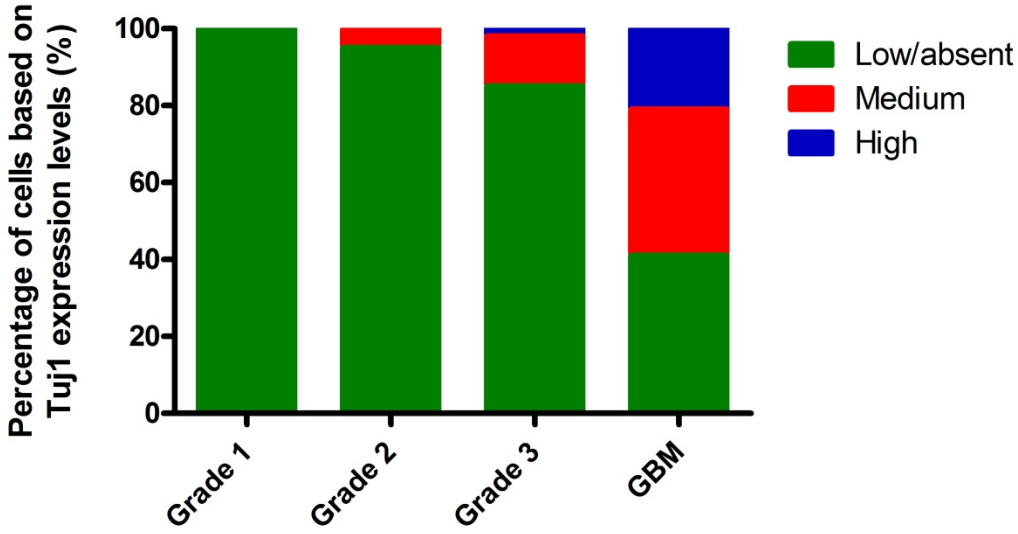



**Figure S1: Tuj1 expression profiles in different grades of human astrocytoma.** Grade 1, n=78; Grade 2, n=198; Grade 3, n=99; Grade 4 (GBM), n=134.

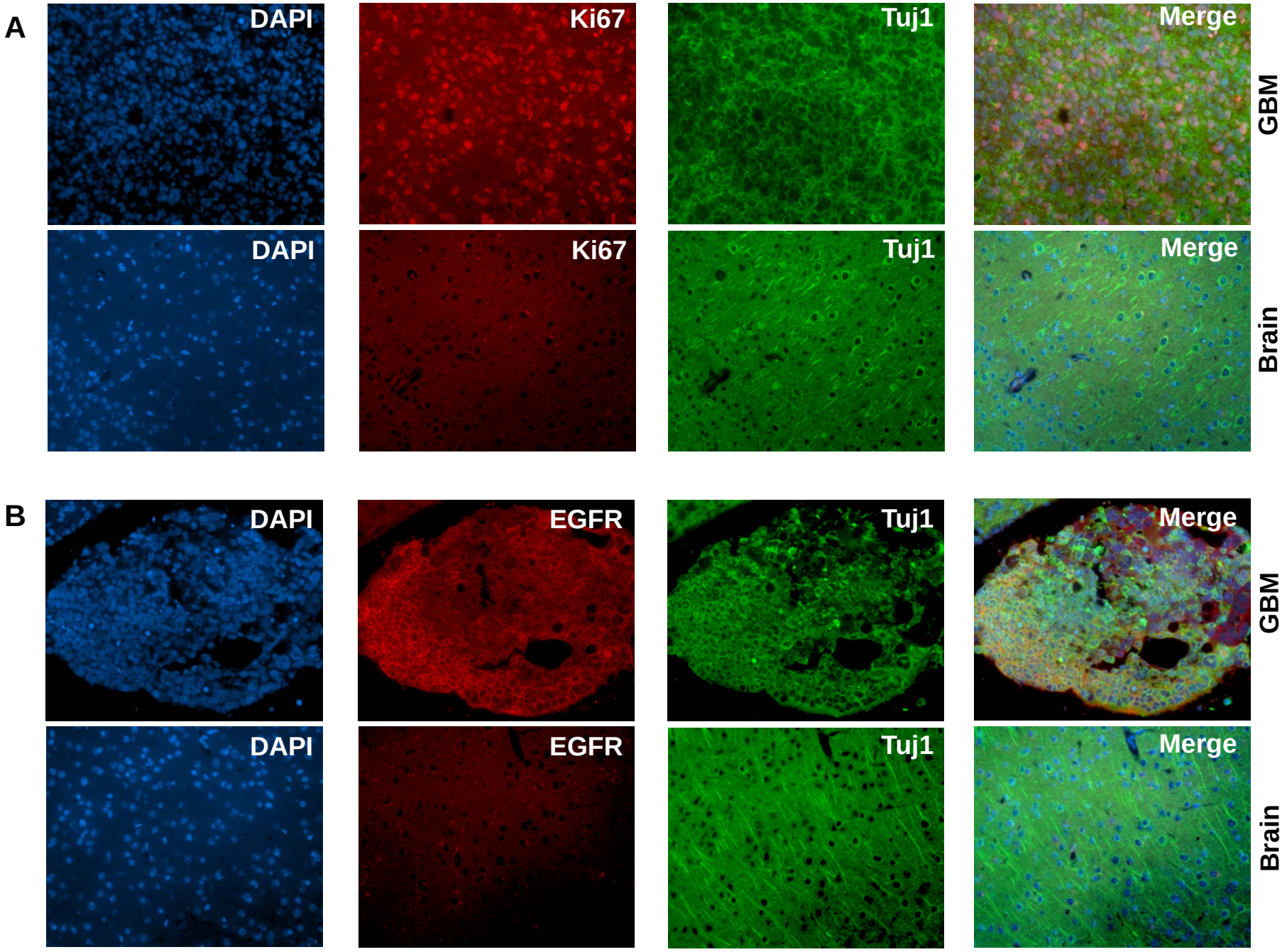



**Figure S2: Representative IF images of co-staining of Tuj1 and Ki67/EGFR in human GBM.**

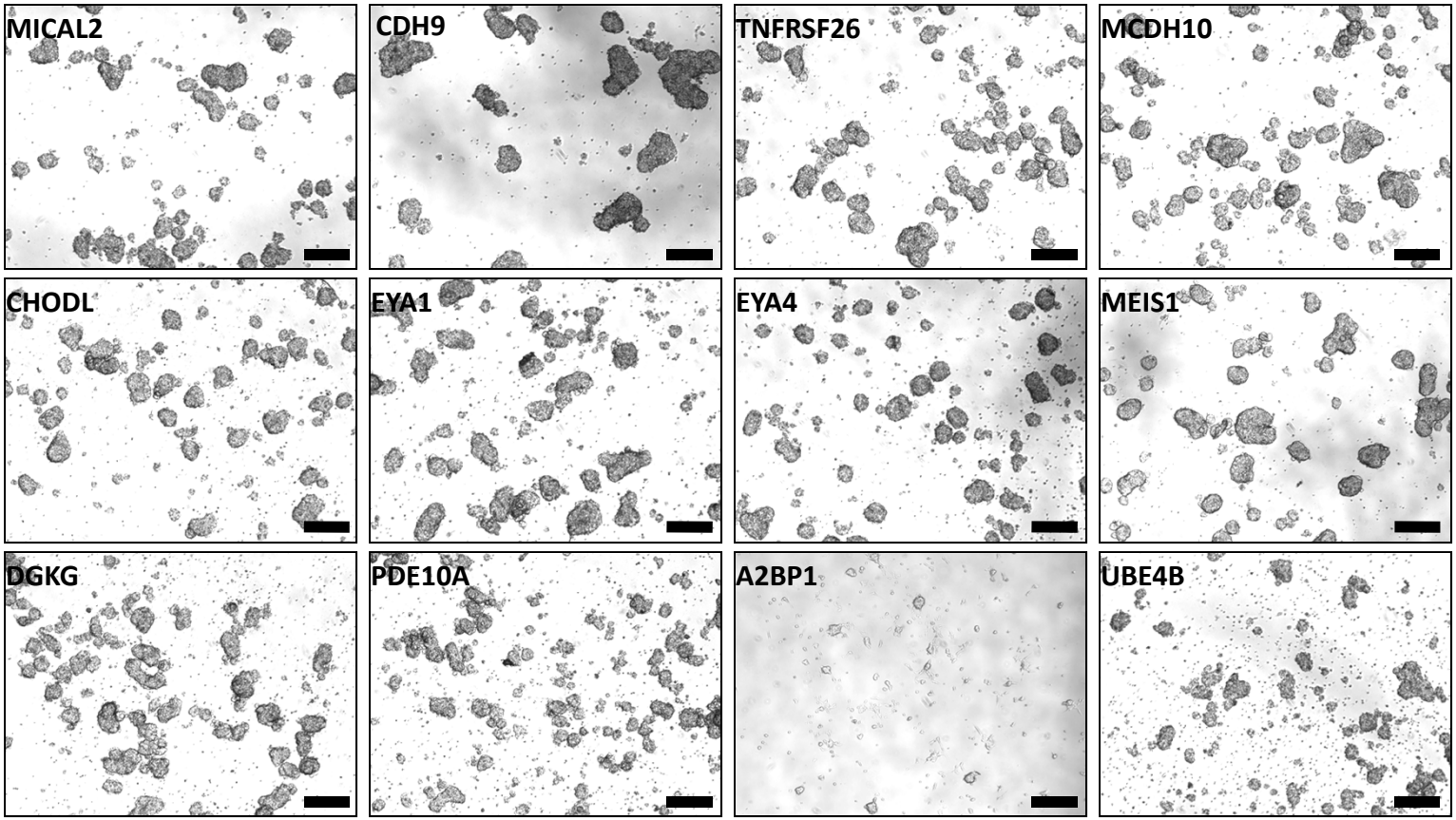



**Figure S3: Representative images of anchorage independent soft agar growth of LN319 cells overexpressed with some of the 71 candidate genes.** Scale bars = 200 mm.

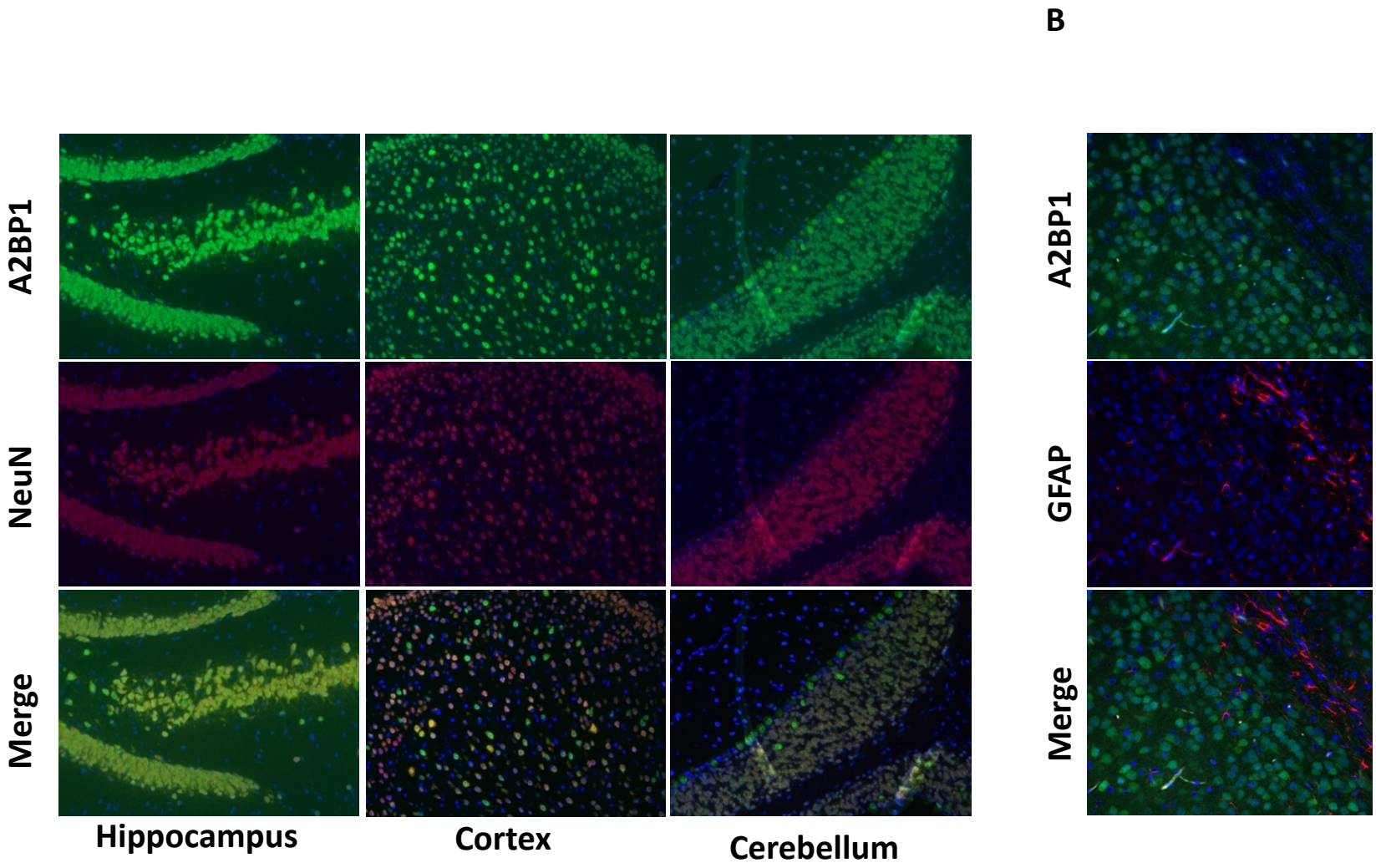



**Figure S4: Co-localization of A2BP1 with multiple cell lineage markers. (A-J)** Co-localization of A2BP1 with lineage markers (NeuN, GFAP, ALDH1L1, MSI-1, Tuj1, Dcx, BLBP, NG2 and A2B5) in multiple regions of normal mouse brain shown with IF. **(K)** Co-localization of A2BP1 with lineage markers in *p53*$^{-/-}$*Pten*$^{+/-}$ PM-NSCs cultured in different differentiation medium (SCM: stem cell medium; SCM+FBS: astrocytic differentiation medium; SCM+IGF-1/T3: oligodendrocytic differentiation medium; EN-StemA: neuronal differentiation medium).

