



Recent References on the Administration of Nucleic Acids
Using ALZET® Osmotic Pumps

DNA

Q8486: O. Gawrys, *et al.* Polyprenol-Based Lipofecting Agents for In Vivo Delivery of Therapeutic DNA to Treat Hypertensive Rats. *Biochemical Genetics* 2021;59(1):62-82

Agents: vascular endothelial growth factor, DNA **Vehicle:** Glucose; **Route:** CSF/CNS (medula); **Species:** Rat; **Pump:** 2001; **Duration:** 1 week;

ALZET Comments: 5% glucose used; Controls received mp w/ vehicle; animal info (Male, adult spontaneously hypertensive rats, 16 weeks old, 299 +- 4); Blood pressure measured via telemetry transmitters; vascular endothelial growth factor aka VEGF-A; ALZET brain infusion kit 2 used; gene therapy;

Q7410: H. Cao, *et al.* Urinary mitochondrial DNA: A potential early biomarker of diabetic nephropathy. *Diabetes/Metabolism Research and Reviews* 2019;35(4):e3131

Agents: Mitochondrial DNA **Vehicle:** Not Stated; **Route:** SC; **Species:** Mice; **Pump:** Not Stated; **Duration:** 28 Days;

ALZET Comments: Dose (30 ug/kg/day); animal info (Male, CD-1, 18-22 g); diabetes;

Q7266: K. Taguchi, *et al.* RAGE-aptamer attenuates deoxycorticosterone acetate/salt-induced renal injury in mice. *Sci Rep* 2018;8(1):2686

Agents: DNA aptamer (RAGE) **Vehicle:** Not Stated; **Route:** SC; **Species:** Mice; **Pump:** 2006; **Duration:** 21 days;

ALZET Comments: Dose (2×10^{-4} ug/day); Controls received mp w/ vehicle; animal info (8 week old, male, C57BL/6J); RAGE-apt is a DNA aptamer against the advanced glycation end products receptor; gene therapy;

Q5501: X. Yang, *et al.* Selection and antitumor activity of anti-Bcl-2 DNAzymes. *Biochemical and Biophysical Research Communications* 2016;479(3):544-550

Agents: DNAzyme DT912 **Vehicle:** Saline; **Route:** IP; **Species:** Mice (nude); **Pump:** 1002; **Duration:** 14 days;

ALZET Comments: animal info (female, BLAB/c, 4-6 weeks old); cancer (Prostate PC3); "we here employed an osmotic pump as a delivery vehicle for DNAzymes via the abdominal route and demonstrated a viable means for efficient DNAzyme delivery" pg 548; Dose (12.5 mg/kg/day);

Q4843: B. Koenig, *et al.* Long term study of deoxyribozyme administration to XT-1 mRNA promotes corticospinal tract regeneration and improves behavioral outcome after spinal cord injury. *Experimental Neurology* 2016;276(51-58)

Agents: DNAXT-1as **Vehicle:** Not Stated; **Route:** CSF/CNS (intrathecal); **Species:** Rat; **Pump:** 1007D; **Duration:** 2 weeks;

ALZET Comments: Controls received mp w/ control enzyme or PBS; animal info (female, Wistar, 200-250g); pumps replaced every week; pumps replaced every week; spinal cord injury; post op. care (Baytril; manual bladder emptying; Rimadyl); behavioral testing (horizontal ladder task); used self-made intrathecal catheter from 32-gauge polyurethane; enzyme inhibitor (DNA enzyme of mRNA of xylosyltransferase-1);

Q5375: C. Huang, *et al.* Thioredoxin interacting protein (TXNIP) regulates tubular autophagy and mitophagy in diabetic nephropathy through the mTOR signaling pathway. *Sci Rep* 2016;6(29196)

Agents: DNAzymes, Scrambled or TXNIP **Vehicle:** Saline; **Route:** SC; **Species:** Rat; **Pump:** 2006; **Duration:** 12 weeks;

ALZET Comments: Controls received mp w/ vehicle; animal info (6-week old, female heterozygous rats); functionality of mp verified by blood glucose levels (AMES glucometer); pumps replaced every 6 weeks; diabetes; Inhibition of TXNIP using DNA-zyme improves autophagy and mitophagy in diabetic nephropathy; Inhibition of TXNIP using DNA-zyme improves autophagy and mitophagy in diabetic nephropathy; Resultant plasma level (pg. 10);

