BrainVTA®

Vector For Life

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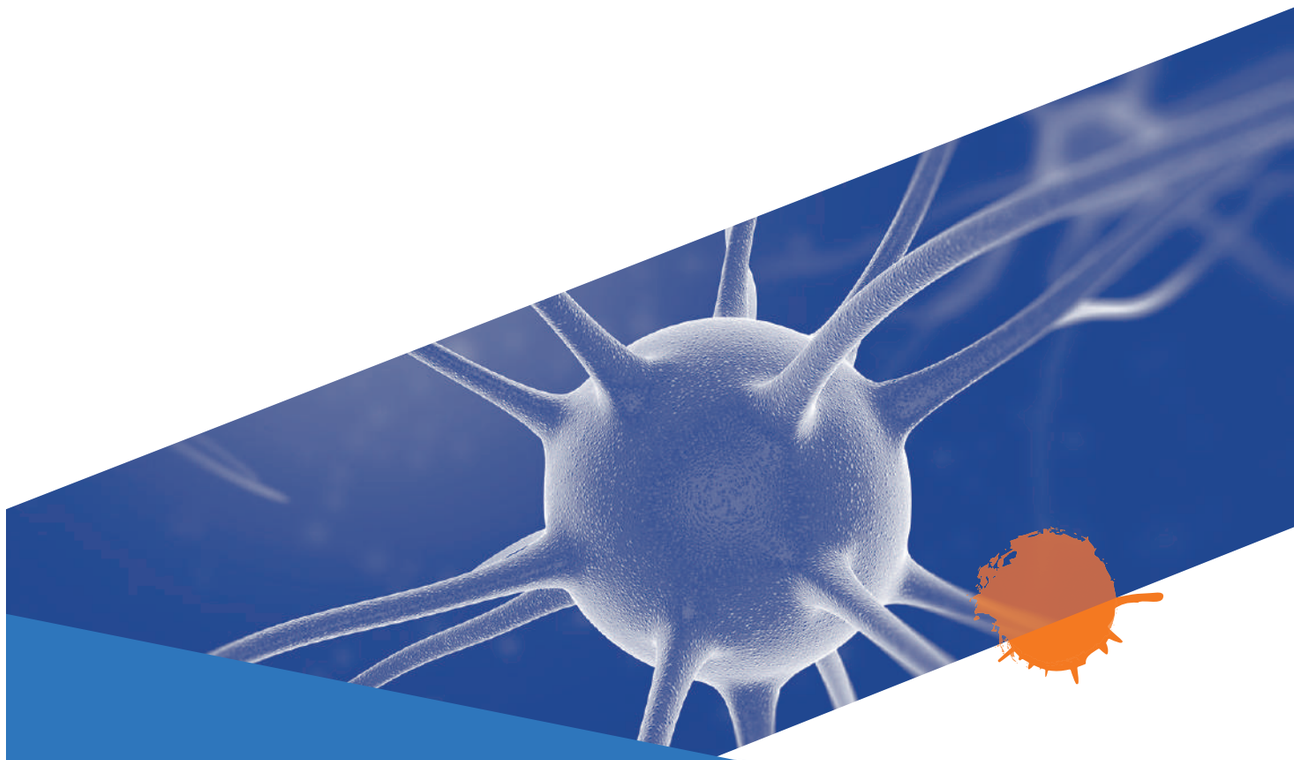
BrainVTA®

AAVs & Neurotropic Viruses

Product and Service manuals



BrainVTA (Wuhan) Co.,Ltd

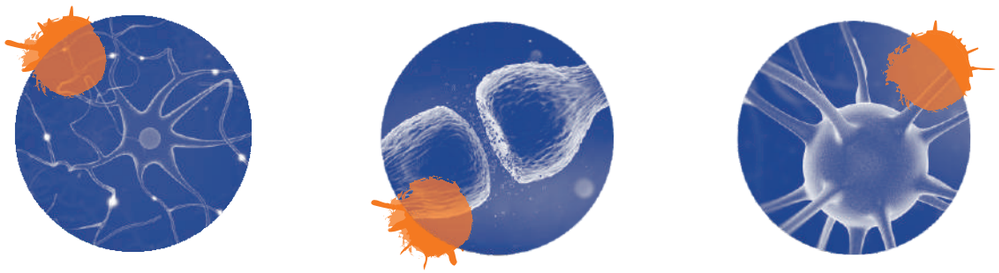
ABOUT US

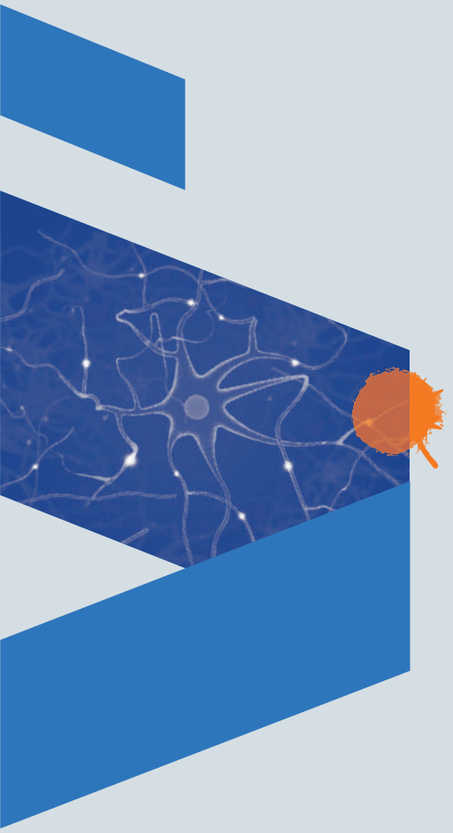
BrainVTA provides innovative viral reagents and customized technical services that help researchers investigate questions about genes, neurons, cell dynamics, circuitry structure, and function of brain network, as well as pathomechanism or treatments of diseases. BrainVTA has been working with many scientists for diverse research purposes in China. With expertise, skills and credibility, our team have designed and constructed various viral vectors, including Lentivirus, Adeno-associated virus, Herpes simplex virus, Vesicular stomatitis virus, etc. for academic and industrial communities.

Vector For Life

rAAV　PRV/HSV　CAV　RV/VSV

CONTENTS





1 Our Platform

AAVS & NEUROTROPIC VIRUSES
Product and Service manuals

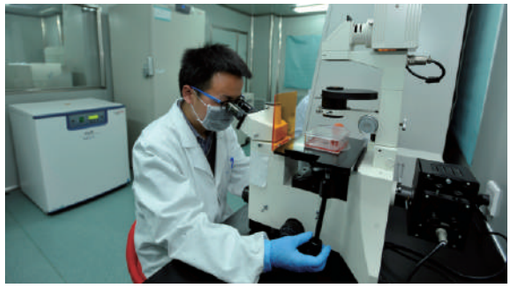
BrainVTA provides constructing& packaging services and outsourcing service by our viral platform and experimental platform. Our viral vector platform includes gene delivery vectors, neural tracing vectors, oncolytic virus vectors and viral–like particle manufacturing vectors. Of which, gene delivery vectors including adeno–associated virus (AAV), lentivirus (LV) , retrovirus and herpes simplex virus (HSV), as well as neural tracing vectors have been developed to be powerful tools in both academic and clinical applications.

Viral vector platform

Gene deliver vectors	Neural tracing vectors	Oncolytic virus vectors	VLP manufacturing vector
Adeno-associated virus, AAV	Rabies virus, RV Vesicular stomatitis virus, VSV	HSV	Baculovirus
Lentivirus, LV	Canine adenovirus, CAV	VSV	
Herpes simplex virus, HSV	HSV Pseudorabies virus, PrV	Poxviridae	

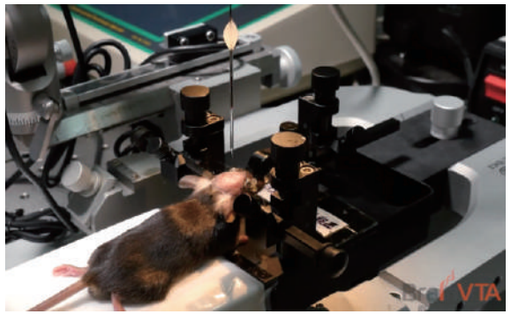
Experimental platform

Molecular cloning platform

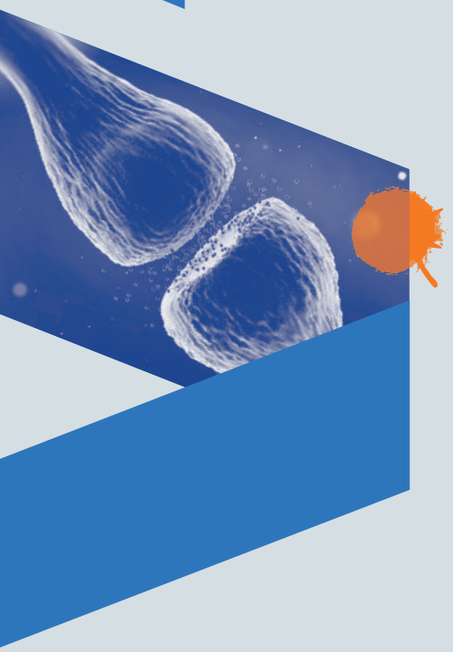


Cell culture platform

Virus vector production platform



Animal experiment platform



AAV vectors packaging service

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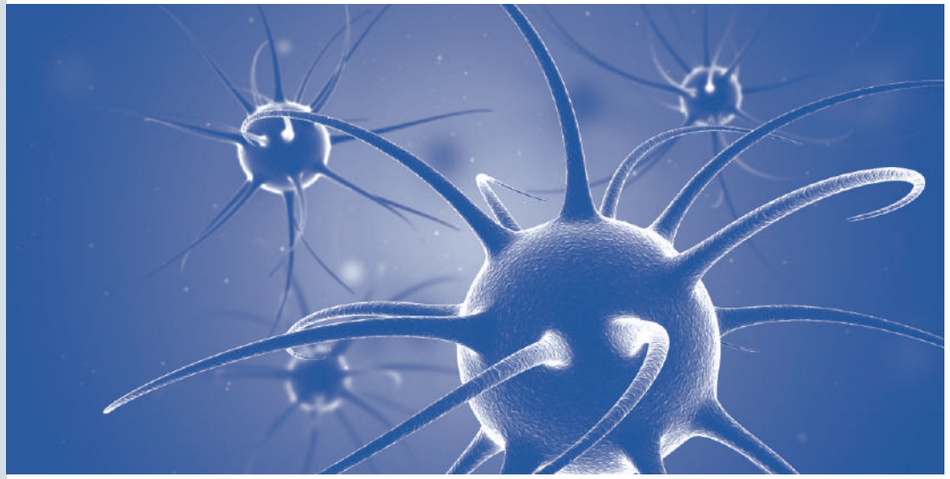


BrainVTA provide professional，convenient and R & D products experienced service of AAV, ranging from small–scale to the large–scale, which help scientist accelerate the research process in circuit tracing, mechanisms of disease and treatment of disease.

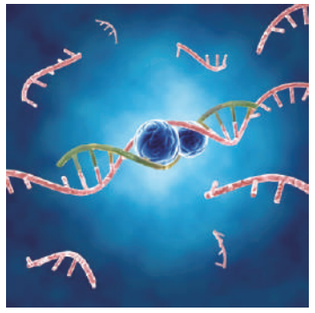
So far, we have nearly 1000 pre–made AAV products with different serotypes and promoters（P15 for the in stock products）. Meanwhile, we have offered 2000 customized AAV services for our clients with the following serotypes: AAV–1, AAV–2, AAV–5, AAV–6, AAV–8, AAV–DJ, AAV–PHP.eB, AAV–retro, AAV–anc80 and AAV–9. Artificially designed serotypes and vectors also can be produced on a case–by–case basis.

