

Supplementary files

Supplementary Table S1: Details of antibodies used for IHC and IF.

Antigen	Primary antibody	Dilution	Raised in	Fixation	Company
Amyloid- Beta	Human A β (715800)	1/400	Rabbit	Acetone	Invitrogen. Carlsbad, CA, USA
Astrocytes	Bovine glial fibrillary acidic protein antibody	1/400	Rabbit	Acetone	DAKO. Santa Clara, CA, USA
Microglia	CD45- Mouse protein tyrosine phosphatase receptor type C	1/100	Rat	Acetone	Gift cell biology VUMC
Hyper-phosphorylated tau	tau protein phosphorylated at both serine 202 and threonine 205	1/2000	Mouse	PFA	Thermo Fischer scientific, Waltham, MA, USA
TG2	Guinea pig TG2 (06471)	1/4000	Goat	Acetone	Millipore, Temecula, CA, USA

Supplementary Table S2: Details of primers used for semi-quantitative RT-PCR.

Gene	Forward	Reverse
mouse HPRT1	CTCATGGACTGATTATGGACAGGAC	GCAGGTCAGCAAAGAACTTATAGCC
human APP	ACACAGAAAACGAAGTTGAGCC	AATTCTGCATCCAGATTCACTTCAGA
mouse TGM1	ACCAGCAGTGGCATCTTC	ATGAAAGGTGTGTCATACTTC
mouse TGM2	GCCATGGTCAACTGCAATG	AGAATGTCCACACTGCCAATC
mouse TGM3	ACATCAGCACCAAGGCAGTAGG	CCTCGAAGATGTTGCGCCGAAA
mouse F13A1	CAGCAATGGTGAATGCCAAGGA	GCTGATGGAGGGATGCCGTA

Oligonucleotide PCR primers are listed in the 5'→3' direction

Supplementary Table S3: Full list of proteins significantly interacting with TG2 in the WT brain, APP23 brain or both phenotypes.

ID	TG2-interactor name	p-value	Phenotype
1433F	14-3-3 protein eta	0.00E+00	APP23
AATC	Aspartate aminotransferase, cytoplasmic	0.00E+00	APP23
AL1B1	Aldehyde dehydrogenase X, mitochondrial	0.00E+00	APP23
ARGL1	Arginine and glutamate-rich protein 1	0.00E+00	APP23
AT5F1	ATP synthase F(0) complex subunit B1, mitochondrial	0.00E+00	APP23
CRYAB	Alpha-crystallin B chain	0.00E+00	APP23
GRID2	Glutamate receptor ionotropic, delta-2	0.00E+00	APP23
KCRB	Creatine kinase B-type	0.00E+00	APP23
KV5AD	Ig kappa chain V-V region HP 123E6	0.00E+00	APP23
PGCB	Brevican core protein	0.00E+00	APP23
RS17	40S ribosomal protein S17	0.00E+00	APP23
SYNE1	Nesprin-1	0.00E+00	APP23
TPM3	Tropomyosin alpha-3 chain	0.00E+00	APP23
MYO5A	Unconventional myosin-Va	0.00E+00	WT
NDUS3	NADH dehydrogenase [ubiquinone] iron-sulfur protein 3, mitochondrial	0.00E+00	WT
RS16	40S ribosomal protein S16	0.00E+00	WT
TECR	Very-long-chain enoyl-CoA reductase	0.00E+00	WT
LANC2	LanC-like protein 2	2.44E-15	APP23
HSP72	Heat shock-related 70 kDa protein 2	2.44E-15	WT
TBB3	Tubulin beta-3 chain	2.44E-15	WT
PSB1	Proteasome subunit beta type-1	3.49E-14	WT/APP23
ANK1	Ankyrin-1	4.72E-14	WT
CYC	Cytochrome c, somatic	9.15E-14	APP23
MED23	Mediator of RNA polymerase II transcription subunit 23	4.80E-13	APP23
RL29	60S ribosomal protein L29	3.04E-12	APP23
DAAM1	Disheveled-associated activator of morphogenesis 1	5.07E-12	WT/APP23
GDIR1	Rho GDP-dissociation inhibitor 1	6.76E-12	APP23
FIBG	Fibrinogen gamma chain	1.02E-11	WT
ATPG	ATP synthase subunit gamma, mitochondrial	1.09E-11	APP23
PPCEL	Prolyl endopeptidase-like	1.79E-11	APP23
NRX1A	Neurexin-1	2.09E-11	APP23
CLH1	Clathrin heavy chain 1	3.21E-11	APP23
CAPS1	Calcium-dependent secretion activator 1	3.69E-11	APP23
KKCC2	Calcium/calmodulin-dependent protein kinase kinase 2	6.98E-11	APP23
1433T	14-3-3 protein theta	7.89E-10	APP23
VATA	V-type proton ATPase catalytic subunit A	1.35E-09	APP23
RL24	60S ribosomal protein L24	7.26E-09	APP23
CTL1	Choline transporter-like protein 1	9.93E-09	APP23
PURA	Transcriptional activator protein Pur-alpha	2.23E-08	APP23
EF1A1	Elongation factor 1-alpha 1	3.51E-08	APP23
MBP	Myelin basic protein	3.69E-08	APP23
SEPT7	Septin-7	4.47E-08	APP23

