



**Recent References (2019-Present) on the Intracerebroventricular Administration of Agents to Rats
Using ALZET® Osmotic Pumps**

Q11044: B. A. Karamian, *et al.* Varenicline mitigates the increased risk of pseudarthrosis associated with nicotine. *The Spine Journal* 2023;23(8):1212-1222

Agents: Nicotine; varenicline **Route:** CSF/CNS; **Species:** Rat; **Strain:** Sprague-Dawley; **Pump:** 2ML4; **Duration:** 8 weeks;
ALZET Comments: Dose: Nicotine 15mg/kg/day, 22.5mg/kg/day, 30mg/kg/day; Varenicline 1mg/kg/day, 2mg/kg/day; animal info: eight-week-old male Sprague-Dawley rats ~300 grams; post op. care: skin closed with running sub-cuticular 4-0 Vicryl suture, incision was dressed with triple antibiotic ointment; pumps replaced after 4 weeks; functionality of mp verified by serum levels; good methods (pump replacement) p. 2-3; therapeutic indication: (Pseudarthrosis, spinal fusion)

Q10505: F. Chamaa, *et al.* Sustained Activation of the Anterior Thalamic Neurons with Low Doses of Kainic Acid Boosts Hippocampal Neurogenesis. *Cells* 2022;11(21):

Agents: Kainic acid **Vehicle:** Saline, sterile; **Route:** CSF/CNS; **Species:** Rat; **Pump:** 2001; **Duration:** 1 week; 4 weeks;
ALZET Comments: "Dose: Kainic acid (500 pM); 0.9% of warm sterile saline used; animal info (male Sprague-Dawley rats (250–300 g); Kainic acid aka (KA); PE-10 catheter used; ALZET brain infusion kit 1 used; Brain coordinates (1.4 mm caudal to the bregma; +0.8 mm lateral, with reference to the midline; and 6 mm vertical from the surface of the brain [20].); cyanoacrylate adhesive; acrylic glue; behavioral testing (Y-maze test; open field test); "

Q10834: Z. Xu, *et al.* A Combination of Lycopene and Human Amniotic Epithelial Cells Can Ameliorate Cognitive Deficits and Suppress Neuroinflammatory Signaling by Choroid Plexus in Alzheimer's Disease Rat. *Journal of Nutritional Biochemistry* 2021;88(108558)

Agents: Amyloid beta 1-42 **Vehicle:** CSF, artificial; **Route:** CSF/CNS; **Species:** Rat; **Pump:** Not Stated; **Duration:** 14 days;
ALZET Comments: Dose: 3 nmol/3ml; Controls received mp w/ vehicle; animal info: adult male Wistar rats (SPF class, weighing 250–300 g); post op. care: daily application of Neosporin; behavioral testing: Morris water maze; Amyloid beta 1-42 aka (A β 1–42); Brain coordinates (anteroposterior 0.8 mm from bregma, mediolateral 1.5 mm, dorsoventral 3.6 mm); dental cement used; neurodegenerative (Alzheimer's disease);

Q10310: J.-M. Renko, *et al.* Neuroprotective Potential of a Small Molecule RET Agonist in Cultured Dopamine Neurons and Hemiparkinsonian Rats. *Journal of Parkinson's Disease* 2021;11(3):1023-1046

Agents: BT44; Neurotrophic factor, glial cell-line derived **Vehicle:** PBS; Propylene glycol; **Route:** CSF/CNS; **Species:** Rat; **Pump:** 2002; **Duration:** 14 days;
ALZET Comments: Dose: BT44 (1 ug/24 h); (0.3 ug/24 h); Controls received mp w/ vehicle; animal info: C57BL/6J, and BALB/c mice 6–8 week old female; post op. care: buprenorphine 0.05 mg/kg; Temgesic® 0.3 mg/ml; Carprofen 5 mg/kg. Additional doses of buprenorphine and carprofen were given 1 day after the surgeries; behavioral testing: Rotational assay; Cylinder test; BT44 is a RET agonist, GDNF aka glial line-derived neurotrophic factor; (Alzet Brain infusion kit no. 2, Durect, USA) used; Brain coordinates (bregma A/P + 0.2; L/M –3.0; D/V –5.0mm); dental cement used; polycarboxylate cement; neurodegenerative (Parkinson's disease); "