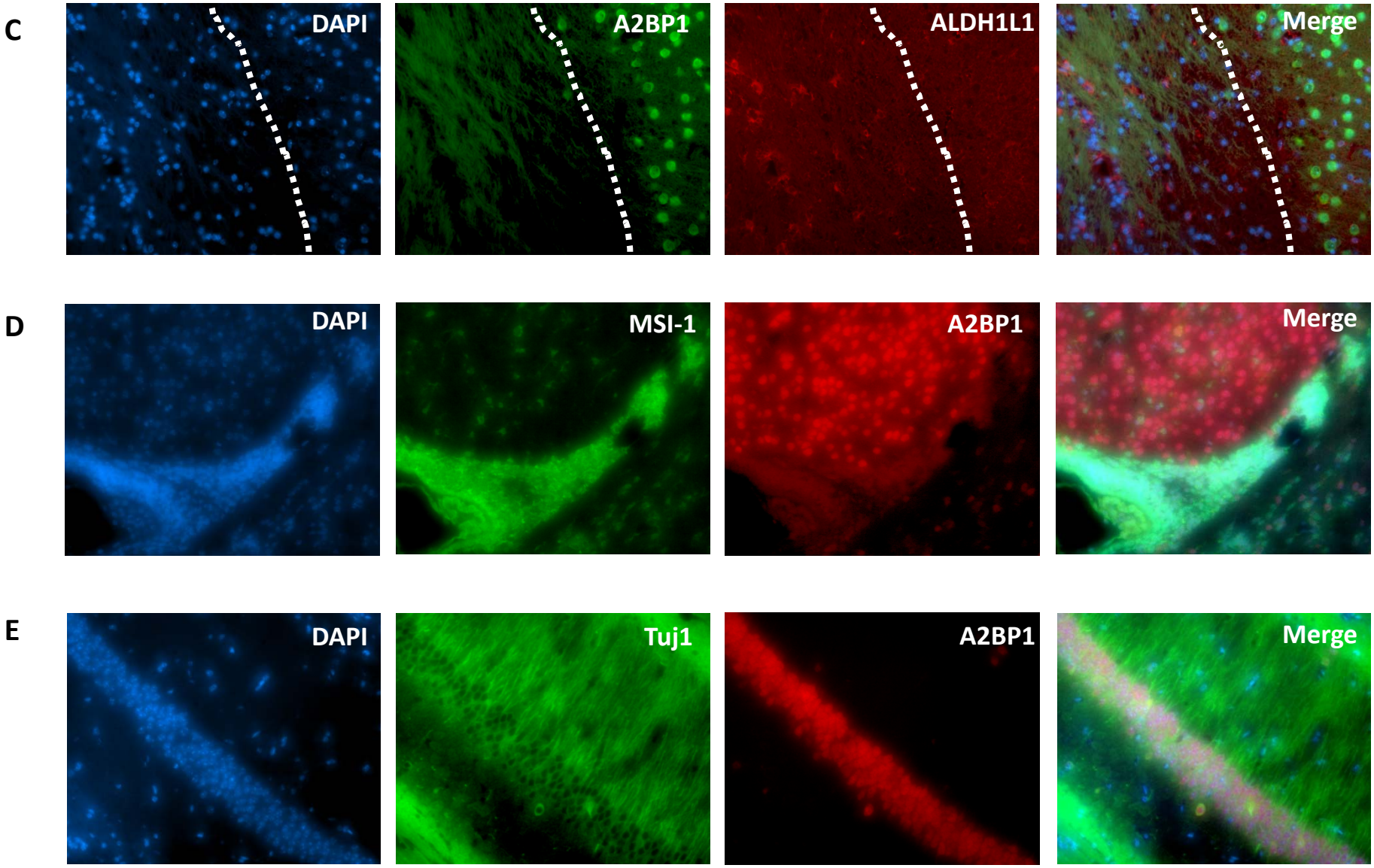



**Figure S4: Co-localization of A2BP1 with multiple cell lineage markers.**

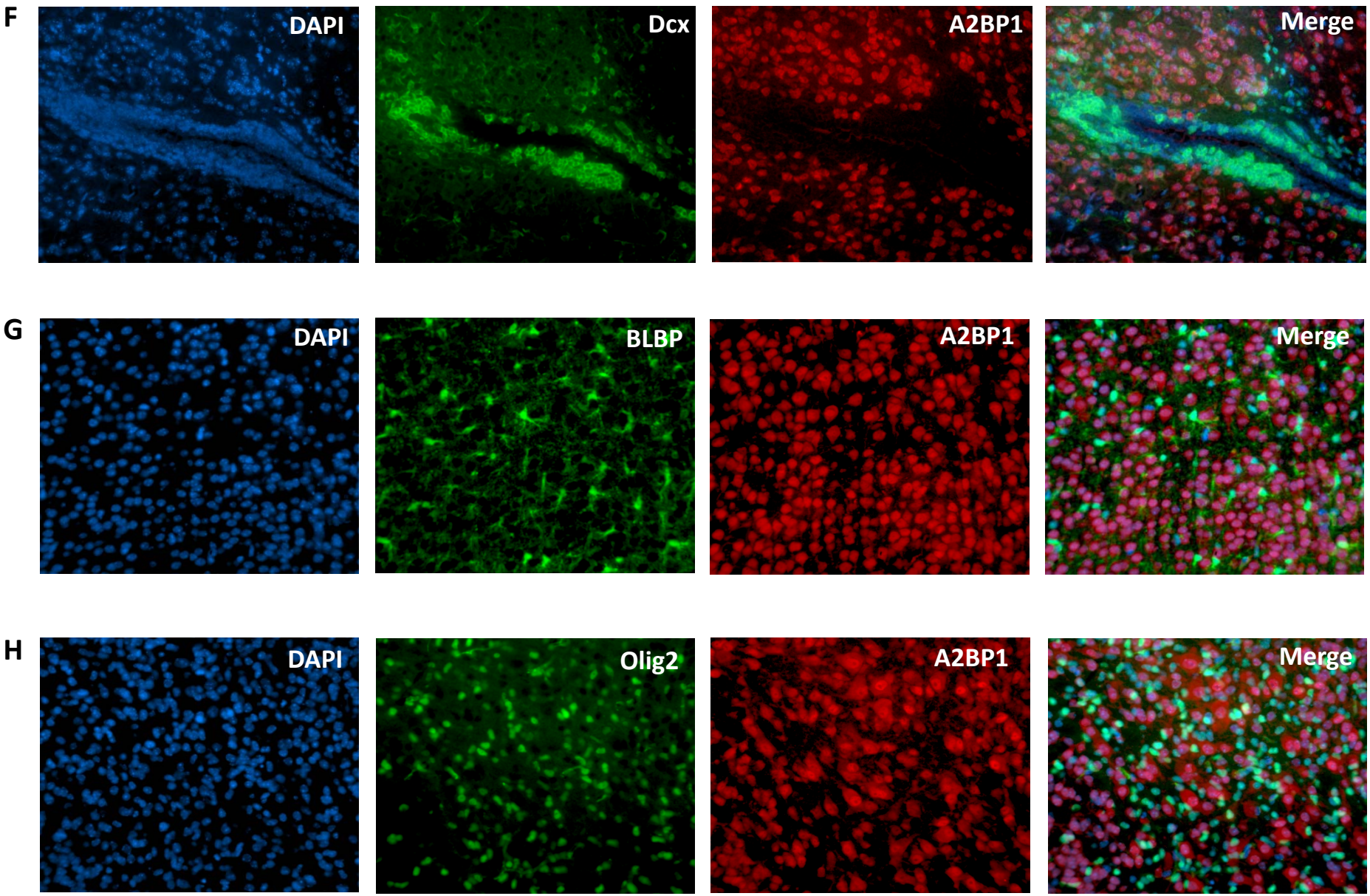



**Figure S4: Co-localization of A2BP1 with multiple cell lineage markers.**

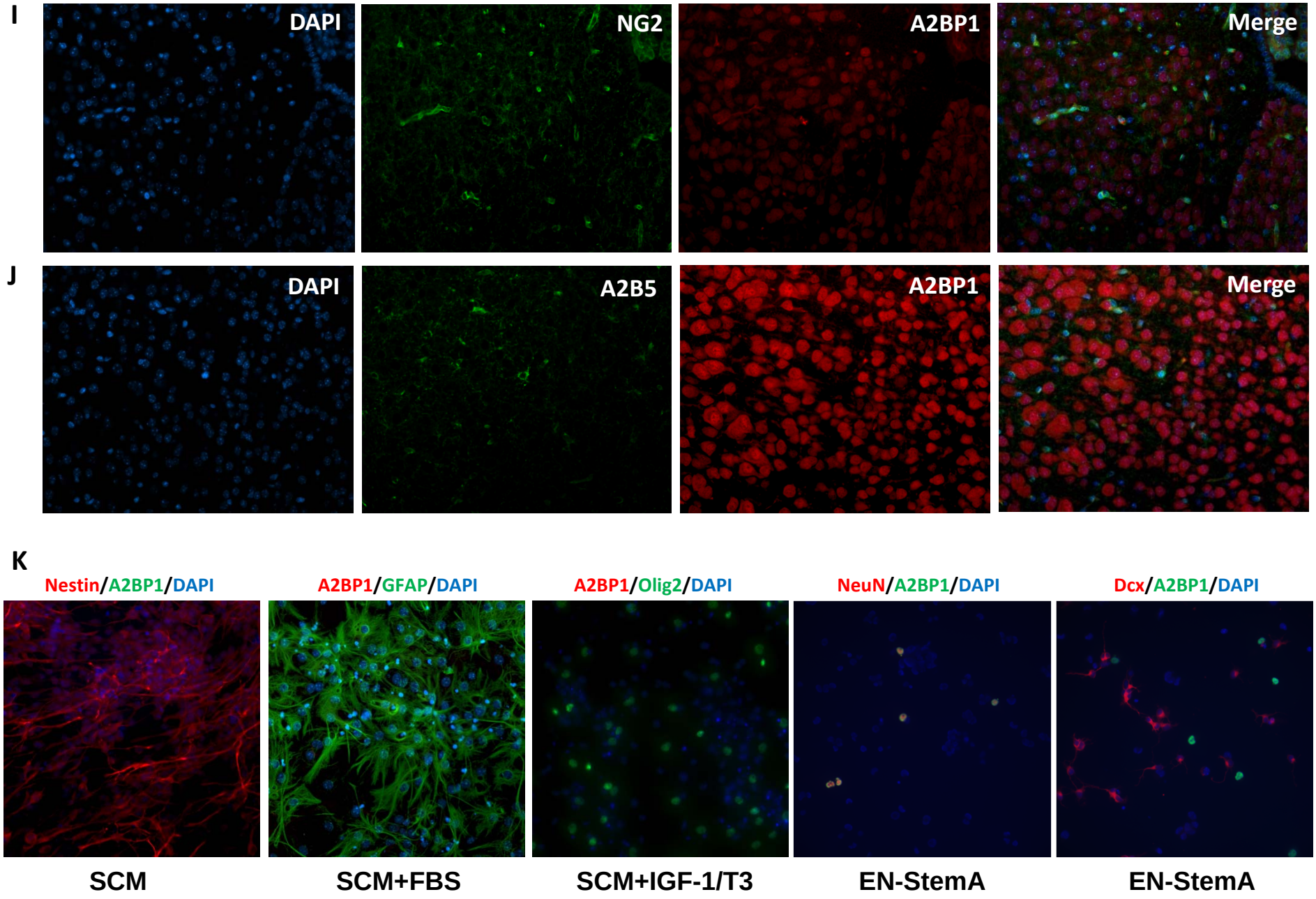



**Figure S4: Co-localization of A2BP1 with multiple cell lineage markers.**

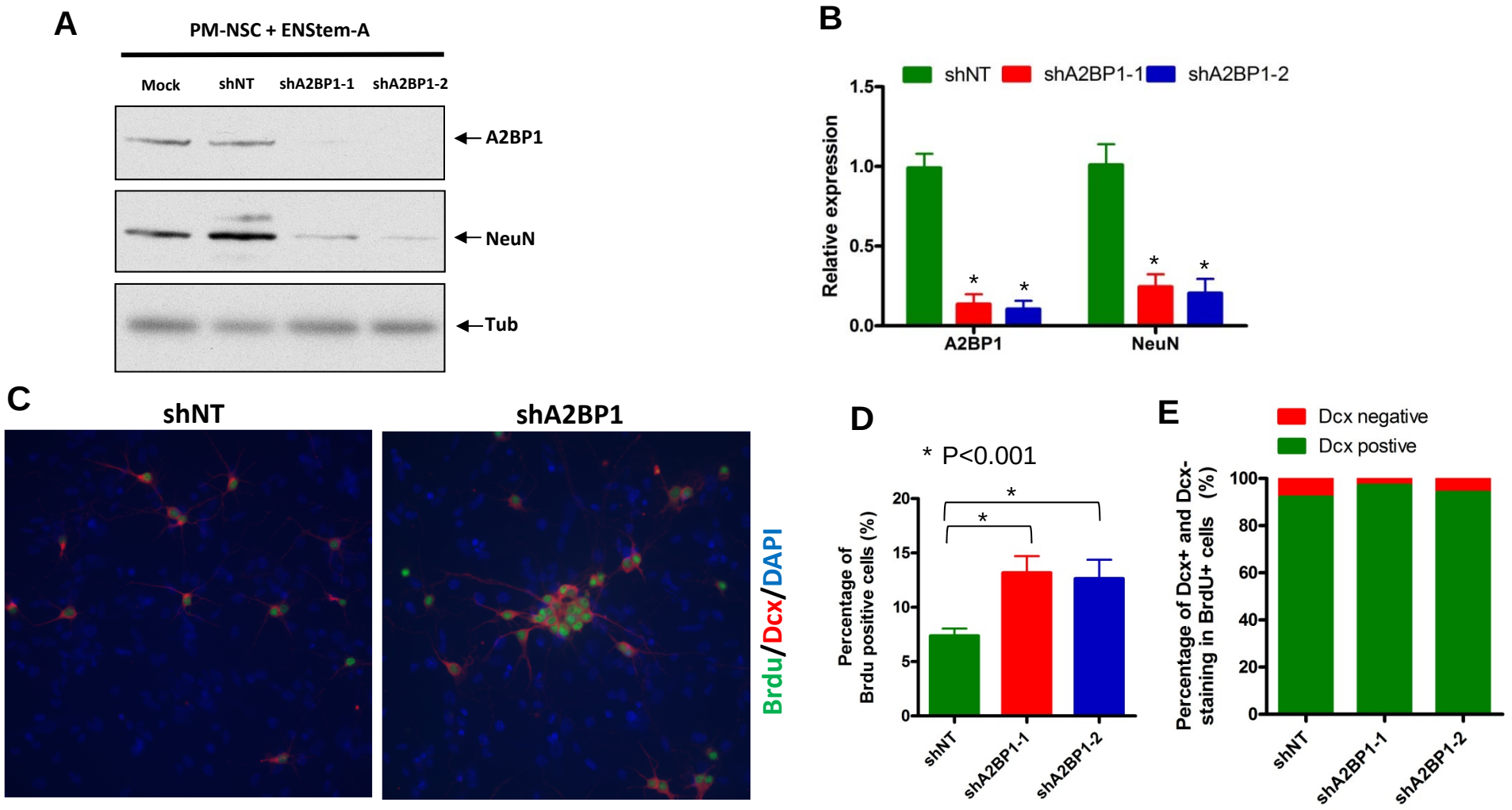



**Figure S5: A2BP1 knockdown doesn't interfere self-renewal and intermediate differentiation steps of PM-NSCs. (A)** Immunoblotting showing levels of A2BP1 and NeuN in PM-NSC with A2BP1 knockdown cultured in EN-StemA medium. **(B)** Q-PCR showing levels of A2BP1 and NeuN in PM-NSC with A2BP1 knockdown cultured in ENStem-A neuronal differentiation medium. **(C)** Representative staining of Dcx and BrdU in PM-NSC with A2BP1 knockdown or control shRNA cultured in ENStem-A neuronal differentiation medium. **(D)** Statistical analysis of Dcx staining in PM-NSC with A2BP1 knockdown or control shRNA cultured in ENStem-A neuronal differentiation medium. **(E)** Percentages of Dcx+ and Dcx- cells among BrdU+ PM-NSC cultured in ENStem-A neuronal differentiation medium with A2BP1 knockdown or control shRNA.

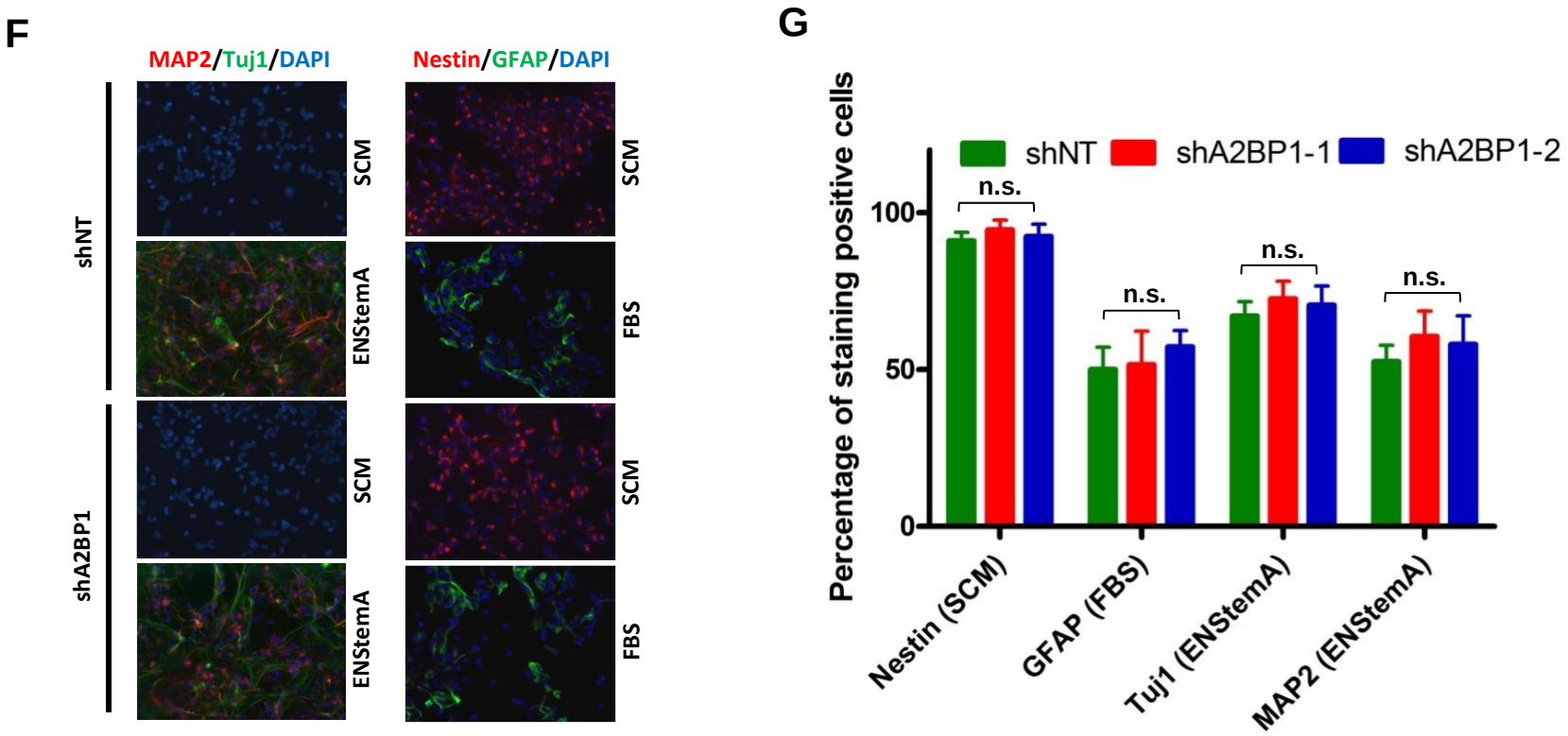



**Figure S5: A2BP1 knockdown doesn't interfere self-renewal and intermediate differentiation steps of PM-NSCs. (F)** Representative staining of NeuN, Tuj1, MAP2 and GFAP in PM-NSCs with A2BP1 knockdown or control shRNA. **(G)** Statistical analysis of (E). Error bars indicate s.d.

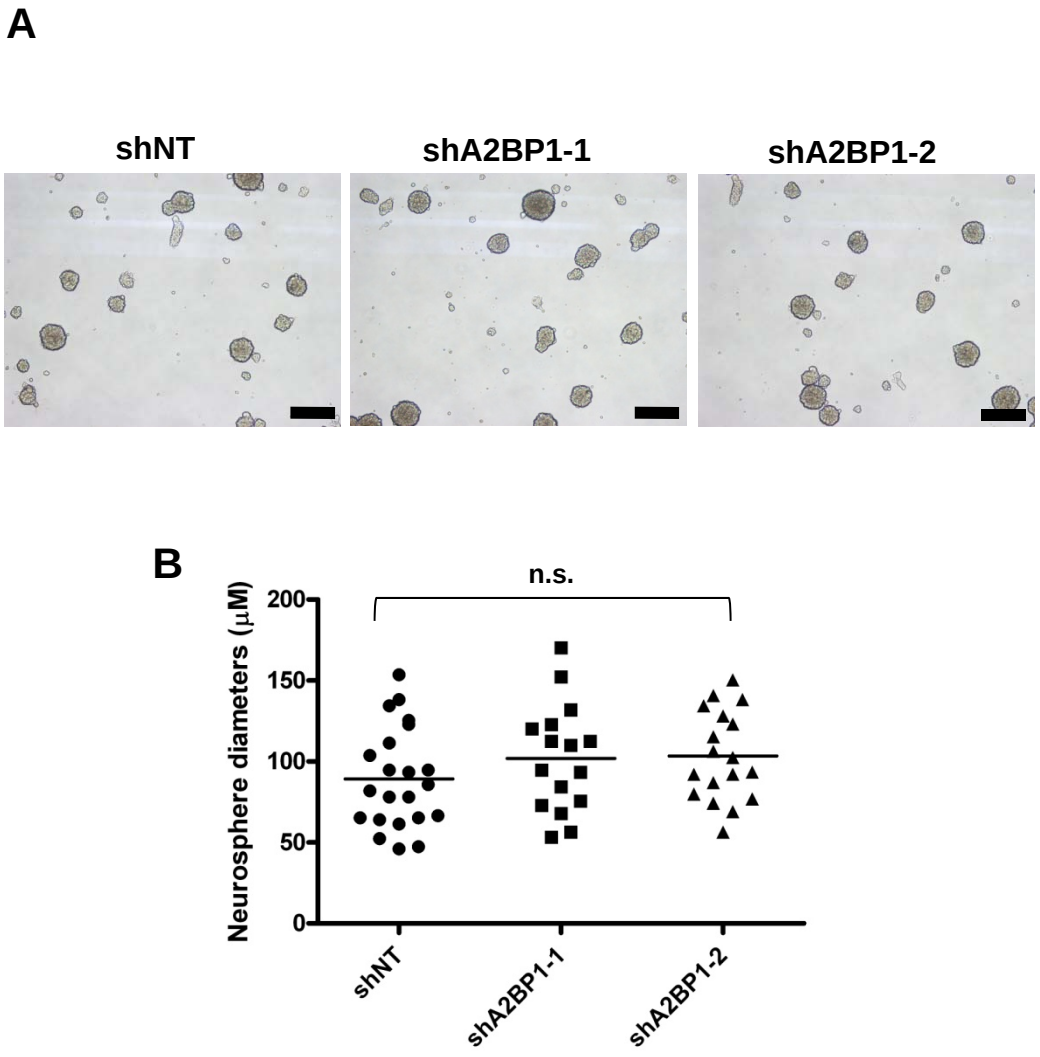



**Figure S6: A2BP1 knockdown doesn't interfere self-renewal of PM-NSCs. (A)** Neurosphere formation of PM-NSCs with A2BP1 knockdown or control shRNA. **(B)** Statistical analysis of (A). Scale bars = 200 mm.

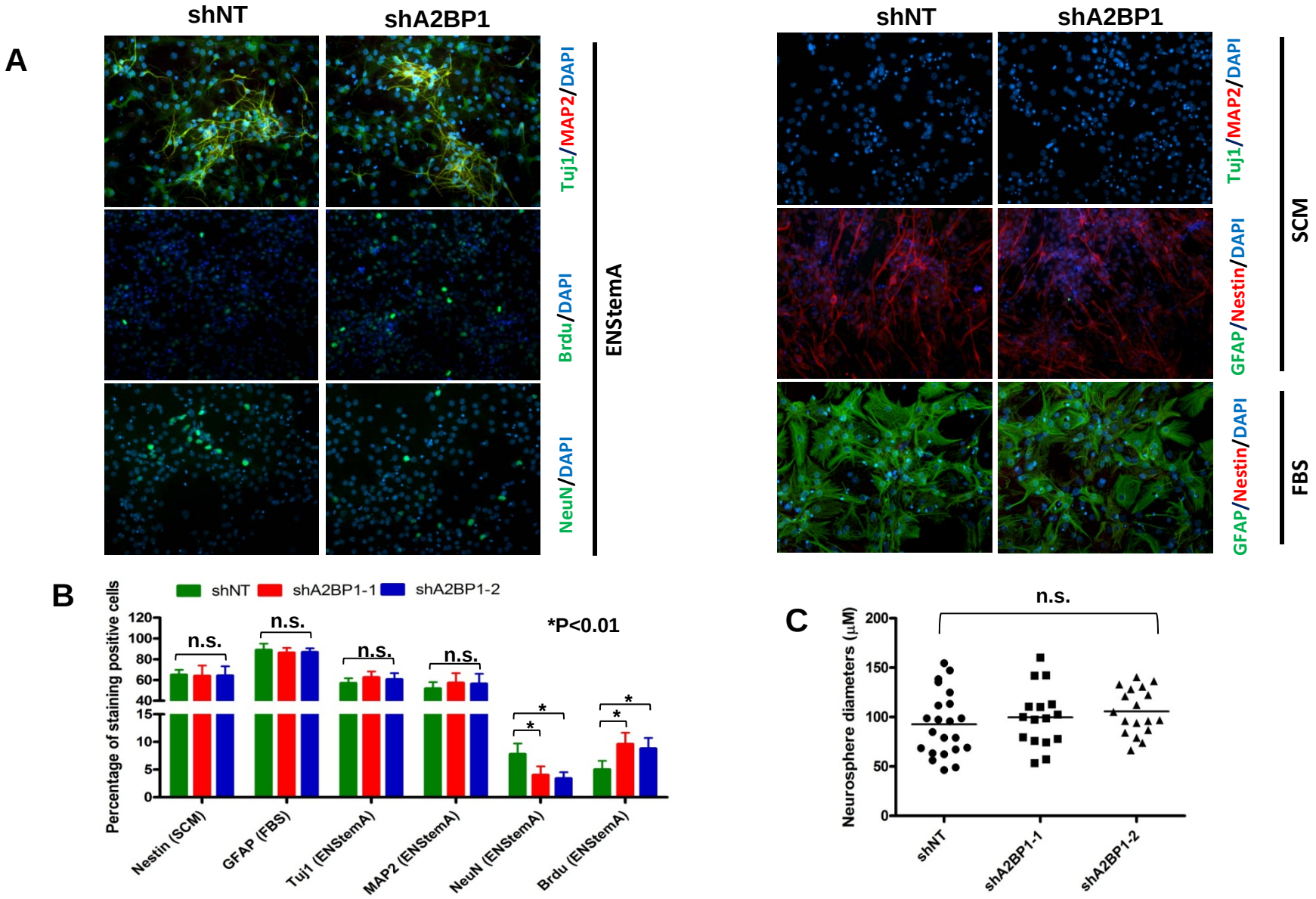



**Figure S7: A2BP1 knockdown impairs terminal differentiation of neural lineage but doesn't interfere self-renewal and intermediate differentiation steps of wild type NSCs. (A)** Representative staining of Nestin, NeuN, Tuj1, MAP2, GFAP and BrdU in NSCs with A2BP1 knockdown or control shRNA. **(B)** Statistical analysis of (A). **(C)** Neurosphere formation of NSCs with A2BP1 knockdown or control shRNA.