PURA1	Adenylosuccinate synthetase isozyme 1	5.65E-08	WT
TNIK	Traf2 and NCK-interacting protein kinase	1.45E-07	WT
ITPA	Inosine triphosphate pyrophosphatase	1.47E-07	WT
HIBCH	3-hydroxyisobutyryl-CoA hydrolase, mitochondrial	2.23E-07	APP23
CDS2	Phosphatidate cytidyltransferase 2	5.10E-07	APP23
F210A	Protein FAM210A	6.83E-07	WT
SRC8	Src substrate cortactin	9.39E-07	WT
HMCS1	Hydroxymethylglutaryl-CoA synthase, cytoplasmic	9.48E-07	WT
SH3L3	SH3 domain-binding glutamic acid-rich-like protein 3	1.01E-06	APP23
PDK3	[Pyruvate dehydrogenase (acetyl-transferring)] kinase isozyme 3, mitochondrial	1.18E-06	APP23
AL4A1	Delta-1-pyrroline-5-carboxylate dehydrogenase, mitochondrial	1.38E-06	APP23
GLSK	Glutaminase kidney isoform, mitochondrial	1.57E-06	WT
CADM2	Cell adhesion molecule 2	1.68E-06	APP23
LRP1	Prolow-density lipoprotein receptor-related protein 1	2.31E-06	WT
PCAT1	Lysophosphatidylcholine acyltransferase 1	2.33E-06	APP23
KV2A6	Ig kappa chain V-II region 7S34.1	2.46E-06	APP23
CYLD	Ubiquitin carboxyl-terminal hydrolase CYLD	2.88E-06	WT
IPO9	Importin-9	2.92E-06	APP23
PLAP	Phospholipase A-2-activating protein	3.24E-06	WT/APP23
NPTX1	Neuronal pentraxin-1	3.95E-06	APP23
GLYM	Serine hydroxymethyltransferase, mitochondrial	3.97E-06	APP23
LYRIC	Protein LYRIC	4.00E-06	APP23
BDH	D-beta-hydroxybutyrate dehydrogenase, mitochondrial	4.37E-06	WT
CPNE5	Copine-5	4.79E-06	WT
CSK11	Caskin-1	5.05E-06	APP23
DMXL2	DmX-like protein 2	5.71E-06	WT/APP23
PP4P1	Type 1 phosphatidylinositol 4,5-bisphosphate 4-phosphatase	5.71E-06	APP23
ENPL	Endoplasmin	6.63E-06	WT
CAH2	Carbonic anhydrase 2	7.36E-06	APP23
GHC1	Mitochondrial glutamate carrier 1	8.00E-06	APP23
KPRA	Phosphoribosyl pyrophosphate synthase-associated protein 1	1.18E-05	WT
EFTU	Elongation factor Tu, mitochondrial	1.19E-05	APP23
ATPA	ATP synthase subunit alpha, mitochondrial	1.32E-05	APP23
KCY	UMP-CMP kinase	1.53E-05	WT
LSAMP	Limbic system-associated membrane protein	1.82E-05	APP23
UGPA	UTP--glucose-1-phosphate uridylyltransferase	2.11E-05	APP23
GLNA	Glutamine synthetase	2.39E-05	APP23
CFAH	Complement factor H	2.50E-05	WT
ASTN1	Astrotactin-1	2.63E-05	WT
AP1B1	AP-1 complex subunit beta-1	2.80E-05	APP23
APOE	Apolipoprotein E	3.48E-05	WT/APP23
SNP25	Synaptosomal-associated protein 25	3.60E-05	APP23
OGFR	Opioid growth factor receptor	4.29E-05	APP23
SCMC2	Calcium-binding mitochondrial carrier protein SCaMC-2	4.31E-05	WT/APP23
IGKC	Immunoglobulin kappa constant	4.49E-05	APP23
PDIA6	Protein disulfide-isomerase A6	5.13E-05	APP23

