SUPPLEMENTARY METHODS

Mice

NPYGAD1 mice were generated previously[1]. CCKGAD1 mice were generated in the following manner. RP23-60I1BAC, containing the *Cholecystokinin* (*mCck*) locus (Chr9: 121,435,221 – 121,551,243, NCBI GRCm38.p1) was purchased from the Children's Hospital of Oakland Research Institute (http://bacpac.chori.org/). The BAC was isolated from the original DH10B *E. coli* strain and transformed into EL250 *E. coli* cells. The presence of the *mCck* locus in RP23-60I1 was verified by restriction enzyme digest mapping. *GFP-miRNA:Gad1-FRT-neo-FRT* was inserted at the start codon of m*Cck*, ensuring that *mCck* promoter would control expression of an engineered construct described previously[1]. In essence, *mNPY* homology arms of the previous construct were swapped with *mCck* homology arms in pSTBlue-1 plasmid vector (Novagen, Madison, WI, USA). The targeting construct carried Cnr1 5’ (150 bp) and 3’(151 bp) homology arms surrounding the eGFP, β-globin minigene and an FRT-flanked neomycin-resistance cassette. The β-globin minigene contained *miRNA:Gad1* in a position allowing the *in vivo* release of functional miRNA, which effectively reduced the GAD1 protein to undetectable levels in cell cultures [1]. After proper insertion of the targeting construct at the *mCck* start codon on the RP23-60I1 BAC, the selective marker *neo* was removed via FRT-directed recombination. BAC modifications were confirmed with restriction mapping and sequence analysis of the region of interest. The modified RP23-60I1 BAC was isolated with alkaline lysis and purified with *Sepharose* CL-4B chromatography, described previously [2]. Transgenic mice on congenic C57Bl/6 backgrounds were generated by injection of circular modified BAC into fertilized C57Bl/6 mouse oocytes by the Transgenic Mouse / ESC Shared Resource at Vanderbilt University (http://www.vicc.org/research/shared/tg-mouse.php) and identified by PCR using construct-specific primers.

Immunohistochemistry

Mice were anesthetized with isoflurane (IsoFlo; Abbott Animal Health ,Abbott Park, IL, USA) and transcardially perfused with ice-cold 1X PBS followed by 4% phosphate-buffered paraformaldehyde (PFA). Brains were removed and post-fixed in 4% PFA overnight before being saturated in phosphate-buffered sucrose concentrations up to 30%. 50 micron sections were cut on a cryostat (Leica Biosystems, Buffalo Grove, IL, USA), washed extensively in PBS, and blocked in 10% normal donkey serum in 0.1mM PB (pH 7.4) for 1 h. Primary antibody incubations were 72 h at 4°C and secondary incubations were 3 h at room temperature. Secondary antibodies (Jackson Immunoresearch, West Grove, PA, USA) were diluted 1:250. For eGFP labeling, sections were incubated with either chicken anti-GFP (Abcam, Cambridge, MA, USA; 1:2000) or rabbit anti-GFP (Invitrogen, Grand Island, NY, USA; 1:2000) and donkey anti-chicken DyLight488 or donkey anti-rabbit DyLight488 secondary. GAD1-stained sections were pre-incubated with 70 mg/ml of monovalent Fab' fragment of donkey anti-mouse immunoglobulin G (Jackson Immunoresearch) to block endogenous mouse immunoglobulins, then incubated with mouse anti-GAD1 (Millipore, Billerica, MA, USA;1:2000) and donkey anti-mouse Cy3 secondary. CCK-stained sections were incubated with either rabbit anti-proCCK (a generous gift from Dr. Andrea Varro) or rabbit anti-CCK8S (Immunostar, Hudson, WI, USA; 1:1000) and donkey anti-rabbit Cy3 secondary. Images were acquired by fluorescence microscopy (Leica Microsystems Inc., Bannockburn, IL, USA).

Matrix-Assisted Laser Desorption Ionization Imaging Mass Spectrometry (MALDI-IMS)

Tissue Preparation

Brains were harvested from 2 month-old naïve transgenic, NPYGAD1TG (n=6) and CCKGAD1TG (n=6), and wild type littermate, NPYGAD1WT (n=3) and CCKGAD1WT n=3), snap frozen immediately on liquid nitrogen, and preserved at -80°C. 12 micron coronal sections were cut in a cryostat (Leica Biosystems). Two sections each (one at the level of the striatum and one at the level of the hippocampus) from two transgenic mice and one wild type littermate mouse were thaw mounted onto each of six gold-coated steel targets and stored in a vacuum desiccator until analysis. MALDI-IMS data from sections from transgenic mice were compared to sections from wild type littermate mice on the same plate in a pairwise design (see data processing section below).

Matrix Application

To prepare sections for protein analysis (m/z 2000-20,000), tissue was washed using 70%, 90%, and 95% ethanol solutions for 30 seconds and dried. Dry, sinapinic acid powder was applied to seed the tissue which promoted uniform crystallization of the matrix on the tissue surface. Sinapinic acid solution (20 mg/mL in 50:49.9:0.1 acetonitrile, water, trifluoroacetic acid) was applied using an acoustic spotter [3] in a 250 micron-spaced array pattern. A total of 45 drops were deposited in each position. Adjacent sections were prepared for lipid and peptide analysis (m/z 500-2000). α-cyano-4-hydroxy-cinnamic acid (CHCA) was used to seed as described above. CHCA solution (10 mg/mL in 50:49.9:0.1 acetonitrile, water, trifluoroacetic acid) was applied to the tissue using an acoustic spotter. Matrix was applied to each section in a 340 micron-spaced array pattern. A total of 60 drops were deposited in each position.

Mass Spectrometry Analysis

Low molecular weight species (m/z 500-2000) were analyzed using an ultrafleXtreme™ MALDI TOF/TOF (Bruker Daltonics, Billerica, MA, USA) operating in reflector positive ion mode tuned for optimum resolution using the standard neurotensin (m/z 1672). Each position of the array was analyzed by summing 1000 spectra at each location. The protein data (m/z 2000-20,000) were collected using a linear autoflex™ speed MALDI TOF (Bruker Daltonics) tuned for optimum resolution of the standard, apomyoglobin (m/z 16,952). Identification of PEP19/PCP4 was performed using LC-MS/MS as previously described[4]. Selected additional peaks were putatively identified based on predictive informatics results within 1% of the measure mass using the Nature Lipidomics Gateway informatics platform[5]. Further characterization of these results is ongoing.

Data processing

Mass spectrometry data were visualized using flexImaging software (Bruker Daltonics, version 3.0). ROIs were annotated and the data for each ROI were exported. Spectral data were processed using ClinProTools (Bruker Daltonics, version 2.2). Spectra were baseline corrected, recalibrated, normalized to total ion current, a peak-picking algorithm was applied, and p-values were calculated using a pairwise two-tailed t-test and corrected using the Benjamini-Hochberg false-discovery rate[6]. The magnitude of significant differences was calculated using $\log_2$-based average log ratios (ALR) where ALR = mean($\log_2$[NPYGAD1$_{\text{plate 1, section a}}$], $\log_2$[NPYGAD1$_{\text{plate 1 section b}}$])-{$\log_2$[NPYBACWT$_{\text{plate1}}$] for each plate.

Behavior

Behavioral testing was performed in the Vanderbilt Murine Neurobehavioral Laboratory (MNL; http://vandymouse.org/) during the light cycle. Adult male mice (NPYGAD1TG (n=12) NPYGAD1WT (n=10), CCKGAD1TG (n=12), and CCKGAD1WT (n=12); aged 3 months at the start of the testing battery) were handled for 5 days prior to testing. Before each session, mice were acclimated for 1 hour under red light in an adjacent room. Tests were at least 24 hours apart. Experimenters were blinded to genotypes. All equipment was cleaned with Vimoba solution (Quip Labs, Wilmington, DE, USA) between animals to reduce odor contamination.

Irwin Screen, Grip Strength, Rotorod

A modified Irwin Screen assessed general health, neuromuscular function, and motor coordination [7]. To test grip strength, averaged across three trials, mice were held with their forepaws gripping metal mesh attached to a load cell and gently pulled away until they released the mesh. The rotorod (Ugo Basile, Comerio, VA, Italy) accelerated from 2-40 rpm over 5 min. Latency to fall was scored for each of three trials. Trials were stopped if the mouse rotated around the rod twice.

Open Field Activity

Mice were placed in a white plastic box (50 x 50 x 40 cm) and allowed to explore freely for 10 min on two consecutive days. Video was recorded and locomotor activity was analyzed by ANY-maze software (Stoelting Co., Wood Dale, IL, USA).

Elevated Zero Maze

The white plastic zero maze was placed 60 cm above the floor in the center the testing room. The 5 cm wide runway was divided into four quadrants: two open and two closed with 15 cm high walls. Mice were placed in the center of one open area and allowed to explore freely for 6 min. Video was recorded and time spent in each zone and locomotor activity were analyzed by ANY-maze (Stoelting Co.).