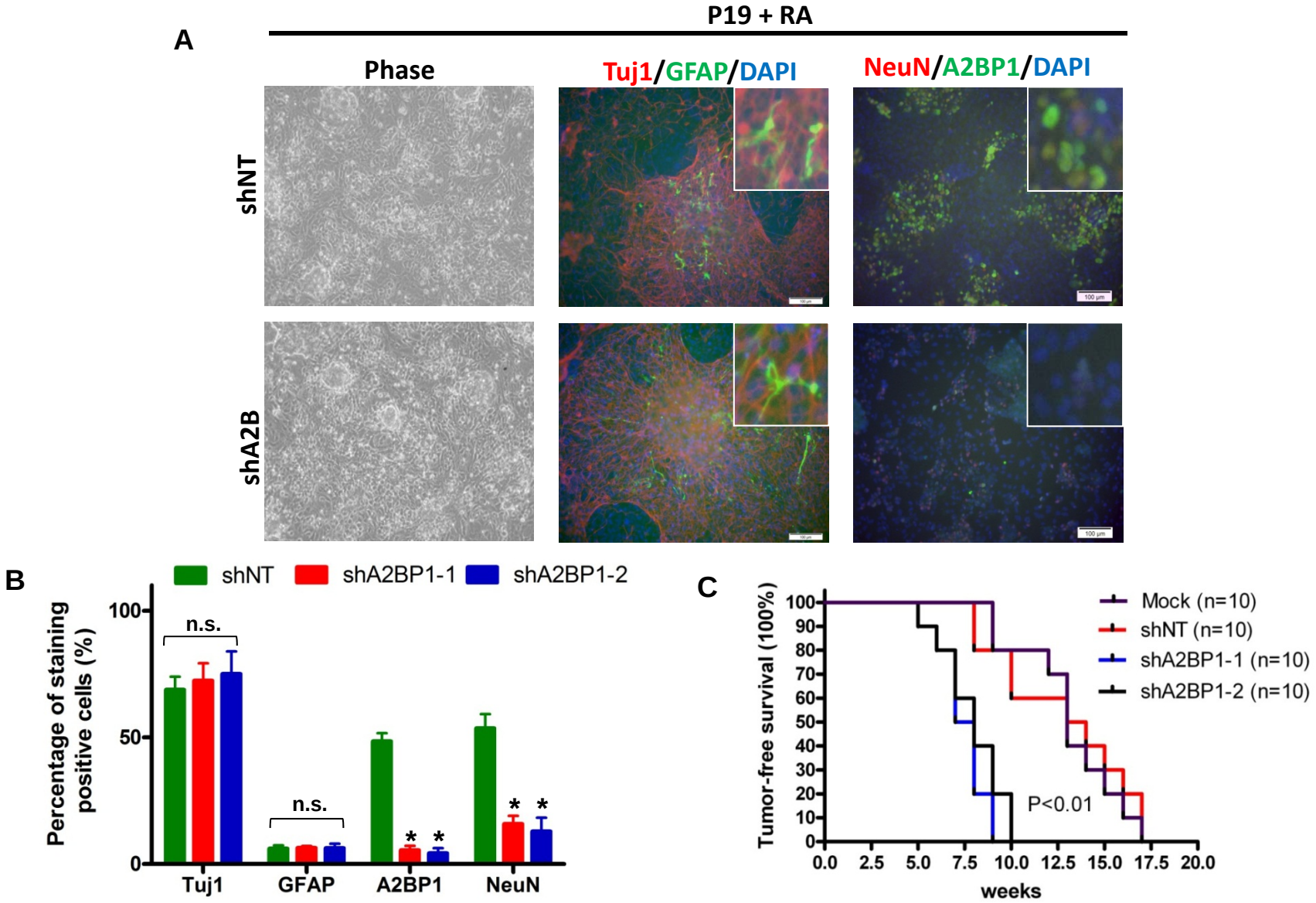



**Figure S8: A2BP1 knockdown leads to compromised neuronal terminal differentiation but not intermediate differentiation steps of P19 cells. (A)** Representative staining of Tuj1, GFAP, A2BP1 and NeuN in P19 cells with A2BP1 knockdown or control shRNA cultured with retinoic acid. **(B)** Statistical analysis of (A). Error bars indicate s.d. **(C)** A2BP1 knockdown increases intracranial tumor formation of P19 cells shown with Kaplan-Meier survival curves (Log-rank test).

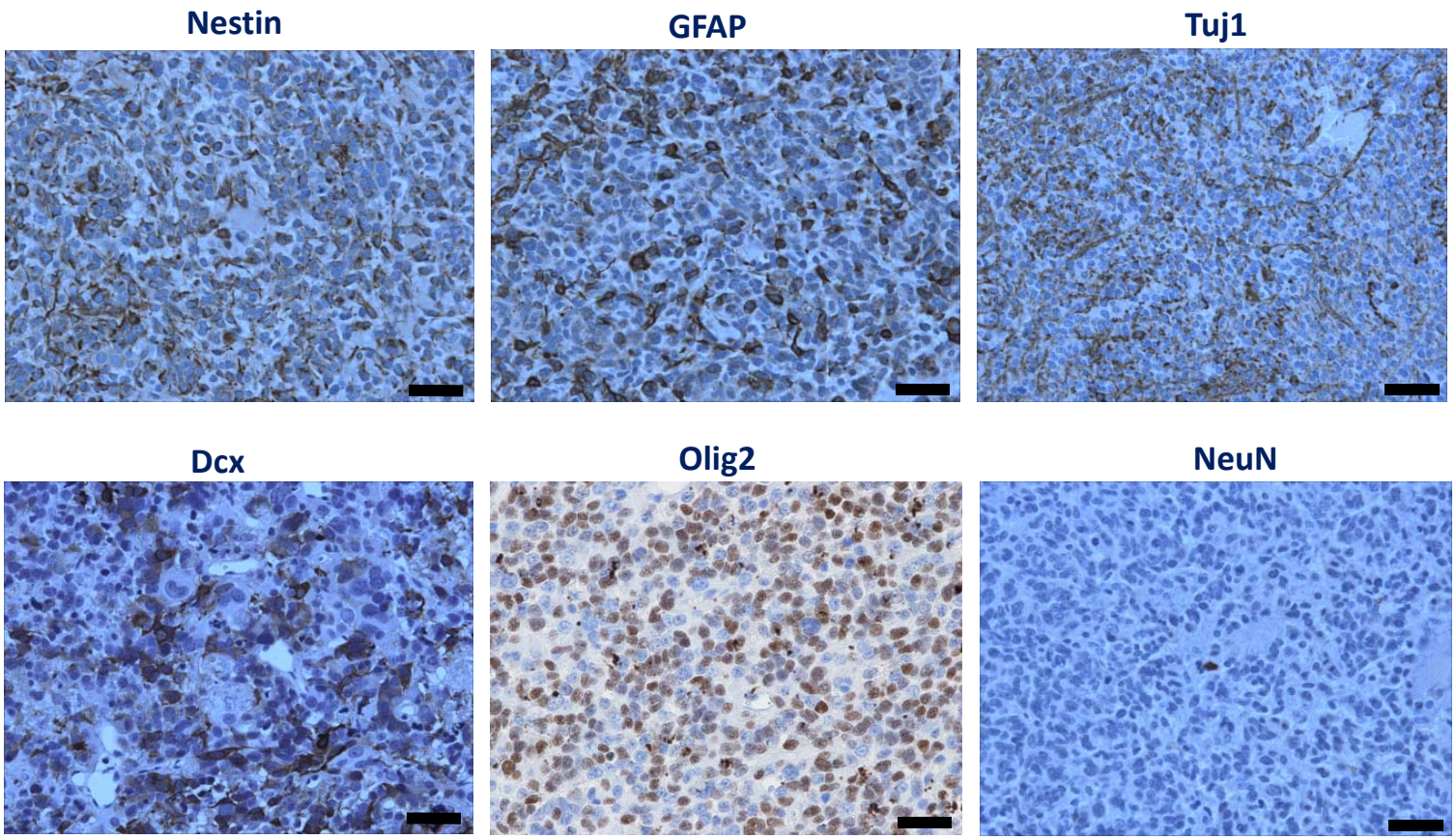



**Figure S9: Representative IHC images of Nestin, GFAP, Tuj1, Dcx, Olig2 and NeuN of tumors derived from PM-NSCs with A2BP1 knockdown.** Scale bars = 50 mm.

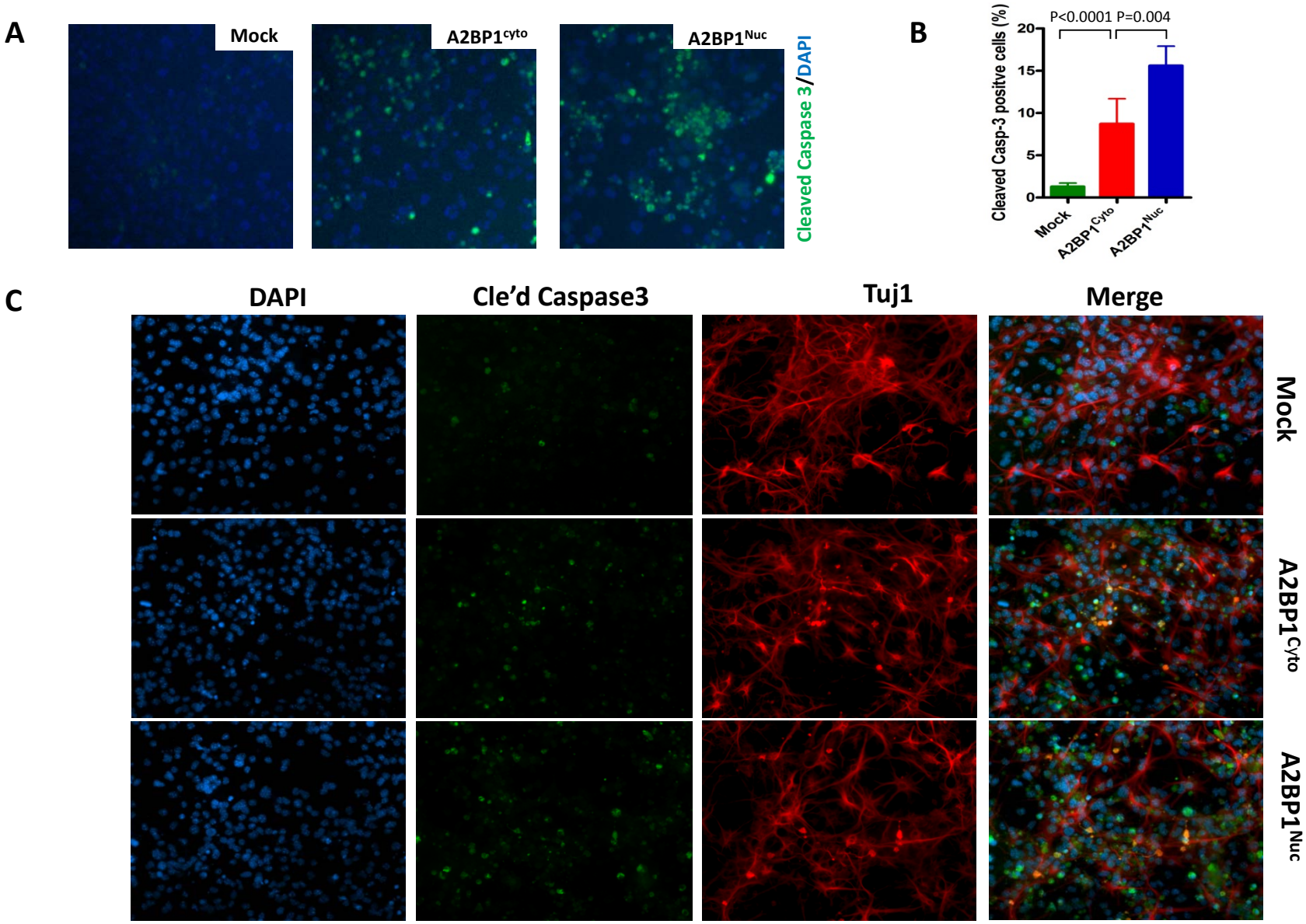



**Figure S10: Ectopic expression of A2BP1 increases apoptosis in neuronal lineage of GSCs. (A)** Representative IF staining of cleaved caspase3 in human GSC line TS603 with A2BP1 overexpression or mock cultured in SCM and EN-StemA medium. **(B)** Statistical analysis of (F). **(C)** Representative IF staining of cleaved Caspase 3 and Tuj1 in *p53*$^{-/-}$*Pten*$^{-/-}$ GSCs with ectopic expression of A2BP and mock in the presence of ENStem-A neuronal differentiation medium.

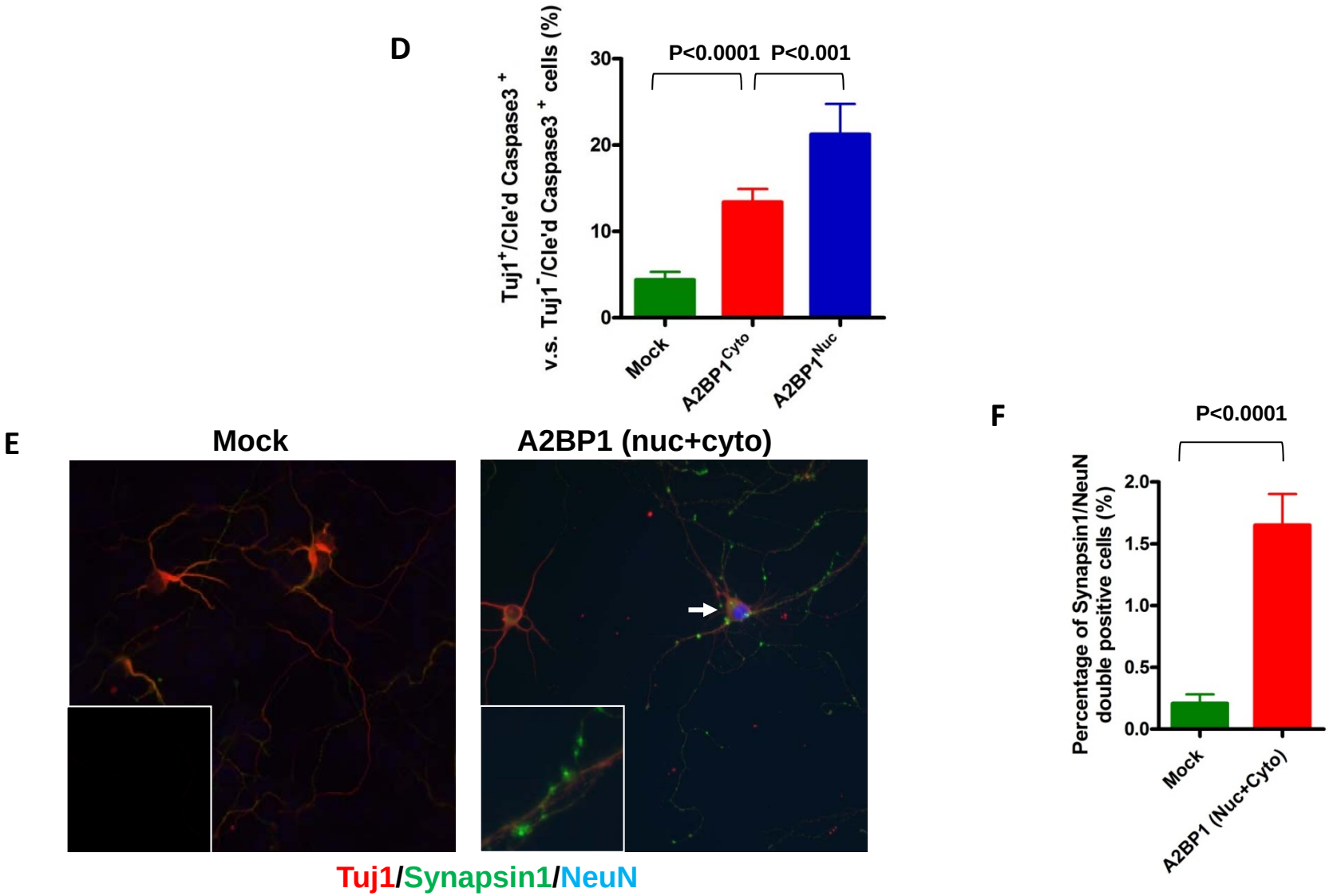



**Figure S10: Ectopic expression of A2BP1 increases apoptosis in neuronal lineage of GSCs.** **(D)** Percentage of Tuj1/Cleaved Caspase 3 double positive staining *p53*$^{-/-}$*Pten*$^{-/-}$ GSCs with ectopic expression of A2BP and mock in the presence of ENStem-A neuronal differentiation medium. **(E)** Representative triple IF staining of Tuj1/Synapsin1/NeuN on mouse NSCs cultured in ENStem-A neuronal differentiation medium with overexpression of A2BP1 (cyto isoform+nuc isoform) or mock. **(F)** Statistical analysis of (E).

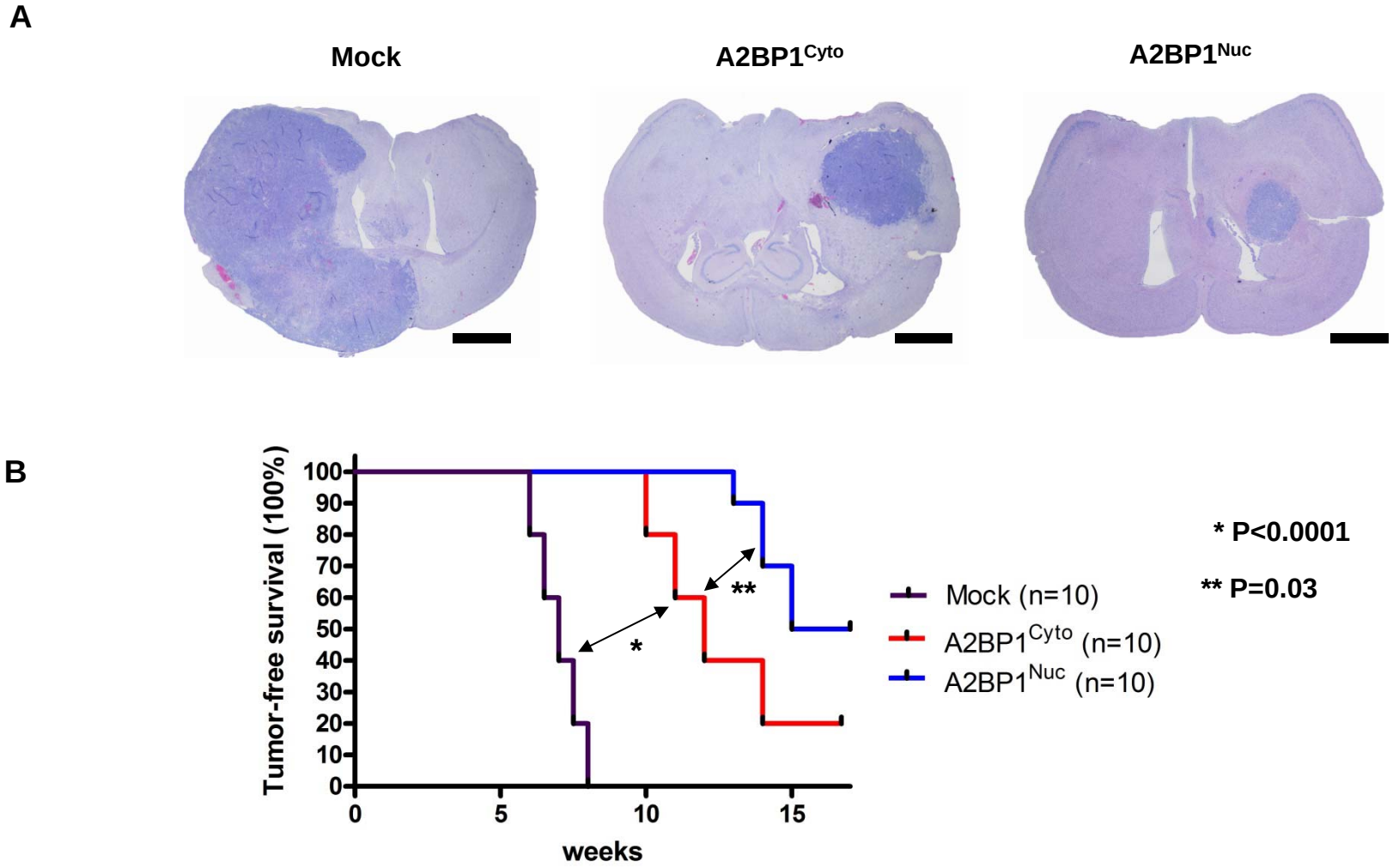



**Figure S11: Ectopic expression of A2BP1 in human GSCs inhibits gliomagenesis. (A)** Representative H&E staining of intracranial tumor formation of human GSC line TS603 with A2BP1 overexpression or mock. **(B)** Kaplan-Meier survival curves (Log-rank test) of mice intracranially injected with human GSC line TS603 with A2BP1 overexpression or mock. Scale bars = 2 mm.