Q4605: C. Y. R. Tan, *et al.* Thioredoxin-Interacting Protein: A Potential Therapeutic Target for Treatment of Progressive Fibrosis in Diabetic Nephropathy. *NEPHRON* 2015;129(109-127)

Agents: Thioredoxin-interacting protein DNAzyme **Vehicle:** Not Stated; **Route:** SC; **Species:** Rat; **Pump:** 2006; **Duration:** 12 weeks;

ALZET Comments: Controls received mp w/ scrambled TXNIP DNAzyme; animal info (female, heterozygous (mRen-2)27, 6 weeks old); pumps replaced every 6 weeks; cardiovascular; diabetes; Thioredoxin-interacting protein aka TXNIP;



Q4242: A. L. Mathes, *et al.* CpGB DNA activates dermal macrophages and specifically recruits inflammatory monocytes into the skin. *Experimental Dermatology* 2015;24(133-139)

Agents: CpGB DNA **Vehicle:** Not Stated; **Route:** SC; **Species:** Mice; **Pump:** Not Stated; **Duration:** 7 days; 28 days;
ALZET Comments: Controls received mp w/ PBS; animal info (male, C57BL6 or TNFa -/- or IFNg -/- or CXCR3 -/- or CCR5 -/- or CCL2 -/- or TLR9 -/-); functionality of mp verified by immunofluorescence at pump outlet; gene therapy; immunology; CpGB DNA is a TLR9 ligand;

Q4752: X. H. Yu, *et al.* Chemosensitization of Solid Tumors by Inhibition of Bcl-xL Expression Using DNAzyme. *ONCOTARGET* 2014;5(9039-9048)

Agents: DNAzyme oligonucleotide **Vehicle:** Saline; **Route:** IP; **Species:** Mice (nude); **Pump:** 1002; **Duration:** 14 days;
ALZET Comments: Animal info (female, Balb/C, 4 weeks old); functionality of mp verified by plasma levels and residual volumes; cancer (prostate adenocarcinoma); "Analysis showed that the DNAzyme was stable over the treatment period and the Alzet osmotic pump provided a consistent delivery of the DNAzyme in vivo " pg 9044;

Q5673: R. P. Kotipatruni, *et al.* Development of plasmid-lipid complexes for direct intratumoral injection. *Methods Mol Biol* 2014;1139(467-76)

Agents: Plasmid DNA-lipid complex **Vehicle:** Not Stated; **Route:** Not Stated; **Species:** Mice (SCID, CD-1); **Pump:** Not Stated; **Duration:** Not Stated;
ALZET Comments: Therapeutic indication (Gene therapy); Brain coordinates: 3 mm lateral and 2 mm caudal to bregma;

Q4773: A. S. b. Alexander Ewe a, Sabine Barnert c, Rolf Schubert c, Achim Temmed, Udo Bakowsky e., *et al.* Storage stability of optimal liposome–polyethylenimine complexes (lipopolyplexes) for DNA or siRNA delivery. *Acta Biomaterialia* 2014;10:2663-2673

Agents: DNA, RNA, small interfering **Vehicle:** Lipopolyplexes, (PEI F25-LMW, DPPC); **Route:** SC; **Species:** Not Stated; **Pump:** Not Stated; **Duration:** 6+ weeks;
ALZET Comments: cancer (mamma carcinoma, prostate carcinoma, colon carcinoma); PEI F25-LMW aka Polyethylenimine F-25 Low molecular weight; DPPC aka dipalmitoyl-phosphatidyl-choline

Q0376: S. C. Tauber, *et al.* Stimulation of Toll-Like Receptor 9 by Chronic Intraventricular Unmethylated Cytosine-Guanine DNA Infusion Causes Neuroinflammation and Impaired Spatial Memory. *Journal of Neuropathology and Experimental Neurology* 2009;68(10):1116-1124

Agents: DNA, cytosine-guanine **Vehicle:** Not Stated; **Route:** CSF/CNS; **Species:** Mice; **Pump:** 2004; **Duration:** 4 weeks;
ALZET Comments: Controls received mp w/saline; animal info (male, C57BL/6, TLR9-deficient); ALZET brain infusion kit 2 used; stress/adverse reaction: (see pg. 1117) "One C57BL/6 mouse died because of complications during the operation, and 1 TLR9-deficient mouse died for unknown reasons 2 weeks after implantation of the pump".