2.1 BrainVTA renders multiply customized services, including:

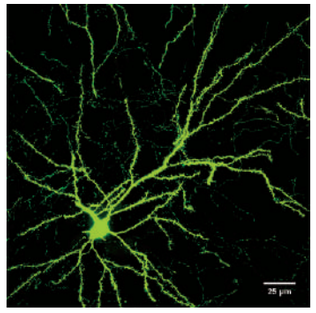
Design, construct and packag service of virus vectors

BrainVTA can help you from any stage to save your time from these time–consuming steps in research, as our scientists have extensive experience in vector design, construction and packag service. Various types of custom–made AAVs, such as gene editing (CRISPR–Cas9), RNA interference (shRNA, microRNA), optogenetic and chemo–genetics technology, calcium and neurotransmitter probe have been offered successfully for our clients.

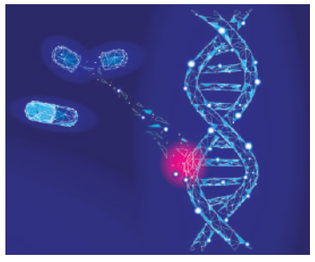
Gene editing



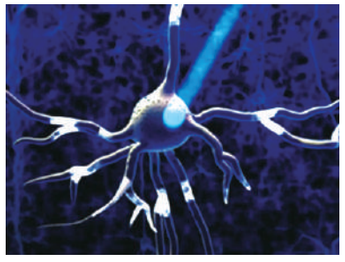
RNAi



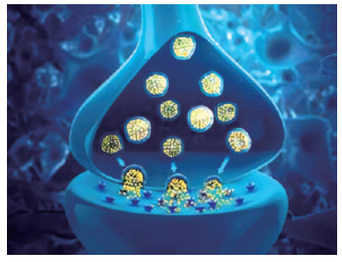
Calcium sensors



Chemogenetics



optogenetic



Neurotransmitter probe

Large-scale AAV vectors production

BrainVTA has established a suspension cell culture system, through which we offer AAV packing service that meet the research needs from mouse to large animal models. Besides, a serum–free cell suspension culture system have also been established with serum free, antibiotic free.

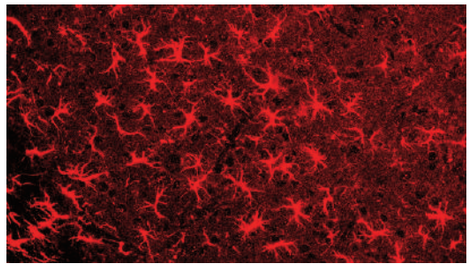
(a) Baculovirus system:

BrainVTA has developed a baculovirus system to prepare large scale preparation (10^{14}~10^{17}vg) of various serotype of AAV. The AAV produced by BEV–SF9 system shown very high infectivity, which is comparable with the AAV produce from HEK293 system.

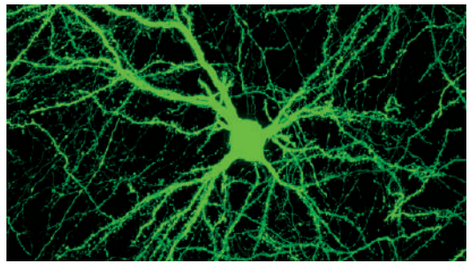
(b) HEK293 system:

The HEK293 transfection system works with any AAV plasmid from any source.

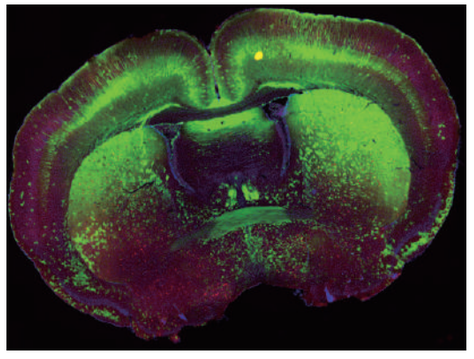
To date, the production of AAV with 10L production system can reach 10^{15}vg per batch, and we also have 50L production system. The virus titer is 10^{12}–10^{14}vg/ml, which is sufficient for various researches.



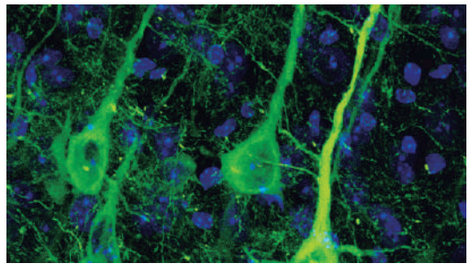
rAAV9–GFAP–mcherry labeled astrocyte



Sparse Labeling



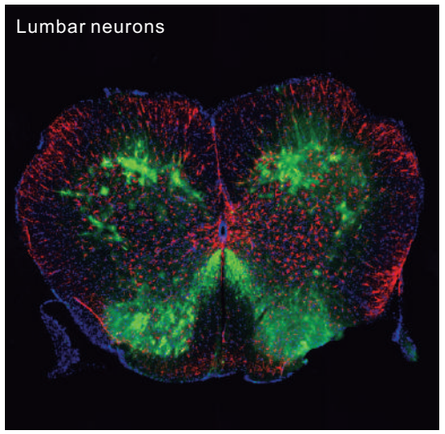
rAAV9– EGFP labeled the whole brain neurons

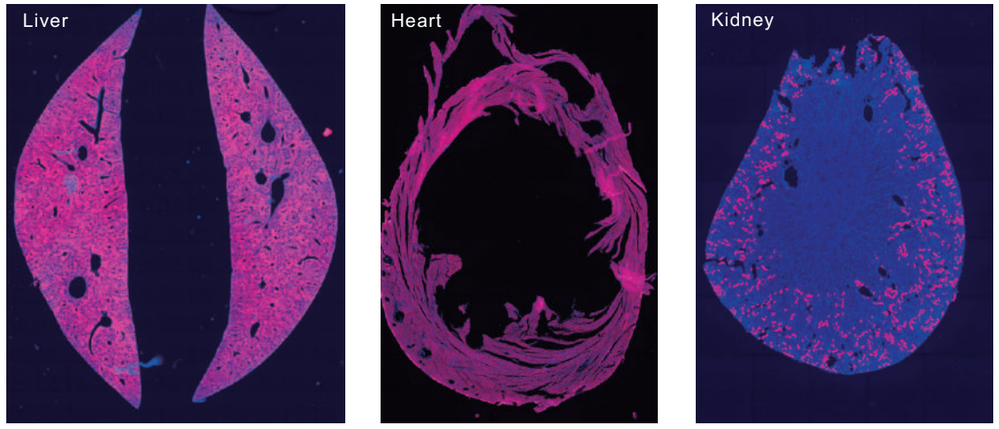


rAAV–Camk2–tau–GFP

Consulting service

BrainVTA have collaborated with customers from various fields from neuroscience to translational medicine, including basic research, preclinical trial and clinical trials. Our experience on viruses might be useful on planning you future projects.





rAAV labeling of peripheral nervous system by intraventricular injection

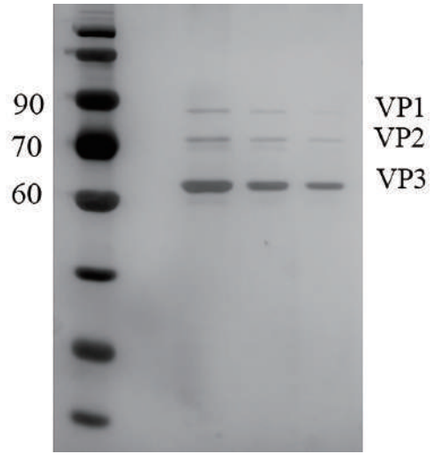
Convenient & Fast

We provide free service on mega plasmids extraction for viral packing service. Our customers just need to drop mini–extracted plasmids on filter paper or PCR tube winded with sealing film and send it to us.
Starting from mini–extracted plasmids, it will take 3 weeks to finish AAV preparation.
Starting from designing and construction, it will take 5~7 weeks to finish AAV preparation.

2.2 AAV purification and titer detection

Purification:

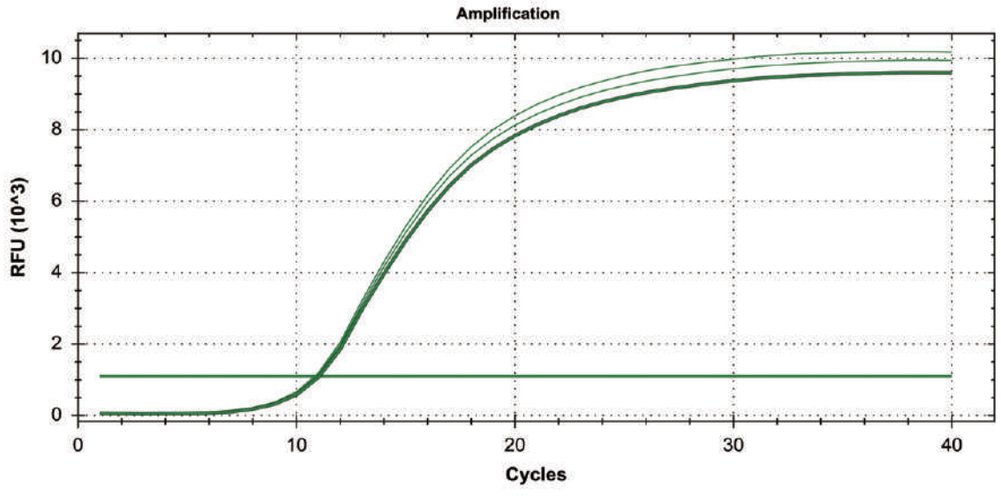
Viral particles are purified by ultracentrifugation on an iodixanol step gradient. In addition, column chromatography including affinity chromatography, anion/cationic chromatography and molecular sieve can also be provided.

