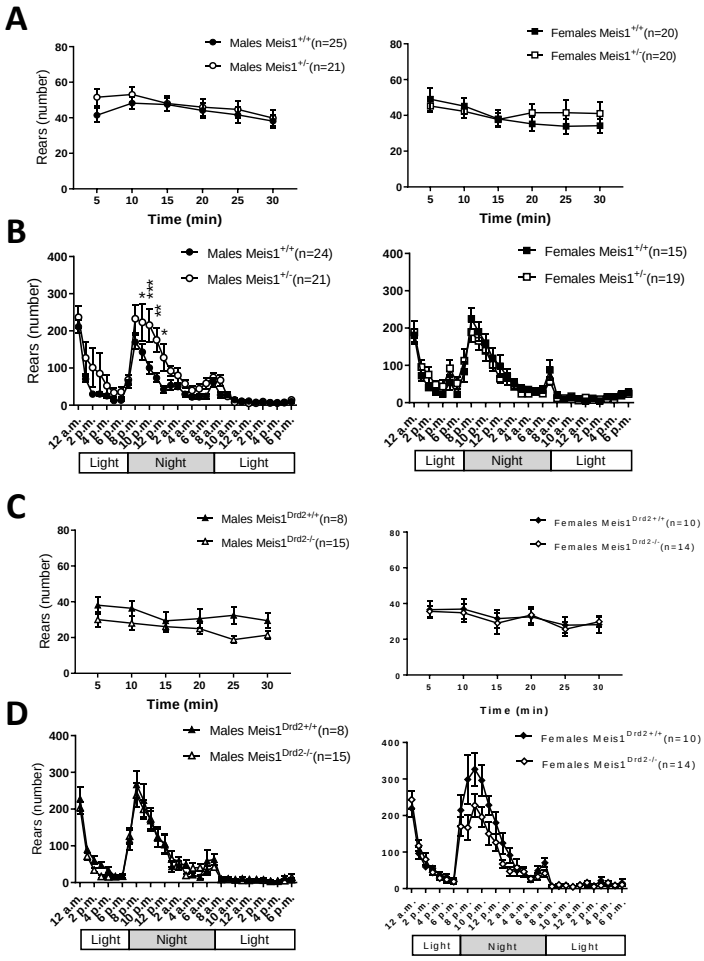

Figure S1: Motor behavior in Meis1$^{+/-}$ and Meis1$^{Drd2-/-}$ mice (refers respectively to Fig.2 and Fig.4)

A and C. The average number of rears in the openfield (motor activity induced by novelty) over the 30 minutes of the test is similar between *Meis1*$^{+/-}$ and *Meis1*$^{+/+}$ mice (A), as well as between *Meis1*$^{Drd2-/-}$ and *Meis1*$^{Drd2+/+}$ male (left panels) and female (right panels) mice (C). **B and D.** As a complement to the spontaneous home-cage locomotor activity, the number of rears was also monitored during 32 consecutive hours in actimetric cages (habituation from 11 a.m. to 7 p.m.; night from 7 p.m. to 7 a.m.; light from 7 a.m. to 6 p.m.) for the male cohort and the female cohort. Concerning *Meis1*$^{+/-}$ mice compared to *Meis1*$^{+/+}$, similarly to the locomotor activity (Fig.1), the mean number of rears increased only for males (B – left panel). No difference was observed for female *Meis1*$^{+/-}$ (B – right panel) or both sexes of *Meis*^{Drd2} strain (D). The cohort included 8-months-old mice comprising 40 females (20 *Meis1*$^{+/-}$ and 20 *Meis1*$^{+/+}$) and 46 males (25 *Meis1*$^{+/-}$ and 21 *Meis1*$^{+/+}$) for openfield; 34 females (19 *Meis1*$^{+/-}$ and 15 *Meis1*$^{+/+}$) and 45 males (24 *Meis1*$^{+/-}$ and 21 *Meis1*$^{+/+}$) for actimetry. Results are plotted as mean±S.E.M. with *p<0.05; **p<0.01; *** p<0.001 vs. corresponding control groups (Fisher LSD posthoc test following three-way ANOVA).