P9079: A. Hurtado, *et al.* Deoxyribozyme-mediated knockdown of xylosyltransferase-1 mRNA promotes axon growth in the adult rat spinal cord. *Brain* 2008;131(12):2596-2605

Agents: DNAXTas **Vehicle:** Not Stated; **Route:** CSF/CNS (intrathecal); **Species:** Rat; **Pump:** 1007D; **Duration:** 14 days;
ALZET Comments: Controls received mp w/ control deoxyribozyme or mp w/ saline; pumps replaced after 7 days; post op. care (gentamicin); animal info (female, Sprague Dawley, 200-225 g.); control also known as DNAXTmb; schematic w/ pump on fig. 1; custom cannula used

P6539: C. P. Locher, *et al.* Evaluation of genetic immunization adjuvants to improve the effectiveness of a human immunodeficiency virus type 2 (HIV-2) envelope DNA vaccine. *DNA and Cell Biology* 2004;23(2):107-110

Agents: DNA, plasmid **Vehicle:** Gene, HIV-2 gp140; **Route:** SC; **Species:** Mice; **Pump:** 2004; **Duration:** 28 days;
ALZET Comments: 28 day stability verified by agarose gel electrophoresis; immunology; different methods of immunization used; genetic immunization; DNA did not adhere to the osmotic minipump after 1 month since DNA concentration remained stable and intact



P5966: A. Roguin, *et al.* Restoration of blood flow by using continuous perimuscular infiltration of plasmid DNA encoding subterranean mole rat *Spalax ehrenbergi* VEGF. PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA 2003;100(8):4644-4648

Agents: DNA, naked; vascular endothelial growth factor, DNA **Vehicle:** Water; **Route:** Intramuscular (left quadriceps muscle); **Species:** Mice; **Pump:** 2001; **Duration:** 7 days;

ALZET Comments: Controls received mp w/ saline; tissue perfusion (quadriceps muscle); gene therapy; fenestrated catheter; pump implanted IP; "we have shown that when using plasmid DNA, continuous administration is superior to multiple simultaneous IM injections." (p. 4647)

Q8741: J. A. A. Spijkers, *et al.* Foetal rise in hepatic enzymes follows decline in c-met and hepatocyte growth factor expression. Journal of Hepatology 2001;34

(Agents: Embryonic DNA **Vehicle:** Not Stated; **Route:** SC; **Species:** Rat; **Pump:** 2001D; **Duration:** Not Stated;

ALZET Comments: Dose (80 ug/hr/day); animal info (Wistar, Female, Pregnant); Embryonic DNA aka BrdU; dependence;

P4781: D. T. Efron, *et al.* A novel method of studying wound healing. Journal of Surgical Research 2001;98(16-20

Agents: Methylisothiourea, S-; adenovirus vector; gene, mouse iNOS cDNA sequence **Vehicle:** Saline; Dye, methylene blue; Dye, India black ink; PBS; **Route:** SC (wound healing site); **Species:** Rat; **Pump:** 2001; 2ML1; **Duration:** 7 days;

ALZET Comments: Controls received mp w/ saline; functionality of mp verified by dye infusion; gene therapy; enzyme inhibitor; methylisothiourea, S- is an inducible nitric oxide synthase inhibitor (iNOS inhibitor); wound healing; SC-implanted pumps infused 2 hydroxyproline sponges via catheter; initial studies used 2ML1 pumps to infuse dyes in order to assess the feasibility of direct infusion with pumps; iNOS inhibitor infusion was with 2001 pumps; pumps were designed to infuse directly into SC implanted polyvinyl sponges at the wound site; Adenovirus vector was dissolved in PBS; iNOS inhibitor was delivered in saline; diagram of pump-catheter assembly and location (p. 18); "Dye infusion demonstrated both grossly and microscopically excellent delivery of the infusate to wound sponges" (p. 18);

RNA (2007-Present)

Q8701: S. Bhattarai, *et al.* Modulation of Brain Pathology by Enhancer RNAs in Cerebral Ischemia. Mol Neurobiol 2021;58(4):1482-1490