Forced Swim

Mice were placed into a 15 x 21 cm Plexiglas cylinder filled with room temperature water for 5 min. Each session was video recorded and scored for latency to float and total immobility time.

Light-Dark Boxes

Mice were placed into the light side of a two-chambered box. The clear plastic light side (15 x 30 x 20 cm) connected to a dark plastic chamber through a 5 x 7 cm opening. Boxes were housed inside ventilated sound-attenuating chambers and lit with overhead lights. Infrared photocells across each side detected the location of the mouse and MED Activity computer software scored time in each box, locomotor activity, and number of transitions between boxes (MED Associates, Georgia, VT, USA).

Prepulse Inhibition

Mice were placed into cylinders affixed to force-transducers inside ventilated sound-attenuating chambers. After a 5 min acclimation, 45 trials were presented randomly with 20 ms of varying prepulse levels (0, 70, 76, 82, or 88 dB) followed by a 40 ms, 120 dB white noise burst. 9 null trials served as baseline measurements. Percent prepulse inhibition (startle during prepulse trials / startle during 0 dB trials x 100) and acoustic startle response (0 dB prepulse vs. null trials) were recorded and analyzed by StartleReflex software (MED associates).

Y-Maze Alternation

Mice were placed into an enclosed clear plastic y-maze (35 x 5 cm arms) and allowed to explore freely for 5 min. ANY-maze (Stoelting Co.) scored arm entries when the mouse moved completely into an arm. Alternations were defined as entering each of the arms in a sliding window of three entries. Percent alternation was determined by calculating the number of successful alternations out of the total possible alternations.

Social Interaction

The three-chambered social interaction task was used as described by Silverman et al. [8] with minor modifications. The task involved three, 10 min phases. First, mice acclimated to the three chambered, clear plastic box (57 x 40 x 45 cm). Second, two wire pencil cups were placed in the two side chambers. In one cup a novel social stimulus mouse was placed while the second cup remained empty. Third, a second novel social stimulus mouse was placed in the empty cup. Social stimulus mice were naïve adult male wild type C57Bl/6 mice. Cup location and social stimulus mouse order were counterbalanced. ANY-maze (Stoelting Co.) tracked the position of the test mouse and scored interaction time when the head was <1 cm from the cups. Preference was calculated as 100 x (novel mouse 1 interaction time – novel object interaction time) / (novel mouse 1 interaction time + novel object interaction time) and 100 x (novel mouse 2 interaction time – familiar mouse interaction time) / (novel mouse 2 interaction time + familiar mouse interaction time).

Olfactory Habituation

A series of nonsocial (orange and almond extract, diluted 1:100 with water, McCormick and Co., Sparks, MD, USA) and social odors (conspecific bedding) were presented via cotton swabs to each mouse [8]. Each presentation lasted 2 min with 1 min between trials. An experimenter, blinded to experimental conditions, measured the total time each mouse investigated the swab.

Fear Conditioning

Contextual and cued fear conditioning was tested using the protocol developed for mice by Smith et al. [9] with minor modifications. Mice explored the chamber (20 x 15 x 10 cm) freely for 12 min. The next day, they received 6 tone-footshock pairings (70 dB, 2 kHz, 20 s tone and 2 s, 0.5 mA shock separated by 18 s). On day three, mice were placed into the “training chamber” for 15 min with no tones or shocks before being returned to a clean cage while the testing chamber was cleaned and outfitted with striped walls and covered floor. Mice were placed back into the chamber and allowed to explore this novel “testing context” for 3 min. Cued testing trials began immediately following the novel context exploration. Ten tones identical to those in the training phase were administered 80 s apart without shocks. Freezing, the absence of movement other than breathing, was scored objectively by VideoFreeze (MED Associates).

Amphetamine-Induced Locomotion

Mice were placed into clear plastic boxes (30 x 30 x 20 cm) inside ventilated sound-attenuating chambers lit with overhead white light, allowed to explore freely for 15 min, removed and injected with 3 mg/kg D-amphetamine hemisulfate (Sigma-Aldrich, St. Louis, MO, USA) in 0.9% saline solution, and immediately returned to the chamber for 60 min. Infrared photocells measured locomotor activity (MED Activity software, MED Associates).