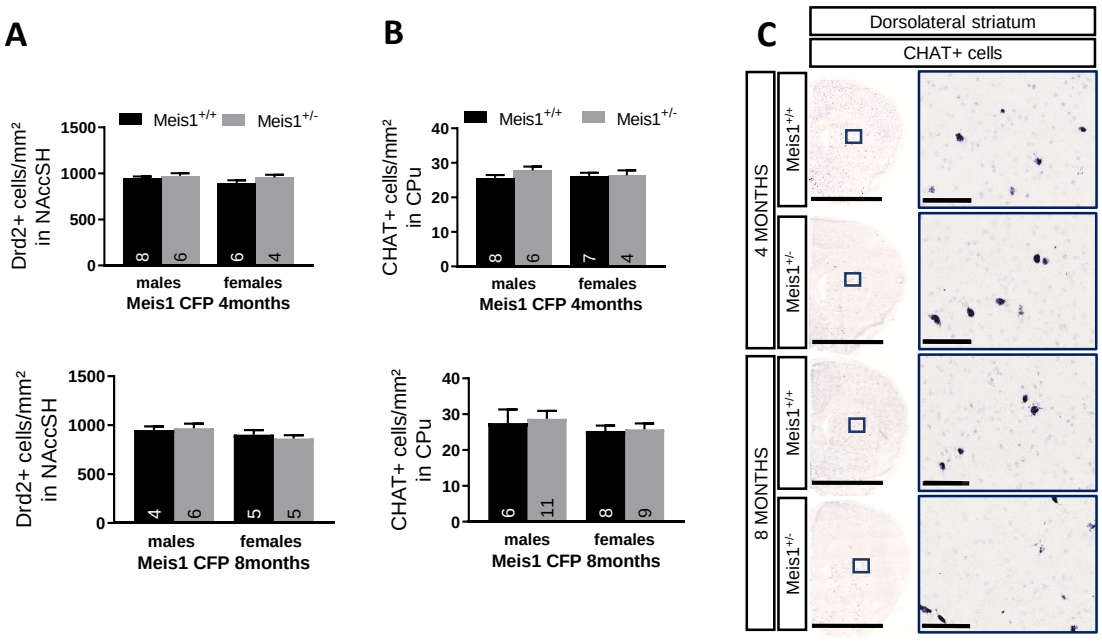

Figure S2: The number of Drd1+, Drd2+ MSNs in the ventral striatum and cholinergic interneurons expressing acetyltransferase positive (ChAT+) in the dorsal striatum is not affected in Meis1$^{+/-}$ mice (refers to Fig. 3).

A. The graphs represent mean counts of Drd2+ interneurons per mm² scored in the nucleus accumbens shell (NaccSH) of 4 months-old (upper panel) and 8 months-old (lower panel) *Meis1*$^{+/-}$ and *Meis1*$^{+/+}$ mice at three levels (bregma 1.57, 1.37 and 1.15). The number of dopaminoceptive neurons in the NaccSH was not affected by genotype, sex and age of mice. Analyses were performed on brain sections from the same 8-months-old mice that were tested for motor behavior (see Fig. 1) and included 10 females (5 *Meis1*$^{+/-}$ and 5 *Meis1*$^{+/+}$) and 10 males (6 *Meis1*$^{+/-}$ and 4 *Meis1*$^{+/+}$) as well as 24 mice at 4 months including 10 females (4 *Meis1*$^{+/-}$ and 6 *Meis1*$^{+/+}$) and 14 males (6 *Meis1*$^{+/-}$ and 8 *Meis1*$^{+/+}$). **B.** The graphs represent the mean numbers of ChAT+ interneurons per mm² counted in the dorsolateral striatum (CPu) of 4 months-old (upper panel) and 8 months-old (lower panel) *Meis1*$^{+/-}$ and *Meis1*$^{+/+}$ control mice (counts performed at bregma 1.15 and 0.50). The number of ChAT+ interneurons was not affected by genotype, sex or age of mice. **C.** The images depict an examples of ChAT-positive neurons detected by in situ hybridization in the Caudate Putamen (CPu) in brains from 4-months-old and 8-months-old *Meis1*$^{+/-}$ and *Meis1*$^{+/+}$ females (bregma 1.15). The square within the CPu shown on the left image corresponds to area shown at higher magnification on the corresponding image on the right. The scale bars correspond to 2.5mm in the left panel and to 100µm in the right panel. The cohort used for ChAT analyses included 36 mice at 8 months of age with 18 females (9 *Meis1*$^{+/-}$ and 9 *Meis1*$^{+/+}$) and 18 males (11 *Meis1*$^{+/-}$ and 7 *Meis1*$^{+/+}$) as well as 25 mice at 4 months of age with 11 females (4 *Meis1*$^{+/-}$ and 7 *Meis1*$^{+/+}$) and 14 males (6 *Meis1*$^{+/-}$ and 8 *Meis1*$^{+/+}$). Results are plotted as mean±S.E.M. Two-way ANOVA were used for statistical testing. *ChAT, choline acetyl transferase; CPu, caudate putamen; NaccSH, Nucleus Accumbens Shell*