Agents: Anti-eRNA oligos **Vehicle:** CSF/ artificial; **Route:** CNS/CSF; **Species:** Mice; **Pump:** 1003D; **Duration:** 3 days;

ALZET Comments: Dose (8.3 pmole/ul); animal info (3 months old, 20-30 g, C57BL/6N); antisense (eRNA_06347: 5'-GATTGGGAATTGCTAG-3'; eRNA_093384: 5'-GGAAGCAGGTGAACAG-3'); ALZET brain infusion kit 3 used; ischemia (Cerebral);

R0396: Y. Li, *et al.* Strategies and materials of "SMART" non-viral vectors: Overcoming the barriers for brain gene therapy. Nano Today 2020;35

(Agents: siRNA **Vehicle:** Not Stated; **Route:** CSF/CNS (intratumoral); **Species:** Mice; **Pump:** 1002; **Duration:** 14 days;

ALZET Comments: Dose: (350 ug/kg; neurodegenerative (brain diseases); gene therapy;

Q8870: D. S. Lee, *et al.* PDI-Mediated Reduction of Disulfide Bond on PSD95 Increases Spontaneous Seizure Activity by Regulating NR2A-PSD95 Interaction in Epileptic Rats Independent of S-Nitrosylation. International Journal of Molecular Sciences 2020;21(6):

Agents: RNA, small interfering (PDI) **Vehicle:** Not Stated; **Route:** CSF/CNS (right lateral ventricle); **Species:** Rat; **Pump:** 1007D; **Duration:** 7 days;

ALZET Comments: Animal info (Male Sprague Dawley rats, 7 weeks old); ALZET brain infusion kit 1 used; Brain coordinates (1 mm posterior; 1.5 mm lateral; 3.5 mm depth from bregma); neurodegenerative (Epilepsy);

Q8576: J. E. Kim, *et al.* PLPP/CIN-mediated Mdm2 dephosphorylation increases seizure susceptibility via abrogating PSD95 ubiquitination. Exp Neurol 2020;331(113383

Agents: siRNA, Mdm2 **Vehicle:** Not stated; **Route:** CNS/CSF (lateral cerebral ventricle); **Species:** Mice; **Pump:** 1007D; **Duration:** 1 day;

ALZET Comments: Dose (20 µM); animal info (PLPP/CIN-/- mice); ALZET brain infusion kit 3 used; Brain coordinates (2.0 mm depth from bregma); dependence;



Q8593: Y. Kamata, *et al.* Paclitaxel Induces Upregulation of Transient Receptor Potential Vanilloid 1 Expression in the Rat Spinal Cord. *International Journal of Molecular Sciences* 2020;21(12):

Agents: siRNA; TRPV1 **Vehicle:** CSF, artificial; **Route:** CSF/CNS (intrathecal); **Species:** Rat; **Pump:** Not stated; **Duration:** 3 days; **ALZET Comments:** Dose (0.5 nmol/ μ L/h); Controls received mp w/ vehicle; animal info (Male Wistar rats weighing 250 to 320 g); behavioral testing (Mechanical or Thermal Stimulation); dependence;

Q8400: C. M. Campolim, *et al.* Short-term exposure to air pollution (PM2.5) induces hypothalamic inflammation, and long-term leads to leptin resistance and obesity via Tlr4/Ikbke in mice. *Scientific Reports* 2020;10(1):10160

Agents: RNA, small interfering **Vehicle:** Not stated; **Route:** CNS/CSF (lateral ventricle); **Species:** Mice; **Pump:** 1007D; **Duration:** 5 days;

ALZET Comments: small interfering RNA aka si-RNA; Brain coordinates (AP -0.5 mm; L -1.3 mm; DV -2.2 mm); Cannula placement verified via angiotensin II and measurement of water intake; toxicology;

Q8762: F. Han, *et al.* Dopamine D2 receptor modulates Wnt expression and control of cell proliferation. *Scientific Reports* 2019;9(1):16861

Agents: RNA, small interfering (Dopamine D2 Receptor) **Vehicle:** Not Stated; **Route:** SC; **Species:** Mice; **Pump:** Not Stated; **Duration:** 28 days;

ALZET Comments: Dose (3 ug/day); animal info (C57BL/6, Male, 20 g, 8-10 weeks old); Dopamine D2 Receptor siRNA aka D2R Receptor ; ischemia (Renal);