Q8822: A. Recabal, *et al.* The FGF2-induced tanycyte proliferation involves a connexin 43 hemichannel/purinergic-dependent pathway. *Journal of Neurochemistry* 2021;156(2):182-199

Agents: Uridine, bromodeoxy-; Fibroblast Growth Factor 2; Gap27 **Vehicle:** CSF, filtered; **Route:** CSF/CNS; **Species:** Rat; **Pump:** 1007D; **Duration:** 8 days;
ALZET Comments: Dose (0.75 ug/h BrdU, 0.0125 ug/hr FGF2, 0.13 ug/h Gap27); Controls received mp w/ vehicle; animal info (Male, Sprague Dawley, 120-280 g); enzyme inhibitor (Cx43HC Inhibitor); dental cement used; dependence;

Q9261: Y. Hasegawa, *et al.* The endogenous and exogenous brain-derived neurotrophic factor plays pivotal roles in the pathogenesis of stroke onset in high salt-loaded hypertensive rats. *Experimental Gerontology* 2021;147(111286)

Agents: Brain-derived neurotrophic factor **Vehicle:** PBS; **Route:** CSF/CNS; **Species:** Rat; **Pump:** 2004; **Duration:** 28 days;
ALZET Comments: Dose (2.1 ug/day); Controls received mp w/ vehicle; animal info (male spontaneously hypertensive stroke-prone rats, 224-282 g); Blood pressure measured via tail cuff method; 184 mmHg - 234 mmHg; Brain-derived neurotrophic factor aka BDNF; ALZET brain infusion kit 2 used; dependence;



Q10187: J. C. Hsu, *et al.* Loss of Group II Metabotropic Glutamate Receptor Signaling Exacerbates Hypertension in Spontaneously Hypertensive Rats. *Life* 2021;11(7):

Agents: LY341495 **Vehicle:** Not Stated; **Route:** CSF/CNS; **Species:** Rat; **Pump:** 2006; **Duration:** 6 weeks;

ALZET Comments: Dose: (0.40 ug/day); Controls received mp w/ vehicle; Sham surgery; animal info: Wistar Kyoto rats 6 week-old; Blood pressure measured via tail cuff; Blood pressure results (see pg.5) LY341495 is a metabotropic glutamate receptor (mGluR) antagonist cardiovascular; Hypertension; "we chronically applied a selective mGluR2/3 antagonist, LY341495, into the dorsal medulla oblongata with the aid of an osmotic pump to block endogenous glutamate in rats during 6–12 weeks of age. In our previous study, we found that mGluR2/3 agonist treatment into the dorsal medulla oblongata could suppress the development of hypertension [22]. However, as NTS microinjection of the mGluR2/3 antagonist could also decrease mean blood pressure by approximately 18 mmHg in normotensive rats [18], the current study was considered very important for understanding pathophysiological mechanisms of blood pressure regulation." pg 2

Q9846: Y. Zhang, *et al.* WWP2 regulates SIRT1-STAT3 acetylation and phosphorylation involved in hypertensive angiopathy. *Journal of Cellular and Molecular Medicine* 2020;24(16):9041-9054

Agents: miR-155 inhibitor **Vehicle:** CSF, Artificial; **Route:** CSF/CNS; **Species:** Rat; **Pump:** Not Stated; **Duration:** Not Stated;

ALZET Comments: Controls received mp w/ vehicle; animal info (Sprague Dawley, 200-250 g); antisense (5'AAU UAC GAU UAG CAC UAU CCC CA-3'); ALZET brain infusion kit XX used; Brain coordinates (3.7mm posterior to the bregma, 4.1mm lateral to the midline, and 3.5mm under the dura); bilateral cannula used; dental cement used; neurodegenerative (Intracerebral Hemorrhage);

Q9847: W. Zhang, *et al.* A blockade of microRNA-155 signal pathway has a beneficial effect on neural injury after intracerebral haemorrhage via reduction in neuroinflammation and oxidative stress. *Archives of Physiology and Biochemistry* 2020;1-7

Agents: miR-155 inhibitor **Vehicle:** CSF, artificial; **Route:** CSF/CNS; **Species:** Rat; **Pump:** Not Stated; **Duration:** 1 day;