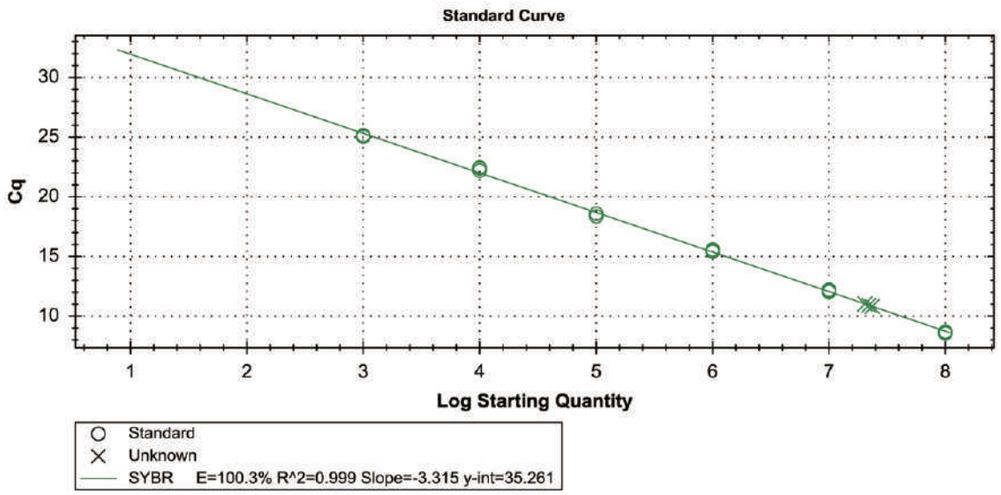


Purity of purified AAV virus

Titer detection

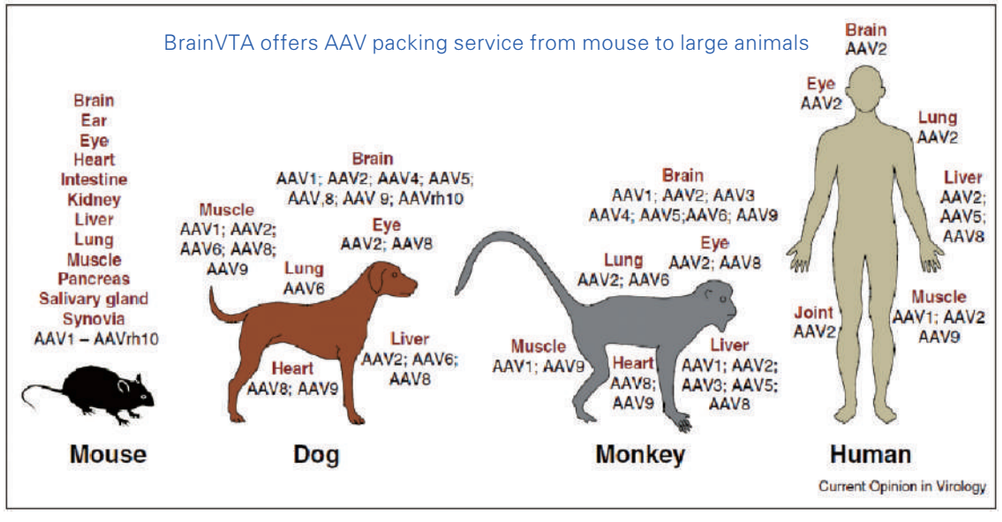
The virus titer is determined by the viral genome copy number by real–time quantitative PCR using primers targeting various region within the genome, such as WPRE, EGFP, promoter, genes as well as ITR. Usually, the titer detected from ITR comparing with that detected from other region, following the rule: Titer (ITR) = 4 X Titer (other region).
The purity of AAV is assayed by comparing the capsid proteins VP1, VP2 and VP3 by SDS–PAGE.

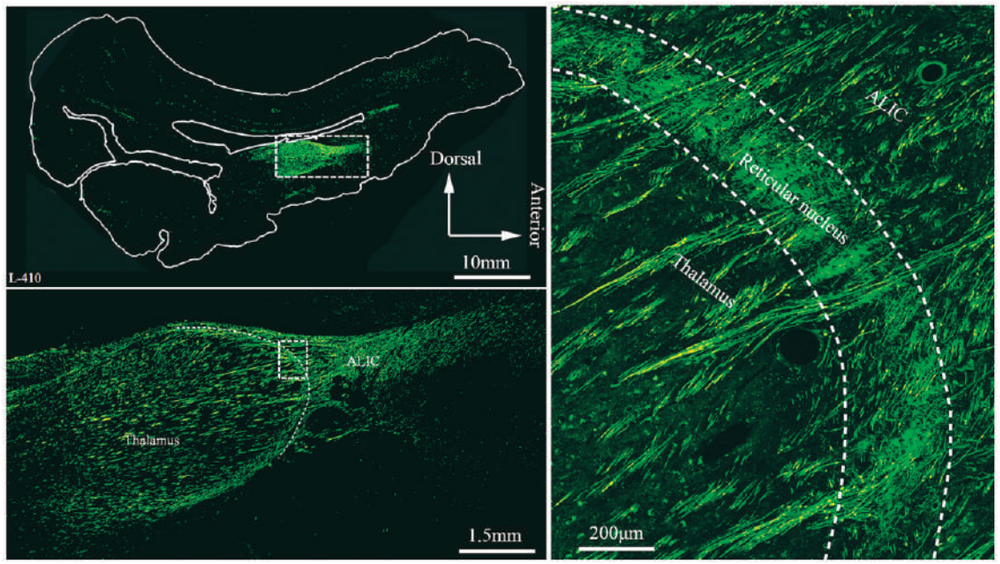




2.3 The applications of AAV vectors

The AAV vectors that provided by BrainVTA have been successfully used in various tissues of different animals such as brain, liver, heart, kidney, lung, eye from mouse, rat, dog, monkey and so on.

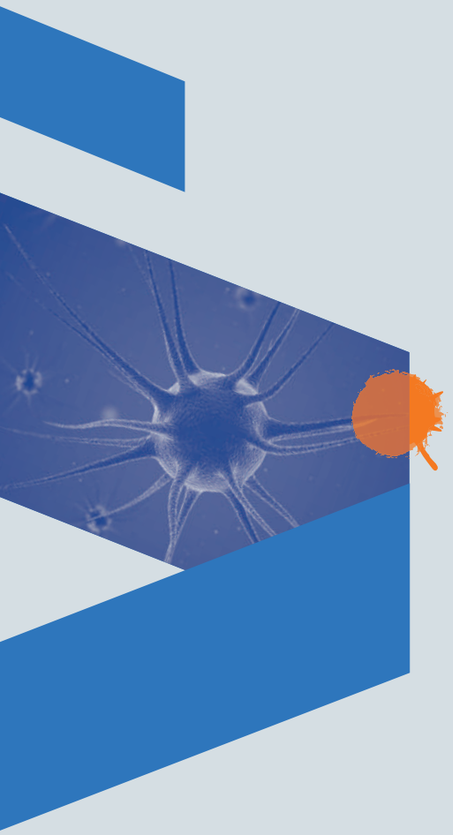




Long range projection of cortical neurons in rhesus monkeys with NHP injection level AAV

Dosage range of AAV in different species

Species	Body weight	Dosage(vg/kg)	Total dosage
Human	70kg (adult)	6×10^{11}–6×10^{13}	4.2×10^{13}–4.95×10^{15}
Monkey	4kg	2×10^{11}–6×10^{13}	8×10^{11}–2.4×10^{14}
Dog	12kg	2×10^{11}–4.95×10^{13}	2.4×10^{12}–5.94×10^{14}
Mouse	25kg	2×10^{12}–6×10^{13}	5×10^{10}–1.5×10^{12}



Neurotropic Viruses Packaging Service &Animal Experimental Service

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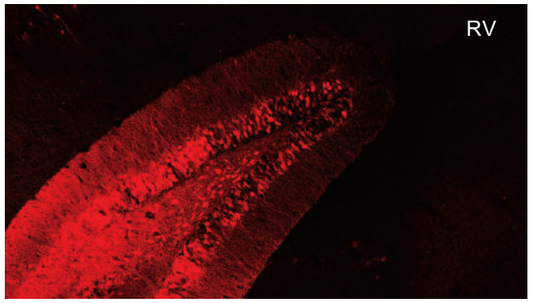
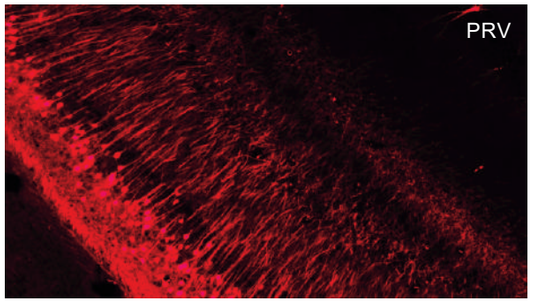
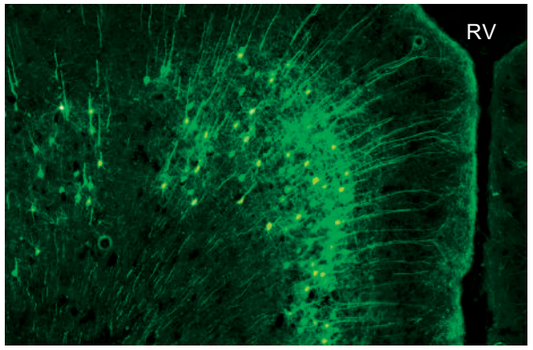
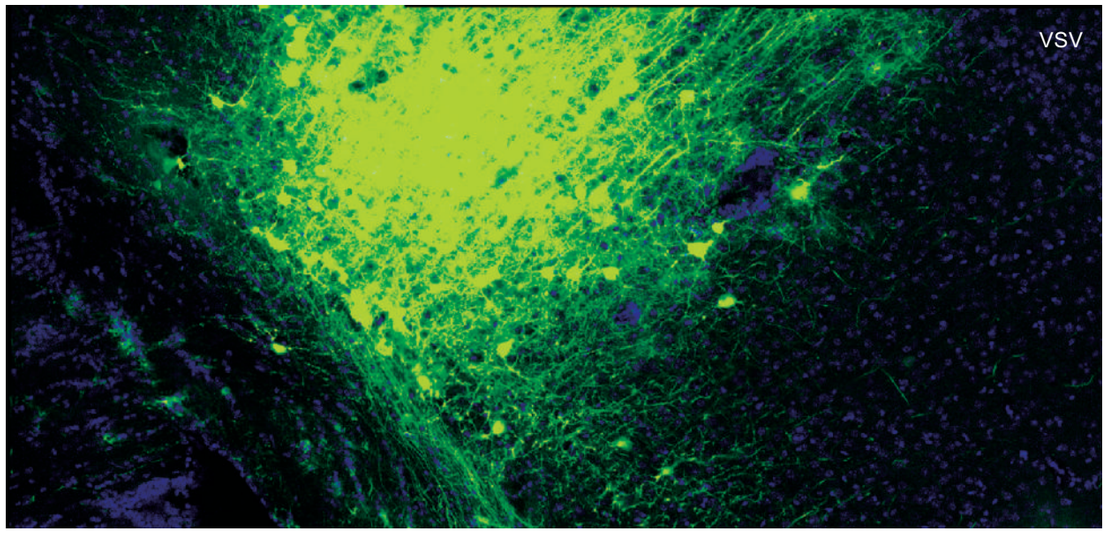
Neuronal tracing technology can study and visualize the connections among neurons, which is of great significance for the analysis of pathological mechanisms and treatment of diseases. Neurotropic viruses are used as tracers because they preferably infect or transduce neurons and some even propagate along neural circuits.

BrainVTA could provide neurotropic viruses packaging service including replication–deficient Rabies virus(RV), Pseudorabies virus(PRV), Herpes simplex virus(HSV) and Vesicular stomatitis virus(VSV) for neural circuit tracing.We also provide animal experiment service on neural circuit tracing in A–BSL2 laboratory.