GSTM5	Glutathione S-transferase Mu 5	5.70E-05	APP23
TCAL5	Transcription elongation factor A protein-like 5	5.81E-05	APP23
MA7D1	MAP7 domain-containing protein 1	6.01E-05	APP23
ACBG1	Long-chain-fatty-acid--CoA ligase ACSBG1	6.88E-05	WT
MAOX	NADP-dependent malic enzyme	7.79E-05	APP23
DCTN1	Dynactin subunit 1	8.24E-05	WT
HS71A	Heat shock 70 kDa protein 1A	8.68E-05	APP23
OCRL	Inositol polyphosphate 5-phosphatase OCRL-1	9.20E-05	APP23
RUVB2	RuvB-like 2	9.81E-05	WT/APP23
KPCB	Protein kinase C beta type	1.04E-04	APP23
VINC	Vinculin	1.07E-04	APP23
HVM10	Ig heavy chain V region 1-62-3	1.08E-04	APP23
H10	Histone H1.0	1.09E-04	WT
H14	Histone H1.4	1.24E-04	APP23
AT1B2	Sodium/potassium-transporting ATPase subunit beta-2	1.26E-04	APP23
GNAO	Guanine nucleotide-binding protein G(o) subunit alpha	1.43E-04	APP23
TENR	Tenascin-R	1.46E-04	WT
PGM2L	Glucose 1,6-bisphosphate synthase	1.46E-04	WT
THOP1	Thimet oligopeptidase	1.46E-04	APP23
CA2D2	Voltage-dependent calcium channel subunit alpha-2/delta-2	1.84E-04	APP23
IP3KA	Inositol-trisphosphate 3-kinase A	2.27E-04	WT
DEST	Destrin	2.34E-04	APP23
SFR1	Swi5-dependent recombination DNA repair protein 1 homolog	2.47E-04	WT
MYH10	Myosin-10	2.47E-04	APP23
DLDH	Dihydrolipoyl dehydrogenase, mitochondrial	2.53E-04	APP23
RL13	60S ribosomal protein L13	2.57E-04	WT/APP23
KV4A1	Ig kappa chain V-IV region S107B	2.60E-04	APP23
CDK5	Cyclin-dependent-like kinase 5	3.01E-04	APP23
CH10	10 kDa heat shock protein, mitochondrial	3.10E-04	APP23
KCNC3	Potassium voltage-gated channel subfamily C member 3	3.13E-04	APP23
AL7A1	Alpha-aminoacidic semialdehyde dehydrogenase	3.31E-04	APP23
EPMIP	EPM2A-interacting protein 1	3.40E-04	WT
FAS	Fatty acid synthase	4.21E-04	WT
KV5A1	Ig kappa chain V19-17	4.72E-04	APP23
PTN23	Tyrosine-protein phosphatase non-receptor type 23	4.77E-04	APP23
SAHH	Adenosylhomocysteinase	4.91E-04	APP23
GOGA7	Golgin subfamily A member 7	5.01E-04	APP23
VATC1	V-type proton ATPase subunit C 1	5.25E-04	WT
NIPS1	Protein NipSnap homolog 1	5.28E-04	WT/APP23
SBP1	Methanethiol oxidase	5.92E-04	WT
PHF24	PHD finger protein 24	6.03E-04	APP23
NDUA4	Cytochrome c oxidase subunit NDUF4A	6.06E-04	APP23
KV2A7	Ig kappa chain V-II region 26-10	6.12E-04	APP23
DECR	2,4-dienoyl-CoA reductase, mitochondrial	6.40E-04	WT
TCPA	T-complex protein 1 subunit alpha	6.58E-04	WT
NCKP1	Nck-associated protein 1	6.59E-04	APP23