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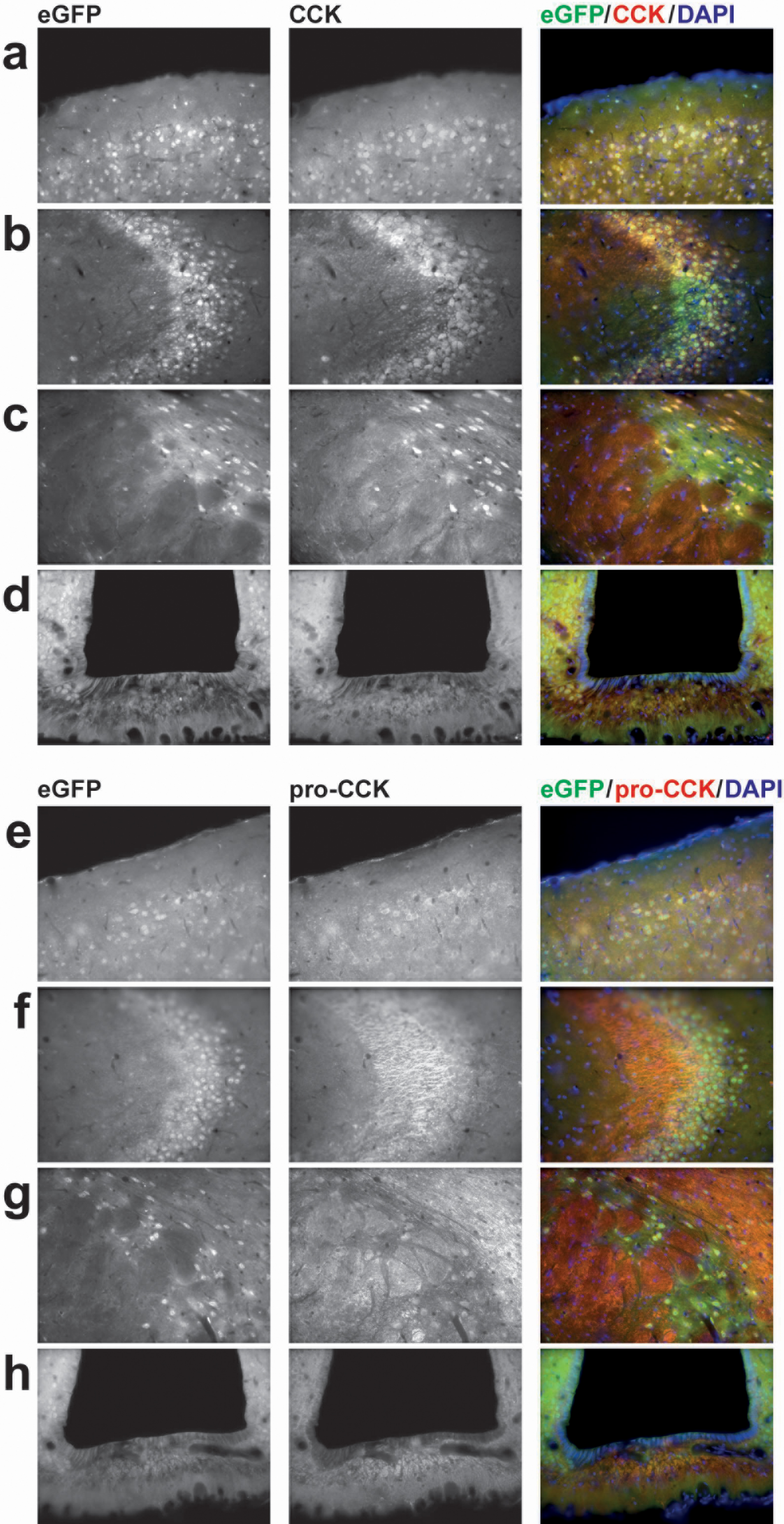
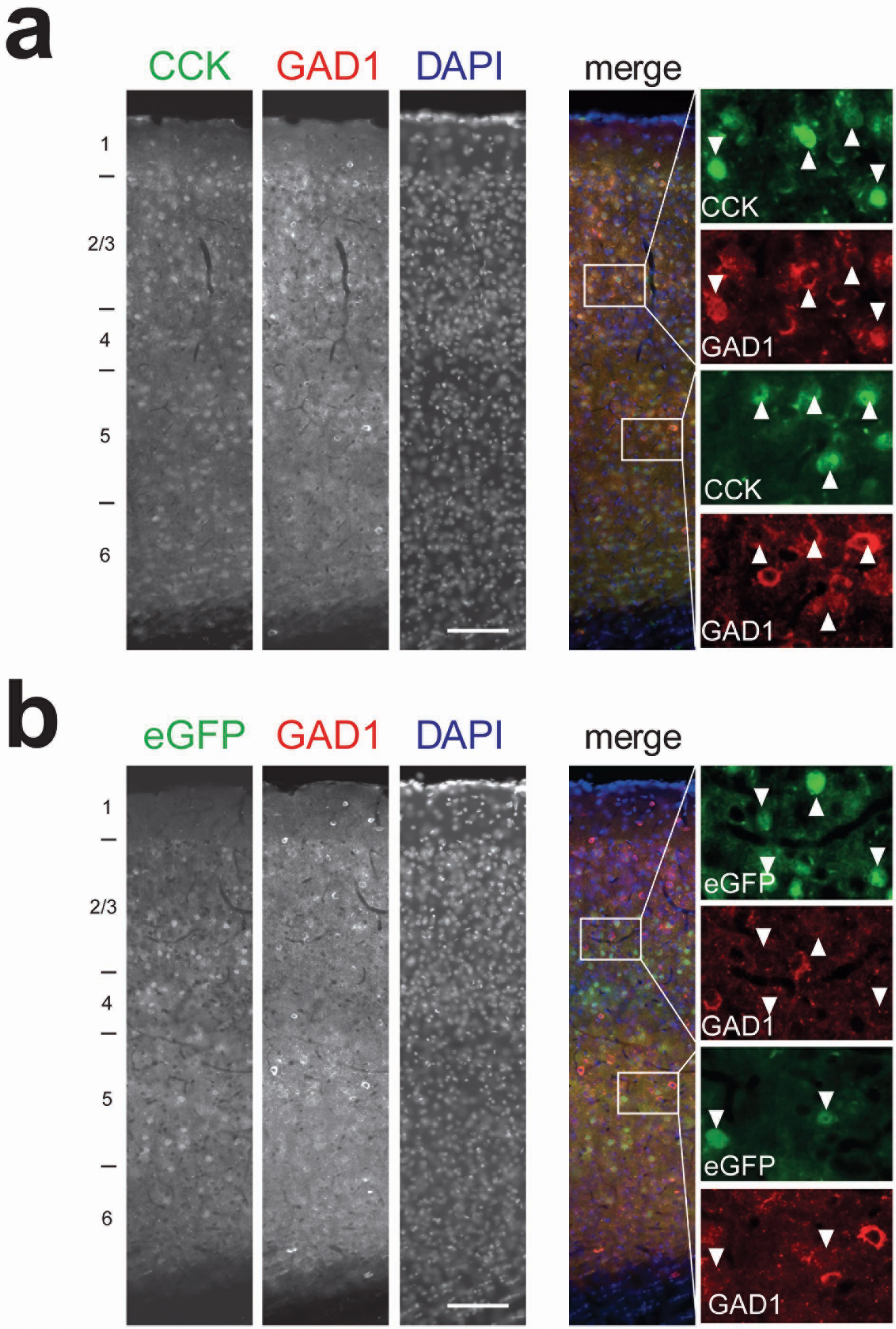
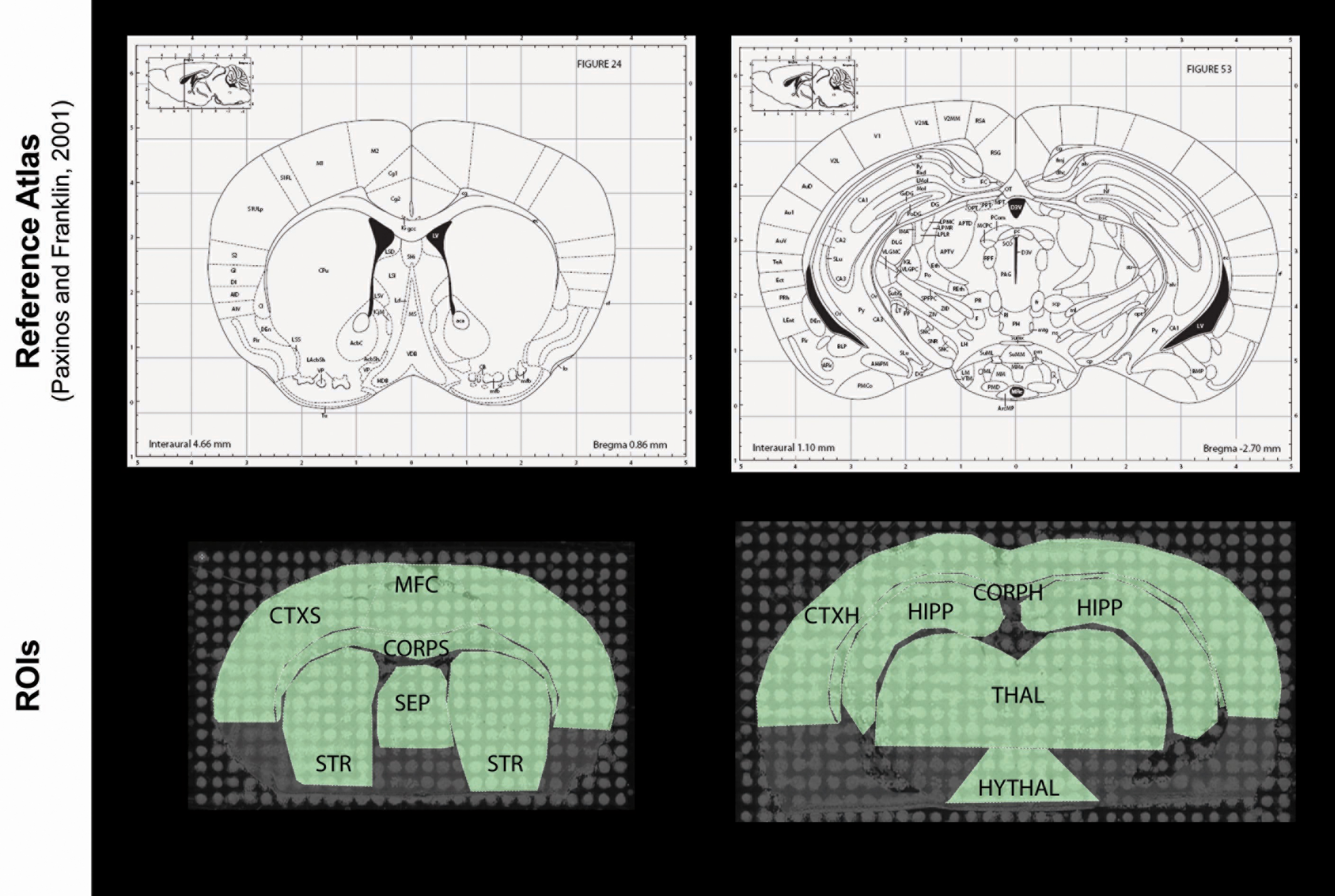
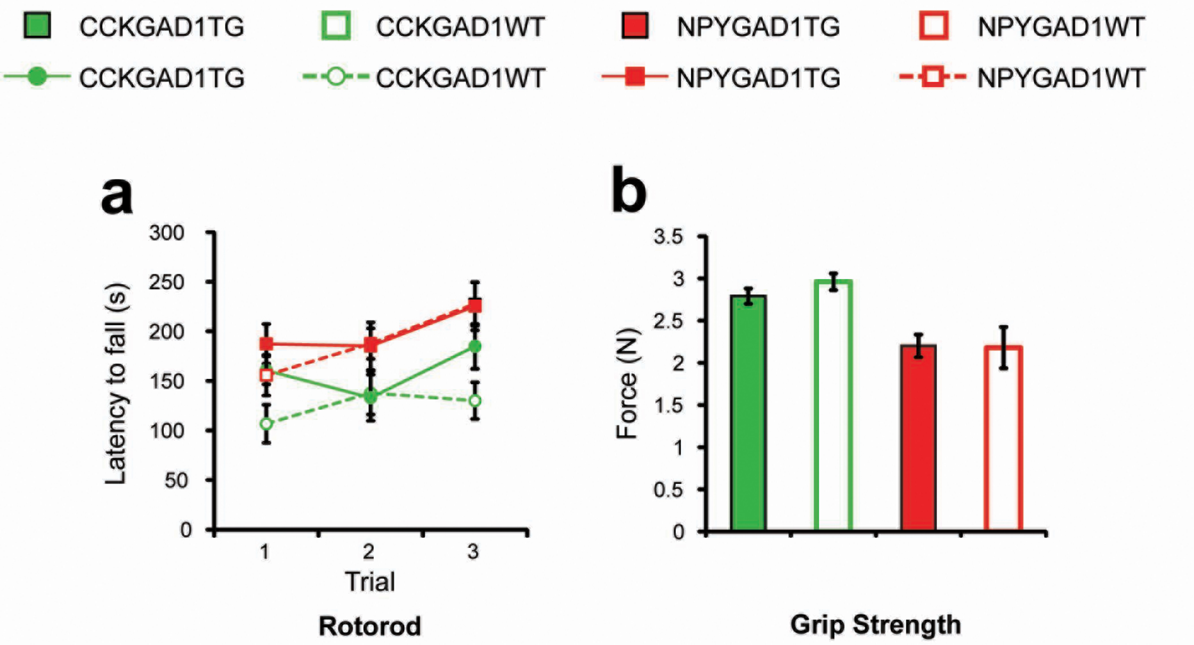
Supplementary Figure 1.



