A
2.5 mm
Bregma -2.06 mm
B
CL
fr
PF
PC
MD
500 µm
C
2.5 mm
Bregma -2.18 mm
D
PF
fr
500 µm
E
β-gal
F
NeuN
G
β-gal
NeuN

Figure 1

A
Control
fr
cKO
fr

B
NR1 mRNA level
(normalized by GAPDH)
1.2
1
0.8
0.6
0.4
0.2
0
*
Control (4)
cKO (6)

Figure 2

A
Control
cKO
Cy5
Cy5 YFP
fr
100 µm
B
Control
cKO_n+
cKO_n-
100 pA
10 ms
C
decay time constant (ms)
8 ms
n = 36
cKO_n+
cKO_n-
n = 20
Control
cKO
Control
cKO
V_hold = -70 mV
V_hold = +40 mV
n = 33
n = 56
n = 33
D
Control
control
20 pA
10 ms
10 µM NBQX
10 µM NBQX + 50 µM APV
cKO_n-
50 pA
control
10 ms
10 µM NBQX
E
Control
cKO_n+
cKO_n−
40 pA
0.5 s
sEPSC amplitude (pA)
P = 0.0007***
n.s.
n.s.
Control
cKO_n+
cKO_n−
n = 33
n = 20
n = 36
sEPSC frequency (Hz)
P = 0.002**
n.s.
Control
cKO_n+
cKO_n−

Figure 3

Figure 4

A
*
70
60
50
40
30
20
10
0
% Prepulse inhibiton
70
75
80
Prepulse (dB)
B
Control (14)
cKO (10)
2
1
0
Startle response (a.u.)
100
110
120
Tone intensity (dB)

Figure 5

A
Hole
Food tray
B
Control (22)
cKO (18)
% Success responses
Day
C
# of Errors
Stimulus duration
D
# of Premature responses
Stimulus duration
E
# of Perseverative responses
Stimulus duration
F
Response speed (sec)
Stimulus duration
5 s
2 s
1 s
0.6 s
*

Figure 6

A
B
C
Control (10)
cKO (11)
% Alternation
80
70
60
50
40
30
*
# of arm entries
25
20
15
10
5
0

Figure 7

A
Escape latency (s)
90
60
30
0
Control (7)
cKO (9)
*
*
1 2 3 4 5 6 7 8 9
Day
B
Spent time (s)
60
40
20
0
Control (7)
cKO (9)
Target
Opposite
Left
Right
C
# of crossings
8
6
4
2
0
*
Control (7)
cKO (9)
D
Escape latency (s)
25
20
15
10
5
0
1 2 3 4
Day

Figure 8

Control (16)
cKO (17)
Distance (m)
0
1
2
3
4
5
% Center region
0
5
10
15
20
25
# of rearings
0
10
20
30
40
50
60
70
80
90
*

Figure 9

A
Control/Solvent (10)
Control/MK-801 (9)
cKO/Solvent (8)
cKO/MK-801 (9)
Distance (a.u.)
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
10 30 50 70 90 110 130 150 170 190 210
Time (min)
B
Control/Solv (10)
Control/MK (9)
cKO/Solv (8)
cKO/MK (9)
Distance (×1000 a.u.)
140
120
100
80
60
40
20
0
*

Figure10

A
12000
10000
8000
6000
4000
2000
0
Distance (a.u.)
Control (8)
cKO (7)
20
8
20
8
20
8
20
8
20
8
Time
B
30000
25000
20000
15000
10000
5000
0
Distance (a.u.)
*
*
Control (8)
cKO (8)
1
2
3
4
5
Day

Figure 11

A
B
NR1 f/f (n=10)
cKO (n=10)
Time (s)
120
100
80
60
40
20
0
Stranger 1
Empty
Stranger 2
Stranger 1

Figure 12

A
CMV promoter
mCherry
2A
iCre
WPRE
B
mCherry
fr
EYFP
fr
C
Habituation 5 min
Familiar arm
Test 2 min
Novel arm
Familiar arm
D
NR1 f/f;AAV-mCherry (7)
NR1 f/f;AAV-iCre (5)
Discrimination index
0.8
0.6
0.4
0.2
0
*
E
Travel distance (m)
4
3
2
1
0

Figure 13

A
loxP
CBA promoter
Stop
HA-NR1
WPRE
Cre recombination
CBA promoter
HA-NR1
WPRE
B
tRFP
fr
HA
fr
C
cKO;AAV-DIO-tRFP (12)
cKO;AAV-fsNR1 (12)
% Alternation
80
70
60
50
40
30
*
D
# of arm entries
14
12
10
8
6
4
2
0

Figure 14