IDE	Insulin-degrading enzyme	6.76E-04	WT
NFL	Neurofilament light polypeptide	7.14E-04	APP23
COX41	Cytochrome c oxidase subunit 4 isoform 1, mitochondrial	7.47E-04	APP23
TBB4A	Tubulin beta-4A chain	8.23E-04	APP23
S10AD	Protein S100-A13	8.46E-04	APP23
USP9X	Probable ubiquitin carboxyl-terminal hydrolase FAF-X	8.93E-04	WT
RAB3A	Ras-related protein Rab-3A	9.62E-04	APP23
USMG5	Up-regulated during skeletal muscle growth protein 5	9.67E-04	WT
ADPRH	[Protein ADP-ribosylarginine] hydrolase	1.05E-03	APP23
LRC59	Leucine-rich repeat-containing protein 59	1.18E-03	APP23
RIN1	Ras and Rab interactor 1	1.26E-03	WT/APP23
CAMP3	Calmodulin-regulated spectrin-associated protein 3	1.28E-03	APP23
DYN1	Dynamin-1	1.43E-03	APP23
FA98B	Protein FAM98B	1.53E-03	APP23
CNDP2	Cytosolic non-specific dipeptidase	1.59E-03	WT
SCG2	Secretogranin-2	1.65E-03	APP23
SYT1	Synaptotagmin-1	1.65E-03	APP23
HEMH	Ferrochelatase, mitochondrial	1.79E-03	WT
CMTD1	Catechol O-methyltransferase domain-containing protein 1	1.85E-03	APP23
K1C42	Keratin, type I cytoskeletal 42	1.86E-03	APP23
NDUS2	NADH dehydrogenase [ubiquinone] iron-sulfur protein 2, mitochondrial	1.96E-03	WT
RAB7A	Ras-related protein Rab-7a	1.99E-03	APP23
RL7	60S ribosomal protein L7	2.02E-03	WT
TRI32	E3 ubiquitin-protein ligase TRIM32	2.03E-03	WT
TIM44	Mitochondrial import inner membrane translocase subunit TIM44	2.19E-03	WT
SMD3	Small nuclear ribonucleoprotein Sm D3	2.19E-03	APP23
1433G	14-3-3 protein gamma	2.26E-03	WT
PPP5	Serine/threonine-protein phosphatase 5	2.30E-03	APP23
MTMR5	Myotubularin-related protein 5	2.33E-03	APP23
ATPD	ATP synthase subunit delta, mitochondrial	2.37E-03	APP23
ENAH	Protein enabled homolog	2.42E-03	APP23
QORL2	Quinone oxidoreductase-like protein 2	2.54E-03	WT/APP23
GGCT	Gamma-glutamylcyclotransferase	2.62E-03	APP23
XPO7	Exportin-7	2.64E-03	APP23
NDUAA	NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 10, mitochondrial	2.68E-03	APP23
DYHC1	Cytoplasmic dynein 1 heavy chain 1	2.83E-03	APP23
THIM	3-ketoacyl-CoA thiolase, mitochondrial	2.86E-03	APP23
K22E	Keratin, type II cytoskeletal 2 epidermal	2.89E-03	APP23
K2C1	Keratin, type II cytoskeletal 1	2.91E-03	WT
PTPRD	Receptor-type tyrosine-protein phosphatase delta	3.12E-03	WT
RAP2B	Ras-related protein Rap-2b	3.15E-03	APP23
CBR4	Carbonyl reductase family member 4	3.20E-03	WT
AT2B1	Plasma membrane calcium-transporting ATPase 1	3.24E-03	APP23
CY1	Cytochrome c1, heme protein, mitochondrial	3.31E-03	APP23
KPCG	Protein kinase C gamma type	3.35E-03	APP23
HVM32	Ig heavy chain V-III region J606	3.40E-03	WT