Supplementary Figure 2.




Reference Atlas
(Paxinos and Franklin, 2001)
ROIs
FIGURE 24
Interaural 4.66 mm
Bregma 0.86 mm
FIGURE 53
Interaural 1.10 mm
Bregma -2.70 mm
MFC
CTXS
CORPS
SEP
STR
STR
CTXH
HIPP
CORPH
HIPP
THAL
HYTHAL


CCKGAD1TG
CCKGAD1WT
NPYGAD1TG
NPYGAD1WT
CCKGAD1TG
CCKGAD1WT
NPYGAD1TG
NPYGAD1WT
a
Latency to fall (s)
300
250
200
150
100
50
0
1
2
3
Trial
Rotorod
b
Force (N)
3.5
3
2.5
2
1.5
1
0.5
0
Grip Strength

NPYGAD1

	CORPH		CORPS		CTXH		CTXS		HIPP	
m/z	ALR	p-value	ALR	p-value	ALR	p-value	ALR	p-value	ALR	p-value
602.2	0.146	0.036*	-0.683	0.398	0.337	**0.018**	-0.628	0.362	-0.032	0.813
606.4	-0.113	0.708	0.46	0.19	-0.015	0.925	0.203	0.169	-0.114	0.412
621.4	-0.067	0.572	0.312	0.09	-0.042	0.603	0.137	0.268	-0.065	0.482
658.1	-0.029	0.871	-0.142	0.657	0.255	**0.04**	-0.339	0.51	0.128	0.089
663.3	0.25	**0.003**	-0.124	0.564	0.124	**0.012**	-0.099	0.501	-0.07	0.41
705.4	-0.194	0.622	0.693	0.129	-0.207	0.441	0.36	0.091	-0.144	0.472
706.4	-0.126	0.698	0.556	0.1	-0.16	0.487	0.321	0.083	-0.103	0.54
767.7	-0.37	0.202	0.676	0.172	-0.349	0.079	0.383	0.146	-0.206	0.27
784.7	-0.204	0.424	0.668	0.159	-0.3	0.232	0.313	0.095	-0.211	0.257
822.8	0.563	0.05	-0.322	0.357	-0.325	0.254	0.279	0.284	-0.22	0.411
824.7	0.184	0.246	0.03	0.871	-0.287	0.262	0.246	0.354	-0.261	0.323
834.8	0.487	0.030*	-0.468	0.133	-0.12	0.325	0.11	**0.043**	-0.104	0.179
838.9	0.846	0.064	-0.582	0.194	-0.274	0.378	0.204	0.525	-0.265	0.334
850.9	0.68	0.053	-0.465	0.354	-0.175	0.498	0.089	0.765	-0.191	0.364
866.9	0.753	**0.048**	-0.542	0.357	-0.159	0.616	-0.016	0.976	-0.215	0.423
884.7	0.445	0.067	-0.325	0.147	_	_	_	_	_	_
896.7	_	_	_	_	0.125	**0.018**	-0.213	0.419	_	_
909.2	_	_	_	_	_	_	_	_	0.221	**0.018**
963.8	-0.012	0.953	-0.504	0.104	0.197	0.175	-0.388	0.366	0.099	0.167
966.9	0.564	0.032*	-0.495	0.161	0.149	0.054	-0.262	0.367	0.047	0.485
968.8	0.517	0.042*	-0.497	0.072	0.093	0.314	-0.165	0.394	0.001	0.993
972.6	0.329	0.106	-0.389	**0.004**	_	_	_	_	_	_
1069.9	_	_	_	_	0.428	**0.02**	-0.394	0.15	_	_
1085	0.097	0.506	-0.544	0.087	0.262	**0.021**	-0.335	0.232	-0.069	0.563
1114	0.075	0.305	-0.27	0.482	0.399	**0**	-0.489	0.253	_	_
1114.8	0.044	0.754	-0.321	0.274	0.413	**0.005**	-0.427	0.251	_	_
1122.9	0.101	0.687	-0.27	0.344	0.297	**0.007**	-0.278	0.2	0.07	0.562
1157.8	0.204	0.293	-0.228	0.182	0.442	**0.009**	-0.187	0.27	0.315	0.064
1158.8	0.213	0.164	-0.486	**0.046**	_	_	_	_	_	_
1173	0.193	0.096	-0.184	0.271	0.273	**0.049**	-0.192	0.095	0.1	0.575
1185.9	0.258	0.088	-0.238	0.346	0.34	**0.026**	-0.329	0.165	0.136	0.303
1188.9	_	_	_	_	0.378	**0.043**	-0.308	0.138	0.113	0.587

1200	_	_	_	_	0.255	0.071	-0.2	**0.026**	0.163	0.335
1201.9	0.37	0.113	-0.087	0.064	0.422	**0.015**	-0.376	0.195	0.224	**0.003**
1223.9	0.052	0.575	-0.598	**0.017**	_	_	_	_	0.114	0.367
1242	_	_	_	_	0.296	0.085	-0.336	0.188	0.136	0.286
1246.1	0.393	0.025*	-0.475	**0.005**	0.428	0.069	-0.388	0.227	0.322	0.112
1259	-0.013	0.963	-0.514	0.086	0.32	**0.033**	-0.461	0.233	0.157	0.441
1274.1	0.177	0.253	-0.24	0.444	0.404	**0.008**	-0.499	0.258	0.208	0.297
1275.9	_	_	_	_	0.394	**0.002**	-0.516	0.223	_	_
1278.2	-0.043	0.764	-0.047	0.716	0.346	**0.034**	-0.269	0.194	0.131	0.471
1290.1	0.531	0.165	-0.219	0.202	0.593	0.086	-0.408	0.238	0.34	**0.023**
1294.2	0.285	0.201	-0.236	**0.034**	0.329	**0.007**	-0.154	0.131	0.161	0.123
1318.1	0.151	0.204	-0.634	0.075	0.441	**0.012**	-0.378	0.196	0.19	0.223
1322.1	0.222	0.332	-0.397	0.269	0.322	0.06	-0.248	0.088	0.134	0.516
1349.7	0.2	**0.001**	-0.404	**0.013**	0.235	**0.018**	-0.131	0.219	0.122	0.268
1352.9	0.184	0.036*	-0.39	**0.007**	_	_	_	_	_	_
1353.8	0.202	0.023*	-0.28	**0.043**	_	_	_	_	_	_
1357.2	0.155	0.391	-0.282	**0.049**	0.25	0.058	-0.26	0.139	0.185	0.131
1362.1	0.288	0.040*	-0.173	0.35	0.397	**0.002**	-0.291	0.1	0.205	0.144
1394	0.143	0.129	-0.462	0.167	0.338	**0.048**	-0.281	0.168	0.044	0.421
1406.2	0.23	0.259	-0.391	0.153	0.528	**0.012**	-0.236	0.111	0.215	0.106
1431.1	0.04	0.81	-0.499	**0.003**	0.289	0.052	-0.294	0.272	0.095	0.376
1432.9	0.109	0.527	-0.61	**0.016**	_	_	_	_	-0.007	0.954
1450.2	0.178	0.249	-0.193	0.523	0.457	**0.023**	-0.331	0.203	0.162	**0.028**
1466.3	0.617	0.41	0.033	0.882	0.572	0.096	-0.212	**0.04**	0.45	0.147
1468.1	_	_	_	_	0.193	0.296	0.01	0.974	0.178	**0.005**
1491.4	_	_	_	_	0.235	0.157	-0.176	**0**	0.116	0.502
1492.2	_	_	_	_	0.192	0.339	-0.074	0.309	_	_
1517.2	_	_	_	_	0.171	**0.017**	-0.014	0.838	0.019	0.866
1538.3	0.415	0.212	-0.494	**0.005**	0.393	0.087	-0.219	0.025*	0.138	0.157
1549.1	-0.012	0.948	-0.114	0.205	0.161	0.148	-0.094	0.45	-0.011	0.909
1578.1	0.109	0.498	-0.295	0.342	0.271	**0.025**	-0.291	0.068	-0.003	0.989
1583.1	0.226	0.056	-0.032	0.476	0.353	**0.003**	-0.226	**0.045**	0.224	**0.043**
1593	_	_	_	_	0.185	**0.007**	-0.25	0.184	_	_
1604.1	0.093	0.154	-0.359	**0.032**	0.251	0.073	-0.259	0.093	0.094	0.506
1613.3	0.112	0.447	-0.307	**0.008**	_	_	_	_	_	_
1626.5	_	_	_	_	0.57	**0.044**	-0.232	0.129	_	_