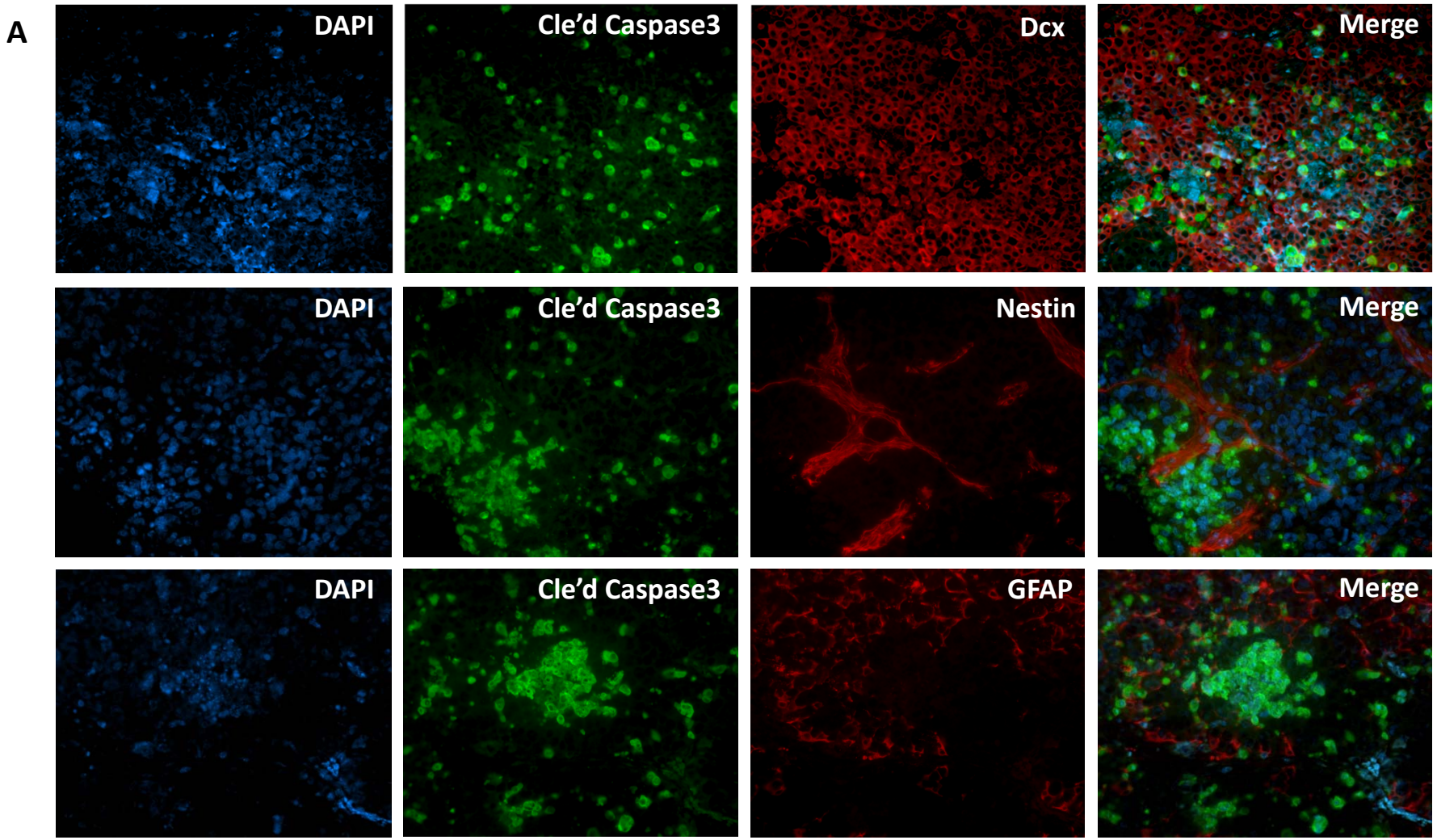



**Figure S12: Ectopically induced expression of A2BP1 increases apoptosis in neuronal lineage cells, but not stem cells, and astrocyte lineage cells in intracranial xenograft of *p53*$^{-/-}$*Pten*$^{-/-}$ GSCs. (A)** Representative IF staining of cleaved Caspase 3 and Dcx/Nestin/GFAP in intracranial xenograft derived from *p53*$^{-/-}$*Pten*$^{-/-}$ GSCs with ectopic expression of A2BP1 induced by Doxycycline for three days.

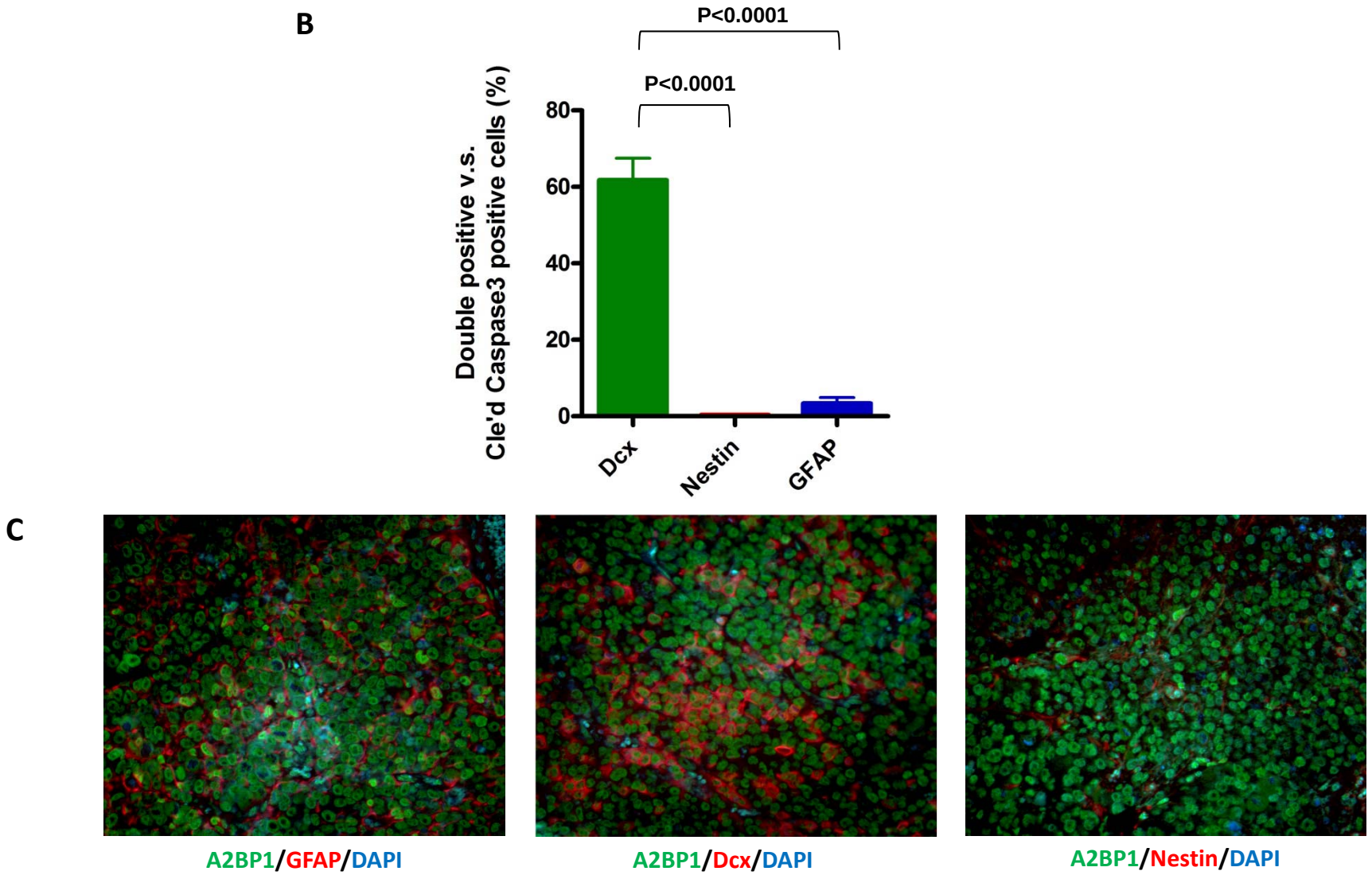
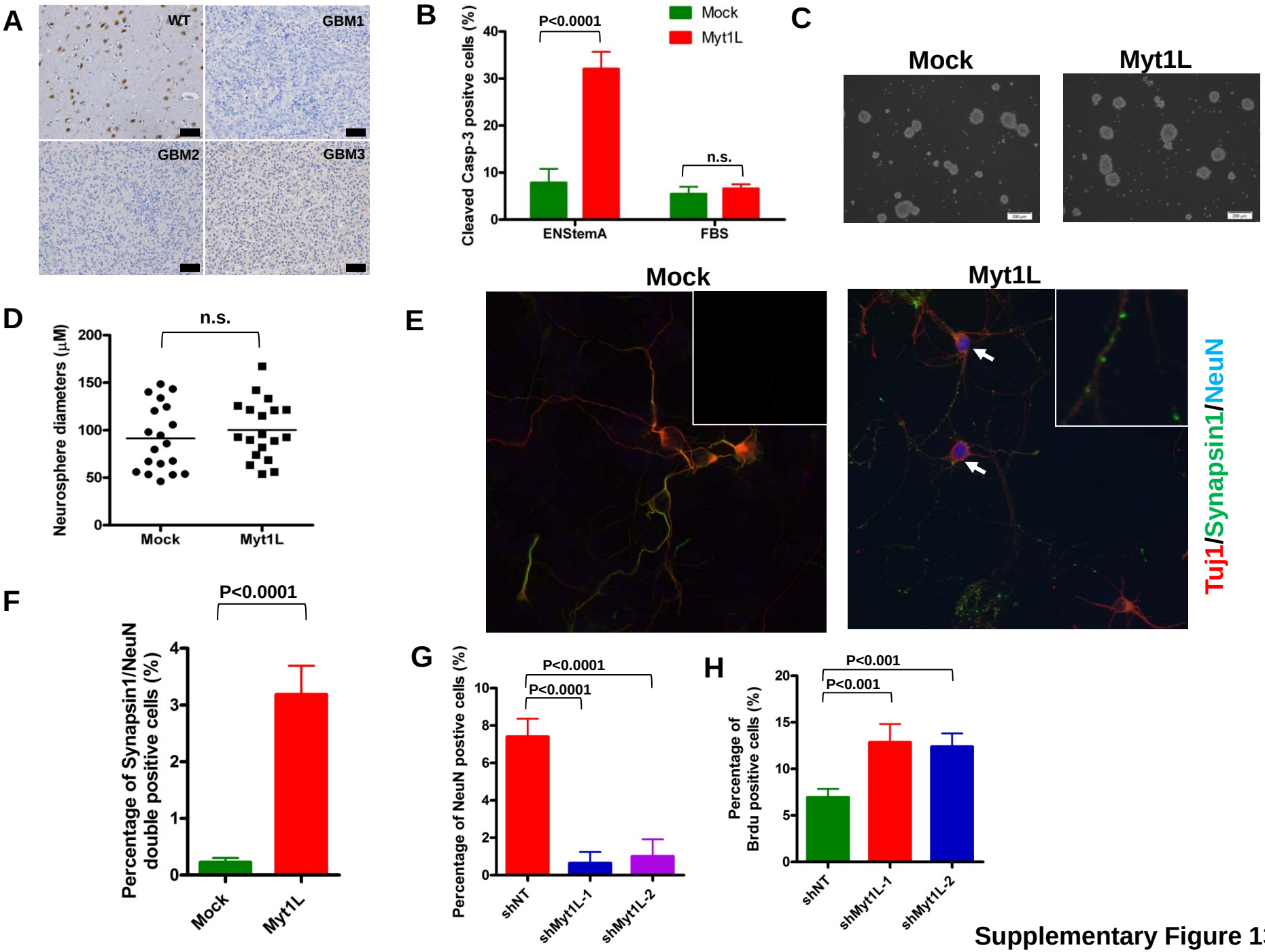
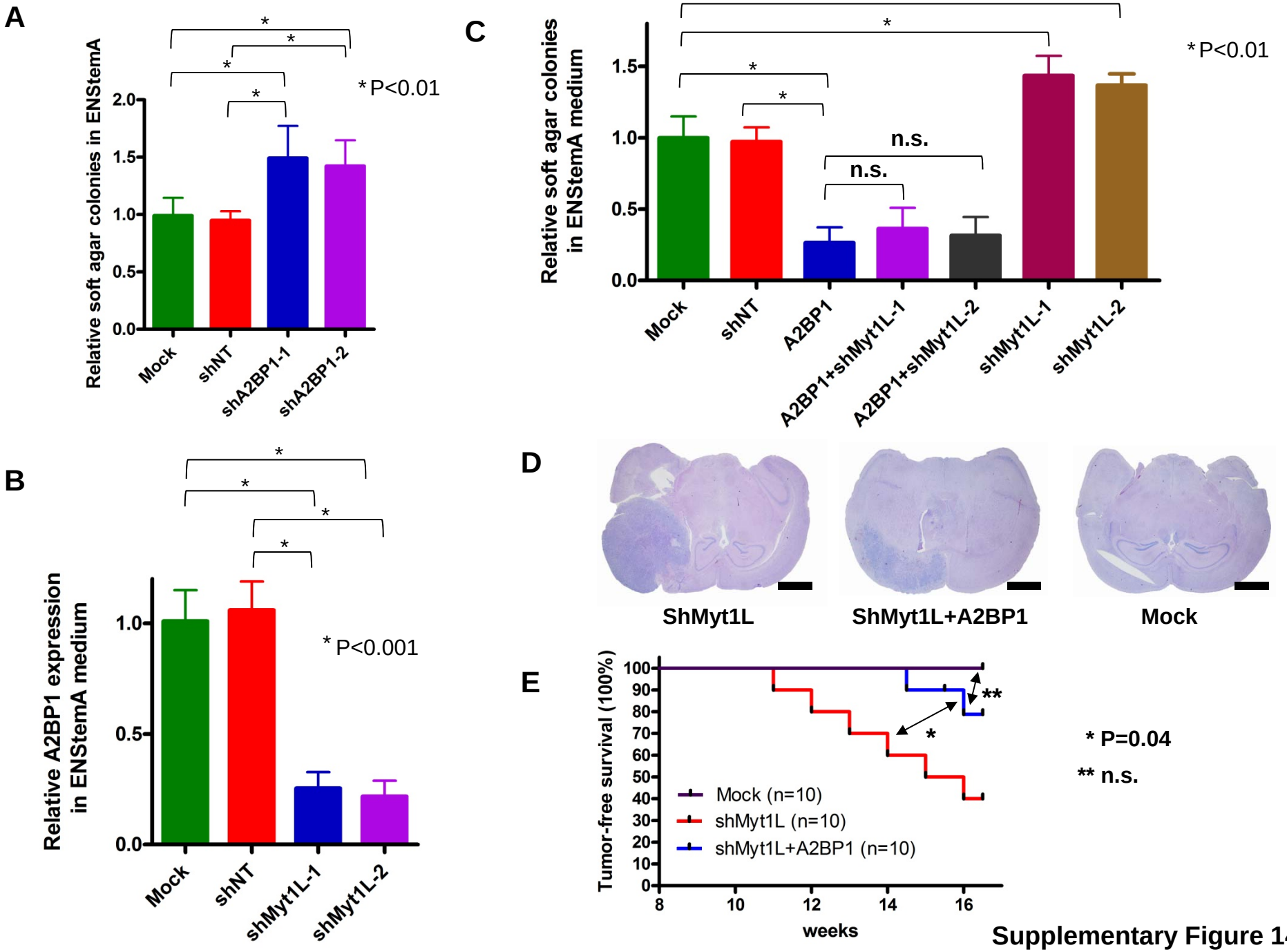



**Figure S12: Ectopically induced expression of A2BP1 increases apoptosis in neuronal lineage cells, but not stem cells, and astrocyte lineage cells in intracranial xenograft of *p53*$^{-/-}$*Pten*$^{-/-}$ GSCs. (B)** Percentage of apoptotic cells in different cell populations with Dox-induced expression of A2BP intracranial xenograft derived from *p53*$^{-/-}$*Pten*$^{-/-}$ GSCs. (C) Representative IF staining of A2BP1 and Dcx/Nestin/GFAP in intracranial xenograft derived from *p53*$^{-/-}$*Pten*$^{-/-}$ GSCs with Dox-induced expression of A2BP1.



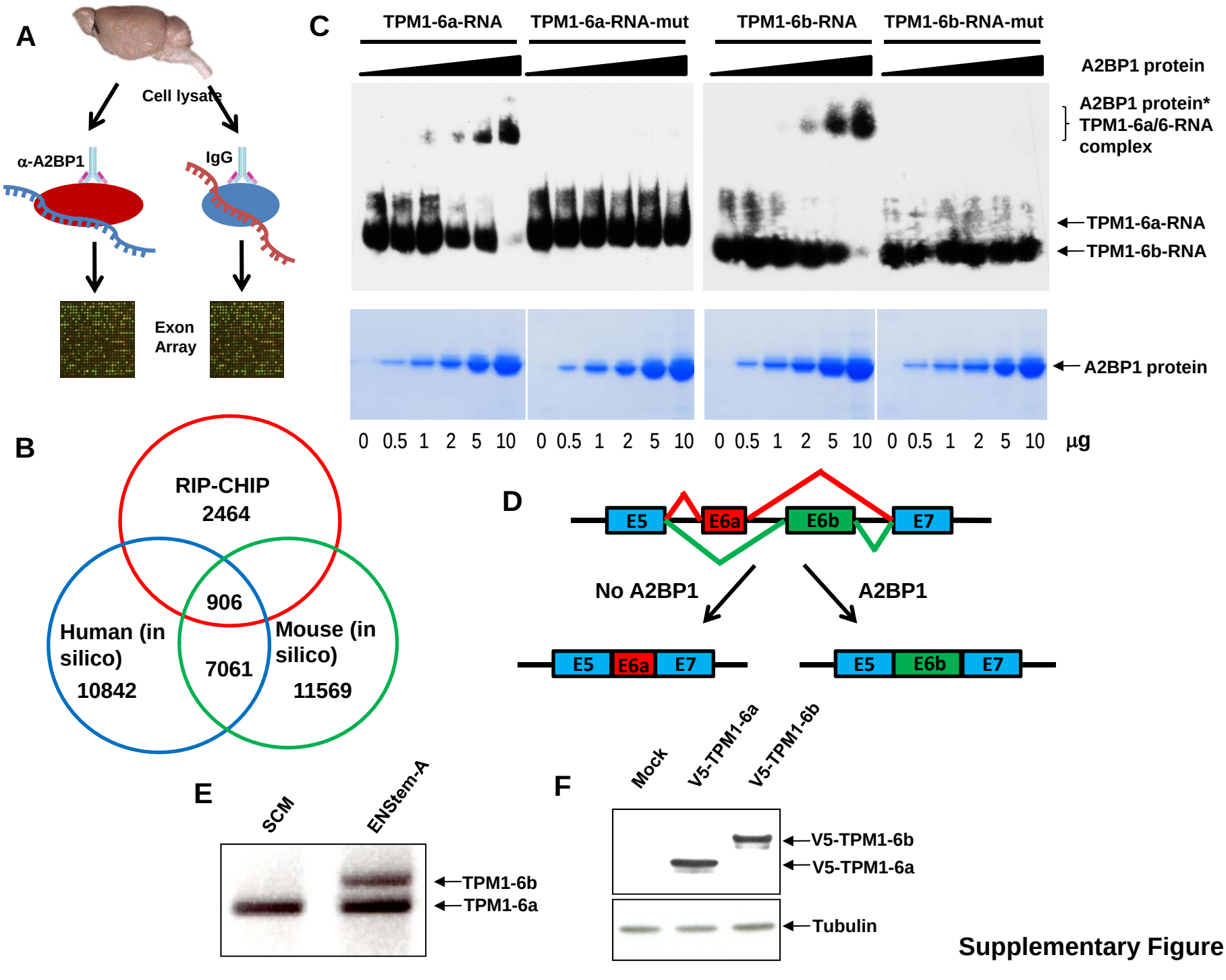

**Supplementary Figure 13**

**Figure S13: Overexpression of Myt1L affects neuronal terminal differentiation but not self-renewal of neural/glioma stem cells. (A)** Representative IHC staining of Myt1L in normal brain and GBM samples. **(B)** Cleaved Caspase 3 staining of glioma stem cells with ectopic expression of Myt1L or mock cultured in ENStem-A neuronal differentiation medium or SCM with 1% FBS. **(C)** Neurosphere formation of glioma stem cells with ectopic expression of Myt1L or mock cultured in SCM. **(D)** Statistical analysis of (B). **(E)** Representative triple IF staining of Tuj1/Synapsin1/NeuN on mouse NSCs cultured in ENStem-A neuronal differentiation medium with overexpression of A2BP1 (cyto isoform+nuc isoform) or mock. **(F)** Statistical analysis of (E). **(G)** Statistical analysis of NeuN staining in *p53*$^{-/-}$*Pten*$^{+/-}$ pre-malignant neural stem cells (PM-NSCs) with Myt1L knockdown or control shRNA cultured in neuronal differentiation medium EN-StemA. **(H)** Statistical analysis of BrdU staining in *p53*$^{-/-}$*Pten*$^{+/-}$ pre-malignant neural stem cells (PM-NSCs) with Myt1L knockdown or control shRNA cultured in neuronal differentiation medium EN-StemA. Scale bars = 100 mm. Error bars indicate s.d.