SH3G1	Endophilin-A2	3.45E-03	APP23
SPB6	Serpin B6	3.46E-03	WT
PSD12	26S proteasome non-ATPase regulatory subunit 12	3.85E-03	WT
ADA10	Disintegrin and metalloproteinase domain-containing protein 10	4.18E-03	WT
INF2	Inverted formin-2	4.23E-03	WT
MK03	Mitogen-activated protein kinase 3	4.23E-03	APP23
TXTP	Tricarboxylate transport protein, mitochondrial	4.46E-03	APP23
PGK1	Phosphoglycerate kinase 1	4.57E-03	APP23
SEM3C	Semaphorin-3C	4.58E-03	APP23
TOM34	Mitochondrial import receptor subunit TOM34	4.61E-03	WT/APP23
SYRC	Arginine--tRNA ligase, cytoplasmic	4.64E-03	WT/APP23
TRIO	Triple functional domain protein	4.70E-03	APP23
NLTP	Non-specific lipid-transfer protein	4.74E-03	APP23
RSU1	Ras suppressor protein 1	4.75E-03	WT
K1C10	Keratin, type I cytoskeletal 10	4.76E-03	APP23
CX7A2	Cytochrome c oxidase subunit 7A2, mitochondrial	4.93E-03	WT/APP23
CP250	Centrosome-associated protein CEP250	5.15E-03	WT
GNAZ	Guanine nucleotide-binding protein G(z) subunit alpha	5.24E-03	APP23
GABT	4-aminobutyrate aminotransferase, mitochondrial	5.76E-03	WT
ABHGA	Protein ABHD16A	5.93E-03	APP23
CLVS1	Clavesin-1	5.95E-03	WT/APP23
NRX2A	Neurexin-2	6.00E-03	APP23
PYC	Pyruvate carboxylase, mitochondrial	6.15E-03	WT
DNJB1	DnaJ homolog subfamily B member 1	6.16E-03	WT
KV3A4	Ig kappa chain V-III region 50S10.1	6.30E-03	APP23
CAD12	Cadherin-12	6.42E-03	WT
RS13	40S ribosomal protein S13	6.68E-03	WT
ANXA5	Annexin A5	6.80E-03	APP23
INP4A	Type I inositol 3,4-bisphosphate 4-phosphatase	6.88E-03	WT
CUL2	Cullin-2	6.91E-03	APP23
SCAM1	Secretory carrier-associated membrane protein 1	7.08E-03	APP23
EIF3D	Eukaryotic translation initiation factor 3 subunit D	7.59E-03	WT
CYTC	Cystatin-C	7.67E-03	WT
VPS35	Vacuolar protein sorting-associated protein 35	7.76E-03	APP23
DHX15	Pre-mRNA-splicing factor ATP-dependent RNA helicase DHX15	7.78E-03	APP23
PICAL	Phosphatidylinositol-binding clathrin assembly protein	7.81E-03	WT
SYSC	Serine--tRNA ligase, cytoplasmic	7.84E-03	APP23
VPS18	Vacuolar protein sorting-associated protein 18 homolog	7.90E-03	WT
ATLA1	Atlastin-1	8.09E-03	WT
RAN	GTP-binding nuclear protein Ran	8.14E-03	APP23
PSMD8	26S proteasome non-ATPase regulatory subunit 8	8.58E-03	WT
GSTA4	Glutathione S-transferase A4	8.78E-03	WT/APP23
HYEP	Epoxide hydrolase 1	8.81E-03	WT
TPC11	Trafficking protein particle complex subunit 11	8.81E-03	APP23
PRUN1	Exopolyphosphatase PRUNE1	9.35E-03	APP23
RPN1	Dolichyl-diphosphooligosaccharide--protein glycosyltransferase subunit 1	9.50E-03	APP23