1627.2	0.355	0.22	-0.372	**0.005**	0.262	0.156	-0.246	0.314	0.112	0.103
1671.1	0.143	0.308	-0.052	0.337	0.41	**0.012**	-0.12	0.357	0.141	0.143
1695.1	0.059	0.778	-0.268	0.241	0.299	0.063	-0.167	**0.002**	0.074	0.649
1715.1	0.299	0.084	-0.303	0.065	0.373	0.071	-0.218	**0.036**	0.112	0.343
1721.8	0.059	0.776	-0.238	0.416	0.233	0.061	-0.112	**0.043**	_	_
1751.3	0.06	0.782	-0.503	**0.007**	0.147	0.255	-0.214	0.193	-0.247	0.398
1759.2	0.376	0.125	-0.24	0.154	0.366	**0.008**	-0.185	0.104	0.049	0.755
1794.2	_	_	_	_	_	_	_	_	_	_
1854.3	_	_	_	_	0.172	0.085	-0.163	0.053	_	_
1857.6	0.275	0.285	-0.563	**0.031**	_	_	_	_	_	_
1907.3	0.45	0.151	-0.005	0.921	0.5	**0.04**	-0.144	**0.039**	0.371	**0.016**
1934.8	0.132	0.327	-0.264	0.136	0.277	0.073	-0.256	0.127	0.141	0.316
1951.3	0.363	0.085	-0.385	**0.025**	0.429	**0.002**	-0.269	0.108	0.175	0.07
1979.3	_	_	_	_	0.332	**0.034**	-0.346	0.2	_	_
1995.4	0.418	0.085	-0.245	0.168	0.408	**0.021**	-0.307	0.061	0.213	0.094
2039.4	0.27	0.022*	-0.545	0.063	0.408	**0.009**	-0.301	0.074	0.197	0.058
2062.2	0.193	0.216	-0.695	**0.042**	0.258	0.08	-0.341	0.305	0.02	0.887
2083.5	0.086	0.448	-0.593	**0.012**	0.419	**0.028**	-0.329	0.134	0.15	0.423
2127.5	0.16	0.114	-0.39	**0.025**	0.335	**0.04**	-0.385	0.129	_	_
2387.6	0.169	0.391	-0.559	**0.028**	0.326	0.147	-0.418	0.129	_	_
2406.5	0.139	0.451	-0.516	0.051	0.282	**0.034**	-0.259	0.266	-0.023	0.867
2442.1	0.211	0.586	-0.316	0.155	0.32	0.099	-0.279	**0.029**	0.109	0.599
3097.6	0.156	0.306	-0.608	**0.025**	_	_	_	_	_	_
3214.9	_	_	_	_	0.167	**0.044**	0.003	0.962	0.151	0.367
3728	_	_	_	_	-0.205	0.259	-0.101	0.081	-0.173	0.141
3769.6	-0.049	0.615	0.126	**0.045**	0.045	0.657	0.185	0.202	0.13	0.347
4118.4	_	_	_	_	0.168	0.328	-0.068	0.457	0.008	0.981
4138.1	_	_	_	_	-0.178	0.073	-0.156	0.208	-0.302	**0.003**
4275.7	-0.021	0.773	0.079	0.352	0.184	**0.006**	0.122	0.207	_	_
4284.8	0.159	0.059	0.251	0.092	0.134	0.365	0.215	0.243	0.108	**0.01**
4338.6	-0.209	0.168	0.02	0.921	-0.112	0.263	-0.057	0.528	-0.201	**0.007**
4419.3	_	_	_	_	-0.087	0.092	-0.153	**0.005**	-0.125	0.203
4510.1	-0.116	**0.047**	-0.223	**0.01**	0.064	0.71	-0.286	0.052	0.197	0.076
4570.5	_	_	_	_	-0.495	0.132	-0.133	0.612	-0.442	0.173
4667.4	0.292	0.28	0.444	**0.041**	0.056	0.814	0.402	0.087	0.02	0.923
5021.6	-0.18	0.043*	-0.206	0.23	-0.154	0.187	-0.249	0.285	-0.05	0.524

5061.1	_	_	_	_	-0.088	0.4	-0.07	0.514	_	_
5105.3	_	_	_	_	_	_	0.121	0.144	_	_
5289.9	_	_	_	_	_	_	_	_	_	_
5378.1	-0.188	0.345	-0.152	0.513	-0.032	0.844	0.132	0.261	-0.083	0.581
5829	_	_	_	_	0.104	0.498	-0.028	0.656	-0.02	0.9
6174	0.317	0.216	0.078	0.655	_	_	_	_	0.164	**0.031**
6332.6	_	_	_	_	_	_	_	_	_	_
6725.9	0.323	0.121	0.226	0.489	0.516	**0.021**	0.325	0.37	0.55	**0.047**
6956.5	-0.281	0.376	-0.029	0.376	-0.65	0.069	_	_	-0.795	**0.018**
7244.8	_	_	_	_	_	_	0.077	0.639	_	_
7758.9	0.212	0.039*	0.387	0.243	0.266	**0.044**	0.197	0.403	0.032	0.84
7864.7	_	_	_	_	_	_	_	_	_	_
8260.4	-0.176	0.034*	0.042	0.624	-0.078	0.532	0.027	0.833	-0.287	**0.022**
8498.9	-0.002	0.985	0.215	**0.001**	-0.072	0.718	0.154	0.392	0.093	0.585
8799	-0.089	0.713	-0.205	0.542	0.129	0.235	0.356	0.087	0.365	0.201
9087.9	0.052	0.301	-0.088	0.312	0.101	0.329	-0.079	0.683	0.058	0.641
9922.1	0.166	0.518	0.153	0.349	-0.02	0.936	0.03	0.818	-0.1	0.577
10271.3	0.168	0.278	0.261	0.291	0.062	0.794	0.057	0.805	0.042	0.818
10495.8	_	_	_	_	0.064	0.784	0.1	0.556	_	_
12421.7	0.148	0.215	0.092	0.748	0.102	0.177	-0.061	0.644	-0.108	0.399
12683.5	_	_	_	_	-0.067	0.611	-0.06	0.704	-0.202	**0.007**
14746.8	_	_	_	_	-0.034	0.534	-0.009	0.943	-0.13	**0.001**
14995.4	0.07	0.839	0.362	0.378	0.006	0.987	0.473	0.318	0.461	0.201
21150.2	_	_	_	_	-0.098	0.403	-0.03	0.83	-0.172	**0.006**
21241.6	_	_	_	_	_	_	-0.039	0.781	-0.143	**0.005**

HYTH		MFC		SEPTUM		STR		THAL		
ALR	p-value	ALR	p-value	ALR	p-value	ALR	p-value	ALR	p-value	m/z
_	_	-0.613	0.326	_	_	-0.549	0.28	0.189	0.291	602.2
-0.501	0.371	0.254	**0.011**	0.218	0.598	0.254	0.375	-0.099	0.333	606.4
-0.157	0.3	0.104	**0.029**	0.161	0.392	0.151	0.345	-0.009	0.891	621.4
_	_	-0.37	0.4	_	_	-0.352	0.455	0.275	0.004*	658.1
0.002	0.99	_	_	_	_	-0.044	0.496	0.06	0.556	663.3
-0.38	0.403	0.271	**0.014**	0.239	0.481	0.435	0.258	-0.22	0.221	705.4
-0.341	0.406	0.221	**0.046**	0.193	0.521	0.393	0.22	-0.157	0.249	706.4
-0.494	0.07	0.341	0.231	0.417	0.16	0.585	**0.04**	-0.23	0.232	767.7
-0.161	0.077	0.21	**0.028**	0.407	0.282	0.49	0.126	-0.303	0.234	784.7
0.289	0.209	0.279	0.44	0.333	**0.044**	0.311	**0.04**	-0.07	0.669	822.8
0.155	0.255	0.299	0.275	0.338	**0.035**	0.335	0.139	-0.105	0.495	824.7
0.224	0.205	0.083	0.699	0.117	0.671	0.104	0.563	-0.007	0.936	834.8
0.509	0.33	0.268	0.688	0.075	0.632	0.103	**0.013**	-0.071	0.671	838.9
0.435	0.359	0.086	0.88	0.181	0.317	0.123	**0.032**	-0.051	0.743	850.9
0.48	0.338	0.084	0.923	0.166	0.377	-0.044	0.726	-0.008	0.954	866.9
_	_	_	_	_	_	_	_	0.18	**0.026**	884.7
_	_	_	_	_	_	_	_	_	_	896.7
_	_	-0.509	0.185	_	_	_	_	_	_	909.2
0.122	**0.047**	-0.304	0.459	-0.172	0.606	-0.368	0.326	0.152	0.358	963.8
0.214	0.06	_	_	-0.021	0.566	-0.172	**0.032**	0.167	0.058	966.9
0.142	0.143	_	_	-0.085	0.141	-0.152	**0.01**	0.095	0.284	968.8
_	_	_	_	_	_	_	_	0.039	0.803	972.6
0.477	0.134	_	_	_	_	_	_	_	_	1069.9
0.149	0.49	-0.455	0.296	-0.573	0.175	-0.475	0.114	0.143	0.492	1085
0.479	0.145	_	_	-0.126	0.67	-0.64	0.208	0.214	0.253	1114
_	_	_	_	_	_	-0.583	0.168	0.22	0.19	1114.8
0.083	0.072	_	_	-0.257	0.541	-0.47	0.067	0.056	0.684	1122.9
0.352	0.238	-0.024	0.683	-0.413	0.092	-0.429	0.174	0.174	0.459	1157.8
_	_	_	_	_	_	_	_	0.234	0.289	1158.8
0.175	0.237	-0.243	0.206	-0.32	0.071	-0.196	0.068	0.145	0.511	1173
0.362	0.040*	-0.314	0.241	-0.452	0.149	-0.365	0.179	0.194	0.2	1185.9
0.197	0.023*	_	_	-0.289	0.222	-0.325	0.148	0.151	0.402	1188.9