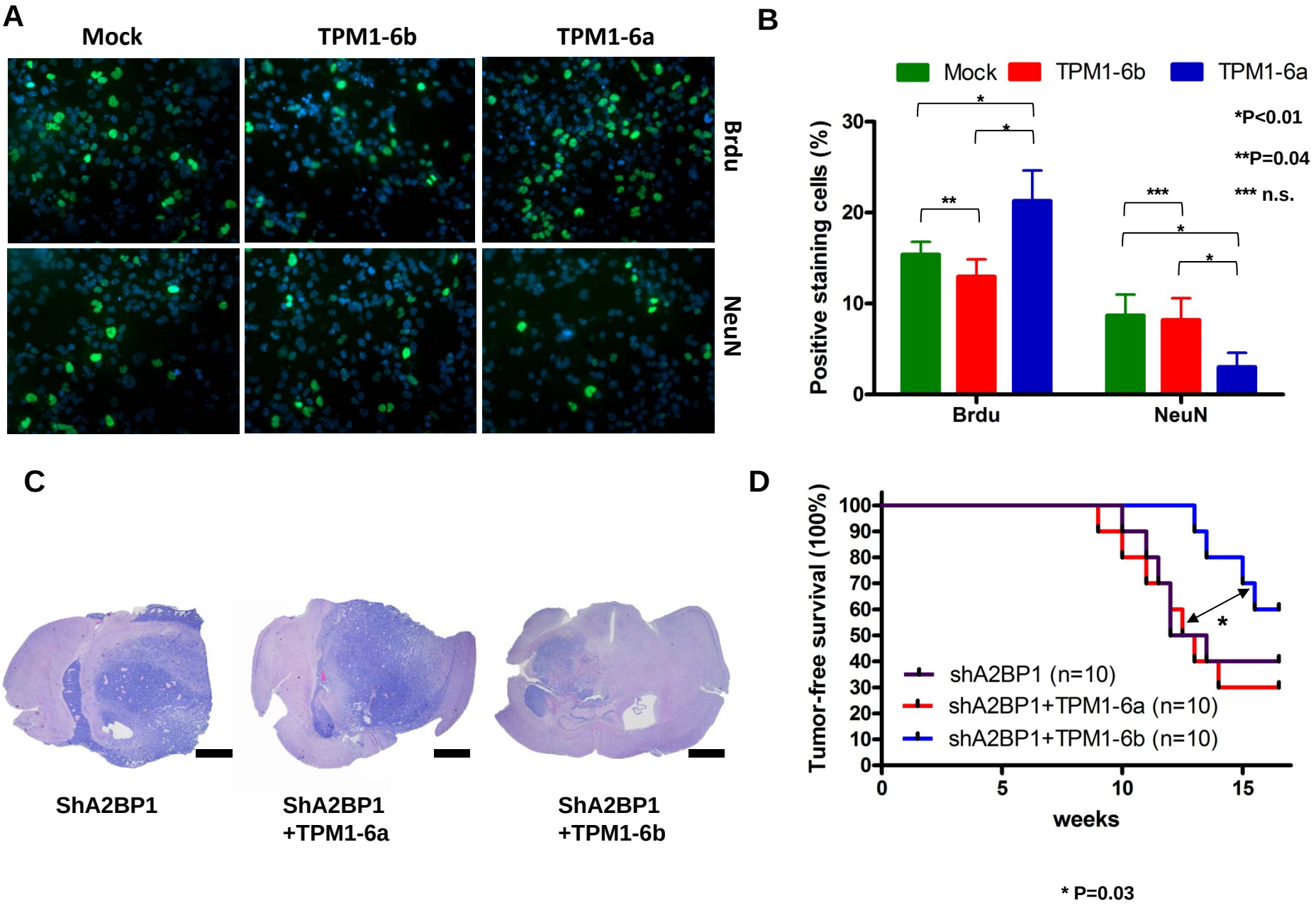

**Supplementary Figure 14**

**Figure S14: Myt1L suppresses gliomagenesis through A2BP1. (A)** Soft agar formation of *p53*$^{-/-}$*Pten*$^{+/-}$ PM-NSCs with shA2BP1 or controls in the presence of ENStem-A neuronal differentiation medium. **(B)** Expression level of A2BP1 in *p53*$^{-/-}$*Pten*$^{+/-}$ PM-NSCs with shMyt1L or controls in the presence of ENStem-A neuronal differentiation medium. **(C)** Soft agar formation of *p53*$^{-/-}$*Pten*$^{+/-}$ PM-NSCs with ectopic expression of A2BP1, shMyt1L, A2BP1+shMyt1L or controls in the presence of ENStem-A neuronal differentiation medium. **(D)** Representative H&E staining of intracranial tumor formation of *p53*$^{-/-}$*Pten*$^{+/-}$ PM-NSCs with shMyt1L, shMyt1L+A2BP1 or control. **(E)** Kaplan-Meier survival curves (Log-rank test) of mice intracranially injected with *p53*$^{-/-}$*Pten*$^{+/-}$ PM-NSCs with ectopic expression of shMyt1L, shMyt1L+A2BP1 or control. Scale bars = 2 mm.




Supplementary Figure 15

**Figure S15: Analyzing targets of A2BP1. (A)** Strategy of identifying A2BP1 associated RNA species in mouse brain through RIP-Chip. **(B)** Integration of RIP-Chip data with *in silico* analysis. **(C)** EMSA assay with fragments (around 310bp, 10nM) surrounding TPM1 exons 6a and 6b and mutants (DUGCAUG) with different amounts of recombinant A2BP1 nuclear isoform (in 20 ml reaction). **(D)** A cartoon depicting TPM1 alternative splicing regulated by A2BP1. **(E)** Expression levels of TPM1 exon 6a and 6b in PM-NSC cultured in SCM or ENStem-A neuronal differentiation medium was shown with PCR. **(F)** Immunoblotting showing the ectopic expression of TPM1-6a and TPM1-6b.




**Supplementary Figure 16**

**Figure S16: A2BP1 suppresses gliomagenesis partly through regulating alternative splicing of TPM1. (A)** Representative IF staining of BrdU and NeuN of *p53*$^{-/-}$*Pten*$^{+/-}$ PM-NSCs with ectopic expression of TPM1-6a, TPM1-6b or control in the presence of ENStem-A neuronal differentiation medium. **(B)** Statistical analysis of (A). (**C)** Representative H&E staining of intracranial tumor formation of *p53*$^{-/-}$*Pten*$^{+/-}$ PM-NSCs with ectopic expression of shA2BP1, shA2BP1+TPM16a or shA2BP1+TPM16b. **(D)** Kaplan-Meier survival curves (Log-rank test) of mice intracranially injected with *p53*$^{-/-}$*Pten*$^{+/-}$ PM-NSCs with ectopic expression of shA2BP1, shA2BP1+TPM16a or shA2BP1+TPM16b. Scale bars = 2 mm.

## Supplementary methods

### Chromatin Immunoprecipitation analyses

For chromatin IP we followed the protocol provided with the EZ ChIP kit from Upstate Biotechnology. In short, normal human astrocytes from five 15 cm plates were fixed by paraformaldehyde, lysed and sheared by sonication (3 x 10 sec, idle time 45 sec). For overnight immunoprecipitations 5 µg of rabbit Myt1L antibody (AB093283, Abnova) or an equal amount control rabbit IgG (Santa Cruz) was used. After extensive washing, the immunoprecipitants were eluted with 2% SDS in 0.1 M $NaH_2CO_3$. Cross-linking was reversed by heating overnight at 65 $^oC$ and samples were treated with proteinase K for 1 h at 45$^oC$. Input DNA and immunoprecipitated DNA were purified using the PCR purification kit (Qiagen). For CHIP-seq immunoprecipitated DNAs were subjected to Illumina high-throughput sequencing library construction. In brief, the DNA fragments were end-repaired, dA tailed, and ligated with TrueSeq sequencing adapters. The ligated fragments were further size-selected with a range of 200-300 bps and linearly amplified with Phusion enzyme. The libraries were quality-checked with the Agilent 2100 Bioanalyzer and sequenced by the Illumina HiSeq 2000 sequencing system in CCCB Sequencing facility at Dana-Farber Cancer Institute. The sequencing raw reads were mapped to the mouse genome (mm9) via bwa(1) and ChIP-Seq peaks were identified with MACS (p-value cut-off 1e-5)(2) and QuEST(3). For CHIP-PCR, the primers are listed in Table S6 and PCR products were separated in 2% agarose gel to visualize.

### Invasion assay

Standard 24-well Boyden invasion chambers (BD Biosciences) were used to assess cell invasiveness following the manufacturer's suggestions. Briefly, cells were trypsinized, rinsed twice with PBS, re-suspended in serum-free media, and seeded at $4 \times 10^5$ cells per well. Chambers in triplicate were placed in 10% serum-containing media as a chemo-attractant and an equal number of cells were seeded in cell culture plates in triplicate as input controls. Following 22 h incubation, the inserts were then removed from the chamber and gently submerged in PBS several times to remove unattached cells. The cells on the bottom of the membrane were then fixed by submersion in cold MeOH (stored at -20° C) for 10 minutes and stained by soaking the membranes in crystal violet solution for 10 minutes. The membranes were washed gently in tap water 3 times to remove excess stain and any un-migrated cells on the top of the membrane were removed by gently scrapping the top of the membrane with a wet cotton swab. The dye was exacted by 10% Acetic Acid and absorbance was read on plate reader at 590 nm.

### Protein expression and EMSA

A2BP1 nuclear isoform protein was expressed and purified by Genscript Inc. In brief, the expression sequence to code A2BP1 nuclear isoform (Accession number NP665898) was optimized with Genscript proprietary OptimumGeneTM codon optimization technology and consequently subcloned into three bacteria expression vectors. The best construct was chosen to express N-his tagged A2BP1 protein with one Liter bacteria culture. The N-his tagged A2BP1 protein was purified by affinity purification coupled with

addition purification methods to yield >90% purity. The purity of protein was determined by western blot against His tag, SDS-PAGE and MALDI-TOF.

EMSA protocol is described in manufacture instructions of LightShift Chemiluminescent RNA EMSA Kit (Thermo Scientific 20158) . In brief, TPM1 exon 6a/6b and flanking sequences (310 bp) were cloned into PENTR plasmid (Invitrogen), and TPM1 exon 6a-m/6b-m were mutated by deleting the TGCACG binding motif. TPM1-6a, TPM1-6a-m, TPM1-6b, TPM1-6b-m DNA templates were amplified by PCR with primers containing T7 promoter. PCR primers are listed in Table S6 (TPM1-6a-fT7, TPM1-6a-r, TPM1-6b-fT7, TPM1-6b-r). RNA probes were conjugated with Biotin with Thermo Scientific Pierce RNA 3' End Biotinylation Kit (Thermo Scientific 20160). A2BP1 protein and RNA probes were then incubated in the binding buffer (10 mM HEPES pH7.9, 2 mM $MgCl_2$, 50 mM KCl, 5% glycerol, 0.5 mM DTT,5 μg yeast tRNA) for 1 hour and then separated by 6% TBE (0.5x) DNA retardation gel (12 well, EC63655BOX, pre-cast from Invitrogen). Gels were then transferred to nylon membranes and crosslinked at 120mJ/$cm^2$ with 254nm bulbs. The nylon membranes were soaked in Blocking Buffer for 30 mins, and then in Conjugating/Blocking Buffer for 15 mins. The membranes were washed with Washing Buffer four times and soaked with Substrate Equilibration Buffer for 5 mins followed by Substrate Working Solution (1:1 Luminol/Enhancer Solution and Stable Peroxide Solution) for 5 mins. The membranes were exposed to X-ray film for 30 sec-5 min.

**Luciferase reporter assay**

A2BP1 promoters (1.2 kb from the transcription start point of long and short transcripts) were cloned into PGL4 Luciferase Reporter Vector. Reporter plasmids, TK-Renilla and control plasmids were transfected into LN18 cells, which were subsequently applied to Dual-Luciferase reporter assay (Promega) following manufacturer's suggestions. In brief, cells were washed with PBS and lysed in Passive Lysis Buffer (lysis buffer volume was based on manufacturer's suggestions). 20 μl of lysate was transferred to 96 well plate followed by 100 μl of Luciferase Assay Buffer II with luciferase substrate. Firefly luciferase activity was measured with plate reader. 100 μl of Stop & Glo Reagent was then added to the well and Renilla luciferase activity was measured subsequently as internal control.


1. Li H & Durbin R (2009) Fast and accurate short read alignment with Burrows-Wheeler transform. (Translated from eng) *Bioinformatics* 25(14):1754-1760 (in eng).
2. Zhang Y*, et al.* (2008) Model-based analysis of ChIP-Seq (MACS). (Translated from eng) *Genome Biol* 9(9):R137 (in eng).
3. Valouev A*, et al.* (2008) Genome-wide analysis of transcription factor binding sites based on ChIP-Seq data. (Translated from eng) *Nat Methods* 5(9):829-834 (in eng).

Supp Table 1: Genes that are both involved in nervous system development and are deleted in GBM

APOB
ATXN10
BARHL2
CELSR1
CXCL12
DKK1
EDNRB
GDF7
GRIP1
HDAC7
HES1
HES3
LSAMP
OLFM1
POU4F1
SDHA
SNTG2
TP73
VSNL1
ZIC2
ZIC5
LTF
PTPN20A
RSU1
ABCA4
ADCY3
AVPR1A
KNG1
NPAS3
POMC
PTPRD
QKI
SLC6A3
PARK7
RHOB
HES5
CHAT
GABRD
PRKCZ
SLC24A2
PRDM16
WNT7B
OMG
IFNG
STYK1
TFAP2B
CNTN4
FUT9
ITGBL1
MICAL2
FSTL5

SYNJ2
NRXN3
LMO3
TMEM132D
A2BP1
KCNAB2
CDH9
TNFRSF26
TPD52L1
RAP1GAP
KITLG
MCDH10
CHODL
EYA1
EYA4
MEIS1
DGKG
PDE10A
UBE4B
RERE

Supp Table 2: Genes whose promoter regions are bound by Myt1L protein

| Gene ID | Gene Symbol | Description |
|---|---|---|
| 100683 | Trrap | Transformation/transcription domain-associated protein |
| 101966 | D8Ertd738e | "DNA segment, Chr 8, ERATO Doi 738, expressed" |
| 102545 | Cmtm7 | CKLF-like MARVEL transmembrane domain containing 7 |
| 104010 | Cdh22 | Cadherin 22 |
| 104601 | Mycbpap | Mycbp associated protein |
| 105501 | Abhd4 | Abhydrolase domain containing 4 |
| 108011 | Ap4e1 | "Adaptor-related protein complex AP-4, epsilon 1" |
| 108705 | Pttg1ip | Pituitary tumor-transforming 1 interacting protein |
| 109332 | Cdcp1 | CUB domain containing protein 1 |
| 114128 | Laptm4b | Lysosomal-associated protein transmembrane 4B |
| 11500 | Adam7 | A disintegrin and metallopeptidase domain 7 |
| 11752 | Anxa8 | Annexin A8 |
| 11771 | Ap2a1 | "Adaptor protein complex AP-2, alpha 1 subunit" |
| 11775 | Ap3b2 | "Adaptor-related protein complex 3, beta 2 subunit" |
| 11776 | Ap3d1 | "Adaptor-related protein complex 3, delta 1 subunit" |
| 118453 | Mmp28 | Matrix metallopeptidase 28 (epilysin) |
| 11861 | Arl4a | ADP-ribosylation factor-like 4A |
| 11941 | Atp2b2 | "ATPase, Ca++ transporting, plasma membrane 2" |
| 12166 | Bmpr1a | "Bone morphogenetic protein receptor, type 1A" |
| 12317 | Calr | Calreticulin |
| 12404 | Cbln1 | Cerebellin 1 precursor protein |
| 12768 | Ccr1 | Chemokine (C-C motif) receptor 1 |
| 12770 | Ccr1l1 | Chemokine (C-C motif) receptor 1-like 1 |
| 12805 | Cntn1 | Contactin 1 |
| 12861 | Cox6a1 | "Cytochrome c oxidase, subunit VI a, polypeptide 1" |
| 12954 | Cryaa | "Crystallin, alpha A" |
| 13039 | Ctsl | Cathepsin L |
| 13135 | Dad1 | Defender against cell death 1 |
| 13193 | Dcx | Doublecortin |
| 13426 | Dync1i1 | Dynein cytoplasmic 1 intermediate chain 1 |
| 140497 | Cd300d | Cd300D antigen |
| 14082 | Fadd | Fas (TNFRSF6)-associated via death domain |
| 14247 | Fli1 | Friend leukemia integration 1 |
| 14387 | Gaa | "Glucosidase, alpha, acid" |
| 14411 | Slc6a12 | "Solute carrier family 6 (neurotransmitter transporter, betaine/GABA), member 12" |
| 14695 | Gnb3 | "Guanine nucleotide binding protein, beta 3" |
| 14793 | Cdca3 | Cell division cycle associated 3 |
| 14894 | Gtl3 | Gene trap locus 3 |
| 15118 | Has3 | Hyaluronan synthase 3 |
| 15288 | Hmbs | Hydroxymethylbilane synthase |
| 15469 | Prmt1 | Protein arginine N-methyltransferase 1 |
| 15558 | Htr2a | 5-hydroxytryptamine (serotonin) receptor 2A |
| 15893 | Ica1 | Islet cell autoantigen 1 |
| 16541 | Napsa | Napsin A aspartic peptidase |
| 16904 | Gzmm | Granzyme M (lymphocyte met-ase 1) |
| 16907 | Lmnb2 | Lamin B2 |
| 170706 | Tmem37 | Transmembrane protein 37 |
| 17112 | Tm4sf1 | Transmembrane 4 superfamily member 1 |
| 17150 | Mfap2 | Microfibrillar-associated protein 2 |
| 17925 | Myo9b | Myosin IXb |

18032 Nfix  Nuclear factor I/X
18164 Nptx1 Neuronal pentraxin 1
18230 Nxn   Nucleoredoxin
18389 Oprl1 Opioid receptor-like 1
18472 Pafah1b1   "Platelet-activating factor acetylhydrolase, isoform 1b, beta1 subunit"
18577 Pde4a "Phosphodiesterase 4A, cAMP specific"
18708 Pik3r1     "Phosphatidylinositol 3-kinase, regulatory subunit, polypeptide 1 (p85 alpha)"
18753 Prkcd "Protein kinase C, delta"
18767 Pkia  "Protein kinase inhibitor, alpha"
18805 Pld1  Phospholipase D1
19023 Ppef2 "Protein phosphatase, EF hand calcium-binding domain 2"
19082 Prkag1     "Protein kinase, AMP-activated, gamma 1 non-catalytic subunit"
192188      Stab2 Stabilin 2
192200      Wfdc12      WAP four-disulfide core domain 12
19224 Ptgs1 Prostaglandin-endoperoxide synthase 1
19270 Ptprg "Protein tyrosine phosphatase, receptor type, G"
19290 Pura  Purine rich element binding protein A
19358 Rad23a     RAD23a homolog (S. cerevisiae)
20393 Sgk   Serum/glucocorticoid regulated kinase
20418 Shc3  Src homology 2 domain-containing transforming protein C3
20429 Shox2 Short stature homeobox 2
20473 Six3  Sine oculis-related homeobox 3 homolog (Drosophila)
20492 Slbp  Stem-loop binding protein
20539 Slc7a5     "Solute carrier family 7 (cationic amino acid transporter, y+ system), member 5"
20562 Slit1 Slit homolog 1 (Drosophila)
20679 Sox6  SRY-box containing gene 6
20853 Stau1 Staufen (RNA binding protein) homolog 1 (Drosophila)
208994      C530008M07Rik    RIKEN cDNA C530008M07 gene
209588      Sectm1a     Secreted and transmembrane 1A
209773      Dennd2a     DENN/MADD domain containing 2A
210321      BC048679    CDNA sequence BC048679
210530      Leprel1     Leprecan-like 1
212706      C330016O10Rik    RIKEN cDNA C330016O10 gene
21335 Tacc3 "Transforming, acidic coiled-coil containing protein 3"
21416 Tcf7l2     "Transcription factor 7-like 2, T-cell specific, HMG-box"
21432 Tcl1  T-cell lymphoma breakpoint 1
215748      Cnksr3      Cnksr family member 3
215890      Rlbp1l2     Retinaldehyde binding protein 1-like 2
216150      Cdc34 Cell division cycle 34 homolog (S. cerevisiae)
217342      Ube2o Ubiquitin-conjugating enzyme E2O
217705      9830169C18Rik    RIKEN cDNA 9830169C18 gene
217707      Coq6  Coenzyme Q6 homolog (yeast)
219135      Mtmr6 Myotubularin related protein 6
219249      Tdrd3 Tudor domain containing 3
21933 Tnfrsf10b  "Tumor necrosis factor receptor superfamily, member 10b"
22003 Tpm1  "Tropomyosin 1, alpha"
22031 Traf3 Tnf receptor-associated factor 3
22123 Psmd3 "Proteasome (prosome, macropain) 26S subunit, non-ATPase, 3"

22194 Ube2e1 "Ubiquitin-conjugating enzyme E2E 1, UBC4/5 homolog (yeast)"
22225 Usp5 Ubiquitin specific peptidase 5 (isopeptidase T)
22275 Urod Uroporphyrinogen decarboxylase
223332 Ranbp3l RAN binding protein 3-like
223593 E430025E21Rik RIKEN cDNA E430025E21 gene
223726 Mpped1 Metallophosphoesterase domain containing 1
224020 Pi4ka "Phosphatidylinositol 4-kinase, catalytic, alpha polypeptide"
224023 Klhl22 Kelch-like 22 (Drosophila)
224454 Zdhhc14 "Zinc finger, DHHC domain containing 14"
225339 Ammecr1l AMME chromosomal region gene 1-like
226075 Glis3 GLIS family zinc finger 3
22628 Ywhag "3-monooxygenase/tryptophan 5-monooxygenase activation protein, gamma polypeptide"
226421 5430435G22Rik RIKEN cDNA 5430435G22 gene
22701 Zfp41 Zinc finger protein 41
22787 Zp2 Zona pellucida glycoprotein 2
22789 Zp3r Zona pellucida 3 receptor
229927 Clca4 Chloride channel calcium activated 4
230393 BC057079 CDNA sequence BC057079
230576 Ttc22 Tetratricopeptide repeat domain 22
230872 Crocc "Ciliary rootlet coiled-coil, rootletin"
233545 2210018M11Rik RIKEN cDNA 2210018M11 gene
234673 Ces5 Carboxylesterase 5
235402 Lingo1 Leucine rich repeat and Ig domain containing 1
238021 Fscn2 "Fascin homolog 2, actin-bundling protein, retinal (Strongylocentrotus purpuratus)"
23876 Fbln5 Fibulin 5
23888 Gpc6 Glypican 6
240334 Pcyox1l Prenylcysteine oxidase 1 like
240354 Malt1 Mucosa associated lymphoid tissue lymphoma translocation gene 1
24083 Gtlf3b Gene trap locus F3b
240880 Scyl3 SCY1-like 3 (S. cerevisiae)
242602 BC055111 CDNA sequence BC055111
243958 Siglecg Sialic acid binding Ig-like lectin G
245684 Cnksr2 Connector enhancer of kinase suppressor of Ras 2
257883 Olfr1357 Olfactory receptor 1357
257891 Olfr479 Olfactory receptor 479
257909 Olfr735 Olfactory receptor 735
258027 Olfr1385 Olfactory receptor 1385
258927 Olfr481 Olfactory receptor 481
258958 Olfr525 Olfactory receptor 525
268859 A2bp1 Ataxin 2 binding protein 1
268958 Capn11 Calpain 11
268996 Ss18 "Synovial sarcoma translocation, Chromosome 18"
269037 Gm672 "Gene model 672, (NCBI)"
26921 Map4k4 Mitogen-activated protein kinase kinase kinase kinase 4
269224 Pask PAS domain containing serine/threonine kinase
269356 Slc4a11 "Solute carrier family 4, sodium bicarbonate transporter-like, member 11"
269589 Sytl1 Synaptotagmin-like 1
269604 Gpr157 G protein-coupled receptor 157