CYFP2	Cytoplasmic FMR1-interacting protein 2	9.55E-03	WT
GNB5	Guanine nucleotide-binding protein subunit beta-5	9.56E-03	APP23
NRCAM	Neuronal cell adhesion molecule	9.64E-03	WT
RIF1	Telomere-associated protein RIF1	9.66E-03	WT/APP23
SCOT1	Succinyl-CoA:3-ketoacid coenzyme A transferase 1, mitochondrial	9.68E-03	WT
H13	Histone H1.3	9.84E-03	APP23
SYHC	Histidine--tRNA ligase, cytoplasmic	1.00E-02	APP23
PDIA3	Protein disulfide-isomerase A3	1.01E-02	WT
L2GL1	Lethal(2) giant larvae protein homolog 1	1.01E-02	WT
PCCA	Propionyl-CoA carboxylase alpha chain, mitochondrial	1.05E-02	WT
CUL5	Cullin-5	1.07E-02	WT
SUCB1	Succinate--CoA ligase [ADP-forming] subunit beta, mitochondrial	1.07E-02	APP23
CE170	Centrosomal protein of 170 kDa	1.08E-02	APP23
CA2D1	Voltage-dependent calcium channel subunit alpha-2/delta-1	1.08E-02	APP23
CALX	Calnexin	1.11E-02	WT
E41L1	Band 4.1-like protein 1	1.12E-02	APP23
ML12B	Myosin regulatory light chain 12B	1.12E-02	WT/APP23
GDIB	Rab GDP dissociation inhibitor beta	1.13E-02	APP23
UCHL1	Ubiquitin carboxyl-terminal hydrolase isozyme L1	1.14E-02	APP23
KV2A5	Ig kappa chain V-II region 17S29.1	1.18E-02	APP23
K22O	Keratin, type II cytoskeletal 2 oral	1.18E-02	APP23
VATB2	V-type proton ATPase subunit B, brain isoform	1.19E-02	APP23
F162A	Protein FAM162A	1.22E-02	WT
GNAI2	Guanine nucleotide-binding protein G(i) subunit alpha-2	1.24E-02	APP23
CAP2	Adenylyl cyclase-associated protein 2	1.24E-02	APP23
IGSF8	Immunoglobulin superfamily member 8	1.28E-02	APP23
TXD12	Thioredoxin domain-containing protein 12	1.30E-02	WT/APP23
ABD12	Monoacylglycerol lipase ABHD12	1.32E-02	WT
NQO2	Ribosyl-dihydroxynicotinamide dehydrogenase [quinone]	1.32E-02	WT
RL23A	60S ribosomal protein L23a	1.33E-02	APP23
WDR7	WD repeat-containing protein 7	1.45E-02	APP23
TAGL2	Transgelin-2	1.47E-02	APP23
DPYL2	Dihydropyrimidinase-related protein 2	1.48E-02	APP23
RAB14	Ras-related protein Rab-14	1.48E-02	APP23
HEXB	Beta-hexosaminidase subunit beta	1.49E-02	WT
SR140	U2 snRNP-associated SURP motif-containing protein	1.50E-02	APP23
CKAP5	Cytoskeleton-associated protein 5	1.52E-02	WT
GPM6A	Neuronal membrane glycoprotein M6-a	1.52E-02	APP23
ACACA	Acetyl-CoA carboxylase 1	1.52E-02	APP23
GHC2	Mitochondrial glutamate carrier 2	1.54E-02	APP23
MAON	NADP-dependent malic enzyme, mitochondrial	1.56E-02	APP23
TAGL3	Transgelin-3	1.56E-02	WT
MYPR	Myelin proteolipid protein	1.62E-02	APP23
SODM	Superoxide dismutase [Mn], mitochondrial	1.63E-02	APP23
MSRA	Mitochondrial peptide methionine sulfoxide reductase	1.64E-02	WT
ALG2	Alpha-1,3/1,6-mannosyltransferase ALG2	1.70E-02	WT