0.075	0.328	-0.223	0.354	-0.262	0.168	-0.2	**0.021**	0.198	0.167	1200
0.468	0.185	-0.139	0.231	-0.291	0.288	-0.514	0.244	0.253	0.12	1201.9
_	_	_	_	_	_	_	_	0.102	0.293	1223.9
0.217	0.07	-0.357	0.207	-0.379	**0.035**	-0.448	0.137	0.202	0.261	1242
0.669	0.188	-0.123	0.357	-0.474	0.123	-0.665	0.207	0.295	**0.044**	1246.1
0.247	0.118	-0.483	0.31	-0.609	0.131	-0.662	0.149	0.193	0.251	1259
0.22	0.172	-0.48	0.276	-0.464	0.25	-0.656	0.192	_	_	1274.1
_	_	_	_	_	_	_	_	0.255	0.205	1275.9
0.272	0.039*	-0.262	0.337	-0.119	0.163	-0.309	0.064	0.122	0.336	1278.2
0.496	0.416	-0.063	0.648	-0.212	0.486	-0.691	0.299	0.271	**0.037**	1290.1
0.21	0.164	-0.232	0.284	-0.02	0.758	-0.276	**0.015**	0.18	0.098	1294.2
0.251	0.335	-0.291	0.435	-0.443	0.154	-0.472	0.232	0.275	**0.027**	1318.1
0.117	0.19	_	_	_	_	-0.305	**0.028**	0.189	0.325	1322.1
0.196	0.296	-0.202	0.111	-0.319	0.167	-0.255	0.063	0.114	0.437	1349.7
0.17	0.264	_	_	_	_	_	_	0.107	0.553	1352.9
_	_	_	_	_	_	_	_	0.111	0.551	1353.8
0.215	0.087	-0.383	0.089	-0.318	0.22	-0.334	0.14	0.109	0.578	1357.2
0.396	0.154	-0.291	0.074	-0.362	0.134	-0.416	0.143	0.239	0.225	1362.1
0.278	0.06	_	_	-0.253	0.487	-0.354	0.075	0.102	0.53	1394
0.425	0.108	-0.127	0.287	-0.253	0.282	-0.381	0.162	0.18	0.334	1406.2
0.367	0.053	_	_	-0.437	0.111	-0.476	0.142	0.151	0.549	1431.1
0.154	0.464	_	_	_	_	_	_	0.002	0.992	1432.9
0.38	0.276	-0.243	0.321	-0.557	0.177	-0.609	0.178	0.207	0.145	1450.2
0.329	0.619	0.279	0.625	-0.191	0.287	-0.657	0.327	0.212	0.109	1466.3
_	_	0.131	0.791	-0.363	**0.01**	-0.302	0.108	0.07	0.434	1468.1
_	_	-0.163	0.401	_	_	-0.257	**0**	_	_	1491.4
0.045	0.564	-0.283	0.114	-0.164	**0.049**	0.102	0.611	_	_	1492.2
_	_	0.095	0.562	-0.231	0.192	-0.139	0.265	-0.024	0.831	1517.2
0.49	0.219	-0.227	0.193	-0.267	0.309	-0.545	0.217	0.219	0.2	1538.3
0.185	0.152	-0.254	**0.002**	-0.347	0.141	-0.22	0.268	0.015	0.922	1549.1
0.028	0.888	_	_	-0.252	0.536	-0.372	**0.043**	0.046	0.787	1578.1
0.158	0.444	-0.134	0.189	-0.198	0.335	-0.368	0.104	0.191	0.166	1583.1
_	_	_	_	-0.412	0.291	_	_	_	_	1593
_	_	_	_	_	_	_	_	0.133	0.514	1604.1
_	_	_	_	_	_	_	_	0.15	0.478	1613.3
_	_	-0.049	0.844	-0.411	**0.015**	-0.569	0.163	_	_	1626.5

0.26	0.392	-0.146	0.522	-0.472	0.097	-0.466	0.194	0.197	0.23	1627.2
0.329	0.354	-0.081	0.435	-0.341	0.122	-0.347	0.163	0.13	0.336	1671.1
0.117	0.604	-0.206	0.385	-0.268	0.416	-0.305	0.071	0.074	0.694	1695.1
0.274	0.41	-0.189	0.195	-0.31	0.306	-0.389	0.149	0.088	0.516	1715.1
_	_	_	_	_	_	_	_	0.08	0.65	1721.8
0.187	0.319	-0.279	0.433	-0.479	0.116	-0.311	0.113	-0.122	0.64	1751.3
0.318	0.194	-0.133	0.394	-0.455	0.145	-0.416	0.159	_	_	1759.2
0.108	0.447	_	_	-0.288	0.359	-0.33	**0.042**	0.001	0.996	1794.2
_	_	_	_	-0.399	0.2	-0.392	**0.015**	_	_	1854.3
_	_	-0.201	0.477	-0.392	0.232	_	_	-0.09	0.81	1857.6
0.324	0.351	0.282	0.362	-0.133	0.47	-0.522	0.267	0.15	0.347	1907.3
0.137	0.246	-0.322	0.264	-0.311	0.066	-0.316	**0.026**	0.132	0.447	1934.8
0.287	0.269	-0.03	0.547	-0.462	0.107	-0.559	0.229	0.13	0.473	1951.3
_	_	_	_	_	_	_	_	_	_	1979.3
0.301	0.358	-0.083	0.264	-0.437	0.215	-0.542	0.188	0.162	0.438	1995.4
0.186	0.349	-0.144	0.424	-0.354	0.176	-0.541	0.193	0.14	0.42	2039.4
_	_	-0.463	0.394	-0.527	0.185	-0.403	0.133	0.11	0.566	2062.2
0.224	0.327	-0.422	0.08	-0.466	0.144	-0.463	0.151	_	_	2083.5
0.06	0.8	-0.441	0.224	-0.363	0.326	-0.49	0.106	_	_	2127.5
0.142	0.244	-0.355	0.462	_	_	_	_	0.156	0.535	2387.6
0.104	0.624	_	_	_	_	_	_	0.027	0.855	2406.5
_	_	-0.243	0.394	-0.398	0.077	-0.354	0.075	0.042	0.795	2442.1
0.097	0.531	-0.493	0.413	_	_	_	_	0.219	0.439	3097.6
_	_	-0.011	0.947	0.106	0.602	-0.038	0.815	0.034	0.904	3214.9
-0.285	0.297	-0.157	0.044*	-0.236	0.065	-0.293	0.085	-0.326	**0.016**	3728
-0.096	0.773	0.017	0.797	-0.118	0.241	0.018	0.802	-0.033	0.759	3769.6
_	_	-0.059	0.563	_	_	-0.142	**0.001**	_	_	4118.4
_	_	-0.119	0.323	-0.098	0.423	-0.198	**0.022**	_	_	4138.1
-0.519	0.482	0.135	**0.026**	_	_	0.029	0.833	_	_	4275.7
_	_	0.22	0.123	0.356	0.084	0.101	0.623	0.112	**0.01**	4284.8
-0.267	0.146	-0.081	0.564	0.06	0.327	-0.103	0.207	-0.215	**0.006**	4338.6
_	_	-0.051	0.495	0.095	0.672	-0.568	0.317	-0.197	0.281	4419.3
0.104	0.132	-0.389	0.025*	-0.251	0.138	-0.22	0.229	0.035	0.875	4510.1
_	_	-0.173	0.558	-0.135	0.627	-0.503	0.218	-0.419	**0.008**	4570.5
-0.222	0.389	0.439	0.125	0.288	0.087	0.291	**0.029**	0.158	0.428	4667.4
0.13	0.375	-0.389	0.245	-0.459	0.261	-0.327	0.151	-0.1	**0.038**	5021.6

