Supplemental Data

Materials and Methods

Slice preparations for biochemistry: The procedure for slice preparations and treatment are the same as *Materials and Methods* in the main text. For D1R agonist treatments of AcbSh slices, after MCH or vehicle treatment, aCSF was replaced with fresh 30°C aCSF containing 10 µM SKF 81297 (Sigma, St. Louis, MO) or vehicle for five minutes. For EGTA experiments, slices were incubated in 1 mM EGTA for 1 hour prior to treatment with MCH.

Western blotting procedure and Antibodies: Procedures are as described in *Materials and Methods*.

Statistical analyses: Analysis of SKF 81297 treatments is described in the main text. A multivariate ANOVA was used for the EGTA experiment followed by Tukey post-hoc analysis.

Supplemental Figure Legends

Fig. S1. MCH mediates a reduction of GluR1 $pSer^{845}$. Graphs represent the ratio of phosphorylated signal to total protein signal for all treatments. Below the graphs are treatment conditions and representative western blot bands for GluR1 $pSer^{845}$ and total GluR1. (**A**) MCH dose-dependently reduces D1 receptor-mediated GluR1 $pSer^{845}$. (**B**) MCH significantly reduces basal GluR1 $pSer^{845}$ within 20 min $*p<0.05$, $**p<0.01$. Error bars indicate +SEM.

Fig. S2. MCH treatment does not alter total GluR1 protein levels, and total GluR1 levels are not changed in MCH-OE and MCH-KO mice. (**A**) Graph represent the ratio of total GluR1 to GAPDH, normalized to aCSF control (**C**, n=6 slices per group). MCH-OE (**B**, n=4 per group) and MCH-KO (**C**, n=4 per group) blots are represented as the ratio of total GluR1 to ß-tubulin, and are normalized to WT controls. Error bars indicate +SEM.

Fig. S3. Extracellular calcium is not required for MCHR1-mediated reduction in GluR1 $pSer^{845}$. Data is normalized to aCSF control. *$p<0.05$ and **$p<0.01$ relative to aCSF control, #$p<0.01$ relative to EGTA alone. Error bars indicate +SEM.

Fig. S4. Local infusions control neuronal activity. (**a**) Location of cannula (wide tract) and microwire electrode tracts in AcbSh; fluorescent-conjugated muscimol (FCM) is red. (**b**) Rasters representing the timing of action potential for three AcbSh neurons; note that neuronal activity dramatically decreases after FCM infusions. (**c**) Wideband activity from Neuron 3 before FCM infusion; spikes represent putative action potentials. Time of recording from C is noted in panel B. (**d**) Wideband activity from channel Neuron 3 after FCM infusion.

Fig S5. Normalized firing rate for nucleus accumbens neurons recorded in aCSF (blue lines; n=7 neurons) or MCH (red lines; n=6 neurons) recording session from two rats. Gray box represents infusion time.