Q7456: C. De Miguel, *et al.* Uncoupling Protein 2 Increases Blood Pressure in DJ -1 Knockout Mice. *J Am Heart Assoc* 2019;8(9):e011856

Agents: DJ-1-specific siRNA **Vehicle:** Not Stated; **Route:** SC; **Species:** Mice; **Pump:** Not Stated; **Duration:** 7 days;

ALZET Comments: Dose (3 ug/day); animal info (Male, C57Bl/6J,); enzyme inhibitor (DJ-1 siRNA inhibits renal ROS production); cyanoacrylate adhesive; cardiovascular;

R0380: A. Clavreul, *et al.* Nanocarriers and nonviral methods for delivering antiangiogenic factors for glioblastoma therapy: the story so far. *Int J Nanomedicine* 2019;14(2497-2513

Agents: Bevacizumab; RNA, small interfering (anti-HIF-1 α /PEG); Immunotoxin, DTAT/DTATEGF; Endostatin; 17-ODYA; Miconazole; **Vehicle:** Not Stated; **Route:** CSF/CNS (intratumoral), IV; **Species:** Mice; **Pump:** Not Stated; **Duration:** Not Stated;

ALZET Comments: enzyme inhibitor (CYP epoxygenase); cancer (glioblastoma); This review describes methods (including convection-enhanced delivery devices, implantable polymer devices, nanocarriers, and cellular vehicles) to deliver antiangiogenic factors to intracranial tumors.

Q6981: H. Chao, *et al.* Cardiolipin-dependent mitophagy guides outcome after traumatic brain injury. *J Neurosci* 2019;

Agents: RNA, small interfering (cardiolipin synthase); RNA, small interfering (Phospholipid scramblase-3) **Vehicle:** Not Stated;

Route: CSF/CNS; **Species:** Rat; **Pump:** 1003D; **Duration:** 72 hours;

ALZET Comments: Dose (30 nmol); animal info (17-day-old male Sprague-Dawley rats); Brain coordinates (-0.8 mm posterior to bregma, -1.5 mm lateral to midline, and -4.6 mm ventral to the skull surface); Traumatic brain injury;

Q7264: C. Rivat, *et al.* Inhibition of neuronal FLT3 receptor tyrosine kinase alleviates peripheral neuropathic pain in mice. *Nat Commun* 2018;9(1):1042

Agents: RNA, small interfering (Flt3, scrambled) **Vehicle:** Not Stated; **Route:** CSF/CNS(Intrathecal); **Species:** Mice; **Pump:** 1002; **Duration:** 6 days;

ALZET Comments: Dose (12.53 ng/ml); animal info (C57BL/6 naive mice, Flt3KO mice 25-30 g.); behavioral testing (reflexive tail flick); spinal cord injury; stress/adverse reaction: (see pg. 10);

Q8810: R. Prince, *et al.* Targeting anticoagulant protein S to improve hemostasis in hemophilia. *Thrombosis and Hemostasis* 2018;131(**Agents:** siRNA ; control siRNA **Vehicle:** Not Stated; **Route:** SC; **Species:** Mice; **Pump:** 2001; **Duration:** Not Stated;

ALZET Comments: Dose (1 mg/kg/day); animal info (10 weeks old, C57BL/6J); siRNA aka s72206, control siRNA aka 4459405; cardiovascular;



Q8096: W. Liu, *et al.* Oxidative stress-elicited YY1 potentiates antioxidative response via enhancement of NRF2-driven transcriptional activity: A potential neuronal defensive mechanism against ischemia/reperfusion cerebral injury. *Biomed Pharmacother* 2018;108(698-706

Agents: YY1-siRNA **Vehicle:** Not stated; **Route:** CSF/CNS; **Species:** Mice; **Pump:** Not stated; **Duration:** 4 days; **ALZET Comments:** animal info (Male, C57B/6, 25-35 g); Brain coordinates (mediolateral=1.0 mm, anteroposterior=0.2 mm; dorsoventral=3.1 mm); ischemia (Cerebral);

Q8078: F. Li, *et al.* Loss of renal SNX5 results in impaired IDE activity and insulin resistance in mice. *Diabetologia* 2018;61(3):727-737