PP2BA	Serine/threonine-protein phosphatase 2B catalytic subunit alpha isoform	1.73E-02	APP23
ODPA	Pyruvate dehydrogenase E1 component subunit alpha, somatic form, mitochondrial	1.74E-02	APP23
HCN1	Potassium/sodium hyperpolarization-activated cyclic nucleotide-gated channel 1	1.77E-02	APP23
AP3B2	AP-3 complex subunit beta-2	1.82E-02	WT
PRAF3	PRA1 family protein 3	1.84E-02	APP23
SPCS	O-phosphoserine-tRNA(Sec) selenium transferase	1.85E-02	WT
S12A5	Solute carrier family 12 member 5	1.90E-02	WT
NDRG1	Protein NDRG1	1.92E-02	WT/APP23
SPTN1	Spectrin alpha chain, non-erythrocytic 1	1.99E-02	APP23
APBB1	Amyloid-beta A4 precursor protein-binding family B member 1	2.04E-02	WT
OGT1	UDP-N-acetylglucosamine--peptide N-acetylglucosaminyltransferase 110 kDa subunit	2.04E-02	WT
SFXN3	Sideroflexin-3	2.04E-02	APP23
PHIPL	Phytanoyl-CoA hydroxylase-interacting protein-like	2.05E-02	APP23
NGEF	Ephexin-1	2.07E-02	WT
CCDC6	Coiled-coil domain-containing protein 6	2.10E-02	WT/APP23
TMX2	Thioredoxin-related transmembrane protein 2	2.13E-02	WT
HVM57	Ig heavy chain V region 6.96	2.15E-02	APP23
ARBK1	Beta-adrenergic receptor kinase 1	2.35E-02	WT
PLXB2	Plexin-B2	2.37E-02	APP23
PGP	Glycerol-3-phosphate phosphatase	2.37E-02	WT/APP23
NDUB2	NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 2, mitochondrial	2.40E-02	WT/APP23
CRYM	Ketimine reductase mu-crystallin	2.41E-02	WT
ABR	Active breakpoint cluster region-related protein	2.46E-02	WT
HNRPU	Heterogeneous nuclear ribonucleoprotein U	2.48E-02	APP23
RAB21	Ras-related protein Rab-21	2.58E-02	WT
CNN3	Calponin-3	2.63E-02	WT/APP23
RHEB	GTP-binding protein Rheb	2.67E-02	WT
ITPR1	Inositol 1,4,5-trisphosphate receptor type 1	2.71E-02	WT
WASF1	Wiskott-Aldrich syndrome protein family member 1	2.83E-02	WT
MDHC	Malate dehydrogenase, cytoplasmic	2.84E-02	APP23
NC2A	Dr1-associated corepressor	2.87E-02	WT/APP23
NEUG	Neurogranin	2.88E-02	APP23
TIF1B	Transcription intermediary factor 1-beta	2.92E-02	APP23
COMD3	COMM domain-containing protein 3	2.92E-02	APP23
SC6A1	Sodium- and chloride-dependent GABA transporter 1	2.93E-02	WT/APP23
CHERP	Calcium homeostasis endoplasmic reticulum protein	2.97E-02	APP23
CYFP1	Cytoplasmic FMR1-interacting protein 1	2.97E-02	APP23
L1CAM	Neural cell adhesion molecule L1	3.17E-02	WT/APP23
ADHX	Alcohol dehydrogenase class-3	3.18E-02	WT
GLTP	Glycolipid transfer protein	3.21E-02	APP23
ACTG	Actin, cytoplasmic 2	3.22E-02	APP23
GRIA2	Glutamate receptor 2	3.29E-02	APP23
HVM54	Ig heavy chain V region 5-84	3.29E-02	APP23
ALDOC	Fructose-bisphosphate aldolase C	3.40E-02	APP23
ABCB8	ATP-binding cassette sub-family B member 8, mitochondrial	3.42E-02	APP23