270096 Mon1b MON1 homolog b (yeast)
270120 Fat3 FAT tumor suppressor homolog 3 (Drosophila)
27405 Abcg3 "ATP-binding cassette, sub-family G (WHITE), member 3"
319845 Bbs9 Bardet-Biedl syndrome 9
320226 4930473A06Rik RIKEN cDNA 4930473A06 gene
320435 5830482F20Rik RIKEN cDNA 5830482F20 gene
329260 Dennd1b DENN/MADD domain containing 1B
329541 EG329541 "Predicted gene, EG329541"
330671 B4galnt4 "Beta-1,4-N-acetyl-galactosaminyl transferase 4"
381066 BC049807 CDNA sequence BC049807
381280 6430706D22Rik RIKEN cDNA 6430706D22 gene
382035 Pabpnl1 Poly(A)binding protein nuclear-like 1
382252 A830080D01Rik RIKEN cDNA A830080D01 gene
383295 Ypel5 Yippee-like 5 (Drosophila)
384281 2010003O18Rik RIKEN cDNA 2010003O18 gene
387565 Cd300c CD300C antigen
403171 4930517K23Rik RIKEN cDNA 4930517K23 gene
407789 BC048644 CDNA sequence BC048644
433938 Mn1 Meningioma 1
50917 Galns Galactosamine (N-acetyl)-6-sulfate sulfatase
53357 Pla2g6 "Phospholipase A2, group VI"
53416 Stk39 "Serine/threonine kinase 39, STE20/SPS1 homolog (yeast)"
53608 Map3k6 Mitogen-activated protein kinase kinase kinase 6
53623 Gria3 "Glutamate receptor, ionotropic, AMPA3 (alpha 3)"
54150 Rdh7 Retinol dehydrogenase 7
54197 Rnf5 Ring finger protein 5
55979 Agpat1 "1-acylglycerol-3-phosphate O-acyltransferase 1 (lysophosphatidic acid acyltransferase, alpha)"
56322 Timm22 Translocase of inner mitochondrial membrane 22 homolog (yeast)
56325 Abcb9 "ATP-binding cassette, sub-family B (MDR/TAP), member 9"
56375 B4galt4 "UDP-Gal:betaGlcNAc beta 1,4-galactosyltransferase, polypeptide 4"
56460 Pkp3 Plakophilin 3
56461 Kcnip3 "Kv channel interacting protein 3, calsenilin"
56727 Miox Myo-inositol oxygenase
56861 Olfr480 Olfactory receptor 480
57312 Mrps31 Mitochondrial ribosomal protein S31
57869 Adck2 AarF domain containing kinase 2
58193 Extl2 Exotoses (multiple)-like 2
58859 Efemp2 Epidermal growth factor-containing fibulin-like extracellular matrix protein 2
59005 Trappc2l Trafficking protein particle complex 2-like
63873 Trpv4 "Transient receptor potential cation channel, subfamily V, member 4"
64454 Slc5a4b "Solute carrier family 5 (neutral amino acid transporters, system A), member 4b"
64931 Folr4 Folate receptor 4 (delta)
65970 Lima1 LIM domain and actin binding 1
66161 Pop4 "Processing of precursor 4, ribonuclease P/MRP family, (S. cerevisiae)"
66208 Nenf Neuron derived neurotrophic factor
66259 Camk2n1 Calcium/calmodulin-dependent protein kinase II inhibitor 1

66385 Ppp1r7 "Protein phosphatase 1, regulatory (inhibitor) subunit 7"
66421 2410004B18Rik RIKEN cDNA 2410004B18 gene
66461 Ptpmt1 "Protein tyrosine phosphatase, mitochondrial 1"
66500 Slc30a7 "Solute carrier family 30 (zinc transporter), member 7"
66809 Krt20 Keratin 20
668110 4930481F22Rik RIKEN cDNA 4930481F22 gene
66999 Med28 "Mediator of RNA polymerase II transcription, subunit 28 homolog (yeast)"
67095 Trak1 "Trafficking protein, kinesin binding 1"
67111 Asahl N-acylsphingosine amidohydrolase (acid ceramidase)-like
67198 2810022L02Rik RIKEN cDNA 2810022L02 gene
67501 Ccdc50 Coiled-coil domain containing 50
67588 Rnf41 Ring finger protein 41
67591 Ubl4b Ubiquitin-like 4B
67873 2410018C20Rik RIKEN cDNA 2410018C20 gene
67903 Gipc1 "GIPC PDZ domain containing family, member 1"
67974 Ccny Cyclin Y
68221 Wfdc15a WAP four-disulfide core domain 15A
68339 Ccdc88c Coiled-coil domain containing 88C
68366 Tmem129 Transmembrane protein 129
68510 Ints1 Integrator complex subunit 1
68519 Eml1 Echinoderm microtubule associated protein like 1
68520 Zfyve21 "Zinc finger, FYVE domain containing 21"
68728 Trp53inp2 Transformation related protein 53 inducible nuclear protein 2
68879 Prpf6 PRP6 pre-mRNA splicing factor 6 homolog (yeast)
69076 Triap1 TP53 regulated inhibitor of apoptosis 1
69527 Mrps9 Mitochondrial ribosomal protein S9
69533 2310002B14Rik RIKEN cDNA 2310002B14 gene
69596 2310035K24Rik RIKEN cDNA 2310035K24 gene
69908 Rab3b "RAB3B, member RAS oncogene family"
69938 Scrn1 Secernin 1
69982 Spink2 "Serine peptidase inhibitor, Kazal type 2"
70297 Gcc2 GRIP and coiled-coil domain containing 2
70988 4931428L18Rik RIKEN cDNA 4931428L18 gene
71365 Pdss2 "Prenyl (solanesyl) diphosphate synthase, subunit 2"
71375 Foxn3 Forkhead box N3
71653 4930506M07Rik RIKEN cDNA 4930506M07 gene
71711 Mus81 MUS81 endonuclease homolog (yeast)
71844 Nupl1 Nucleoporin like 1
71889 Epn3 Epsin 3
71903 2310038E17Rik RIKEN cDNA 2310038E17 gene
72729 Cdc42se2 CDC42 small effector 2
72881 Zdhhc4 "Zinc finger, DHHC domain containing 4"
74270 Usp20 Ubiquitin specific peptidase 20
74335 Xrcc3 X-ray repair complementing defective repair in Chinese hamster cells 3
74481 Batf2 "Basic leucine zipper transcription factor, ATF-like 2"
74646 Spsb1 SplA/ryanodine receptor domain and SOCS box containing 1
74708 4930521A18Rik RIKEN cDNA 4930521A18 gene
75007 4930504E06Rik RIKEN cDNA 4930504E06 gene
76073 Pcgf5 Polycomb group ring finger 5
76355 Tgds "TDP-glucose 4,6-dehydratase"

76479 Smndc1 Survival motor neuron domain containing 1
76484 Kndc1 Kinase non-catalytic C-lobe domain (KIND) containing 1
76499 Clasp2 CLIP associating protein 2
76608 Hectd3 HECT domain containing 3
76916 4930455C21Rik RIKEN cDNA 4930455C21 gene
77031 Slc9a8 "Solute carrier family 9 (sodium/hydrogen exchanger), member 8"
77782 Polq "Polymerase (DNA directed), theta"
77976 Nuak1 "NUAK family, SNF1-like kinase, 1"
78070 Cpt1c Carnitine palmitoyltransferase 1c
78789 Vsig1 V-set and immunoglobulin domain containing 1
81006 Gpr63 G protein-coupled receptor 63
81701 Egfl8 EGF-like domain 8
94045 P2rx5 "Purinergic receptor P2X, ligand-gated ion channel, 5"
94216 Col4a6 "Collagen, type IV, alpha 6"
97998 Depdc6 DEP domain containing 6
99167 Ssx2ip "Synovial sarcoma, X breakpoint 2 interacting protein"

Supp Table 3: Pathways regulated by Myt1L

| Pathway names | geneCount | p |
|---|---|---|
| Chemokine signaling pathway | 6 | 0 |
| Fc gamma R-mediated phagocytosis | 4 | 0 |
| Lysosome | 9 | 0 |
| Metabolic pathways | 17 | 0 |
| Protein processing in endoplasmic reticulum | 6 | 0 |
| Endocytosis | 5 | 0.001 |
| Ether lipid metabolism | 3 | 0.001 |
| Neurotrophin signaling pathway | 4 | 0.002 |
| Homologous recombination | 2 | 0.003 |
| Small cell lung cancer | 3 | 0.004 |
| Apoptosis | 3 | 0.005 |
| Glycerophospholipid metabolism | 3 | 0.006 |
| Fc epsilon RI signaling pathway | 3 | 0.008 |
| Phagosome | 4 | 0.008 |
| GnRH signaling pathway | 3 | 0.01 |
| Pancreatic secretion | 3 | 0.01 |
| Toll-like receptor signaling pathway | 3 | 0.011 |
| Chagas disease (American trypanosomiasis) | 3 | 0.014 |
| Amoebiasis | 3 | 0.015 |
| Pathways in cancer | 5 | 0.015 |
| Porphyrin and chlorophyll metabolism | 2 | 0.015 |
| Endometrial cancer | 2 | 0.017 |
| Aldosterone-regulated sodium reabsorption | 2 | 0.018 |
| Cytokine-cytokine receptor interaction | 4 | 0.018 |
| Fat digestion and absorption | 2 | 0.018 |
| Natural killer cell mediated cytotoxicity | 3 | 0.021 |
| Ubiquitin mediated proteolysis | 3 | 0.023 |
| Insulin signaling pathway | 3 | 0.024 |
| ABC transporters | 2 | 0.025 |
| Acute myeloid leukemia | 2 | 0.025 |
| Inositol phosphate metabolism | 2 | 0.025 |
| Neuroactive ligand-receptor interaction | 4 | 0.026 |
| Bacterial invasion of epithelial cells | 2 | 0.028 |
| Glioma | 2 | 0.031 |
| RIG-I-like receptor signaling pathway | 2 | 0.032 |
| RNA transport | 3 | 0.032 |
| Type II diabetes mellitus | 2 | 0.032 |
| Long-term depression | 2 | 0.034 |
| Pancreatic cancer | 2 | 0.035 |
| Colorectal cancer | 2 | 0.036 |
| Ubiquinone and other terpenoid-quinone biosynthesis | 1 | 0.038 |
| Adipocytokine signaling pathway | 2 | 0.039 |
| Chronic myeloid leukemia | 2 | 0.04 |
| VEGF signaling pathway | 2 | 0.04 |
| Adherens junction | 2 | 0.041 |
| B cell receptor signaling pathway | 2 | 0.042 |
| Calcium signaling pathway | 3 | 0.043 |
| Cardiac muscle contraction | 2 | 0.044 |
| Antigen processing and presentation | 2 | 0.046 |
| Phosphatidylinositol signaling system | 2 | 0.047 |
| Arachidonic acid metabolism | 2 | 0.05 |

Supp Table 4: A2BP1 associated RNAs with binding motif (906 genes)

| mouse gene ID | gene names |
|---|---|
| 51796 | serine/arginine repetitive matrix 1 |
| 66948 | """acyl-Coenzyme A dehydrogenase family, member 8""" |
| 68421 | LMBR1 domain containing 1 |
| 227541 | calcium/calmodulin-dependent protein kinase ID |
| 67958 | RIKEN cDNA 2610101N10 gene |
| 15247 | hippocampus abundant gene transcript 1 |
| 14412 | """solute carrier family 6 (neurotransmitter transporter, GABA), member 13""" |
| 13176 | deleted in colorectal carcinoma |
| 99296 | histamine receptor H3 |
| 12912 | cAMP responsive element binding protein 1 |
| 16784 | lysosomal-associated membrane protein 2 |
| 67465 | """splicing factor 3a, subunit 1""" |
| 380698 | """obscurin, cytoskeletal calmodulin and titin-interacting RhoGEF""" |
| 12033 | B-cell receptor-associated protein 29 |
| 214058 | multiple EGF-like-domains 11 |
| 15212 | hexosaminidase B |
| 59047 | polynucleotide kinase 3'- phosphatase |
| 330189 | transmembrane protein 120B |
| 73094 | SH3-domain GRB2-like (endophilin) interacting protein 1 |
| 217012 | unc-45 homolog B (C. elegans) |
| 218397 | RAS p21 protein activator 1 |
| 107515 | leucine-rich repeat-containing G protein-coupled receptor 4 |
| 19116 | prolactin receptor |
| 69017 | proline-rich transmembrane protein 2 |
| 269784 | contactin 4 |
| 70417 | multiple EGF-like-domains 10 |
| 11764 | """adaptor protein complex AP-1, beta 1 subunit""" |
| 107770 | transmembrane 6 superfamily member 2 |
| 235180 | fasciculation and elongation protein zeta 1 (zygin I) |
| 74315 | ring finger protein 145 |
| 246196 | zinc finger protein 277 |
| 19134 | PRP4 pre-mRNA processing factor 4 homolog B (yeast) |
| 237553 | TRH-degrading enzyme |
| 16179 | interleukin-1 receptor-associated kinase 1 |
| 76539 | """DNA segment, Chr 19, ERATO Doi 737, expressed""" |
| 76897 | RALY RNA binding protein-like |
| 13040 | cathepsin S |
| 59093 | poly(rC) binding protein 3 |
| 20687 | trans-acting transcription factor 3 |
| 69993 | chimerin (chimaerin) 2 |
| 22234 | UDP-glucose ceramide glucosyltransferase |
| 241062 | post-GPI attachment to proteins 1 |
| 212163 | RIKEN cDNA 8030462N17 gene |
| 239827 | """phosphatidylinositol glycan anchor biosynthesis, class Z""" |
| 102545 | CKLF-like MARVEL transmembrane domain containing 7 |
| 17101 | lysosomal trafficking regulator |
| 76192 | abhydrolase domain containing 12 |

252838 thymocyte selection-associated high mobility group box; similar to thymus high mobility group box protein TOX
215085 """solute carrier family 35, member F1"""
218335 CLPTM1-like
74182 preimplantation protein 4
170822 ubiquitin specific peptidase 33
77031 """solute carrier family 9 (sodium/hydrogen exchanger), member 8"""
76007 """zinc finger, MYM-type 2"""
13047 cut-like homeobox 1
17151 cyclin D-type binding-protein 1
66624 signal peptidase complex subunit 2 homolog (S. cerevisiae); predicted gene 14045
54364 ribonuclease P/MRP 30 subunit (human)
75212 ring finger protein 121
212167 pigeon homolog (Drosophila)
56195 polypyrimidine tract binding protein 2
54611 """phosphodiesterase 3A, cGMP inhibited"""
268859 ataxin 2 binding protein 1
74718 sorting nexin 16
16211 karyopherin (importin) beta 1
65098 """zinc finger, AN1-type domain 6"""
12972 """crystallin, zeta"""
19324 """RAB1, member RAS oncogene family"""
225358 """family with sequence similarity 13, member B"""
18970 """polymerase (DNA directed), beta"""
209558 ectonucleotide pyrophosphatase/phosphodiesterase 3
98711 retinol dehydrogenase 10 (all-trans)
56690 malonyl-CoA decarboxylase
22194 """similar to Ubiquitin-conjugating enzyme E2 E1 (Ubiquitin-protein ligase E1) (Ubiquitin carrier protein E1) (UbcM3); ubiquitin-conjugating enzyme E2E 1, UBC4/5 homolog (yeast)"""
432530 adenylate cyclase 1
72144 """solute carrier family 37 (glycerol-3-phosphate transporter), member 3"""
74185 """glucan (1,4-alpha-), branching enzyme 1"""
20617 """synuclein, alpha"""
59013 heterogeneous nuclear ribonucleoprotein H1
26896 mediator complex subunit 14
67574 asparagine-linked glycosylation 13 homolog (S. cerevisiae)
68524 """WAS/WASL interacting protein family, member 2"""
210992 lysophosphatidylcholine acyltransferase 1
67216 membrane bound O-acyltransferase domain containing 2
13805 endoglin
29859 """sulfotransferase family 4A, member 1"""
52666 """DNA segment, Chr 10, ERATO Doi 610, expressed"""
69219 dimethylarginine dimethylaminohydrolase 1
76499 CLIP associating protein 2
50497 heat shock protein 14
11622 aryl-hydrocarbon receptor
13427 dynein cytoplasmic 1 intermediate chain 2
230157 transmembrane protein with EGF-like and two follistatin-like domains 1; similar to Transmembrane protein with EGF-like and two follistatin-like domains 1
72404 WD repeat domain 44

18019 """nuclear factor of activated T-cells, cytoplasmic, calcineurin-dependent 2"""
74563 """RasGEF domain family, member 1C"""
11991 heterogeneous nuclear ribonucleoprotein D
11938 """ATPase, Ca++ transporting, cardiac muscle, slow twitch 2"""
72179 F-box and leucine-rich repeat protein 2
13846 Eph receptor B4
102866 plastin 3 (T-isoform)
20933 mediator complex subunit 22
229731 """solute carrier family 25 (mitochondrial carrier, phosphate carrier), member 24"""
67391 FUN14 domain containing 2
68944 transmembrane and coiled-coil domains 1
19042 """protein phosphatase 1A, magnesium dependent, alpha isoform"""
17295 met proto-oncogene
68050 akirin 1
233744 """spondin 1, (f-spondin) extracellular matrix protein"""
231380 ubiquitin-like modifier activating enzyme 6
108903 tubulin-specific chaperone d
211922 """family with sequence similarity 116, member A"""
67057 YY1 associated factor 2
58894 zinc finger protein 862
16439 """inositol 1,4,5-triphosphate receptor 2"""
20392 """sarcoglycan, epsilon"""
13030 cathepsin B
74838 NMDA receptor-regulated gene 1
22634 pleiomorphic adenoma gene-like 1
243272 """sno, strawberry notch homolog 1 (Drosophila)"""
16774 """laminin, alpha 3"""
100710 """PDS5, regulator of cohesion maintenance, homolog B (S. cerevisiae)"""
67198 RIKEN cDNA 2810022L02 gene
30932 zinc finger protein 330
14998 """histocompatibility 2, class II, locus DMa"""
140579 """engulfment and cell motility 2, ced-12 homolog (C. elegans)"""
18046 nuclear transcription factor-Y gamma
27392 """phosphatidylinositol glycan anchor biosynthesis, class N"""
72157 phosphoglucomutase 2
244049 """multiple C2 domains, transmembrane 2"""
11303 """ATP-binding cassette, sub-family A (ABC1), member 1"""
208624 """asparagine-linked glycosylation 3 homolog (yeast, alpha-1,3-mannosyltransferase)"""
68770 putative homeodomain transcription factor 2
13808 """enolase 3, beta muscle"""
80286 tumor suppressor candidate 3
245386 """family with sequence similarity 70, member A"""
238266 synaptotagmin XVI
192663 """similar to ATP-binding cassette, sub-family G (WHITE), member 4; ATP-binding cassette, sub-family G (WHITE), member 4"""
14683 """GNAS (guanine nucleotide binding protein, alpha stimulating) complex locus"""
72899 predicted gene 2348; MACRO domain containing 2
21826 thrombospondin 2

70415 RIKEN cDNA 2610018G03 gene
66799 ubiquitin-conjugating enzyme E2W (putative)
216549 aftiphilin
53871 polycystic kidney disease 2-like 2
26556 homer homolog 1 (Drosophila)
14815 """nuclear receptor subfamily 3, group C, member 1"""
75965 """zinc finger, DHHC domain containing 20"""
56543 """potassium voltage-gated channel, Shal-related family, member 3"""
239393 low density lipoprotein-related protein 12
244579 TOX high mobility group box family member 3
216131 trafficking protein particle complex 10
226844 major facilitator superfamily domain containing 7B
12293 """calcium channel, voltage-dependent, alpha2/delta subunit 1"""
269954 """tubulin tyrosine ligase-like family, member 13"""
30948 bridging integrator 1
18807 """phospholipase D family, member 3"""
230027 """coenzyme Q3 homolog, methyltransferase (yeast)"""
72832 cartilage acidic protein 1
209176 """indoleamine 2,3-dioxygenase 2"""
20348 """sema domain, immunoglobulin domain (Ig), short basic domain, secreted, (semaphorin) 3C"""
52187 Ras-related GTP binding D
109880 Braf transforming gene
56711 pleiomorphic adenoma gene 1
56316 gamma-glutamyl carboxylase
211484 testis specific 10
76261 RIKEN cDNA 0610040J01 gene
320129 """adrenergic receptor kinase, beta 2"""
19400 receptor-associated protein of the synapse
19876 roundabout homolog 1 (Drosophila)
12918 corticotropin releasing hormone
74125 armadillo repeat containing 8
73991 predicted gene 3086; atlastin GTPase 1; similar to Spg3a protein
20873 polo-like kinase 4 (Drosophila)
21416 """transcription factor 7-like 2, T-cell specific, HMG-box"""
13690 """eukaryotic translation initiation factor 4, gamma 2"""
21374 TATA box binding protein
20361"""sema domain, immunoglobulin domain (Ig), and GPI membrane anchor, (semaphorin) 7A"""
11684 arachidonate 12-lipoxygenase
210035 transmembrane protein 194
11302 apoptosis-associated tyrosine kinase
103978 glypican 5
26419 mitogen-activated protein kinase 8
27416 """ATP-binding cassette, sub-family C (CFTR/MRP), member 5"""
66960 RIKEN cDNA 2310047O13 gene
72567 BCL2-associated transcription factor 1
12793 cornichon homolog (Drosophila)
68795 ubiquitin protein ligase E3 component n-recognin 3
67705 RIKEN cDNA 1810058I24 gene
74763 """N-acetyltransferase 15 (GCN5-related, putative)"""
276846 """phosphatidylinositol glycan anchor biosynthesis, class S"""