_	_	-0.039	0.813	-0.176	0.557	-0.023	0.933	-0.354	**0.016**	5061.1
_	_	0.12	0.249	0.158	**0.004**	0.148	0.068	-0.012	0.895	5105.3
_	_	-0.185	0.131	-0.271	**0.035**	_	_	_	_	5289.9
0.137	0.712	0.254	0.208	0.064	0.704	0.013	0.925	-0.127	**0.038**	5378.1
-0.493	0.123	0.138	0.436	-0.171	**0.023**	_	_	-0.302	0.337	5829
0.109	0.662	_	_	0.026	0.79	0.049	0.754	0.175	0.24	6174
_	_	_	_	_	_	_	_	-0.268	**0.014**	6332.6
0.025	0.952	0.383	0.314	0.499	0.186	0.306	0.549	0.732	0.183	6725.9
_	_	-0.2	0.357	-0.253	0.289	-0.282	**0.023**	_	_	6956.5
_	_	_	_	0.21	**0.016**	0.115	0.213	_	_	7244.8
-0.107	0.429	0.35	0.259	0.005	0.964	0.27	0.216	0.092	0.536	7758.9
0.507	**0.048**	_	_	_	_	_	_	0.1	0.601	7864.7
-0.019	0.929	0.171	0.153	0.019	0.95	0.025	0.902	-0.239	0.237	8260.4
-0.201	0.457	0.12	0.36	0.283	**0.015**	0.127	0.296	0.139	0.375	8498.9
0.618	0.044*	0.233	0.354	0.409	**0.031**	0.235	**0.013**	0.205	0.463	8799
0.138	0.228	-0.051	0.813	-0.06	0.854	-0.084	0.688	0.167	**0.011**	9087.9
-0.421	0.079	0.181	0.412	0.289	**0.025**	0.065	0.577	0.067	0.392	9922.1
-0.301	0.185	0.326	**0.007**	0.342	0.212	0.139	0.344	0.177	0.194	10271.3
_	_	0.279	**0.038**	0.102	0.716	0.067	0.685	_	_	10495.8
-0.07	0.883	0.234	**0.047**	-0.013	0.959	-0.042	0.818	-0.045	0.851	12421.7
-0.171	0.348	-0.026	0.807	-0.032	0.898	-0.091	0.401	-0.192	**0.016**	12683.5
_	_	0.02	0.842	0.004	0.988	-0.064	0.504	-0.074	0.555	14746.8
1.178	0.108	0.365	0.28	0.229	0.491	0.353	0.397	0.731	**0.006**	14995.4
_	_	0.005	0.964	0.025	0.924	-0.07	0.564	_	_	21150.2
_	_	-0.001	0.992	0.071	0.79	-0.097	0.44	_	_	21241.6

CCKGAD1

m/z	CorpH		CorpS		CTXH		CTXS		HIPP	
	ALR	p-value	ALR	p-value	ALR	p-value	ALR	p-value	ALR	p-value
606.4	-0.272	0.248	-0.541	**0.011**	-0.024	0.9	-0.034	0.899	-0.115	0.593
705.4	-0.383	0.329	-0.527	**0.017**	-0.064	0.824	-0.067	0.785	-0.195	0.355
706.4	-0.289	0.371	-0.439	**0.045**	-0.056	0.825	-0.074	0.741	-0.191	0.348
724.4	-0.074	0.416	-0.307	0.484	0.078	0.428	0.18	0.27	-0.091	**0.004**
757.7	-0.104	0.485	-0.563	0.134	-0.026	0.856	-0.021	0.855	-0.173	0.192
773.7	-0.096	0.17	-0.317	0.493	0.046	0.598	0.159	0.402	-0.12	**0.012**
790.7	0.132	0.371	-0.272	**0.014**	_	_	_	_	_	_
804.7	0.069	0.536	-0.184	0.122	-0.089	0.38	-0.01	0.904	0.01	0.898
812.8	0.044	0.197	-0.344	**0.029**	-0.052	0.667	0.019	0.759	-0.053	0.091
856.7	0.077	0.471	-0.069	0.768	_	_	_	_	0.171	**0.05**
868.7	0.092	0.527	0.025	0.884	-0.058	**0.049**	-0.142	0.649	0.297	0.082
1099.9	0.152	0.302	1.074	0.435	0.112	0.717	-0.014	0.98	0.384	0.11
1135	-0.039	0.857	0.004	0.987	-0.055	0.728	-0.294	**0.012**	0.183	0.377
1157.8	0.036	0.934	0.137	0.622	0.165	0.020*	-0.18	**0.015**	0.096	0.8
1210.9	-0.09	**0.047**	0.439	0.453	_	_	_	_	0.174	0.038*
1246.1	0.112	0.777	0.67	0.057	0.176	0.361	0.096	0.314	0.022	0.96
1321.9	0.084	0.314	0.137	0.762	-0.119	0.499	-0.168	0.428	0.074	**0.003**
1362.1	-0.058	0.878	0.244	**0.019**	0.035	0.691	-0.08	0.411	-0.1	0.654
1408.1	-0.025	0.944	0.706	0.13	_	_	_	_	_	_
1415.1	_	_	_	_	_	_	_	_	_	_
1450.2	-0.064	0.898	0.61	0.106	0.111	0.431	-0.072	0.719	-0.016	0.974
1495.2	-0.24	0.653	0.215	0.704	0.07	0.547	-0.018	0.913	-0.04	0.855
1629	_	_	_	_	_	_	_	_	0.028	0.852
1700.9	-0.061	0.785	0.395	0.366	-0.438	0.207	-0.14	0.642	-0.014	0.927
1835	0.221	0.659	1.294	0.351	-0.16	0.063	0.303	0.658	0.436	**0.003**
1840.2	-0.205	0.435	0.034	0.968	-0.491	0.209	0.356	0.43	-0.159	0.535
1847.5	-0.072	0.827	1.036	0.192	-0.025	0.809	0.075	0.723	0.147	0.46
1854.3	_	_	_	_	-0.254	0.231	-0.075	0.549	_	_
1873	-0.002	0.996	1.018	0.393	-0.243	**0.027**	0.096	0.842	0.375	0.159
1891.4	-0.063	0.725	0.654	**0.03**	-0.002	0.99	-0.074	0.484	_	_
1934.8	-0.166	0.278	0.469	**0**	-0.136	0.384	-0.037	0.748	-0.005	0.969
1990.1	-0.1	0.461	0.46	0.462	_	_	_	_	0.047	0.536

2083.5	0.051	0.808	0.821	**0.042**	0.023	0.924	0.22	0.195	0.349	0.29
2127.5	0.098	0.618	0.862	**0.028**	0.006	0.975	0.156	0.123	_	_
2224.5	-0.188	0.234	0.345	0.308	-0.238	0.288	-0.131	0.555	-0.055	0.644
3051.3	-0.175	0.299	0.355	**0.034**	_	_	_	_	0.034	0.876
3246	_	_	_	_	0.299	0.409	-0.137	0.307	_	_
3347.1	0.592	0.239	0.068	0.383	0.672	**0.039**	0.216	0.394	0.581	0.341
4138.1	_	_	_	_	0.097	0.704	0.047	0.639	0.026	0.879
6124.3	0.318	0.093	0.029	0.888	0.181	0.28	-0.137	0.605	_	_
6189.9	0.228	0.183	-0.186	**0.041**	0.336	0.217	-0.122	0.474	0.159	0.199
6916.6	-0.566	0.16	0.098	0.484	-0.218	0.359	_	_	-0.117	0.407
10271.3	0.023	0.678	-0.011	0.952	-0.234	0.1	0.009	0.922	0.064	0.458
12421.7	0.03	0.958	-0.379	**0.024**	0.221	0.591	-0.24	0.434	0.014	0.979
13905.5	-0.836	0.295	0.019	0.945	-0.421	0.468	0.059	0.318	-0.3	0.598
14541.4	-0.538	0.094	-0.101	0.662	-0.341	0.007*	-0.109	**0.048**	-0.632	0.107
14746.8	_	_	_	_	-0.042	0.735	0.119	0.662	-0.346	0.045*
15631.1	-0.644	**0.005**	0.095	0.688	-0.347	0.195	0.188	0.434	-0.675	0.093
16291.2	-0.121	0.425	0.078	0.748	0.058	0.784	0.155	0.624	-0.112	0.459
17279.8	-0.162	0.4	-0.034	0.678	-0.002	0.993	0.005	0.961	-0.148	0.444
22185.7	-0.469	0.071	0.098	0.163	-0.528	0.012*	0.19	0.079	-0.419	0.095
22385.1	_	_	_	_	-0.247	0.344	0.235	0.305	-0.327	0.065