ACADM	Medium-chain specific acyl-CoA dehydrogenase, mitochondrial	3.46E-02	WT
GARS	Glycine--tRNA ligase	3.48E-02	WT
RACK1	Receptor of activated protein C kinase 1	3.49E-02	WT
ACLY	ATP-citrate synthase	3.65E-02	WT
K0513	Uncharacterized protein KIAA0513	3.66E-02	APP23
SRP54	Signal recognition particle 54 kDa protein	3.67E-02	APP23
TMM65	Transmembrane protein 65	3.68E-02	APP23
HVM02	Ig heavy chain V region 93G7	3.70E-02	APP23
SAHH2	S-adenosylhomocysteine hydrolase-like protein 1	3.76E-02	APP23
MY18A	Unconventional myosin-XVIIIa	3.76E-02	WT
FUS	RNA-binding protein FUS	3.80E-02	WT
SCN9A	Sodium channel protein type 9 subunit alpha	3.82E-02	WT
SNAA	Alpha-soluble NSF attachment protein	3.85E-02	WT
PCBP1	Poly(rC)-binding protein 1	3.92E-02	APP23
ATP5J	ATP synthase-coupling factor 6, mitochondrial	3.96E-02	WT
E41L3	Band 4.1-like protein 3	3.99E-02	WT
RRAGC	Ras-related GTP-binding protein C	4.03E-02	WT
CMPK2	UMP-CMP kinase 2, mitochondrial	4.07E-02	WT
THUM1	THUMP domain-containing protein 1	4.09E-02	WT/APP23
SYT2	Synaptotagmin-2	4.16E-02	WT/APP23
COR1C	Coronin-1C	4.23E-02	APP23
ENOG	Gamma-enolase	4.25E-02	APP23
HS105	Heat shock protein 105 kDa	4.26E-02	WT
ODO1	2-oxoglutarate dehydrogenase, mitochondrial	4.28E-02	WT
QCR1	Cytochrome b-c1 complex subunit 1, mitochondrial	4.28E-02	APP23
SOGA3	Protein SOGA3	4.39E-02	WT
COX6C	Cytochrome c oxidase subunit 6C	4.41E-02	WT
HEMO	Hemopexin	4.45E-02	WT/APP23
MPC2	Mitochondrial pyruvate carrier 2	4.48E-02	APP23
BIEA	Biliverdin reductase A	4.49E-02	WT
ACOC	Cytoplasmic aconitate hydratase	4.60E-02	APP23
ALDR	Aldose reductase	4.64E-02	WT
AT1A1	Sodium/potassium-transporting ATPase subunit alpha-1	4.66E-02	APP23
PEF1	Peflin	4.67E-02	WT
IMPA1	Inositol monophosphatase 1	4.70E-02	APP23
LYNX1	Ly-6/neurotoxin-like protein 1	4.79E-02	WT
ELOB	Elongin-B	4.92E-02	WT
NSF1C	NSFL1 cofactor p47	5.00E-02	APP23
PRSR2	Proline and serine-rich protein 2	5.13E-02	WT
H33	Histone H3.3	5.17E-02	APP23
DNJA4	DnaJ homolog subfamily A member 4	5.23E-02	WT
ATPK	ATP synthase subunit f, mitochondrial	5.25E-02	WT
KV5AC	Ig kappa chain V-V region HP 93G7	5.33E-02	WT
U2AF1	Splicing factor U2AF 35 kDa subunit	5.37E-02	APP23
GBB2	Guanine nucleotide-binding protein G(I)/G(S)/G(T) subunit beta-2	5.40E-02	WT
PABP1	Polyadenylate-binding protein 1	5.45E-02	WT

ALBU	Serum albumin	5.45E-02	WT/APP23
GRM3	Metabotropic glutamate receptor 3	5.48E-02	APP23
AINX	Alpha-internexin	5.48E-02	APP23

The specificity of association with TG2 was evaluated by z-test analysis ($P \leq 0.05$) of $n=5$ animals per cohort, using the TG2^{-/-} mice as background control (as outlined in Figure 3, A and B). Proteins are denoted by full name and UniProtKB protein entry name (ID), and they are listed according to the specificity of the interaction with TG2 (p-value). WT/APP23, TG2-associated proteins in both WT and APP23 brain (p-value listed is for WT); WT, TG2-associated proteins in WT brain; APP23, TG2-associated proteins in APP23 brain.