ALZET Comments: Dose (0.25 ul/hr); Controls received mp w/ vehicle; animal info (Sprague Dawley, 200-250 g, Male); enzyme inhibitor (miR-155 inhibitor); ALZET brain infusion kit XX used; Brain coordinates (3.7 mm posterior to the bregma, 4.1 mm lateral to the midline, and 3.5 mm under the dura); bilateral cannula used; dental cement used; neurodegenerative (Brain Injury);

Q9868: W. Zhang, *et al.* Inhibition of NADPH oxidase within midbrain periaqueductal gray decreases pain sensitivity in Parkinson's disease via GABAergic signaling pathway. *Physiological Research* 2020;

Agents: 6-hydroxydopamine **Vehicle:** CSF, Artificial; **Route:** CSF/CNS; **Species:** Rat; **Pump:** 1003D; **Duration:** 3 days;

ALZET Comments: Dose (6 ul/min); Controls received mp w/ vehicle; animal info (Male, Sprague Dawley, 200-250 g); behavioral testing (Rotation Behavior Test); 6-hydroxydopamine aka 6-OHDA ; Brain coordinates (3.3 mm rostral to the interaural line, 1.4 mm left of the midline, and 6.5 and 6.8 mm ventral to the dural surface); neurodegenerative (Parkinson's Disease);

Q9907: H. Yang, *et al.* TLR4/MyD88/NF-kappaB Signaling in the Rostral Ventrolateral Medulla Is Involved in the Depressor Effect of Candesartan in Stress-Induced Hypertensive Rats. *ACS Chemical Neuroscience* 2020;11(19):2978-2988

Agents: VIPER or Candesartan **Vehicle:** CSF, artificial; **Route:** CSF/CNS; **Species:** Rat; **Pump:** 2002; **Duration:** 14 days;

ALZET Comments: Dose (VIPER-40 ug/kg/day or Candesartan-4 ug/day); Controls received mp w/ vehicle; animal info (7 weeks old, Male, Sprague Dawley); VIPER aka TLR4 Inhibitor Candesartan aka AT1R antagonist ; enzyme inhibitor (TLR4 Inhibitor); Brain coordinates (0.5 mm caudal to bregma, 1.5 mm lateral to the midline, and 2.7 mm below the skull surface); bilateral cannula used; cardiovascular;

Q9933: Y. N. Wu, *et al.* Functional interactions between complex I and complex II with nNOS in regulating cardiac mitochondrial activity in sham and hypertensive rat hearts. *European Journal of Physiology* 2020;472(12):1743-1755

Agents: Recombinant human Shh protein **Vehicle:** Saline; **Route:** CSF/CNS; **Species:** Rat;

ALZET Comments: Dose (5 ug/ml); Controls received mp w/ vehicle; animal info (Male, Sprague Dawley, 250-300 g); behavioral testing (Morris Water Maze Test); Brain coordinates (1.5 mm caudal to the bregma, 1.1 mm lateral to the midline, and 4.5 mm deep from the surface of the skull); neurodegenerative (Traumatic Brain Injury);



Q9426: J. S. Rechberger, *et al.* Evaluating infusate parameters for direct drug delivery to the brainstem: a comparative study of convection-enhanced delivery versus osmotic pump delivery. *Neurosurgical Focus* 2020;48(1):E2

Agents: FITC-Dextran **Vehicle:** Saline; **Route:** CSF/CNS; **Species:** Rat; **Pump:** 2001D; 2ML1; **Duration:** 24 hours; 5 days;

ALZET Comments: Animal info (Female Sprague-Dawley rats (mean age 6 weeks, mean weight 140 g)); ALZET brain infusion kit II used; cyanoacrylate adhesive; dependence;

Q8916: R. L. O'Hare Doig, *et al.* Acute Cellular and Functional Changes With a Combinatorial Treatment of Ion Channel Inhibitors Following Spinal Cord Injury. *Frontiers in Molecular Neuroscience* 2020;13(85)

Agents: Lomerizine; YM872; oxATP **Vehicle:** PBS; **Route:** CSF/CNS; **Species:** Rat; **Pump:** 2002; **Duration:** 2 weeks;

ALZET Comments: Dose (); Controls received mp w/ vehicle; animal info (Female Fischer rats, 150-200 g, 12-15 weeks old); post op. care (Buprenorphine); behavioral testing (open field locomotion assessment); Lomerizine aka Lom; ALZET brain infusion kit 3 used; spinal cord injury;