HYTH		MFC		SEPTUM		STR		THAL		
ALR	p-value	ALR	p-value	ALR	p-value	ALR	p-value	ALR	p-value	m/z
0.418	**0.033**	-0.02	0.946	-0.008	0.966	-0.07	0.808	-0.155	0.152	606.4
0.336	0.023*	-0.038	0.894	-0.121	0.323	-0.15	0.546	-0.221	0.171	705.4
0.323	0.018*	-0.056	0.821	-0.135	0.286	-0.158	0.482	-0.197	0.178	706.4
0.168	0.551	0.172	**0.01**	-0.083	0.56	-0.049	0.465	0.074	0.606	724.4
0.143	**0.002**	_	_	-0.124	0.298	_	_	-0.072	0.155	757.7
0.105	0.645	_	_	-0.114	0.493	-0.053	0.655	0.053	0.752	773.7
_	_	_	_	_	_	_	_	_	_	790.7
-0.037	0.905	0.026	0.812	-0.153	**0.035**	-0.104	0.457	0.033	0.768	804.7
0.009	0.951	-0.001	0.994	-0.083	0.215	-0.086	0.381	-0.058	0.029*	812.8
-0.178	0.465	-0.101	0.533	-0.132	0.365	_	_	0.024	0.545	856.7
-0.253	0.482	0.09	0.564	-0.047	0.725	-0.097	0.61	0.062	0.406	868.7
-0.181	0.609	-0.116	0.693	0.083	0.696	0.18	0.754	0.506	**0.008**	1099.9
0.096	0.646	-0.327	0.040*	-0.237	0.408	-0.167	0.413	0.01	0.977	1135
0.218	0.589	-0.38	0.184	-0.258	0.444	-0.002	0.981	0.107	0.791	1157.8
-0.105	0.225	_	_	_	_	_	_	0.04	0.565	1210.9
0.013	0.978	-0.125	0.615	0.035	0.938	0.229	**0.01**	0.109	0.76	1246.1
-0.023	0.841	_	_	-0.057	0.799	0.066	0.752	0.042	0.761	1321.9
-0.357	0.48	-0.237	0.239	0.041	0.818	0.122	0.343	-0.068	0.861	1362.1
_	_	-0.188	**0.049**	_	_	_	_	-0.022	0.916	1408.1
_	_	_	_	_	_	_	_	0.102	**0.047**	1415.1
-0.279	0.691	-0.142	0.555	0.139	0.726	0.421	**0.013**	0.021	0.96	1450.2
-0.337	0.45	0.061	0.693	0.123	0.378	0.264	**0.002**	-0.07	0.768	1495.2
_	_	_	_	_	_	_	_	-0.163	**0.002**	1629
-0.354	**0.04**	-0.168	0.458	0.017	0.865	0.011	0.95	-0.162	0.121	1700.9
-0.298	0.694	0.122	0.751	0.522	0.289	0.548	0.416	0.631	0.229	1835
-0.367	**0.032**	0.279	0.544	0.422	0.558	0.276	0.368	-0.324	0.073	1840.2
-0.43	0.423	-0.008	0.968	0.558	**0.024**	0.558	**0.034**	0.084	0.735	1847.5
_	_	_	_	0.294	**0.009**	0.085	0.614	_	_	1854.3
-0.491	0.359	0.044	0.902	0.57	0.312	0.339	0.572	0.232	0.515	1873
-0.454	0.419	-0.082	0.639	0.247	0.339	0.328	0.105	_	_	1891.4
-0.316	0.471	-0.057	0.697	0.139	0.12	0.14	0.27	-0.049	0.797	1934.8
-0.125	**0.044**	_	_	0.228	0.366	_	_	0.062	0.583	1990.1

-0.078	0.902	0.096	0.75	0.455	0.314	0.561	**0.01**	_	_	2083.5
-0.132	0.796	-0.061	0.754	0.314	0.479	0.436	**0.004**	_	_	2127.5
-0.232	0.149	_	_	0.335	**0.032**	0.103	0.531	-0.066	0.328	2224.5
_	_	_	_	_	_	_	_	-0.069	0.674	3051.3
_	_	-0.09	0.545	_	_	-0.289	**0.027**	_	_	3246
0.764	0.094	0.131	0.275	-0.22	0.064	-0.223	0.388	0.52	0.393	3347.1
_	_	0.085	**0.013**	-0.191	**0.004**	-0.157	0.381	_	_	4138.1
-0.227	0.381	_	_	-0.037	0.678	0.082	0.593	0.241	**0.008**	6124.3
0.198	0.635	-0.064	0.784	-0.21	0.023*	-0.194	0.199	0.264	**0.045**	6189.9
-0.099	0.513	_	_	0.456	**0.029**	0.312	0.165	-0.078	0.824	6916.6
0.447	**0.037**	0.003	0.969	-0.045	0.736	0.081	0.477	0.241	0.396	10271.3
-0.12	0.885	-0.146	0.641	-0.333	0.362	-0.457	0.156	-0.024	0.951	12421.7
-0.52	**0.037**	-0.288	0.431	0.275	0.488	0.196	0.179	-0.424	0.502	13905.5
-0.149	0.689	-0.145	0.592	-0.078	0.793	-0.197	0.556	-0.44	0.159	14541.4
_	_	0.196	0.349	0.125	0.505	0.085	0.4	-0.318	**0.01**	14746.8
0.008	0.99	0.201	0.489	-0.186	0.631	-0.114	0.264	-0.821	0.251	15631.1
0.217	0.711	0.178	0.417	-0.024	0.932	0.05	0.819	-0.285	**0.037**	16291.2
0.103	0.824	-0.028	0.904	0.123	0.571	-0.122	**0.025**	-0.138	0.629	17279.8
0.283	0.394	0.161	0.479	0.17	0.023*	0.332	0.207	-0.436	**0.038**	22185.7
_	_	0.178	0.148	0.281	**0.03**	0.273	0.096	_	_	22385.1

Supplementary Figure 1. eGFP colocalizes with eGFP in CCKGAD1 transgenic mice.

The CCK-BAC/GAD1-miRNA construct was specifically expressed in the neural subpopulations that normally express the CCK gene in CCKGAD1TG mice (**a, e** – cerebral cortex; **b, f** – hippocampus; **c, g** – substantia nigra; **d, h** – median eminence). Target specific expression was verified by immunofluorescent labeling for cholecystokinin and its precursor (proCCK). The left column micrographs represent eGFP immunostaining; the middle column micrographs represent sections labeled with anti-CCK (**a, b, c,** and **d**) or anti-proCCK (**e, f, g** and **h**) antibodies; and the right column micrographs illustrate pseudocolored composites of eGFP-CCK co-localization in the same tissue sections counterstained with DAPI nuclear stain. Note that while eGFP and CCK labeling is located to the soma and proximal dendrites, proCCK labels mainly the proximal dendritic branches of the same cells.

Supplementary Figure 2. GAD1 is suppressed in CCK+ interneurons. Immunofluorescence images show CCK (green) colocalization with GAD1 (red) in the cortex of wild type mice (**a**). GAD1 fluorescence is not present in eGFP+ (green) interneurons in the cortex of CCKGAD1 transgenic mice, indicating that the construct effectively suppresses GAD1 expression in CCK+ interneurons.

Supplementary Figure 3. MALDI-IMS profiles lipids, peptides, and proteins with spatial resolution. Sections at the level of the striatum (left side) and hippocampus (right side) were taken from adult male mice from each BAC transgenic line and wild type littermates. Each section was imaged using matrix assisted laser desorption ionization mass spectrometry at 250-micron resolution. Sections were subdivided into regions of interest (ROIs) for the cortex, medial frontal cortex, corpus callosum, hippocampus, hypothalamus, septum, striatum, and thalamus (bottom row). Mass spectra for each ROI were then processed and analyzed for statistical significance. Atlas images from Paxinos and Franklin, 2001

Paxinos G, Franklin KBJ. *The mouse brain in stereotaxic coordinates. 2nd edn.* Academic Press: San Diego, CA, USA, 2001.

Supplementary Figure 4. GAD1 does not affect basic neuromuscular performance. There were no differences between groups on the accelerating rotorod (**a**) or grip strength (**b**) at the start of the behavioral testing battery.

Supplementary Table 1. MALDI-IMS analysis identifies region-specific changes in NPYGAD1 transgenic mice. *In situ* proteomic analysis identified 129 lipids, peptides, and proteins (0 – approximately 22,000 Da) with significantly altered expression in NPYGAD1TG mice compared to wild type controls. were decreased, 65 were increased, and 13 had region-specific changes. Only two results (m/z 1583.09 and m/z 1907.27) were significant across more than three regions. *, significant results assessed by Benjamini-Hochberg correction for false discovery rate.

Supplementary Table 2. MALDI-IMS analysis identifies region-specific changes in CCKGAD1 transgenic mice. *In situ* proteomic analysis identified 52 lipids, peptides, and proteins (0 – approximately 22,000 Da) with significantly altered expression in CCKGAD1TG mice compared to wild type controls. 25 were decreased, 23 were increased, and 4 had region-specific changes. No results were significant across more than three regions. *, significant results assessed by Benjamini-Hochberg correction for false discovery rate.