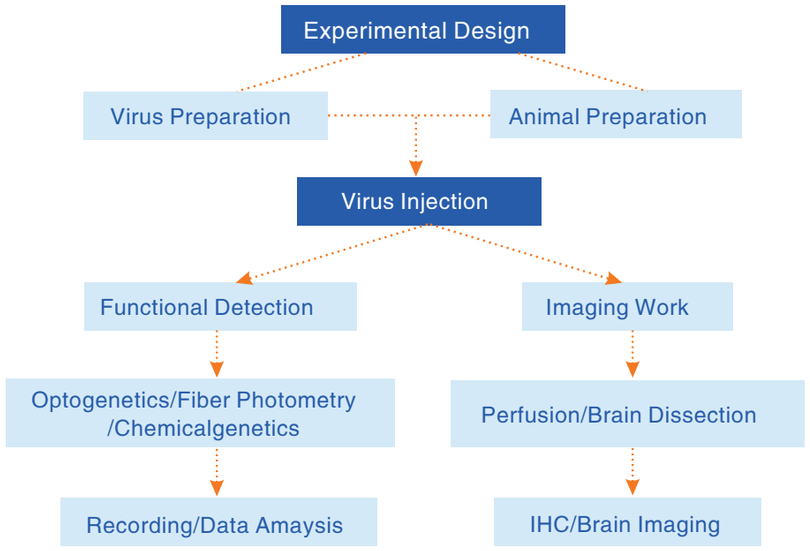




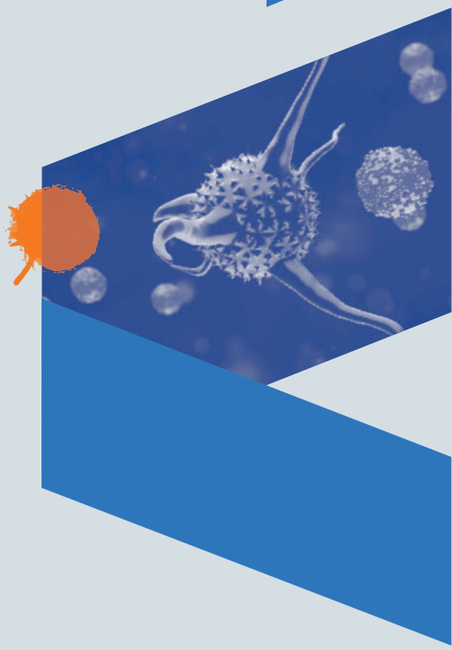


Outsourcing service process

Custom Service of Neural Circuit Tracing



In Stock Products



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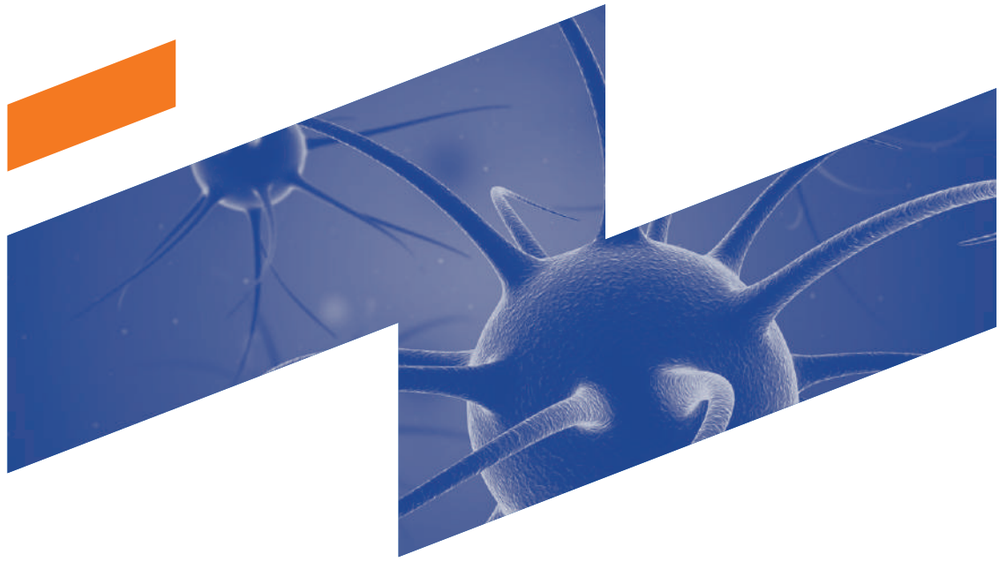
4.1 Pre-Made AAVs

Optogenetics

Catalog Number	Vector Name
PT-0001	rAAV-Ef1a-DIO-hChR2(H134R)-EYFP-WPRE-pA
PT-0002	rAAV-Ef1a-DIO-hChR2(H134R)-mCherry-WPRE-pA
PT-0004	rAAV-CaMKIIa-hChR2(E123T/T159C)-EYFP-WPRE-pA
PT-0005	rAAV-CaMKIIa-hChR2(E123T/T159C)-mCherry-WPRE-pA
PT-0006	rAAV-Ef1a-DIO-eNpHR3.0-EYFP-WPRE-pA
PT-0007	rAAV-Ef1a-DIO-eNpHR3.0-mCherry-WPRE-pA
PT-0008	rAAV-CaMKIIa-eNpHR3.0-EYFP-WPRE-pA
PT-0009	rAAV-CaMKIIa-eNpHR3.0-mCherry-WPRE-pA
PT-0010	rAAV-hSyn-eNpHR3.0-EYFP-WPRE-pA
PT-0011	rAAV-hSyn-eNpHR3.0-mCherry-WPRE-pA
PT-0063	rAAV-CaMKIIa-ReachR-Citrine-WPRE-pA
PT-0064	rAAV-Ef1a-DIO-ReachR-Citrine-WPRE-pA
PT-0065	rAAV-hSyn-Con/Fon-hChR2(H134R)-EYFP-WPRE-pA
PT-0066	rAAV-nEF1a-Con/Foff-hChR2(H134R)-EYFP-WPRE-pA
PT-0067	rAAV-hSyn-Coff/Fon-hChR2(H134R)-EYFP-WPRE-pA
PT-0068	rAAV-nEF1a-Con/Fon-hChR2(H134R)-EYFP-WPRE-pA
PT-0080	rAAV-nEf1a-FDIO-Arch-EYFP-WPRE-pA
PT-0081	rAAV-nEf1a-FDIO-hChR2(H134R)-EYFP-WPRE-pA
PT-0103	rAAV-Ef1a-DIO-Jaws-EGFP-ER2-WPRE-pA
PT-0109	rAAV-Ef1a-DIO-Jaws-KGC-EGFP-ER2-WPRE-pA
PT-0120	rAAV-CaMKIIa-Jaws-KGC-EGFP-ER2-WPRE-pA
PT-0121	rAAV-hSyn-Jaws-EGFP-ER2-WPRE-pA
PT-0122	rAAV-hSyn-dF-HA-KORD-IRES-mCitrine-WPRE-pA
T-0123	rAAV-CaMKIIa-HA-KORD-IRES-mCitrine-WPRE-pA
PT-0150	rAAV-hSyn-hChR2(H134R)-mCherry-WPRE-pA
PT-0158	rAAV-EF1a-ChR2-EYFP-WPRE-pA
PT-0182	rAAV-VGAT1-eNpHR3.0-EYFP-WPRE-pA
PT-0189	rAAV-hSyn-FDIO-hChR2(H134R)-mCherry-WPRE-pA
PT-0218	rAAV-GFAP-hChR2(H134R)-mCherry-WPRE-pA
PT-0221	rAAV-GFAP-hChR2(H134R)-EYFP-WPRE-pA
PT-0228	rAAV-EF1a-DIO-oChIEF(E163A/T199C)-P2A-dTomato-WPRE-BGHpA

Catalog Number	Vector Name
PT-0232	rAAV-Ef1a-DIO-ChETA-EYFP-WPRE-pA
PT-0233	rAAV-CamKII-ArchT-GFP-WPRE-pA
PT-0235	rAAV-CAG-hChR2(H134R)-tdTomato-WPRE-pA
PT-0243	rAAV-CAG-FLEX-ArchT-GFP-WPRE-pA
PT-0250	rAAV-TRE3G-OChIEF-P2A-mcherry-WPRE-pA
PT-0272	rAAV-CS-CRM4-aMHC-hChR2(H134R)-mCherry-WPRE-pA
PT-0284	rAAV-GFAP104-hChR2(H134R)-EYFP-WPRE-pA
PT-0296	rAAV-CaMKIIa-hChR2(H134R)-EYFP-WPRE-pA
PT-0297	rAAV-CaMKIIa-hChR2(H134R)-mCherry-WPRE-pA
PT-0299	rAAV-PTH-hChR2(H134R)-mCherry-WPRE-pA
PT-0336	rAAV-mDLx-hChR2(H134R)-mCherry-WPRE-pA
PT-0337	rAAV-mDLx-eNpHR3.0-EYFP-WPRE-pA
PT-0364	rAAV-D1-Nphr-EYFP-WPRE-pA
PT-0365	rAAV-D2-ChR2-mCherry-WPRE-pA
PT-0394	rAAV-TRPV1-hChR2(H134R)-EYFP-WPREs-pA
PT-0404	rAAV-L7-ChR2-mCherry-WPRE-pA
PT-0474	rAAV-CAG-DIO-hChR2(H134R)-EYFP-WPREs-pA
PT-0491	rAAV-hSyn-hChR2(E123T/T159C)-mCherry-WPRE-pA
PT-0515	rAAV-TRE3G-hChR2(H134R)-mCherry-WPRE-pA
PT-1429	rAAV-CaMKIIa-C1V1 (t/t)-TS-EYFP-WPRE-pA
PT-1430	rAAV-CaMKIIa-hChR2(C128S/D156A)-mCherry -WPRE-pA



DREADDs

Catalog Number	Vector Name
PT-0017	rAAV-CaMKIIa-hM4D(Gi)-mCherry-WPRE-pA
PT-0019	rAAV-hSyn-DIO-hM3D(Gq)-mCherry-WPRE-pA
PT-0020	rAAV-hSyn-DIO-hM4D(Gi)-mCherry-WPRE-pA
PT-0037	rAAV-TRE3g-DIO-hM3D(Gq)-mCherry-WPRE-pA
PT-0042	rAAV-Ef1 α -DIO-hM3D(Gq)-mCherry-WPRE-pA
PT-0043	rAAV-Ef1 α -DIO-hM4D(Gi)-mCherry-WPREs-pA
PT-0049	rAAV-CaMKIIa-hM3D(Gq)-mCherry-WPREs-pA
PT-0050	rAAV-CaMKIIa-hM4D(Gi)-mCherry-WPREs-pA
PT-0138	rAAV-TRE-tight-hM3D(Gq)-mCherry-WPRE-pA
PT-0152	rAAV-hSyn-hM3D(Gq)-EGFP-WPRE-pA
PT-0153	rAAV-hSyn-hM4D(Gi)-EGFP-WPRE-pA
PT-0159	rAAV-nEF1a-fDIO-hM4D(Gi)-EGFP-WPRE-pA
PT-0160	rAAV-nEF1a-fDIO-hM3D(Gq)-EGFP-WPRE-PA
PT-0170	rAAV-hSyn-FDIO-hM4D(Gi)-mCherry-WPRE-pA
PT-0294	rAAV-CMV-DIO-hM3D(Gq)-mCherry-WPRE-pA
PT-0300	rAAV-PTH-hM4D(Gi)-mCherry-WPRES-pA
PT-0312	rAAV-TRE-tight-hM4D(Gi)-mCherry-WPRE-pA
PT-0344	rAAV-hSyn-DIO-hM4D(Gi)-EYFP-WPRE-pA
PT-0488	rAAV-VGAT1-hM4D(Gi)-mCherry-WPRE-pA
PT-0489	rAAV-VGAT1-hM3D(Gq)-mCherry-WPRE-pA

Calcium Sensor

Catalog Number	Vector Name
PT-0046	rAAV-hSyn-CaMPARI-WPREs-pA
PT-0047	rAAV-Ef1 α -DIO-CaMPARI-WPRE-pA
PT-0048	rAAV-TRE3G-DIO--CaMPARI-WPRE-pA
PT-0090	rAAV-CaMKIIa-DIO-Gcamp6s-WPRE-pA
PT-0091	rAAV-hSyn-DIO-Gcamp6s-WPRE-pA
PT-0097	rAAV-nEf1 α -FDIO-Gcamp6s-WPRE-pA