Q8869: J. Lee, *et al.* Involvement of Satellite Cell Activation via Nitric Oxide Signaling in Ectopic Orofacial Hypersensitivity. *International Journal of Molecular Sciences* 2020;21(4):

Agents: Fluorocitrate **Vehicle:** PBS; **Route:** CSF/CNS; **Species:** Rat; **Pump:** Not Stated; **Duration:** 3 days;

ALZET Comments: Dose (1 µL/h); Controls received mp w/ vehicle; animal info (Male Sprague Dawley rats, 7 weeks old, weighing 200–250 g); behavioral testing (The mechanical head-withdrawal threshold); Brain coordinates (9 mm below the skull surface, 2.8 mm anterior from the posterior fontanelle, and 2.7 mm lateral to the surgical suture); dependence;

Q8610: J. C. Kreutzmann, *et al.* Chronic inhibition of GABA synthesis in the infralimbic cortex facilitates conditioned safety memory and reduces contextual fear. *Translational Psychiatry* 2020;10(1):120

Agents: L-allylglycine; D-allylglycine **Vehicle:** Not stated; **Route:** CSF/CNS; **Species:** Rat; **Pump:** Not stated; **Duration:** 14 days;

ALZET Comments: Dose (7.0 nmoles/ 0.25 µL/h); animal info (adult male Sprague Dawley rats, aged 8 weeks); behavioral testing (Startle setup); Brain coordinates (AP, +2.5; ML, ±0; DV, –5.0); dependence;

Q8379: F. Diaz, *et al.* Simultaneous nicotine and oral contraceptive exposure alters brain energy metabolism and exacerbates ischemic stroke injury in female rats. *J Cereb Blood Flow Metab* 2020;271678X20925164

Agents: Nicotine Hydrogen Tartrate **Vehicle:** Saline; **Route:** CSF/CNS; **Species:** Rat; **Pump:** 2ML2; **Duration:** 21 days;

ALZET Comments: Dose (4.5 mg/kg/day); Controls received mp w/ vehicle; animal info (SD, 6 or 14 weeks old); ischemia

Q9783: R. Dhaher, *et al.* Oral glutamine supplementation increases seizure severity in a rodent model of mesial temporal lobe epilepsy. *Nutritional Neuroscience* 2020;1-6

Agents: Methionine Sulfoximine **Vehicle:** Saline; **Route:** CSF/CNS; **Species:** Rat; **Pump:** 2004; **Duration:** 28 days;

ALZET Comments: Dose (0.625 µg/hr); Controls received mp w/ vehicle; animal info (Male, Sprague Dawley, 280-400 g); Methionine Sulfoximine aka MSO; enzyme inhibitor (Glutamine Synthetase Inhibitor); Brain coordinates (AP 7.8 mm, ML 5.2 mm, DV –6.5 mm); bilateral cannula used; neurodegenerative (Epileptogenesis);

Q9568: Y. M. Chen, *et al.* Inhibition of Hypothalamic Inhibitor kappaB Kinase beta/Nuclear Transcription Factor kappaB Pathway Attenuates Metabolism and Cardiac Dysfunction in Type 2 Diabetic Rats. *Neuroendocrinology* 2020;110(11-12):899-913

Agents: IKKβ inhibitor SC-514 **Vehicle:** CSF, artificial; **Route:** CSF/CNS; **Species:** Rat; **Pump:** 2006; **Duration:** Not Stated;

ALZET Comments: "Dose (4.5 mg/mL); animal info (Male, Sprague Dawley, 8 weeks old); Brain coordinates (bregma: 3.4–3.6 mm posterior, 0.1–0.2 mm lateral, and 9.7–10 mm ventral to the dura); bilateral cannula used; dental cement used;

Q8699: S. Beesley, *et al.* D-serine mitigates cell loss associated with temporal lobe epilepsy. *Nat Commun* 2020;11(1):4966

Agents: D-serine **Vehicle:** CSF, artificial; **Route:** CSF/CNS; **Species:** Rat; **Pump:** 1004; **Duration:** 28 days;

ALZET Comments: Dose (0.1 µL/hr); Controls received mp w/ vehicle; bilateral cannula used; dental cement used; neurodegenerative (Epilepsy);



Q8697: J. Baecker, *et al.* Treatment with the Neurotrophic Protein S100B Increases Synaptogenesis after Traumatic Brain Injury. *J Neurotrauma* 2020;37(8):1097-1107