26416 mitogen-activated protein kinase 14
244886 expressed sequence AI118078
108099 """protein kinase, AMP-activated, gamma 2 non-catalytic subunit"""
68614 LETM1 domain containing 1
16559 kinesin family member 17
100756 ubiquitin specific peptidase 30
72701 zinc fingerprotein 618
66083 SET domain containing 6
20462 transformer 2 beta homolog (Drosophila); predicted gene 6439
51869 Rap1 interacting factor 1 homolog (yeast)
114142 forkhead box P2
60455 transmembrane protein 8 (five membrane-spanning domains)
12042 B-cell leukemia/lymphoma 10; predicted gene 6141
11774 """adaptor-related protein complex 3, beta 1 subunit"""
100434 """solute carrier family 44, member 1"""
67120 tetratricopeptide repeat domain 14
12684 """cell death-inducing DNA fragmentation factor, alpha subunit-like effector B"""
110750 chromosome segregation 1-like (S. cerevisiae)
58994 """sphingomyelin phosphodiesterase 3, neutral"""
19383 RIKEN cDNA C130057N11 gene; hnRNP-associated with lethal yellow
234915 similar to CDNA sequence AK129341; cDNA sequence AK129341
26358 """aldehyde dehydrogenase family 1, subfamily A7"""
108686 coiled coil domain containing 88A
14933 glycerol kinase
56336 """UDP-Gal:betaGlcNAc beta 1,4-galactosyltransferase, polypeptide 5"""
252972 two pore channel 1
320267 far upstream element (FUSE) binding protein 3
74770 hedgehog acyltransferase-like
22017 thiopurine methyltransferase
107868 """ubiquitin specific peptidase 9, Y chromosome"""
18682 phosphorylase kinase gamma 1
20192 ryanodine receptor 3
11440 """cholinergic receptor, nicotinic, alpha polypeptide 6"""
52120 heparan-alpha-glucosaminide N-acetyltransferase
70533 basic transcription factor 3-like 4
103554 """proteasome (prosome, macropain) activator subunit 4"""
218236 """family with sequence similarity 120, member A"""
244653 hydrocephalus inducing
229227 RIKEN cDNA 4932438A13 gene
56496 tetraspanin 6
66592 predicted gene 5626; stomatin (Epb7.2)-like 2
12289 """calcium channel, voltage-dependent, L type, alpha 1D subunit"""
70495 """ATPase, H+ transporting, lysosomal accessory protein 2"""
51886 far upstream element (FUSE) binding protein 1
233833 trinucleotide repeat containing 6a
52588 tetraspanin 14
260315 neuron navigator 3
193385 """family with sequence similarity 65, member B"""
16880 leukemia inhibitory factor receptor
106861 abhydrolase domain containing 3

227695 """DNA segment, Chr 2, Wayne State University 81, expressed"""
239273 """ATP-binding cassette, sub-family C (CFTR/MRP), member 4"""
17996 nebulin
12366 caspase 2
70355 """G protein-coupled receptor, family C, group 5, member C; similar to G protein-coupled receptor, family C, group 5, member C"""
22019 tripeptidyl peptidase II
11363 """acyl-Coenzyme A dehydrogenase, long-chain"""
230700 forkhead box J3
11491 a disintegrin and metallopeptidase domain 17
12175 BCL2/adenovirus E1B interacting protein 2
74020 copine IV
235574 """ATPase, Ca++-sequestering; hypothetical protein LOC100045884"""
70640 DCP2 decapping enzyme homolog (S. cerevisiae)
330790 hyaluronan and proteoglycan link protein 4
56363 transmembrane protein with EGF-like and two follistatin-like domains 2
102442 DENN/MADD domain containing 4A
12335 calpain 3
218734 RIKEN cDNA 3830406C13 gene
53609 """splicing factor, arginine/serine-rich 16"""
67472 mitochondrial fission regulator 1
208440 DIP2 disco-interacting protein 2 homolog C (Drosophila)
234663 """dynein, cytoplasmic 1 light intermediate chain 2"""
52589 neurocalcin delta
271564 vacuolar protein sorting 13A (yeast)
16004 insulin-like growth factor 2 receptor
20822 """TROVE domain family, member 2"""
233115 dpy-19-like 3 (C. elegans)
24057 Sh3 domain YSC-like 1
217995 HEAT repeat containing 1
69871 RIKEN cDNA 2010007H12 gene
230967 cDNA sequence BC046331
22022 protein-tyrosine sulfotransferase 2
56631 tripartite motif-containing 17
218121 membrane bound O-acyltransferase domain containing 1
14269 formin binding protein 1
67933 host cell factor C2
26432 """procollagen lysine, 2-oxoglutarate 5-dioxygenase 2"""
105352 dual specificity phosphatase 22
15561 5-hydroxytryptamine (serotonin) receptor 3A
20750 secreted phosphoprotein 1
97112 NMD3 homolog (S. cerevisiae)
72787 transmembrane protein 48
14479 ubiquitin specific peptidase 15
104444 """REX2, RNA exonuclease 2 homolog (S. cerevisiae)"""
13136 CD55 antigen
319880 transmembrane and coiled coil domains 3
233276 """tubulin, gamma complex associated protein 5"""
116837 regulating synaptic membrane exocytosis 1
240725 sulfatase 1
17448 """malate dehydrogenase 2, NAD (mitochondrial)"""

66053 peptidylprolyl isomerase (cyclophilin)-like 2
76295 """ATPase, class VI, type 11B"""
59044 ring finger protein 130; similar to Ring finger protein 130
229706 """solute carrier family 6 (neurotransmitter transporter), member 17"""
230908 predicted gene 13886; TAR DNA binding protein
18213 """neurotrophic tyrosine kinase, receptor, type 3; similar to neurotrophic tyrosine kinase, receptor, type 3"""
19418 RAS protein-specific guanine nucleotide-releasing factor 2
72515 WD repeat domain 43; RIKEN cDNA 2610029G23 gene; hypothetical protein LOC674157
73086 """ribosomal protein S6 kinase, polypeptide 5"""
67486 polymerase (RNA) III (DNA directed) polypeptide G
21753 testis derived transcript
224090 transmembrane protein 44
21333 tachykinin 1
69605 limb and neural patterns
52592 breast cancer metastasis-suppressor 1-like
54484 """makorin, ring finger protein, 1"""
76025 calcium activated nucleotidase 1
65969 cubilin (intrinsic factor-cobalamin receptor)
13116 """cytochrome P450, family 46, subfamily a, polypeptide 1"""
73287 RIKEN cDNA 1700040L02 gene
75769 RIKEN cDNA 4833424O15 gene
13602 SPARC-like 1
13508 Down syndrome cell adhesion molecule
218811 """Sec24 related gene family, member C (S. cerevisiae)"""
15259 homeodomain interacting protein kinase 3; similar to homeodomain interacting protein kinase 3
213326 SCY1-like 2 (S. cerevisiae)
70652 transmembrane protein 144
52906 Abelson helper integration site 1
105245 thioredoxin domain containing 5
66073 thioredoxin domain containing 12 (endoplasmic reticulum)
74105 """golgi associated, gamma adaptin ear containing, ARF binding protein 2"""
72649 transmembrane protein 209
72881 """zinc finger, DHHC domain containing 4"""
66871 copine VIII
67781 interleukin enhancer binding factor 2
17986 Norrie disease (pseudoglioma) (human)
11352 """v-abl Abelson murine leukemia viral oncogene homolog 2 (arg, Abelson-related gene)"""
94218 cyclin M3
16497 """potassium voltage-gated channel, shaker-related subfamily, beta member 1"""
252966 predicted gene 6190; CDK5 and Abl enzyme substrate 2
71785 """platelet-derived growth factor, D polypeptide"""
16168 interleukin 15
76187 """alcohol dehydrogenase, iron containing, 1"""
21425 transcription factor EB
73124 golgi integral membrane protein 4
56406 nuclear receptor coactivator 6
56177 olfactomedin 1

79264 """KRIT1, ankyrin repeat containing"""
69257 E74-like factor 2
271813 ATP/GTP binding protein-like 2
231474 progestin and adipoQ receptor family member III
170762 nucleoporin 155
217463 sorting nexin 13
12977 colony stimulating factor 1 (macrophage)
59046 cAMP-regulated phosphoprotein 19
18753 """protein kinase C, delta"""
11992 AU RNA binding protein/enoyl-coenzyme A hydratase
20185 nuclear receptor co-repressor 1
68121 centrosomal protein 70
19056 """protein phosphatase 3, catalytic subunit, beta isoform"""
15204 hect (homologous to the E6-AP (UBE3A) carboxyl terminus) domain and RCC1 (CHC1)-like domain (RLD) 2
236794 """solute carrier family 9 (sodium/hydrogen exchanger), member 6"""
233726 importin 7
72175 major facilitator superfamily domain containing 8
230597 """zinc finger, FYVE domain containing 9"""
14810 """glutamate receptor, ionotropic, NMDA1 (zeta 1)"""
320405 Ca2+-dependent activator protein for secretion 2
217371 """Rab40b, member RAS oncogene family"""
78286 neuron navigator 2
108073 """glutamate receptor, metabotropic 7"""
19664 recombination signal binding protein for immunoglobulin kappa J region
67151 """proteasome (prosome, macropain) 26S subunit, non-ATPase, 9"""
68278 DEAD (Asp-Glu-Ala-Asp) box polypeptide 39
23945 monoglyceride lipase
67724 """processing of precursor 1, ribonuclease P/MRP family, (S. cerevisiae)"""
268345 """potassium voltage gated channel, Shaw-related subfamily, member 2"""
54354 Ras association (RalGDS/AF-6) domain family member 5
75619 FAST kinase domains 2
210148 """solute carrier family 30 (zinc transporter), member 6"""
11928 """ATPase, Na+/K+ transporting, alpha 1 polypeptide"""
245650 guanylate cyclase 2f
19260 """protein tyrosine phosphatase, non-receptor type 22 (lymphoid)"""
231571 RNA polymerase II associated protein 2
52708 zinc finger protein 410
26920 centrosomal protein 110
109594 LIM domain only 1
76740 EFR3 homolog A (S. cerevisiae)
228071 SEC14 and spectrin domains 1; predicted gene 9165
18979 paraoxonase 1
11496 a disintegrin and metallopeptidase domain 22
218506 mitochondrial ribosomal protein S27
11980 """ATPase, aminophospholipid transporter (APLT), class I, type 8A, member 1"""
19647 retinoblastoma binding protein 6
18220 nucleobindin 1

23943 """family with sequence similarity 62 (C2 domain containing), member A"""
20932 surfeit gene 4
99375 cullin 4A
67405 neurotensin
20975 synaptojanin 2
233724 transmembrane protein 41B
223473 NIPA-like domain containing 2
231386 YTH domain containing 1
73711 """family with sequence similarity 125, member A"""
320492 RIKEN cDNA A830018L16 gene
73137 proline-rich coiled-coil 1
71778 kelch-like 5 (Drosophila)
22278 upstream transcription factor 1
17161 monoamine oxidase A
71175 Nipped-B homolog (Drosophila)
227720 nucleoporin 214
108151 """sema domain, immunoglobulin domain (Ig), short basic domain, secreted, (semaphorin) 3D; hypothetical protein LOC100044160"""
22785 """solute carrier family 30 (zinc transporter), member 4"""
66855 transcription factor 25 (basic helix-loop-helix)
76954 suppression of tumorigenicity 5
73205 RIKEN cDNA 3110043O21 gene
94190 oligophrenin 1
12816 """collagen, type XII, alpha 1"""
207781 C2 calcium-dependent domain containing 2
64213 suppression of tumorigenicity 7
338349 """centlein, centrosomal protein"""
208643 """eukaryotic translation initiation factor 4, gamma 1"""
237339 l(3)mbt-like 3 (Drosophila)
20346 """sema domain, immunoglobulin domain (Ig), short basic domain, secreted, (semaphorin) 3A; hypothetical protein LOC100044161"""
51792 """protein phosphatase 2 (formerly 2A), regulatory subunit A (PR 65), alpha isoform"""
217835 Ras and Rab interactor 3
18004 NIMA (never in mitosis gene a)-related expressed kinase 1
100683 transformation/transcription domain-associated protein
75202 RIKEN cDNA 4930546H06 gene
18127 """nitric oxide synthase 3, endothelial cell"""
223922 activating transcription factor 7
100317 expressed sequence AU040320
17248 transformed mouse 3T3 cell double minute 4
77018 """collagen, type XXV, alpha 1"""
270109 pecanex-like 2 (Drosophila)
13000 """casein kinase 2, alpha prime polypeptide; similar to casein kinase II, alpha prime subunit"""
69784 RIKEN cDNA 1500009L16 gene
78887 """Sfi1 homolog, spindle assembly associated (yeast)"""
268656 """serine palmitoyltransferase, long chain base subunit 1"""
107869 cystathionase (cystathionine gamma-lyase)
208618 enhancer trap locus 4
29809 RAB GTPase activating protein 1-like
227937 plakophilin 4
16573 kinesin family member 5B

59032 """protein phosphatase 2, regulatory subunit B'', gamma; predicted gene 2446; predicted gene 2436"""
14265 fragile X mental retardation syndrome 1 homolog
192185 NAD kinase
329559 zinc finger protein 335
57743 """Sec61, alpha subunit 2 (S. cerevisiae)"""
68897 dispatched homolog 1 (Drosophila)
192197 breast carcinoma amplified sequence 3
68525 Ellis van Creveld syndrome 2 homolog (human)
20840 src homology three (SH3) and cysteine rich domain
18080 ninein
22036 TRAF-interacting protein
81003 tripartite motif-containing 23
20541 """solute carrier family 8 (sodium/calcium exchanger), member 1"""
17390 matrix metallopeptidase 2
11800 apoptosis inhibitor 5
20397 sphingosine phosphate lyase 1
104681 """solute carrier family 16 (monocarboxylic acid transporters), member 6"""
72413 """potassium large conductance calcium-activated channel, subfamily M, beta member 2"""
56150 similar to spindle assembly checkpoint protein; MAD2 mitotic arrest deficient-like 1 (yeast)
268448 PHD finger protein 12
665563 methylenetetrahydrofolate dehydrogenase (NADP+ dependent) 2-like
229722 RIKEN cDNA 5330417C22 gene
237459 PCTAIRE-motif protein kinase 2
13134 dachshund 1 (Drosophila)
26875 piccolo (presynaptic cytomatrix protein); hypothetical protein LOC100044163
72656 integrator complex subunit 8
12310 """calcitonin/calcitonin-related polypeptide, alpha"""
50496 E2F transcription factor 6
11783 apoptotic peptidase activating factor 1
108058 """calcium/calmodulin-dependent protein kinase II, delta"""
13617 endothelin receptor type A
105559 muscleblind-like 2
68059 transmembrane 9 superfamily member 2
212391 ligand dependent nuclear receptor corepressor
76178 RIKEN cDNA 6330578E17 gene
22003 """tropomyosin 1, alpha"""
56874 ring finger protein 32
98845 EPS8-like 2
11682 anaplastic lymphoma kinase
76508 RIKEN cDNA 2210015D19 gene
68187 """family with sequence similarity 135, member A"""
13205 """DEAD/H (Asp-Glu-Ala-Asp/His) box polypeptide 3, X-linked"""
331374 diacylglycerol kinase kappa
338521 fatty acid 2-hydroxylase
56273 peroxisomal biogenesis factor 14
56444 ARP10 actin-related protein 10 homolog (S. cerevisiae)
17254 """solute carrier family 3 (activators of dibasic and neutral amino acid transport), member 2"""

235527 phospholipid scramblase 4
67332 small nuclear ribonucleoprotein D3
213391 Ras association (RalGDS/AF-6) domain family member 4
73469 ring finger protein 38
218756 """solute carrier family 4, sodium bicarbonate cotransporter, member 7"""
234069 PCI domain containing 2
30841 lysine (K)-specific demethylase 2B
109333 protein kinase N2
68889 ubiquitin associated domain containing 2
68558 """ankyrin repeat, family A (RFXANK-like), 2"""
54399 blocked early in transport 1 homolog (S. cerevisiae)-like
54343 activating transcription factor 7 interacting protein
78656 bromodomain containing 8
67834 isocitrate dehydrogenase 3 (NAD+) alpha
140571 plexin B3
83946 pleckstrin homology domain interacting protein
66897 NMDA receptor regulated 1-like
13650 rhomboid family 1 (Drosophila)
69562 cell division cycle 2-like 5 (cholinesterase-related cell division controller)
105239 ring finger protein 44
235469 suppressor of hairy wing homolog 4 (Drosophila)
74569 tetratricopeptide repeat domain 17
27801 """zinc finger, DHHC domain containing 8"""
226922 """potassium voltage-gated channel, subfamily Q, member 5"""
71924 epsilon-tubulin 1
17876 """myelin basic protein expression factor 2, repressor"""
227638 quiescin Q6 sulfhydryl oxidase 2
69675 peroxidasin homolog (Drosophila)
20603 predicted gene 7270; predicted gene 14680; spermine synthase
114716 """sprouty-related, EVH1 domain containing 2"""
56741 """immunoglobulin superfamily, DCC subclass, member 4"""
67399 PDZ and LIM domain 7
20662 son of sevenless homolog 1 (Drosophila)
76775"""solute carrier family 10 (sodium/bile acid cotransporter family), member 7"""
269587 erythrocyte protein band 4.1
101739 PC4 and SFRS1 interacting protein 1
215378 """family with sequence similarity 5, member C"""
83691 cysteine-rich secretory protein LCCL domain containing 1
14030 predicted gene 6627; Ewing sarcoma breakpoint region 1
78752 chondroitin sulfate N-acetylgalactosaminyltransferase 2
72322 exportin 5
29810 BCL2-associated athanogene 3
233532 remodeling and spacing factor 1
15357 3-hydroxy-3-methylglutaryl-Coenzyme A reductase
209645 BEN domain containing 7
94216 """collagen, type IV, alpha 6"""
98403 zinc finger protein 451
66775 protein tyrosine phosphatase-like A domain containing 2
170829 translocating chain-associating membrane protein 2
59007 N-glycanase 1
18457 pallidin

19274 """protein tyrosine phosphatase, receptor type, M"""
70561 thioredoxin domain containing 16
230257 ROD1 regulator of differentiation 1 (S. pombe)
68801 """ELOVL family member 5, elongation of long chain fatty acids (yeast)"""
68975 mediator complex subunit 27
12827 """collagen, type IV, alpha 2"""
73379 """discoidin, CUB and LCCL domain containing 2"""
381218 RIKEN cDNA 4430402I18 gene
228850 RIKEN cDNA B230339M05 gene
67804 sorting nexin 2
74737 cleavage and polyadenylation factor subunit homolog (S. cerevisiae)
64706 """signal peptide, CUB domain, EGF-like 1"""
16993 leukotriene A4 hydrolase
76199 mediator complex subunit 13-like
66190 alkaline ceramidase 3
17423 N-deacetylase/N-sulfotransferase (heparan glucosaminyl) 2
214951 """rhomboid, veinlet-like 1 (Drosophila)"""
72145 WD repeat and FYVE domain containing 3
20907 syntaxin 1A (brain)
227648 SEC16 homolog A (S. cerevisiae)
71729 regulator of G-protein signaling 12
22141 cDNA sequence BC049265; tubby candidate gene
14406 """gamma-aminobutyric acid (GABA) A receptor, subunit gamma 2"""
14387 """glucosidase, alpha, acid"""
77480 kinase D-interacting substrate 220
329506 """CTD (carboxy-terminal domain, RNA polymerase II, polypeptide A) small phosphatase like 2"""
241694 RIKEN cDNA A230067G21 gene
67500 cell division cycle and apoptosis regulator 1
237636 NPC1-like 1
18016 neurofibromatosis 2
77264 zinc finger protein 142
231050 UDP-N-acetyl-alpha-D-galactosamine:polypeptide N-acetylgalactosaminyltransferase 11
278279 transmembrane and tetratricopeptide repeat containing 2
245860 autophagy-related 9A (yeast)
333605 FERM and PDZ domain containing 4
213819 CAS1 domain containing 1; similar to O-acetyltransferase
27967 calcium homeostasis endoplasmic reticulum protein
12558 cadherin 2; similar to N-cadherin
217869 similar to Eukaryotic translation initiation factor 5; eukaryotic translation initiation factor 5
11449 """cholinergic receptor, nicotinic, gamma polypeptide"""
225642 gastrin releasing peptide
66950 transmembrane protein 206
208691 eukaryotic translation initiation factor 5A2
209760 transmembrane channel-like gene family 7; similar to Tmc7 protein
71375 forkhead box N3
217262 """ATP-binding cassette, sub-family A (ABC1), member 9"""
20403 intersectin 2
14007 """CUG triplet repeat, RNA binding protein 2"""
14407 """gamma-aminobutyric acid (GABA) A receptor, subunit gamma 3"""