Agents: SNX5-specific or non silencing snRNA **Vehicle:** Not stated; **Route:** SC; **Species:** Mice; **Pump:** 1007D; **Duration:** 7 days; **ALZET Comments:** Dose (3 ug/day); animal info (Male, C57BL/6J, 1 year old); SNX5-specific aka sorting nexin 5; gene therapy;

Q7151: D. S. Lee, *et al.* PDI-mediated S-nitrosylation of DRP1 facilitates DRP1-S616 phosphorylation and mitochondrial fission in CA1 neurons. *Cell Death & Disease* 2018;9(9):869

Agents: RNA, small interfering (protein disulfide isomerase), L-NAME **Vehicle:** Saline; **Route:** CSF/CNS (right lateral ventricle); **Species:** Rats; **Pump:** 1007D; **Duration:** Not Stated; **ALZET Comments:** Dose (15 µg/µl L-NAME); animal info (7-week-old male Sprague-Dawley rats); Nw-nitro-L-arginine methyl ester hydrochloride aka L-name; enzyme inhibitor (protein disulfide isomerase); ALZET brain infusion kit 1 used; Brain coordinates (right lateral ventricle, 1mm posterior; 1.5 mm lateral; 3.5 mm depth from bregma);

Q7191: J. E. Kim, *et al.* P2RX7-MAPK1/2-SP1 axis inhibits MTOR independent HSPB1-mediated astroglial autophagy. *Cell Death & Disease* 2018;9(5):546

Agents: BzATP, OxATP, A740003, Compound C, 3-chloroacetyl indole, Mithramycin A, U0126, RNA, small interfering (Heat shock protein B1) **Vehicle:** Not Stated; **Route:** CSF/CNS (lateral ventricle); **Species:** Mice; **Pump:** 1007D; **Duration:** 7 days; **ALZET Comments:** Dose: BzATP (5 mM), OxATP (5 mM) A740003 (10 µM), Comp C (100 nM), 3CAI (25 µM), MMA (25 µM), U0126 (25 µM); animal info (Male, C57BL/6J, 25-30 g, 60-90 days old); BzATP is a P2RX7 agonist, OxATP and A740003 are P2RX7 antagonists; enzyme inhibitor (mitogen-activated protein kinase 1/2); ALZET brain infusion kit 3 used; Brain coordinates (lateral cerebral ventricle 1.0mm lateral to bregma); dependence; no stress: doses were well tolerated, and no signs of neurotoxicity (hind-limb paralysis, vocalization, food intake, or neuroanatomical damage) were observed;

Q6927: A. R. Jeon, *et al.* PDI Knockdown Inhibits Seizure Activity in Acute Seizure and Chronic Epilepsy Rat Models via S-Nitrosylation-Independent Thiolation on NMDA Receptor. *Front Cell Neurosci* 2018;12(438

Agents: RNA, small interfering; L-NAME; PACMA31 **Vehicle:** Saline; **Route:** CSF/CNS (Right lateral ventricle); **Species:** Rat; **Pump:** 1007D; **Duration:** 1 week; **ALZET Comments:** Controls received mp w/ vehicle; animal info (7 week old male Sprague-Dawley rats); enzyme inhibitor (PACMA31 is a selective PDI inhibitor); ALZET brain infusion kit 1 used; Brain coordinates (1 mm posterior; 1.5 mm lateral; 3.5 mm depth from bregma); Therapeutic indication (seizure);

Q7886: X. Du, *et al.* Regeneration of Cochlear Hair Cells and Hearing Recovery through Hes1 Modulation with siRNA Nanoparticles in Adult Guinea Pigs. *Mol Ther* 2018;26(5):1313-1326

Agents: siHes1, scRNA NPs **Vehicle:** Not Stated; **Route:** CSF/CNS; **Species:** Guinea Pig; **Pump:** 2001; **Duration:** 1 day; **ALZET Comments:** Dose (1 uL/hr); animal info (200-250 g, Female); siHes1 aka Hes1 siRNA; bilateral cannula used; cyanoacrylate adhesive; dependence;

Q7115: S. Y. Cheon, *et al.* Apoptosis Signal-regulating Kinase 1 Silencing on Astroglial Inflammasomes in an Experimental Model of Ischemic Stroke. *Neuroscience* 2018;390(218-230