Agents: S100 calcium-binding protein B **Vehicle:** Saline; **Route:** CSF/CNS; **Species:** Rat; **Pump:** 1007D; **Duration:** 1 week;
ALZET Comments: Dose (50 ng/hr); Controls received mp w/ vehicle; animal info (Male, SD, 250-300 g); S100 calcium-binding protein B aka S100B; ALZET brain infusion kit 3 used; Brain coordinates (0.8mm behind bregma, 1.5mm lateral to midline, 3-4mm beneath the surface of the skull); bilateral cannula used; dental cement used; neurodegenerative (Traumatic Brain Injury);

Q9036: W. Zhang, *et al.* Role of microRNA-155 in modifying neuroinflammation and gamma-aminobutyric acid transporters in specific central regions after post-ischaemic seizures. *Journal of Cellular and Molecular Medicine* 2019;23(8):5017-5024

Agents: MiR-Inhibitor **Vehicle:** Not Stated; **Route:** CSF/CNS; **Species:** Rat; **Pump:** Not Stated; **Duration:** 1 day;
ALZET Comments: Animal info (Male, Sprague-Dawley, 200-250 g); ALZET brain infusion kit XX used; Brain coordinates (3.7 mm posterior to the bregma, 4.1 mm lateral to the midline, and 3.5 mm under the dura); bilateral cannula used; neurodegenerative (Seizure);

Q9124: Z. Y. Zhai, *et al.* Constraint-induced movement therapy enhances angiogenesis and neurogenesis after cerebral ischemia/reperfusion. *Neural Regeneration Research* 2019;14(10):1743-1754

Agents: NEP1-40 **Vehicle:** DMSO/Saline; **Route:** CSF/CNS; **Species:** Rat; **Pump:** 2ML4; **Duration:** 1, 3 weeks;
ALZET Comments: Dose (1 mg); Controls received mp w/ vehicle; animal info (Male, Sprague Dawley, 8-10 weeks old, 280-320 g); behavioral testing (Beam Walking Test, Morris Water Maze Test); NEP1-40 aka Specific antagonist of the Nogo-66 receptor; ALZET brain infusion kit 2 used; Brain coordinates (anteroposterior -0.9 mm and mediolateral +2.0 mm); ischemia (Cerebral);

Q9908: J. B. Yang, *et al.* Infusion of Melatonin Into the Paraventricular Nucleus Ameliorates Myocardial Ischemia-Reperfusion Injury by

Regulating Oxidative Stress and Inflammatory Cytokines. *Journal of Cardiovascular Pharmacology* 2019;

Agents: Melatonin **Vehicle:** CSF, artificial; **Route:** CSF/CNS; **Species:** Rat; **Pump:** 1004; **Duration:** 1 week;
ALZET Comments: "Dose (0.025 ug/hr); Controls received mp w/ vehicle; animal info (Male, Sprague Dawley, 220-285 g); Melatonin aka Mel; Brain coordinates (1.8 mm caudal from bregma, 0.4 mm lateral to the midline, and 7.9 mm ventral to the dorsal surface); bilateral cannula used; ischemia (Myocardial); "

Q9085: P. Thakkar, *et al.* Hypertensive Response to Ischemic Stroke in the Normotensive Wistar Rat. *Stroke* 2019;50(9):2522-2530

Agents: Nifedipine **Vehicle:** Not Stated; **Route:** CSF/CNS; **Species:** Rat; **Pump:** 2001D; 2003D; **Duration:** 1, 3 days;
ALZET Comments: Dose (1.5 mg/kg/ hr or 0.75 mg/kg/hr); animal info (393 +/- 34 g, Wistar); Blood pressure measured via Telemeter; 106.5 mmHg - 128 mmHg; Nifedipine aka Calcium channel blocker; Brain coordinates (AP 0.0 mm, lateral -4.5 and 2.3 mm below the dura); dental cement used; ischemia (Stroke);

Q9084: L. Taoro-Gonzalez, *et al.* Differential role of interleukin-1beta in neuroinflammation-induced impairment of spatial and nonspatial memory in hyperammonemic rats. *FASEB Journal* 2019;33(9):9913-9928

