**KEY RESOURCES TABLE**

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| **REAGENT or RESOURCE** | **SOURCE** | **IDENTIFIER** | **Dilution** |
| Antibodies |  |  |  |
| Rabbit anti-LAMB1 | Proteintech, Wuhan, China | 23498-1-AP | 1:500 (WB) |
| Rabbit anti-RARB | Abcam, Cambridgeshire, UK | ab124701 | 1:1000 (WB) |
| 1:200 (IF) |
| Rabbit anti-RARA | Proteintech, Wuhan, China | 10331-1-AP | 1:1000 (WB) |
| Rabbit anti- ALDH1A2 | Proteintech, Wuhan, China | 13951-1-AP | 1:1000 (WB) |
| Mouse anti-GFP | Proteintech, Wuhan, China | 66002-1-Ig | 1:1000 (WB) |
| Mouse anti-GAPDH | Proteintech, Wuhan, China | 60004-1-Ig | 1:4000 (WB) |
| Mouse anti-NeuN | Abcam, Cambridgeshire, UK | ab104224 | 1:200 (IF) |
| Mouse anti-GFAP | Abcam, Cambridgeshire, UK | ab4648 | 1:200 (IF) |
| Goat anti-Iba1 | Abcam, Cambridgeshire, UK | ab5076 | 1:200 (IF) |
| Mouse anti-CaMKII | Abcam, Cambridgeshire, UK | ab22609 | 1:200 (IF) |
| Mouse anti-GAD67 | Abcam, Cambridgeshire, UK | ab26116 | 1:200 (IF) |
| Anti-rabbit lgG, HRP-linked Antibody | Cell Signaling Technology, Boston, MA, USA | 7074 | 1:4000 (WB) |
| Anti-mouse lgG, HRP-linked Antibody | Cell Signaling Technology, Boston, MA, USA | 7076 | 1:4000 (WB) |
| Goat anti-mouse IgG (H+L) Highly Cross-Adsorbed Secondary Antibody, Alexa Fluor 488 | Invitrogen, Carlsbad, CA, USA | A11029 | 1:800 (IF) |
| Goat anti-rabbit IgG (H+L) Highly Cross-Adsorbed Secondary Antibody, Alexa Fluor 594 | Invitrogen, Carlsbad, CA, USA | A32740 | 1:800 (IF) |
| Goat anti-rabbit IgG (H+L) Highly Cross-Adsorbed Secondary Antibody, Alexa Fluor 647 | Invitrogen, Carlsbad, CA, USA | A32733 | 1:800 (IF) |
| Donkey anti-goat IgG (H+L) Cross-Adsorbed Secondary Antibody, Alexa Fluor 488 | Invitrogen, Carlsbad, CA, USA | A32814 | 1:800 (IF) |
| Chemicals  |  |
| DAPI | Sigma-Aldrich, St. Louis, MO, USA | D9542 | 1 μg/ml (IF) |
| Retinoic acid | MCE, Monmouth Junction, NJ, USA | HY-14649 |  |
| Talarozole | MCE, Monmouth Junction, NJ, USA | HY-14531 |  |
| Corticosterone | Solarbio, Beijing, China | C9480 | 0.1 mg/ml |
| QX314 | Sigma-Aldrich, St. Louis, MO, USA | L5783 | 5 mM |
| AP5 | Sigma-Aldrich, St. Louis, MO, USA | A8054 | 50 μM |
| Picrotoxin | Sigma-Aldrich, St. Louis, MO, USA | R284556 | 100 μM |
| Sodium deoxycholate | Solarbio, Beijing, China | D8331 | 4 % |
| DNase I | Solarbio, Beijing, China | D8071 | 40 Ku/mL |
| Hexamethyl disilazane | Sigma-Aldrich, St. Louis, MO, USA | 283134 |  |
| Complete Freund’s adjuvant | Sigma-Aldrich, St. Louis, MO, USA | F5881 | 1 mg/ml |
| Tetrodotoxin | TOCRIS, Bristol, UK | 1078 | 1 μM |
| Virus Strains |  |
| rAAV2/9-CaMKIIα-mRarb-3×FLAG-P2A-mCherry-WPRE-hGH polyA | Braincase, Shenzhen, China | BC-1070 |  |
| rAAV2/9-CaMKIIα-mCherry-WPRE-hGH polyA | Braincase, Shenzhen, China | BC-0028 |  |
| rAAV2/9-CaMKIIα-mCherry-5'miR-30a-shRNA(mRarb)-3'miR-30a-WPREs | Braincase, Shenzhen, China | BC-1033 |  |
| rAAV2/9- CaMKIIα-mCherry-5'miR-30a-shRNA(Scramble)-3'miR-30a-WPREs | Braincase, Shenzhen, China | BC-1034 |  |
| rAAV2/9-CaMKIIα-GCaMP6s-WPRE-pA | Braincase, Shenzhen, China | PT-0110 |  |
| rAAV2/9-3×RARE-Mini-TK promotor-EGFP-3×Flag-SV40-puromycin | Genechem, Shanghai, China | GOSV0366178 |  |
| rAAV2/9-CaMKIIα-mAldh1a2-3×FLAG-P2A-mCherry-WPREs | Braincase, Shenzhen, China | BC-1664 |  |
| rAAV2/9-U6-shRNA(scramble)-CMV-EGFP-SV40pA | BrainVTA, Wuhan, China | PT-0916 |  |
| rAAV2/9-U6-shRNA (Lamb1)-CMV-EGFP-SV40pA | BrainVTA, Wuhan, China | PT-2272 |  |
| Plasmids |  |  |  |
| pCDNA3.1(+)-mRarb | Genomeditech, Shanghai, China | 47719 |  |
| PGL3-basic-mLamb1 promoter(-1862to+84) WT | Genomeditech, Shanghai, China | 47717 |  |
| pCDNA3.1(+) | Genomeditech, Shanghai, China | GM-1013FL01 |  |
| PGL3-basic | Genomeditech, Shanghai, China | GM-1013P001 |  |
| pGMR-TK | Genomeditech, Shanghai, China | GM-0210RC |  |
| PGL3-basic-mLamb1 promoter(-1862to+84) MT(-77~-432) | Genomeditech, Shanghai, China | 110301GA-P |  |
| PGL3-basic-mRarb promoter(-2000to+30) WT | Genechem, Shanghai, China | GOSE5012850 |  |