Catalog Number	Vector Name
PT-0106	rAAV-Ef1 α -DIO-Gcamp6f-P2A-NLS-dTomato-WPRE-pA
PT-0110	rAAV-CaMKIIa-GCaMP6s-WPRE-pA
PT-0111	rAAV-CaMKIIa-Gcamp6m-WPRE-pA
PT-0116	rAAV-CaMKIIa-GCaMP6s-P2A-nls-dTomato-WPRE-pA
PT-0119	rAAV-CaMKIIa-Gcamp6f-WPRE-pA
PT-0145	rAAV-hSyn-Gcamp6s-WPRE-pA
PT-0147	rAAV-hSyn-Gcamp6f-WPRE-pA
PT-0148	rAAV-hSyn-Gcamp6m-WPRE-pA
PT-0151	rAAV-hSyn-Gcamp6f-P2A-NLS-dTomato-WPRE-pA
PT-0180	rAAV-EF1a-DIO-GCaMP6f-P2A-mCherry-WPRE-pA
PT-0194	rAAV-EF1a-DIO-GCaMP5G-WPRE-pA
PT-0195	rAAV-CaMKIIa-GCaMP5G-WPRE-pA
PT-0196	rAAV-CAG-DIO-GCaMP6s-WPRE-pA
PT-0211	rAAV-Ef1 α -DIO-K-CaMPARI-WPRE-pA
PT-0212	rAAV-Ef1 α -DIO-K-CaMPARI（V398D）-WPRE-pA
PT-0213	rAAV-Ef1 α -DIO-K-CaMPARI（W391F V398L）-WPRE-pA
PT-0273	rAAV-CMV-GCaMP6s-WPRE-pA
PT-0283	rAAV-Ef1a-DIO-GCaMP6m-WPRE-pA
PT-0286	rAAV-TRPV1-GCaMP6s-WPRE-pA
PT-0287	rAAV-Ef1α-DIO-GCaMP6f-P2A-NLS-dTomato-WPRE-pA
PT-0295	rAAV-hSyn-FDIO-GCaMP6f-WPRE-pA
PT-0342	rAAV-nEf1a-FDIO-GCaMP6f-WPRE-pA
PT-0372	rAAV-CAG-GCaMP6s-WPRE-pA
PT-1379	rAAV-hSyn-CaMPARI2-WPRE-pA
PT-1380	rAAV-EF1α-DIO-CaMPARI2-WPRE-pA
PT-1421	rAAV-CAG-FLEX-jGCaMP7s-WPRE-pA
PT-1422	rAAV-CAG-FLEX-jGCaMP7f-WPRE-pA
PT-1423	rAAV-CAG-FLEX-jGCaMP7b-WPRE-pA
PT-1424	rAAV-CAG-FLEX-jGCaMP7c-WPRE-pA
PT-1464	rAAV-hSyn-GCaMP6m-XC-WPRE-hGH polyA
PT-1593	rAAV-hSyn-jRGECO1a-WPRE-pA

Tracing Helper

Catalog Number	Vector Name
PT-0021	rAAV-Ef1 α -DIO-His-EGFP-2a-TVA-WPRE-pA
PT-0022	rAAV-hSyn-EGFP-2a-TVA-2a-RVG-WPREs-pA
PT-0023	rAAV-Ef1 α -DIO-RVG-WPRE-pA
PT-0027	rAAV-nEf1 α -DIO-mCherry-2a-TVA-2a-RVG-WPREs-pA
PT-0032	rAAV-TRE3G-DIO-EGFP-2A-TVA-WPRE-pA
PT-0038	rAAV-Ef1 α -Coff/Fon His-EGFP-2A-TVA-WPRE-pA
PT-0039	rAAV-Ef1 α -Con/Fon His-EGFP-2A-TVA-WPRE-pA
PT-0040	rAAV-Ef1 α -Con/Foff His-EGFP-2A-TVA-WPRE-pA
PT-0041	rAAV-hSyn-mCherry-2a-TVA-2a-RVG-WPREs-pA
PT-0051	rAAV-TRE3G-DIO-BFP-2A-TVA-2A-RVG-WPREs-pA
PT-0119	rAAV-CaMKIIa-Gcamp6f-WPRE-pA
PT-0145	rAAV-hSyn-Gcamp6s-WPRE-pA
PT-0147	rAAV-hSyn-Gcamp6f-WPRE-pA
PT-0148	rAAV-hSyn-Gcamp6m-WPRE-pA
PT-0151	rAAV-hSyn-Gcamp6f-P2A-NLS-dTomato-WPRE-pA
PT-0052	rAAV-TRE3G-DIO-mCherry-2A-TVA-2A-RVG-WPREs-pA
PT-0053	rAAV-Ef1 α (mini)-DIO-BFP-2A-TVA-2A-RVG-WPREs-pA
PT-0062	rAAV-Ef1 α -DIO-EGFP-2a-TVA-WPRE-pA
PT-0069	rAAV-CAG-Flex-TC66T-WPRE-pA
PT-0070	rAAV-Ef1 α -DIO-VSVG-WPRE-pA
PT-0076	rAAV-nEf1 α -FDIO-EGFP-2A-TVA-WPRE-pA
PT-0077	rAAV-nEf1 α -FDIO-RVG-WPRE-pA
PT-0078	rAAV-nEf1 α -FDIO-TVA(T66)-mCherry-WPRE-pA
PT-0086	rAAV-Ef1 α -DIO-EGFP-2a-cmTK-WPRE-pA
PT-0087	rAAV-Ef1α-DIO-EGFP-2a-TK-WPRE-pA
PT-0092	rAAV-nEf1α-FDIO-mCherry-2a-TK-WPRE-pA
PT-0095	rAAV-Ef1α-DIO-His-BFP-2a-TVA-WPRE-pA
PT-0146	rAAV-nEf1α-DIO-EGFP-2a-TVA-2a-RVG-WPREs-pA
PT-0149	rAAV-Ef1α-DIO-TVA-P2A-NLS-dTomato-WPRE-pA
PT-0155	rAAV-EF1a-DIO-oG-WPRE-pA
PT-0157	rAAV-nEf1α-FDIO-TVA-P2A-NLS-dTomato-WPRE-pA
PT-0162	rAAV-nEF1a-fDIO-TVA/EGFP-WPRE-pA
PT-0165	rAAV-EF1a-DIO-TVA/EGFP-WPRE-pA
PT-0202	rAAV-T7P-FDIO-Mcherry-2A-TK-WPRE-hGHpA

Catalog Number	Vector Name
PT-0204	rAAV-hSyn-DIO-RVG-WPRE-pA
PT-0207	rAAV-EF1a-DIO-mCherry-F2A-TVA-WPRE -pA
PT-0210	rAAV-hSyn-DIO-His-EGFP-2A-TVA-WPRE-pA
PT-0216	rAAV-hSyn-His-EGFP-2A-TVA-WPRE-pA
PT-0219	rAAV-Ef1α-DIO-mCherry-2A-tk-WPRE-pA
PT-0225	rAAV-Ef1α-DIO-BFP-2A-TK-WPRE-pA
PT-0239	rAAV-DIO-EF1a-FLEX-H2B-GFP-P2A-N2c(G)-WPRE-pA
PT-0281	rAAV-CMV-DIO-EGFP-2A-TK-WPRE-pA
PT-0282	rAAV-RK-GFP-WPRE-pA
PT-0338	rAAV-CAG-RVG-WPRE-pA
PT-0517	rAAV-CaMKIIa-RVG-WPRE-pA
PT-0518	rAAV-CaMKIIa-His-BFP-2A-TVA-WPRE-pA
PT-0519	rAAV-CAG-DIO-RVG-WPRE-pA

Gene Editing

Catalog Number	Vector Name
PT-0054	rAAV-hSyn-spCas9-NLS-flag-pA
PT-0055	rAAV-U6-sasg-TBG-saCas9-pA
PT-0201	rAAV-CMV::NLS-SaCas9-NLS-3xHA-bGHpA
PT-0234	rAAV-pMecp2-SpCas9-spA
	rAAV-CMV::NLS-SaCas9-NLS-3xHA-bGHpA;U6::BsaI-sgRNA
	rAAV-TBG::NLS-SaCas9-NLS-HA-OLLAS-bGHpA;U6::BsaI-sgRNA

Neuron Ablation

Catalog Number	Vector Name
PT-0206	rAAV-flex-taCasp3-TEVp-WPRE-pA
PT-0345	AAV-EF1a-DIO-DTA-WPRE-pA
PT-0390	rAAV-CMV-DIO-taCasp3-TEVp-WPRE-pA
PT-0436	rAAV-EF1a-fDIO-DTA-WPRE-pA
PT-0438	rAAV-EF1a-fDIO-taCasp3-GFP-WPRE-pA

CRE or FLP Recombinase

Catalog Number	Vector Name
PT-0025	rAAV-CMV-Cre-pA
PT-0026	rAAV-hSyn-EGFP-2a-TVA-2a-RVG-WPREs-pA
PT-0075	rAAV-Ef1 α -DIO-FLP-WPRE-pA
PT-0133	rAAV-phSyn1(S)-FLP-bGHpA
PT-0134	rAAV-CMV- β Globin-Cre-3flag-WPRE-pA
PT-0136	rAAV-hSyn-Cre-WPRE-pA
PT-0137	rAAV-CaMKIIa-GFP-2A-CRE-WPRE-pA
PT-0143	rAAV-Ef1 α -NLS-Cre-WPRE-pA
PT-0144	rAAV-Ef1 α -FLP-WPRE-pA
PT-0156	rAAV-hSyn-GFP-2A-CRE-WPRE-pA
PT-0179	rAAV-TH-NLS-CRE-WPRE-pA
PT-0209	rAAV-GFAP-CRE-WPRE-pA
PT-0220	rAAV-CaMKII-CRE-WPRE-pA
PT-0244	rAAV-TRE3G-CRE-WPRE-pA
PT-0248	rAAV-Tre-tight-DIO-FLP-WPRE-pA
PT-0253	rAAV-CMV-EGFP-P2A-CRE-WPRE-pA
PT-0263	rAAV-Oxytocin-CRE-WPREs-pA
PT-0275	rAAV-fPV-CRE-pA
PT-0276	rAAV-Ef1a-DIO-FLP-2A-EGFP-WPRE-pA
PT-0279	rAAV-fSST-CRE-pA
PT-0285	rAAV-Ef1a-DIO-FLP-2A-mCherry-WPRE-pA
PT-0306	rAAV-mDlX-Cre-WPRE-pA
PT-0311	rAAV-CAG-DIO-FLP-WPRE-pA
PT-0331	rAAV-GFAP-CRE-3xflag-WPRE-pA
PT-0341	rAAV-hSyn-FLP-WPRE-pA
PT-0343	rAAV-Ef1a-EGFP-P2A-CRE-WPRE-pA
PT-0346	rAAV-VGAT1-CRE-WPRE-pA
PT-0351	rAAV-CMV-Mito-dsRed-2A-CRE-WPRE-pA
PT-0368	rAAV-CMV-Cre-WPRE-pA
PT-0369	rAAV-CMV-FLP-WPRE-pA
PT-0396	rAAV-TPH2-CRE-WPRE-pA
PT-0418	rAAV-TH2-CRE-WPRE-pA
PT-0441	rAAV-GFAP104-CRE-EGFP-WPRE-pA