Agents: RNA, small interfering (ASK1) **Vehicle:** siPORTNeoFX Transfection agent; **Route:** CSF/CNS (left lateral ventricle); **Species:** Mice; **Pump:** 1003D; **Duration:** 3 days; **ALZET Comments:** Dose (1 IL/h/ day); animal info (Adult,C57BL/6, male); enzyme inhibitor (apoptosis signal-regulating kinase 1); ALZET brain infusion kit used; ALZET brain infusion kit used; ischemia (Cerebral);



Q7089: F. X. Blaudin de The, *et al.* Engrailed homeoprotein blocks degeneration in adult dopaminergic neurons through LINE-1 repression. *EMBO J* 2018;37(15):

Agents: Colominic acid, RNA, small interfering (anti-Orf2p), cell-permeable peptide Penetratin-coupled siRNA **Vehicle:** Saline; **Route:** CSF/CNS; **Species:** Mice; **Pump:** 1003D; **Duration:** 3 days;

ALZET Comments: 0.9% sodium chloride used; Dose (1.5 ug/ul- colomic acid, 5 uM- En 1/2); Controls received mp w/ vehicle; animal info (male, En1-het mice,); Brain coordinates (-3.8 mm dorso/ventral); neurodegenerative (dopaminergic neurons);

Q6552: J. Zhang, *et al.* MiR-146a promotes remyelination in a cuprizone model of demyelinating injury. *Neuroscience* 2017;348(252-263

Agents: RNA, micro 146a **Vehicle:** Not Stated; **Route:** CSF/CNS (corpus callosum); **Species:** Mice; **Pump:** 1007D; **Duration:** 7 days;

ALZET Comments: animal info (8-10 week old male C57BL/6 mice); enzyme inhibitor (interleukin-1 receptor-associated kinase 1); Brain coordinates (0 mm to the bregma, 1 mm bilateral to the midline, 1.8 mm depth from the surface of the cortex);

Q5934: D. Yu, *et al.* Multiplexed RNAi therapy against brain tumor-initiating cells via lipopolymeric nanoparticle infusion delays glioblastoma progression. *Proc Natl Acad Sci U S A* 2017;114(30):E6147-E6156

Agents: RNA, small interfering **Vehicle:** Not Stated; **Route:** CSF/CNS (intratumoral); **Species:** mice (nude); **Pump:** 1002, 2002; **Duration:** 14 days;

ALZET Comments: animal info (athymic nude, 6-8 weeks old); ALZET brain infusion kit 3 used; cancer (glioblastoma); "Because repeated surgery introduces stress and pain that may impact the survival of the experimental animals, we opted for the convection-enhanced delivery (CED) strategy using an Alzet osmotic pump to deliver a continuous supply of the nano RNAi combination..." pg E6151;

Q5892: J. Tang, *et al.* A selective CB2R agonist (JWH133) restores neuronal circuit after Germinal Matrix Hemorrhage in the preterm via CX3CR1(+) microglia. *Neuropharmacology* 2017;119(157-169

Agents: shRNA, NM_133534.1; antibody, CX3CR1 **Vehicle:** NaCl; **Route:** CSF/CNS; **Species:** Rat; **Pump:** 1003D; **Duration:** 3 days;

ALZET Comments: Controls received mp w/ vehicle; animal info (male, Sprague Dawley, P7); ALZET brain infusion kit 3 used; ALZET brain infusion kit 3 used; Brain coordinates;

Q6753: P. G. Quresma, *et al.* Cdc2-like kinase 2 in the hypothalamus is necessary to maintain energy homeostasis. *Int J Obes (Lond)* 2017;41(2):268-278

Agents: RNA, small interfering (Cdc2-like kinase 2) **Vehicle:** Saline; DMSO; **Route:** CSF/CNS (lateral ventricle); **Species:** Mice; **Pump:** 1007D; **Duration:** 7 days;

ALZET Comments: Dose (2 µg/day); 0.3% DMSO used; Controls received mp w/ vehicle; animal info (Eight-week-old male Swiss, db/db mice (Leprdb/Leprdb) and Leprdb/+ mice); Small interference RNA aka siCLK2;

Q6597: C. Lin, *et al.* Omega-3 fatty acids regulate NLRP3 inflammasome activation and prevent behavior deficits after traumatic brain injury. *Experimental Neurology* 2017;290(115-122

Agents: RNA, small interfering **Vehicle:** Not Stated; **Route:** CSF/CNS (left lateral ventricle); **Species:** Rat; **Pump:** 1003D; **Duration:** 72 hours;