12894 """carnitine palmitoyltransferase 1a, liver"""
71973 predicted gene 3470; RNA binding protein with multiple splicing 2
57810 cell adhesion molecule-related/down-regulated by oncogenes
20874 STE20-like kinase (yeast)
74355 SMC hinge domain containing 1
19671 """RCE1 homolog, prenyl protein peptidase (S. cerevisiae)"""
245638 """TBC1 domain family, member 8B"""
54373 """protease, serine, 16 (thymus)"""
74841 ubiquitin specific peptidase 38
13876 avian erythroblastosis virus E-26 (v-ets) oncogene related
381101 cDNA sequence BC048355
226043 COBW domain containing 1
234730 fucokinase
66865 peptidase (mitochondrial processing) alpha
19713 ret proto-oncogene
319670 echinoderm microtubule associated protein like 5
14073 fatty acid amide hydrolase
72033 """TSC22 domain family, member 2"""
16431 integral membrane protein 2A
75426 insulin-like growth factor binding protein-like 1
99712 choline/ethanolaminephosphotransferase 1
22249 unc-13 homolog B (C. elegans)
320878 """microtubule associated monoxygenase, calponin and LIM domain containing 2"""
67554 """solute carrier family 25, member 30"""
328108 """family with sequence similarity 179, member B"""
19082 """protein kinase, AMP-activated, gamma 1 non-catalytic subunit"""
70574 carboxypeptidase M
238386 BTB (POZ) domain containing 7
67988 thioredoxin-related transmembrane protein 3
229589 predicted gene 5217; prune homolog (Drosophila)
56055 GTP binding protein 2
19889 retinitis pigmentosa 2 homolog (human)
18786 """phospholipase A2, activating protein"""
241308 Ral GEF with PH domain and SH3 binding motif 1
12274 complement component 6
19012 phosphatidic acid phosphatase type 2A
213389 PR domain containing 9
217733 transmembrane protein 63c
245877 microtubule-associated protein 7 domain containing 1
14571 """glycerol phosphate dehydrogenase 2, mitochondrial"""
20787 sterol regulatory element binding transcription factor 1
76898 """beta-1,3-glucuronyltransferase 1 (glucuronosyltransferase P)"""
19272 """protein tyrosine phosphatase, receptor type, K"""
11512 adenylate cyclase 6
319604 """family with sequence similarity 168, member A"""
59041 serine/threonine kinase 25 (yeast)
18618 phosphatidylethanolamine N-methyltransferase
18189 neurexin I
170749 myotubularin related protein 4
12508 CD53 antigen
67141 F-box protein 5
211347 pantothenate kinase 3
78334 cell division cycle 2-like 6 (CDK8-like)

72580 zinc finger with UFM1-specific peptidase domain
20661 sortilin 1
170791 RNA binding motif protein 39
67863 """solute carrier family 25 (mitochondrial carrier oxoglutarate carrier), member 11"""
319817 ring finger and CCCH-type zinc finger domains 2
269437 """phospholipase C, eta 1"""
93871 bromodomain and WD repeat domain containing 1
75320 ethanolamine kinase 1
286940 """filamin, beta"""
217588 MAP3K12 binding inhibitory protein 1
76501 COMM domain containing 9
215436 """solute carrier family 35, member E3; predicted gene 7341"""
71819 kinesin family member 23
13480 dolichol-phosphate (beta-D) mannosyltransferase 1
217340 ring finger protein 157
381510 dpy-19-like 4 (C. elegans)
242425 """gamma-aminobutyric acid (GABA) B receptor, 2; similar to ortholog of human G protein-coupled receptor 51 GPR51"""
20271 """sodium channel, voltage-gated, type V, alpha"""
22230 ubiquitin fusion degradation 1 like
69178 sorting nexin 5
18846 plexin A3
71983 transmembrane and coiled-coil domains 6
16430 """STT3, subunit of the oligosaccharyltransferase complex, homolog A (S. cerevisiae)"""
67579 cytoplasmic polyadenylation element binding protein 4
66867 high mobility group 20A
19266 """protein tyrosine phosphatase, receptor type, D"""
20733 """serine protease inhibitor, Kunitz type 2"""
73132 """solute carrier family 25 (mitochondrial carrier, Graves disease autoantigen), member 16"""
67826 """synaptosomal-associated protein, 47"""
228836 """discs, large homolog-associated protein 4 (Drosophila)"""
381694 """beta 1,3-galactosyltransferase-like"""
218693 polyadenylate binding protein-interacting protein 1; similar to poly(A) binding protein interacting protein 1
20370 seizure related gene 6
20430 cytoplasmic FMR1 interacting protein 1
93730 leucine zipper transcription factor-like 1; predicted gene 6776
232286 TATA element modulatory factor 1
215446 ectonucleoside triphosphate diphosphohydrolase 3
73242 RIKEN cDNA 2610110G12 gene
71745 cullin 2
13929 archaelysin family metallopeptidase 2
72902 """sparc/osteonectin, cwcv and kazal-like domains proteoglycan 3"""
320007 """SID1 transmembrane family, member 1"""
109711 """actinin, alpha 1"""
101118 transmembrane protein 168
69617 pitrilysin metallepetidase 1
233187 lens intrinsic membrane protein 2
73419 RIKEN cDNA 1700052N19 gene

16423 """CD47 antigen (Rh-related antigen, integrin-associated signal transducer)"""
228432 anoctamin 3
50770 """ATPase, class VI, type 11A"""
103136 PWP1 homolog (S. cerevisiae)
20742 spectrin beta 2
18583 phosphodiesterase 7A
98388 carbohydrate sulfotransferase 10
14792 lysophosphatidylcholine acyltransferase 3
17069 """lymphocyte antigen 6 complex, locus E"""
20378 frizzled-related protein
71732 vacuolar protein sorting 11 (yeast)
30937 LIM and cysteine-rich domains 1
67561 WD repeat domain 48
381633 predicted gene 1673
209212 oxidative stress induced growth inhibitor family member 2
234515 """inositol polyphosphate-4-phosphatase, type II"""
234695 """RGD motif, leucine rich repeats, tropomodulin domain and proline-rich containing"""
14230 FK506 binding protein 10
53623 """glutamate receptor, ionotropic, AMPA3 (alpha 3)"""
12421 RB1-inducible coiled-coil 1
214627 PAP associated domain containing 5
20519 """solute carrier family 22 (organic cation transporter), member 3"""
381409 cadherin-like 26
269344 elongation factor RNA polymerase II-like 3
226115 oligodendrocytic myelin paranodal and inner loop protein
320940 """ATPase, class VI, type 11C"""
15483 hydroxysteroid 11-beta dehydrogenase 1
224023 kelch-like 22 (Drosophila)
210998 """DNA segment, Chr 15, ERATO Doi 621, expressed"""
209692 dehydrogenase E1 and transketolase domain containing 1
57258 exportin 4
23938 mitogen-activated protein kinase kinase 5
108089 ring finger protein 144A
14313 follistatin
215798 G protein-coupled receptor 126
56426 programmed cell death 10
64918 betaine-homocysteine methyltransferase 2
18087 natural killer tumor recognition sequence
12848 """COP9 (constitutive photomorphogenic) homolog, subunit 2 (Arabidopsis thaliana)"""
13626 embryonic ectoderm development
13990 """SWI/SNF-related, matrix-associated actin-dependent regulator of chromatin, subfamily a, containing DEAD/H box 1"""
24000 """protein tyrosine phosphatase, non-receptor type 21"""
21885 """transducin-like enhancer of split 1, homolog of Drosophila E(spl)"""
77462 transmembrane protein 116
320558 synaptonemal complex protein 2
28006 """DNA segment, Chr 6, Wayne State University 116, expressed"""
28064 """Yip1 domain family, member 3"""

353169 """solute carrier family 2 (facilitated glucose transporter), member 12"""
72776 spindle assembly 6 homolog (C. elegans)
192119 """Dicer1, Dcr-1 homolog (Drosophila)"""
56457 cleft lip and palate associated transmembrane protein 1
114604 PR domain containing 15
66410 MTERF domain containing 1
13132 disabled homolog 2 (Drosophila)
226591 """TIP41, TOR signalling pathway regulator-like (S. cerevisiae)"""
12846 catechol-O-methyltransferase 1
12727 chloride channel 4-2
217109 """UTP18, small subunit (SSU) processome component, homolog (yeast)"""
320024 arylacetamide deacetylase-like 1
66500 """solute carrier family 30 (zinc transporter), member 7"""
11933 """ATPase, Na+/K+ transporting, beta 3 polypeptide"""
72477 transmembrane protein 87B
18669 """ATP-binding cassette, sub-family B (MDR/TAP), member 1B"""
74596 CDP-diacylglycerol synthase 1
76257 """solute carrier family 38, member 3"""
66168 """glutamate receptor, ionotropic, N-methyl D-aspartate-associated protein 1 (glutamate binding)"""
20355 """sema domain, immunoglobulin domain (Ig), TM domain, and short cytoplasmic domain"""
71279 """solute carrier family 29 (nucleoside transporters), member 3"""
80748 cDNA sequence BC004004
58800 """transient receptor potential cation channel, subfamily M, member 7"""
99237 transmembrane 9 superfamily protein member 4
229898 guanylate binding protein 5
71968 WD repeat domain 73
330361 expressed sequence AW146020
67867 leucine rich repeat containing 28
12400 core binding factor beta
70552 leucine rich repeat containing 56
13180 pterin 4 alpha carbinolamine dehydratase/dimerization cofactor of hepatocyte nuclear factor 1 alpha (TCF1) 1
58909 """family with sequence similarity 13, member A"""
11736 ankyrin repeat and FYVE domain containing 1
217480 """diacylglycerol kinase, beta"""
54161 """coatomer protein complex, subunit gamma"""
211660 centrosome and spindle pole associated protein 1
66643 limb expression 1 homolog (chicken)
227377 """FERM, RhoGEF and pleckstrin domain protein 2"""
66681 phosphoglucomutase 1
96957 transmembrane protein 62
226539 aspartyl-tRNA synthetase 2 (mitochondrial)
70998 PHD finger protein 6
19356 RAD17 homolog (S. pombe)
69787 annexin A13
75863 """C-type lectin domain family 4, member g"""
13169 drebrin-like
16536 """potassium voltage-gated channel, subfamily Q, member 2"""

22221 upstream binding protein 1
69923 predicted gene 8546; acylglycerol kinase
269529 F-box protein 10
12380 calpastatin
230249 expressed sequence AI314180
69900 major facilitator superfamily domain containing 11
20168 reticulon 3
224008 RIKEN cDNA 2310008H04 gene
12550 cadherin 1
68055 """ATP synthase, H+ transporting, mitochondrial F0 complex, subunit s"""
67287 """poly (ADP-ribose) polymerase family, member 6"""
13166 dopamine beta hydroxylase
226025 """transient receptor potential cation channel, subfamily M, member 3"""
107589 """myosin, light polypeptide kinase"""
12476 CD151 antigen
12494 CD38 antigen
60344 fidgetin
18198 """muscle, skeletal, receptor tyrosine kinase"""
12291 """calcium channel, voltage-dependent, T type, alpha 1G subunit"""
68298 """non-SMC condensin I complex, subunit D2"""
72584 cullin 4B
243277 G protein-coupled receptor 133
110521 human immunodeficiency virus type I enhancer binding protein 1
12841 """collagen, type IX, alpha 3"""
231207 cytoplasmic polyadenylation element binding protein 2
56046 """ubiquinol-cytochrome c reductase complex chaperone, CBP3 homolog (yeast)"""
20897 stimulated by retinoic acid gene 6
18784 """phospholipase A2, group V; similar to phospholipase A2, group V"""
12843 """collagen, type I, alpha 2"""
328580 """tubulin, gamma complex associated protein 6"""
75296 Fgfr1 oncogene partner
237175 G protein-coupled receptor 64
67264 NADH dehydrogenase (ubiquinone) 1 beta subcomplex 8
228410 """cleavage stimulation factor, 3' pre-RNA, subunit 3"""
26429 """origin recognition complex, subunit 5-like (S. cerevisiae)"""
22642 zinc finger and BTB domain containing 17
17159 """mannosidase 2, alpha B1"""
23984 phosphodiesterase 10A
73692 RIKEN cDNA 2410089E03 gene
17847 ubiquitin specific peptidase 34
103743 transmembrane protein 98
22063 """transient receptor potential cation channel, subfamily C, member 1"""
19663 RNA binding protein gene with multiple splicing
545391 """predicted gene, EG545391; hypothetical protein LOC674459"""
11836 v-raf murine sarcoma 3611 viral oncogene homolog
227154 STE20-related kinase adaptor beta
108069 """glutamate receptor, metabotropic 3"""

17126 MAD homolog 2 (Drosophila)
14160 leucine rich repeat containing G protein coupled receptor 5
72479 hydroxysteroid dehydrogenase like 2
94229 """solute carrier family 4, sodium bicarbonate cotransporter-like, member 10"""
59287 nicastrin
67144 leucine rich repeat containing 40
70357 Kv channel-interacting protein 1
15182 histone deacetylase 2
12388 """catenin (cadherin associated protein), delta 1"""
74150 """solute carrier family 35, member F5"""
72085 O-sialoglycoprotein endopeptidase-like 1
269774 AP2 associated kinase 1
108645 """methionine adenosyltransferase II, beta"""
26456 """sema domain, immunoglobulin domain (Ig), transmembrane domain (TM) and short cytoplasmic domain, (semaphorin) 4G"""
331004 """solute carrier family 9 (sodium/hydrogen exchanger), member 9"""
77579 """myosin, heavy polypeptide 10, non-muscle"""
224079 ATPase type 13A4
381411 1-aminocyclopropane-1-carboxylate synthase homolog (Arabidopsis)(non-functional)-like
67608 nuclear prelamin A recognition factor
27660 RIKEN cDNA 1700088E04 gene
18761 """protein kinase C, theta"""
72401 """solute carrier family 43, member 1"""
109674 adenosine monophosphate deaminase 2 (isoform L)
71517 RIKEN cDNA 9030624J02 gene
26942 sperm associated antigen 1
18787 """serine (or cysteine) peptidase inhibitor, clade E, member 1"""
18018 """nuclear factor of activated T-cells, cytoplasmic, calcineurin-dependent 1"""
17385 matrix metallopeptidase 11
269198 neurobeachin like 1
66576 predicted gene 14088; ubiquinol-cytochrome c reductase hinge protein
268902 roundabout homolog 2 (Drosophila)
12294 """calcium channel, voltage-dependent, alpha2/delta subunit 3"""
214575 tudor domain containing 5
69634 citrate lyase beta like
664883 neuro-oncological ventral antigen 1
381546 coiled-coil domain containing 24
78943 endoplasmic reticulum (ER) to nucleus signalling 1
105298 ependymin related protein 1 (zebrafish)
269019 serine/threonine kinase 32A; similar to serine/threonine kinase 32A
56790 """family with sequence similarity 48, member A"""
78935 serum amyloid A-like 1
14252 flotillin 2
80877 LPS-responsive beige-like anchor
74122 transmembrane protein 43
76826 predicted gene 7514; nucleotide binding protein-like
68810 nexilin

52123 """1-acylglycerol-3-phosphate O-acyltransferase 5 (lysophosphatidic acid acyltransferase, epsilon)"""
13824 erythrocyte protein band 4.1-like 4a
30805 """solute carrier family 22 (organic cation transporter), member 4"""
108735 SFT2 domain containing 2
70093 ubiquitin-conjugating enzyme E2Q (putative) 1
19649 roundabout homolog 3 (Drosophila)
320091 anoctamin 4
27368 transducin (beta)-like 2
66205 CD302 antigen
214150 """eukaryotic translation initiation factor 2C, 3"""
30838 F-box and WD-40 domain protein 4
75901 DCP1 decapping enzyme homolog A (S. cerevisiae)
13559 E2F transcription factor 5
229473 RIKEN cDNA D930015E06 gene
18479 p21 protein (Cdc42/Rac)-activated kinase 1
12733 chloride channel Ka
70729 nitric oxide synthase 1 (neuronal) adaptor protein
66069 snurportin 1
28042 """DNA segment, Chr 5, Wayne State University 178, expressed"""
100169 phosphatase and actin regulator 4
66826 tafazzin
223870 SUMO1/sentrin specific peptidase 1
211499 transmembrane protein 87A
16924 ligand of numb-protein X 1
67778 zinc finger protein 639
94254 Williams-Beuren syndrome chromosome region 16 homolog (human)
14802 """glutamate receptor, ionotropic, AMPA4 (alpha 4); hypothetical protein LOC100044208"""
140559 """immunoglobulin superfamily, member 8"""
80294 protein O-fucosyltransferase 2
70789 kynureninase (L-kynurenine hydrolase)
80915 dual specificity phosphatase 12
216238 early endosome antigen 1
106200 thioredoxin domain containing 11
320782 transmembrane protein 154
67299 dedicator of cytokinesis 7
72141 ADP-dependent glucokinase
74430 RIKEN cDNA 4930452B06 gene
217715 """eukaryotic translation initiation factor 2B, subunit 2 beta"""

Supp Table 5: Pathways regulated by A2BP1

| Pathways | P value |
|---|---|
| **Cytoskeleton regulation related pathways** | |
| Adherens junction | 0.001 |
| Arrhythmogenic right ventricular cardiomyopathy (ARVC) | 0.001 |
| Calcium signaling pathway | 0.001 |
| Cardiac muscle contraction | <0.0001 |
| Dilated cardiomyopathy | 0.002 |
| ECM-receptor interaction | 0.022 |
| Focal adhesion | 0.003 |
| Gap junction | 0.037 |
| Hypertrophic cardiomyopathy (HCM) | 0.008 |
| Regulation of actin cytoskeleton | 0.031 |
| Vascular smooth muscle contraction | 0.001 |
| Neural development related pathways Alzheimer's disease | 0.004 |
| Axon guidance | <0.0001 |
| Calcium signaling pathway | 0.001 |
| Long-term depression | 0.004 |
| Long-term potentiation | 0.005 |
| Neurotrophin signaling pathway | <0.0001 |
| **Metabolism related pathways** | |
| Ether lipid metabolism | 0.006 |
| Glycerolipid metabolism | <0.0001 |

Glycerophospholipid metabolism <0.0001

Glycosylphosphatidylinositol(GPI)-anchor biosynthesis 0.009

Metabolic pathways <0.0001

N-Glycan biosynthesis 0.032

Nicotinate and nicotinamide metabolism 0.048

Purine metabolism 0.002

Ribosome biogenesis in eukaryotes 0.004

Sphingolipid metabolism <0.0001

Starch and sucrose metabolism 0.026

**Signaling pathways**

Calcium signaling pathway 0.001

ErbB signaling pathway 0.032

GnRH signaling pathway <0.0001

Insulin signaling pathway 0.017

MAPK signaling pathway <0.0001

Neurotrophin signaling pathway <0.0001

T cell receptor signaling pathway 0.036

VEGF signaling pathway 0.037

Cancer related pathways Bladder cancer 0.014

Colorectal cancer 0.012

Endometrial cancer 0.027

Pathways in cancer 0.038

Renal cell carcinoma 0.032

Thyroid cancer 0.014

**Other pathways**

ABC transporters 0.002

Bile secretion <0.0001

Chagas disease (American trypanosomiasis) 0.022

Lysosome <0.0001

Oocyte meiosis 0.011

Pancreatic secretion 0.001

Progesterone-mediated oocyte maturation 0.006

Protein digestion and absorption <0.0001

Protein processing in endoplasmic reticulum 0.018

Proximal tubule bicarbonate reclamation 0.032

RNA transport <0.0001

Salivary secretion 0.004

Ubiquitin mediated proteolysis 0.039

Supp Table 6: Oligo sequence info used in this study

| | |
|---|---|
| mA2BP1-L-CHIP-f1 | ttctctgctccacccactct |
| mA2BP1-L-CHIP-r1 | ctggcgagccaaaaataatc |
| mA2BP1-L-CHIP-f2 | acttctgcccaccaagaaga |
| mA2BP1-L-CHIP-r2 | agcccctaaatgagctctcc |
| mA2BP1-L-CHIP-f3 | agcaggcaaaagggaaagat |
| mA2BP1-L-CHIP-r3 | ctggggtttgttctctgagc |
| mA2BP1-S-CHIP-f1 | tgaagaaggggtggaaagtg |
| mA2BP1-S-CHIP-r1 | tccgccacagttatgaacaa |
| mA2BP1-S-CHIP-f2 | gcggaatgggtataggtgtg |
| mA2BP1-S-CHIP-r2 | cctgaggactggaatttgga |
| mA2BP1-S-CHIP-f3 | tcctcaggacaaatgccttc |
| mA2BP1-S-CHIP-r3 | aaacaaaaccctgcatcagc |
| Ctr-CHIP-f | CAATGGTAGGCTCACTCTGGGAGATGAT |
| Ctr-CHIP-r | AACACACACTGGCAGGACTGGCTAGG |
| TPM1-6a-fT7 | TAATACGACTCACTATAGGGtctggcagctgcacatttac |
| TPM1-6a-r | aaagctgtctgggatgcagt |
| TPM1-6b-fT7 | "TAATACGACTCACTATAGGGctggggtgtgattaatggt<br>" |
| TPM1-6b-r | tcatcaatgcttttctccaattt |
| shMyt1L-1 | CGTGACTACTTTGACGGAAAT |
| shMyt1L-2 | GCAAATATGCACGACACAGAA |
| shA2BP1-1 | GCACCAACTATCATAAATCTA |
| shA2BP1-2 | CCGACAAATGTTTGGTCAATT |
| mMyt1l-QPCR-f1 | AACCTGACTCTGCTAGAGAAAGC |
| mMyt1l-QPCR-r1 | GGAGACTGGTCCTCATAGGATCT |
| mMyt1l-QPCR-f2 | TGGTCACGTCAGTGGCAAATA |
| mMyt1l-QPCR-r2 | TGCAAATGGTTTTCGCTTGGG |
| mA2BP1-QPCR-f1 | CCTACGGCGGAGTAGTGTATC |
| mA2BP1-QPCR-r1 | GTCAAAGGTGCAAAAGCATTCA |
| mA2BP1-QPCR-f2 | ACGGCGGAGTAGTGTATCAAG |
| mA2BP1-QPCR-r2 | TCAGTCAAAGGTGCAAAAGCAT |