Control

Catalog Number	Vector Name
PT-0012	rAAV-Ef1 α -DIO-EYFP-WPRE-pA
PT-0013	rAAV-Ef1 α -DIO-mCherry-WPRE-pA
PT-0079	rAAV-nEf1 α -FDIO-EYFP-WPRE-pA
PT-0098	rAAV-Ef1 α -EYFP-WPRE-pA
PT-0099	rAAV-Ef1 α -mCherry-WPRE-pA
PT-0100	rAAV-hSyn-mCherry-WPRE-pA
PT-0101	rAAV-nEF1 α -EYFP-WPRE-pA
PT-0102	rAAV-hSyn-EYFP-WPRE-pA
PT-0104	rAAV-CAG-EYFP-WPRE-pA
PT-0105	rAAV-CAG-mCherry-WPRE-pA
PT-0107	rAAV-CaMKIIa-EYFP-WPRE-pA
PT-0108	rAAV-CaMKIIa-mCherry-WPRE-pA
PT-0112	rAAV-TRE3G-DIO-EYFP-WPRE-pA
PT-0113	rAAV-TRE3G-DIO-mCherry-WPRE-pA
PT-0114	rAAV-hSyn-DIO-EYFP-WPRE-pA
PT-0115	rAAV-hSyn-DIO-mCherry-WPRE-pA
PT-0117	rAAV-CaMKIIa-tau-EGFP-WPRE-pA
PT-0129	rAAV-CFOS-EYFP-WPRE-pA
PT-0130	rAAV-CFOS-mCherry-WPRE-pA
PT-0140	rAAV-TRE3G-EYFP-WPRE-pA
PT-0141	rAAV-TRE3G-mCherry-WPRE-pA
PT-0142	rAAV-CMV-EGFP-pA
PT-0166	rAAV-PV-mCherry-pA
PT-0168	rAAV-CAG-Dio-EGFP-WPRE-pA
PT-0169	rAAV-hSyn-Con/Fon-EYFP-WPRE-pA
PT-0184	rAAV-TH-EYFP-WPRE-pA
PT-0190	AAV-VGAT1-EYFP-WPRE-pA
PT-0191	rAAV-CMV-EGFP-3Flag-WPRE-pA
PT-0214	rAAV-D1P-GFP-WPRE-PA
PT-0215	rAAV-D2P-disRED-WPRE-PA
PT-0217	rAAV-GFAP-EYFP-WPRE-pA
PT-0241	rAAV-hSyn-EGFP-WPRE-pA
PT-0242	rAAV-nEF-EGFP-WPRE-pA
PT-0258	rAAV-EF1a-DIO-H2B-GFP-WPRE-pA

Catalog Number	Vector Name
PT–0264	rAAV–GFAP104–EYFP–WPRE–pA
PT–0432	rAAV–nEF1a –Flag–WPREs–pA
PT–0435	rAAV–EF1a–fDIO–GFP–WPRE–pA
PT–0470	rAAV–CFOS–D2EGFP–WPRE–pA
PT–0472	rAAV–hSyn–DIO–pHTomato–WPRE–pA
PT–0473	rAAV–CAG–DIO–mCherry–WPREs–pA
PT–0475	rAAV–TBG–Luciferase–WPRE–pA
PT–0487	‘rAAV–EF1a–DIO–BFP–flag–WPRE–pA
PT–0492	rAAV–Grm6– EYFP–WPRE–pA
PT–0493	rAAV–CAR– mCherry–WPRE–pA
PT–0499	rAAV–CBh–EGFP–bGHpA
PT–0500	rAAV–miniEf1a–EGFP–bGHpA
PT–0516	rAAV–TRE3G–mCherry–WPRE–pA

Activity–dependent

Catalog Number	Vector Name
PT–0032	rAAV–TRE3G–DIO–EGFP–2A–TVA–WPRE–pA
PT–0034	rAAV–TRE3G–DIO–hChR2(H134R)–YFP–WPREs–pA
PT–0035	rAAV–TRE3G–DIO–eArch3.0–YFP–WPRE–pA
PT–0036	rAAV–TRE3G–DIO–hM4D(Gi)–mCherry–WPRE–pA
PT–0037	rAAV–TRE3G–DIO–hM3D(Gq)–mCherry–WPRE–pA
PT–0048	rAAV–TRE3G–DIO–CaMPARI–WPRE–pA
PT–0112	rAAV–TRE3G–DIO–EYFP–WPRE–pA
PT–0113	rAAV–TRE3G–DIO–mCherry–WPRE–pA
PT–0129	rAAV–CFOS–EYFP–WPRE–pA
PT–0130	rAAV–CFOS–mCherry–WPRE–pA
PT–0131	rAAV–E–SARE–TTA–WPRE–pA
PT–0138	rAAV–TRE–tight–hM3D(Gq)–mCherry–WPRE–pA
PT–0139	rAAV–CFOS–tTA–WPRE–pA
PT–0140	rAAV–TRE3G–EYFP–WPRE–pA
PT–0141	rAAV–TRE3G–mCherry–WPRE–pA
PT–0244	rAAV–TRE3G–CRE–WPRE–pA
PT–0248	rAAV–Tre–tight–dio–FLP–WPRE–pA

Catalog Number	Vector Name
PT–0250	rAAV–TRE3G–OChIEF–P2A–mCherry–WPRE–pA
PT–0262	rAAV–TRE3G–PArac–dTomato–WPRE–pA
PT–0312	rAAV–Tre–tight–hM4D(Gi)–mCherry–WPRE–pA
PT–0384	rAAV–TRE3G–GFP–2A–TVA–WPREs–pA
PT–0470	rAAV–CFOS–D2EGFP–WPRE–pA
PT–0515	rAAV–TRE3G–hChR2(H134R)–mCherry–WPRE–pA
PT–0516	rAAV–TRE3G–mCherry–WPRE–pA
PT–0626	rAAV–RAM–d2TTA::TRE–EGFP–WPRE–pA
PT–0627	rAAV–RAM–d2TTA::TRE–ChR2–WPRE–pA
PT–0747	rAAV–RAM–d2TTA::TRE–ArchT–WPRE–pA

Neurotransmitter sensors

Catalog Number	Vector Name
PT–0982	rAAV–hSyn–dLight1.1
PT–1138	rAAV–CAG–dLight1.1–WPRE–hGH polyA
PT–1139	rAAV–EF1 α –DIO–dLight1.1
PT–1140	rAAV–hSyn–iGluSnFR(A184S)
PT–1141	rAAV–CAG–iGluSnFR(A184S)–WPRE–hGH polyA
PT–1142	rAAV–EF1 α –DIO–iGluSnFR(A184S)
PT–1249	rAAV–hSyn–iGABASnFR
PT–1297	rAAV–CAG–DA1m
PT–1298	rAAV–hSyn–DA1m
PT–1299	rAAV–EF1 α –DIO–DA1m
PT–1300	rAAV–CAG–GRAB–DA1h–WPRE–pA
PT–1301	rAAV–hSyn–DA1h
PT–1302	rAAV–EF1 α –DIO–DA1h
PT–1303	rAAV–CAG–GRAB–DA mut–WPRE–pA
PT–1304	rAAV–hSyn–DA1h–mut
PT–1305	rAAV–EF1 α –DIO–DA1h–mut
PT–1306	rAAV–CAG–iGABASnFR–WPRE–pA
PT–1307	rAAV–EF1 α –DIO–iGABASnFR
PT–1308	rAAV–CAG–GACh2.0–WPRE–pA
PT–1309	rAAV–hSyn–ACh2.0

Catalog Number	Vector Name
PT–1310	rAAV–EF1α–DIO–ACh2.0
PT–1335	rAAV–hSyn–ACh4.3
PT–1336	rAAV–hSyn–ACh4.3_mut
PT–1340	rAAV–hSyn–DA4.4
PT–1341	rAAV–hSyn–NE1m
PT–1342	rAAV–hSyn–NE1h
PT–1343	rAAV–hSyn–NEmut
PT–1344	rAAV–hSyn–NE3.1
PT–1348	rAAV–hSyn–Ado1.0
PT–1349	rAAV–hSyn–Ado1.0mut
PT–1350	rAAV–hSyn–ATP1.0
PT–1351	rAAV–hSyn–ATP1.0_mut
PT–1352	hSyn–ATP1.1h
PT–1353	hSyn–ATP1.1m
PT–1354	rAAV–hSyn–CCK2.0
PT–1356	rAAV–hSyn–eCB1.0
PT–1358	rAAV–GfaABC1D–Ado1.0
PT–1359	rAAV–GfaABC1D–ATP1.0
PT–1415	rAAV–hSyn–DIO–5HT2.1(mutant)
PT–1416	rAAV–hSyn–DIO–GRAB–5HT2.1–WPRE–hGH polyA
PT–1473	rAAV–CAG–5HT2.1–WPRE–hGH polyA
PT–1485	rAAV–hSyn–5HT2B–WPRE–hGH polyA
PT–1486	rAAV–hSyn–5HT6–WPRE–hGH polyA
PT–1516	rAAV–EF1α–DIO–NE1m
PT–1517	rAAV–EF1α–DIO–NE1h
PT–1518	rAAV–EF1α–DIO–NEmut
PT–1817	rAAV–hSyn–MT1.5
PT–1818	rAAV–hSyn–SST1.5
PT–1819	rAAV–hSyn–AVP1.5

4.2 Neurotropic Viruses

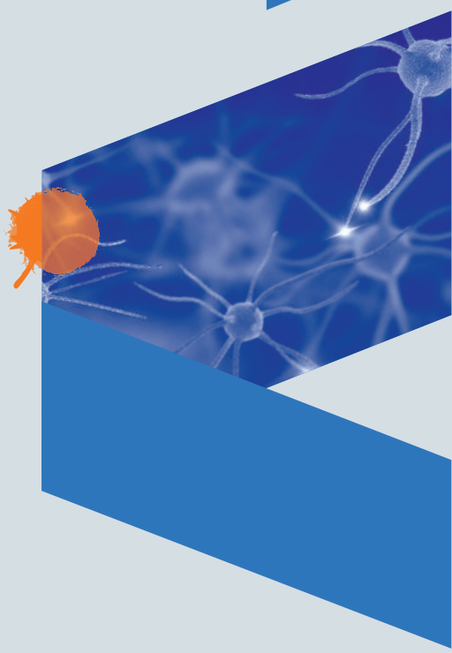
Catalog Number	Vector Name
R01001	RV–EnVA–△G–eGFP
R01002	RV–EnVA–△G–dsRed
R01003	RV–EnVA–△G–GCaMP6s–dsRed
R01004	RV–EnVA–△G–mCherry
R01005	RV–EnVA–△G–TagBFP
R01009	RV–EnVA–△G–histone–tdTomato
R01010	RV–EnVA–△G–eGFP–N–P–M–synphRFP–L
R01012	RV–EnVA–△G–ChR2–dsRed
R01013	RV–EnVA–△G–pre–mGRASP–dsRed
R01014	RV–EnVA–△G–post–mGRASP–dsRed
R02001	RV–△G–eGFP
R02002	RV–△G–dsRed
R02003	RV–△G–GCaMP6s–dsRed
R02004	RV–△G–mCherry
R02005	RV–△G–TagBFP
R02006	RV–△G–PDZ12–GFP
R02007	RV–△G–Cre–TagBFP
R02008	RV–△G–Gephriyin–mCherry
R03001	RV–N2C(G)–△G–eGFP
R03002	RV–N2C(G)–△G–dsRed
R03004	RV–N2C(G)–△G–mCherry
R03005	RV–N2C(G)–△G–TagBFP
R03006	RV–N2C(G)–△G–PDZ12–GFP
R03009	Rv–N2C(G)–△G–histone–tdTomato
R03010	RV–N2C(G)–△G–EGFP–N–P–M–synphRFP–L

