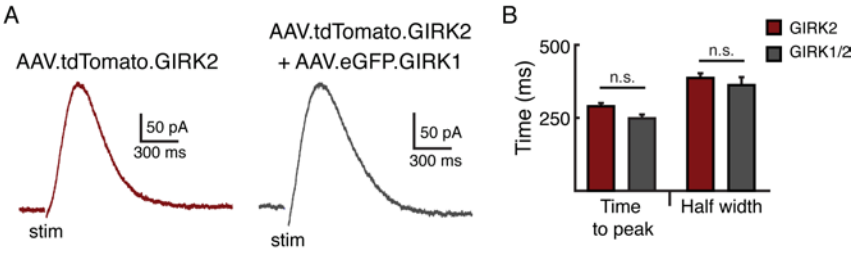
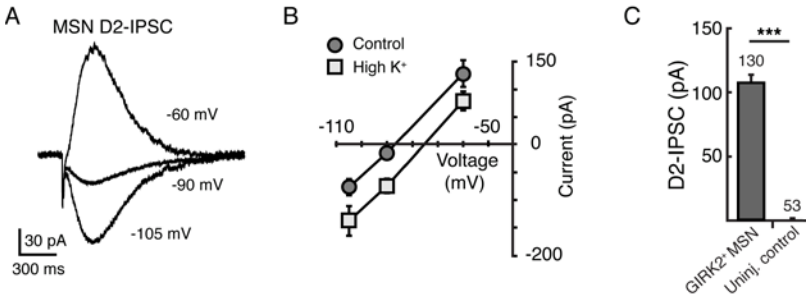
Supplemental Figure 1, related to Figure 1.

Expression and properties of GIRK1^{+}/2^{+} MSNs



(**A**) Representative traces of D2-IPSCs recorded from an animal injected with AAV.tdTomato.GIRK2 alone (left) or an animal injected with both AAV.tdTomato.GIRK2 and AAV.eGFP.GIRK1 (right). No significant difference in kinetics (time to peak: p = 0.06; half width: p = 0.4) was observed between D2-IPSCs from animals injected with GIRK2 (n = 21) and D2-IPSCs from animals injected with GIRK1/2 (n = 7). (**B**) Summary data

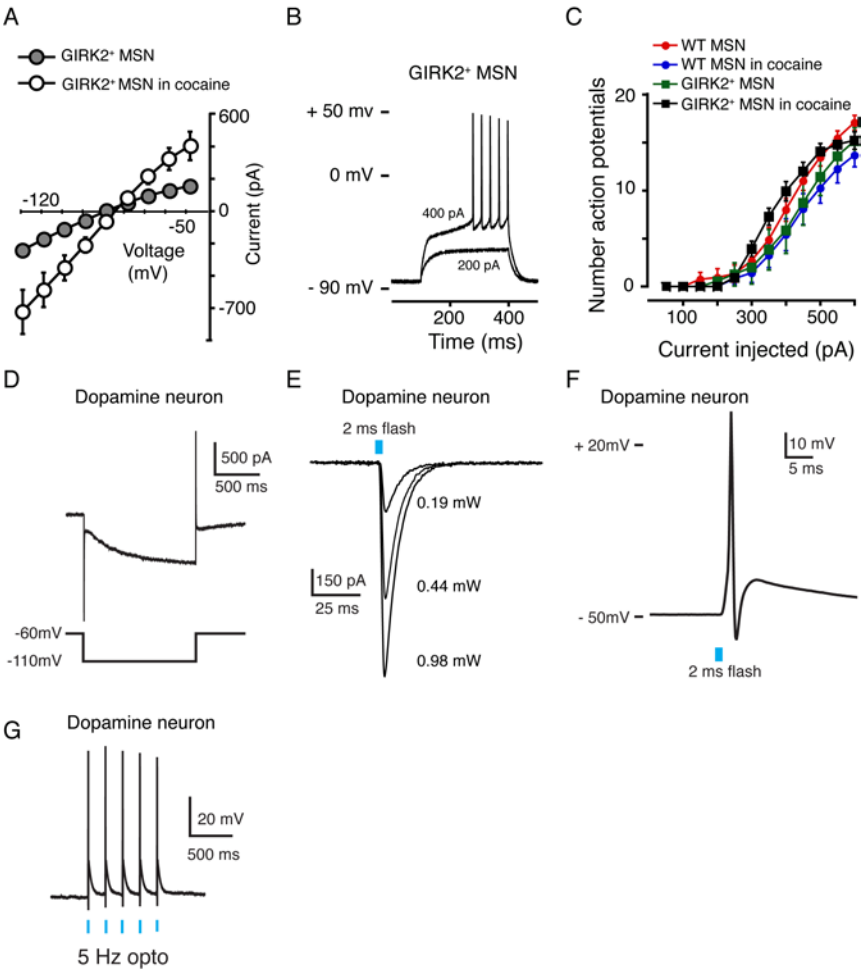
Supplemental Figure 2, related to Figure 2.
Properties of MSN D2-IPSCs.



(**A**) Representative whole cell recording of D2-IPSCs evoked at a holding potential of -60 mV, -90 mV, and -105 mV, illustrating that the D2-IPSC reverses near the predicted potassium reversal potential (E_{rev} = -88 mV, n = 6). (**B**) Current-voltage relationship of the D2-IPSC under control conditions (2.5 mM extracellular K_+, gray circles) and in high extracellular K_+ (5 mM extracellular K_+, open squares) demonstrating the expected right shift of the current-voltage plot (E_{rev} = -76 mV, n = 6). (**C**) Summary data illustrating a lack of D2-IPSCs following electrical stimulation of uninjected control MSNs (control uninjected: n = 53; $GIRK2^+$ n = 130, $p < 0.001$).

Supplemental Figure 3, related to Figure 3.

Excitability of MSNs and expression of ChR2 in dopamine neurons



(**A**) Dopamine-evoked current-voltage relationship. 10 mV voltage steps were given from -50 mV to -130 mV (as in Figure 1G). Dopamine was applied to GIRK2+ MSNs in the presence and absence of cocaine (3 μM). (**B**) Current camp recording illustrating the excitability of GIRK2+ MSN. (**C**) Expression of GIRK2^{+} and the presence of cocaine (3 μM) does not alter the excitability of MSNs. (**D**) Dopamine neurons in the SNc and VTA were identified by the existence of an h-current. (**E**) Example voltage clamp recording from a dopamine neuron showing that a 2 ms flash of blue light produced an inward current that was dependent on the power of light used. (**F**) Example current-clamp

recording from a dopamine neuron showing light evoked an action potential (flash, 2 ms). **(G)** Example current-clamp recording from a dopamine neuron showing a train of light evoked action potentials by a train of stimulation (5 Hz, 2 ms pulse). Action potentials from SNc dopamine neurons were recorded in current-clamp mode in horizontal slices (220 μm) containing 200 nM S-(-)-sulpiride to prevent autoreceptor-mediated inhibition of firing.