ALZET Comments: Dose (30 nmol); Controls received mp w/ vehicle; animal info (8-weeks-old male Sprague-Dawley rats); behavioral testing (Beam balance, Morris water maze);

Q6293: A. R. Ko, *et al.* TRPC6-mediated ERK1/2 phosphorylation prevents dentate granule cell degeneration via inhibiting mitochondrial elongation. *Neuropharmacology* 2017;121(120-129

Agents: RNA, small interfering; TRPC6; U0126 **Vehicle:** Not Stated; **Route:** CSF/CNS (right lateral ventricle); **Species:** Rat; **Pump:** 1007D; **Duration:** Not Stated;

ALZET Comments: Controls received mp w/ vehicle; animal info (7 week old male Sprague-Dawley rats); U0126 is a selective ERK1/2 inhibitor; ALZET brain infusion kit 1 used; Brain coordinates (1 mm posterior; 1.5 mm lateral; -3.5 mm depth to the bregma); Therapeutic indication (epilepsy);



Q5674: J. Y. Kim, *et al.* PDI regulates seizure activity via NMDA receptor redox in rats. *Sci Rep* 2017;7(42491)

Agents: RNA, small interfering (PDI; DTNB); bacracin; Immunoglobulin, anti-PDI; tunicamycin ; **Vehicle:** Not Stated; **Route:** CSF/CNS; **Species:** Rat; **Pump:** 1007D; **Duration:** 7 days, 14 days;

ALZET Comments: Controls received mp w/ vehicle or control siRNA or control IgG; animal info (male, Sprague Dawley, 7 weeks old); pumps replaced every week; ALZET brain infusion kit 1 used; behavioral testing (behavioral seizure severity); Brain coordinates;

Q5837: J. E. Kim, *et al.* Sustained HSP25 Expression Induces Clasmatodendrosis via ER Stress in the Rat Hippocampus. *Front Cell Neurosci* 2017;11(47)

Agents: RNA, small interfering (HSP25) **Vehicle:** Saline; **Route:** CSF/CNS (right lateral ventricle); **Species:** Rat; **Pump:** 1007D; **Duration:** 7 days, 1 week;

ALZET Comments: Controls received control siRNA ; animal info (7 months old); ALZET brain infusion kit 1 used; Electrophysiology; Therapeutic indication (Heat shock proteins, ER stress);

Q5844: X. Jiang, *et al.* Gastrin stimulates renal dopamine production by increasing the renal tubular uptake of L-DOPA. *American Journal of Physiology Endocrinology and Metabolism* 2017;312(1):E1-E10

Agents: RNA, small interfering (Gastrin-specific) **Vehicle:** TransIT in vivo transfection reagent; **Route:** Kidney (subscapular space); **Species:** Mice; **Pump:** 1007D; **Duration:** 7 days;

ALZET Comments: Controls received mp with mock (nonsilencing) siRNA; ALZET polyethylene tubing used ; Therapeutic indication (Nephrology, Hypertension, L-Dopa); Dose (3 ug/day)

Q6011: S. Y. Cheon, *et al.* Regulation of Microglia and Macrophage Polarization via Apoptosis Signal-Regulating Kinase 1 Silencing after Ischemic/Hypoxic Injury. *Front Mol Neurosci* 2017;10(261)

Agents: RNA, small interfering (ASK1) **Vehicle:** siPORTNeoFX Transfection agent; **Route:** CSF/CNS (Left ventricle); **Species:** Mice; **Pump:** 1003D; **Duration:** 3 days;

ALZET Comments: animal info (C57BL/6, 8-12 weeks) ; Therapeutic indication (Hypoxia, late inflammation, ischemic stroke);

Q6007: M. Y. Chang, *et al.* MicroRNAs 218a-5p, 219a-5p, and 221-3p regulate vestibular compensation. *Sci Rep* 2017;7(1):8701

Agents: RNA, micro **Vehicle:** CSF, artificial; **Route:** CSF/CNS (right lateral ventricle); **Species:** Rat; **Pump:** 2001; **Duration:** 7 days;

ALZET Comments: Controls received mp w/ vehicle; ALZET brain infusion kit 2 used; behavioral testing (Rotarod); Dose (12.5 uM);