Catalog Number	Vector Name
H01001	HSV–hUbC–eGFP
H01002	HSV–tdTomato
H01003	HSV–HBeGFP
H01004	HSV–HBmCherry
H02001	HSV–DIO–brainbow 3
H02002	HSV–DIO–brainbow 3.1
H02003	HSV–LSL–tdTomato–2A–TK
H03001	HSVΔTK–hUbC–tdTomato
H03002	HSVΔTK–LSL–tdTomato
H03003	HSVΔTK–CVG–brainbow

Catalog Number	Vector Name
V01001	VSV–eGFP
V01002	VSV–mCherry
V01003	VSV–BFP
V02001	VSV–EnVA–ΔG–eGFP
V02002	VSV–EnVA–ΔG–mCherry
V03001	VSV–ΔG–eGFP
V03002	VSV–ΔG–mCherry
V03003	VSV–ΔG–taueGFP
V03004	VSV–ΔG–taueGFP–ferritin

Catalog Number	Vector Name
P01001	PRV–CMV–GFP
P01002	PRV–CMV–RFP
P01003	PRV–hUbC–GFP

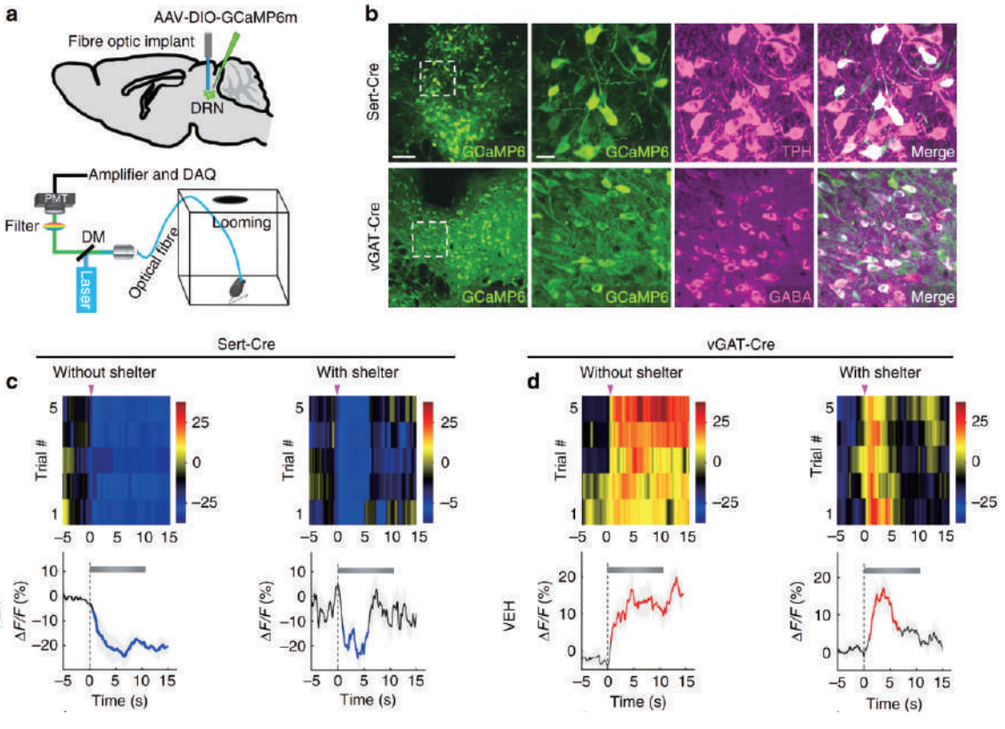
Customer Cases



AAVS & NEUROTROPIC VIRUSES
Product and Service manuals

Example 1

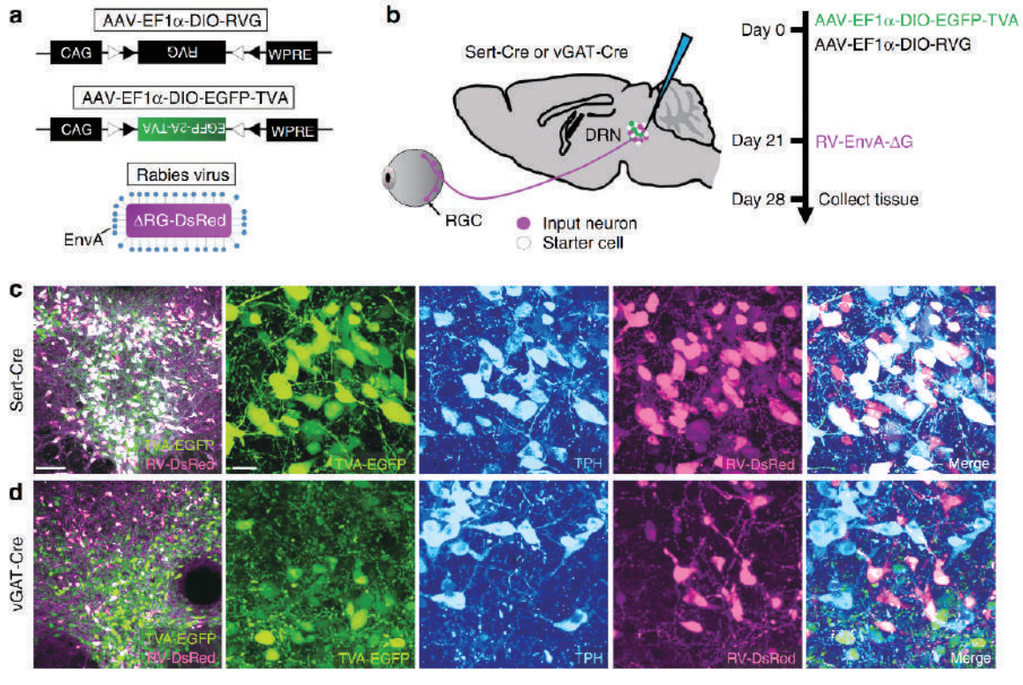
An AAV vector expressing the calcium–sensitive protein GCaMP6m under the control of cre recombinase and calcium fluctuation caused by neural activities is detected by fibre photometry. This study successfully demonstrates the responses of serotonergic and GABAergic neurons in dorsal Raphe nuclei (DRN) of a mouse to looming stimuli with or without shelter. (a) shows the AAV injection site and method of experiment. (b) presents the image of immunofluorescence, which shows the expression of AAV.



Nature Communications (2017)

Example 2

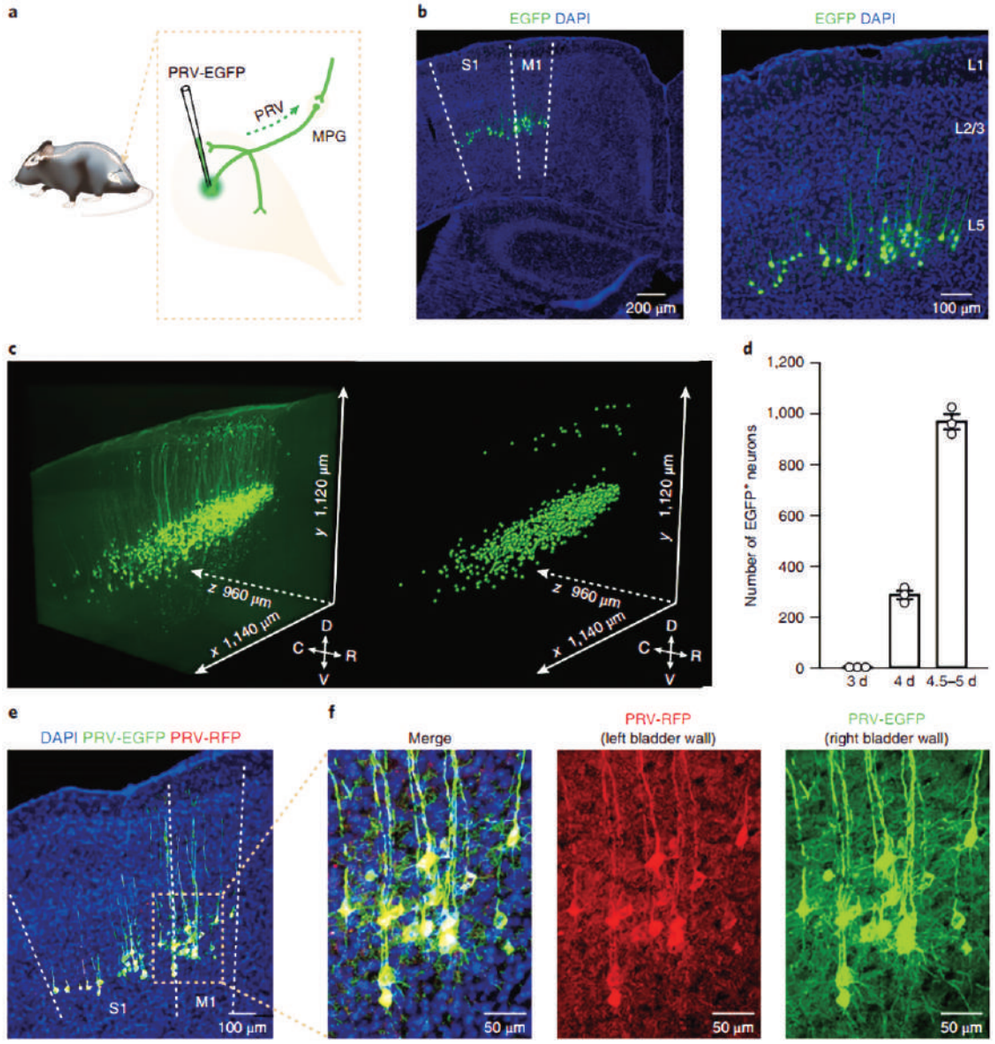
Recombinase Cre–dependent expression of avian viral receptor TVA and Rabies glycoprotein RVG from helper AAVs, which intern enable a glycoprotein gene–deleted (ΔG) rabies virus pseudotyped with the avian sarcoma leucosis virus glycoprotein EnvA (RV–EnvA–ΔG) to be packaged and spread exclusively in neurons. This study demonstrates RVs released from serotoninergic and GABAergic neurons in dorsal Raphe nuclei (DRN) trans–synaptically infect the axons projected to the DRN and propagate retrogradely to label neuron soma in the retina. (a) Schematic representation of the designed AAV. (b) AAV injection site and experimental design. (c and d) Immuno–fluorescence analysis after AAV injection, which suggests the normal expression of AAV.



Nature Communications (2017)

Example 3

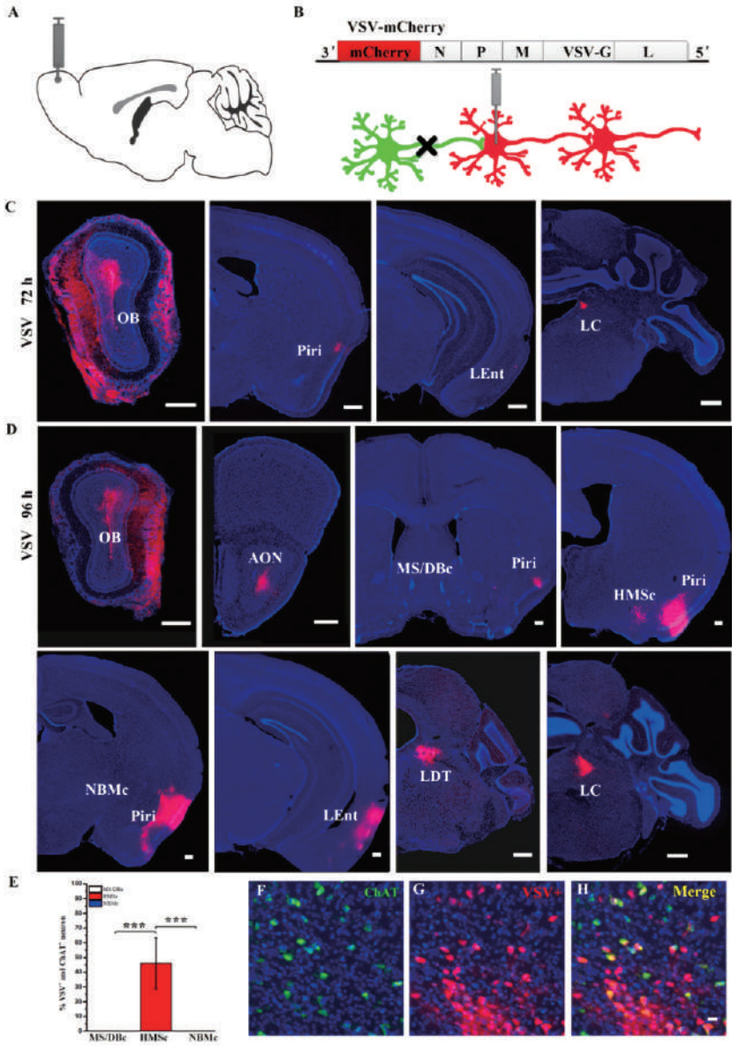
Retrograde and trans–synaptic identification of a cluster of cortical L5 pyramidal neurons after PRV expressing either EGFP or RFP injection into the right or left bladder wall, respectively (a). The two groups of PRVs propagate across the synapses between the bladder wall cells and major pelvic ganglia (MPG) neurons en route to the brain cortex (c). Bottom: cortical pyramidal neurons co–expression of EGFP and RFP in motor cortex M1 and somatosensory cortex S1 after injections of PRV injection.



Nature Neuroscience (2018)

Example 4

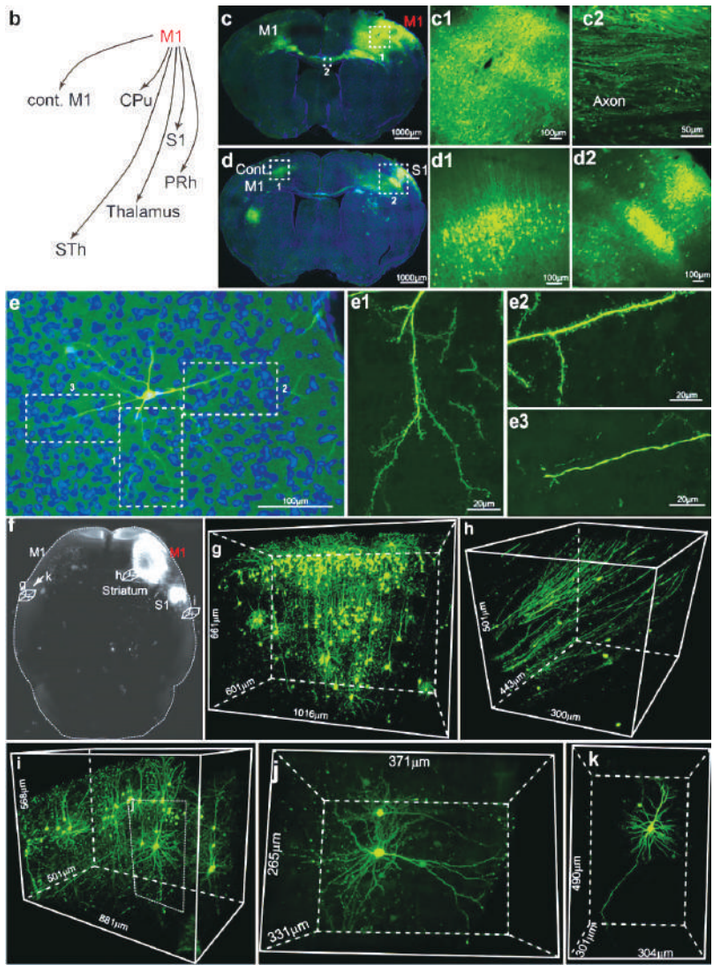
The outputs of the olfactory bulb (OB) to the BF using VSV. The tracing results showed few neurons in several olfactory relative brain regions were VSV infected by 72 h. By 96 h, more neurons were infected in multiple regions, including AON, PIR, LEnt, HMSc, LC and lateral tegmental. The results also showed that approximately 50% of the VSV infected neurons was ChAT–positive(top left).



Frontiers in Neural Circuits(2018)

Example 5

HSV is capable to spread transneuronally through the primary motor cortex (M1) pathway and efficiently label the downstream brain regions of M1 (b–d). The fluorescence intensity of HSV is sufficient to clearly label and visualize the neuron morphological details, including the dendrites, spines and axonal fibers (e–e3). The bright labeling makes HSV compatible with the fluorescence Micro–Optical Sectioning Tomography (f–k).



Molecular Neurodegeneration (2017)

Representative Literatrue of Client

AAVS & NEUROTROPIC VIRUSES
Product and Service manuals

Titel	Journal	BrainVTA provide virus tools
The paraventricular thalamus is a critical thalamic area for wakefulness	Science	AAV
A corticopontine circuit for initiation of urination	Nature Neuroscience	VSV/PRV
Serotonin receptor 2c–expressing cells in the ventral CA1 control attention via innervation of the Edinger–Westphal nucleus	Nature Neuroscience	AAV
GABA and glutamate neurons in the VTA regulate sleep and wakefulness	Nature Neuroscience	AAV
A novel cortico–intrathalamic circuit for flight behavior	Nature Neuroscience	RV/AAV
A whole–brain map of long–range inputs to GABAergic interneurons in the mouse medial prefrontal cortex	Nature Neuroscience	RV/AAV
Anterior cingulate cortex dysfunction underlies social deficits in Shank3 mutant mice	Nature Neuroscience	SFV
A neural circuit for comorbid depressive symptoms in chronic pain	Nature Neuroscience	RV/AAV
Laterodorsal tegmentum interneuron subtypes oppositely regulate olfactory cue–induced innate fear	Nature Neuroscience	RV/AAV
Processing of visually evoked innate fear by a non–canonical thalamic pathway	Nature Communications	PRV/RV/AAV
Cannabinoid CB1 receptors in the amy–gdalar cholecystokinin glutamatergic afferents to nucleus accumbens modulate depressive–like behavior	Nature Medicine	RV/AAV
A VTA GABAergic neural circuit mediates visually evoked innate defensive responses	Neuron	RV/AAV
A novel mechanism of memory loss in Alzheimer's disease mice via the degeneration of entorhinal–CA1 synapses	Molecular Psychiatry	RV/AAV
A retinoraphe projection regulates serotonergic activity and looming–evoked defensive behaviour	Nature Communications	RV/AAV
A Visual Circuit Related to Habenula Underlies the Antidepressive Effects of Light Therapy	Neuron	RV/AAV

Titel	Journal	BrainVTA provide virus tools
A Disinhibitory Microcircuit Mediates Conditioned Social Fear in the Prefrontal Cortex	Neuron	AAV
Rostral and Caudal Ventral Tegmental Area GABAergic Inputs to Different Dorsal Raphe Neurons Participate in Opioid Dependence	Neuron	RV/AAV
A Central Catecholaminergic Circuit Con–trols Blood Glucose Levels during Stress	Neuron	RV/AAV
Depolarized GABAergic Signaling in Su–bicular Microcircuits Mediates Generalized Seizure in Temporal Lobe Epilepsy	Neuron	RV/AAV
Nucleus accumbens controls wake–fulness by a subpopulation of neurons expressing dopamine D1 receptors	Nature Communication	RV/AAV
Locus coeruleus–CA1 projections are involved in chronic depressive stress–induced hippocampal vulnerability to transient global ischaemia	Nature Communication	AAV
Impairments of spatial memory in an Alzheimer's disease model via degeneration of hippocampal cholinergic synapses	Nature Communication	RV/AAV
Autism–associated Dyrk1a truncation mutants impair neuronal dendritic and spine growth and interfere with postnatal cortical development	Molecular Psychiatry	Lentivirus
Dopamine D1 and D2 Receptors Differenti–ally Regulate Rac1 and Cdc42 Signaling in the Nucleus Accumbens to Modulate Behavioral and Structural Plasticity After Repeated Methamphetamine Treatment	Biological Psychiatry	AAV
Stress Accelerates Defensive Responses to Looming in Mice and Involves a Locus Coeruleus–Superior Colliculus Projection	Current Biology	AAV
Cholecystokinin release triggered by NMDA receptors produces LTP and sound–sound associative memory	PNAS	AAV
Basolateral amygdala input to the medial prefrontal cortex controls obsessive–compulsive disorder–like checking behavior	PNAS	RV/AAV
Somatostatin Neurons in the Basal Fore–brain Promote High–Calorie Food Intake	Cell Reports	RV/AAV
Neuron–Specific Menin Deletion Leads to Synaptic Dysfunction and Cognitive Impairment by Modulating p35 Expression	Cell Reports	AAV

Titel	Journal	BrainVTA provide virus tools
A Central Amygdala–Substantia Innominata Neural Circuitry Encodes Aversive Reinforcement Signals	Cell Reports	RV/AAV
Inhibition of Hsp70 Suppresses Neuronal Hyperexcitability and Attenuates Epilepsy by Enhancing A–Type Potassium Current	Cell Reports	AAV
Activation of the dopaminergic pathway from VTA to the medial olfactory tubercle generates odor–preference and reward	eLife	RV/AAV/CAV
Increased anxiety and decreased sociability induced by paternal deprivation involve the PVN–PrL OTergic pathway	eLife	AAV
Distinct Anatomical Connectivity Patterns Differentiate Subdivisions of the Nonlemniscal Auditory Thalamus in Mice	Cerebral Cortex	RV/AAV
Neuronal Organization in the Inferior Colliculus Revisited with Cell–Type–Dependent Monosynaptic Tracing	The Journal of Neuroscience	RV/AAV
Corticosterone signaling and a lateral habenula–ventral tegmental area circuit modulate compulsive self–injurious behavior in a rat model	The Journal of Neuroscience	PRV/HSV
Lateral Entorhinal Modulation of Piriform Cortical Activity and Fine Odor Discrimination	The Journal of Neuroscience	RV
Alpha–synuclein overexpression in the olfactory bulb initiates prodromal symptoms and pathology of Parkinson's disease	Translational Neurodegeneration	RV/AAV
CDK5–mediated phosphorylation of Sirt2 contributes to depressive–like behavior induced by social defeat stress	BBA–Molecular Basis of Disease	AAV
Optogenetic Long–Term Depression Induction in the PVT–CeL Circuitry Mediates Decreased Fear Memory	Molecular Neurobiology	AAV

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