Agents: IL-1 receptor antagonist **Vehicle:** Saline; **Route:** CSF/CNS; **Species:** Rat; **Pump:** Not Stated; **Duration:** 28 days;
ALZET Comments: Dose (55 ug/ul); Controls received mp w/ vehicle; animal info (Male, Wistar, 120-140 g); IL-1 receptor antagonist aka IL-1Ra; ALZET brain infusion kit 2 used; neurodegenerative (Memory);

Q9985: L. Sun, *et al.* Inhibition of microRNA-155 Alleviates Neurological Dysfunction Following Transient Global Ischemia and Contribution of Neuroinflammation and Oxidative Stress in the Hippocampus. *Current Pharmaceutical Design* 2019;25(40):4310-4317

Agents: miR-155 Inhibitor **Vehicle:** Not Stated; **Route:** CSF/CNS; **Species:** Rat; **Pump:** Not Stated; **Duration:** 24, 96 hours;
ALZET Comments: Dose (0.25 ul/hr); animal info (Male, Sprague Dawley, 200-250 g); peptides; ALZET brain infusion kit Not Stated used; Brain coordinates (3.7 mm posterior to the bregma, 4.1 mm lateral to the midline, and 3.5 mm under the dura); bilateral cannula used; dental cement used; ischemia (Global);



Q7420: A. M. Schiller, *et al.* Increased Brain-Derived Neurotrophic Factor in Lumbar Dorsal Root Ganglia Contributes to the Enhanced Exercise Pressor Reflex in Heart Failure. *Int J Mol Sci* 2019;20(6):

Agents: Brain-derived neurotrophic factor, Anti- **Vehicle:** Vehicle not stated; **Route:** CSF/CNS; **Species:** Rat; **Pump:** 1007D; **Duration:** 1 Week;

ALZET Comments: Dose (10 g/mL); Controls received mp w/ vehicle; animal info (male Sprague-Dawley rats weighing 420 to 510 g); post op. care (Betadine, buprenorphine); cardiovascular;

Q8738: H. Park, *et al.* Dysfunction of 67-kDa Laminin Receptor Disrupts BBB Integrity via Impaired Dystrophin/AQP4 Complex and p38 MAPK/VEGF Activation Following Status Epilepticus. *Frontiers in Cellular Neuroscience* 2019;13(236)

Agents: Immunoglobulin G; Mitogen-activated protein kinase, p38 inhibitor; Antibody, anti-67-kDa laminin receptor **Vehicle:** Not Stated; **Route:** CSF/CNS; **Species:** Rat; **Pump:** 1003D; **Duration:** 3 days;

ALZET Comments: animal info (Male, Sprague Dawley, 7 weeks old); anti-67-kDa Lr IgG aka anti-67-kDa laminin receptor; ALZET brain infusion kit 1 used; Brain coordinates (1 mm posterior; 1.5 mm lateral; -3.5 mm depth to the bregma); neurodegenerative (Seizure);

Q9807: L. Pang, *et al.* Amiloride Alleviates Neurological Deficits Following Transient Global Ischemia and Engagement of Central IL-6 and TNF-alpha Signal. *Current Molecular Medicine* 2019;19(8):597-604

Agents: Amiloride, SC144, Etanercept **Vehicle:** CSF, artificial; **Route:** CSF/CNS; **Species:** Rat; **Pump:** Not Stated; **Duration:** 72 hours;

ALZET Comments: Dose (Amiloride- 50 ug, SC144- 10 ug, ETAN-10 uM); Controls received mp w/ vehicle; animal info (Male, Sprague Dawley, 200-250 g); SC144 aka gp130 inhibitor, Etanercept aka ETAN, TNF-a receptor antagonist ; enzyme inhibitor (SC144- gp120 inhibitor); ALZET brain infusion kit Not stated used; Brain coordinates (3.7 mm posterior to the bregma, 4.1 mm lateral to the midline, and 3.5 mm under the dura); ischemia (Global);

Q6955: A. Ortiz-Matamoros, *et al.* Differential Changes in the Number and Morphology of the New Neurons after Chronic Infusion of Wnt7a, Wnt5a, and Dkk-1 in the Adult Hippocampus In Vivo. *Anat Rec (Hoboken)* 2019;

Agents: Wnt7a, Wnt5a, Dkk-1 **Vehicle:** PBS; **Route:** CSF/CNS; **Species:** Rat; **Pump:** 2004; **Duration:** 11 days;

ALZET Comments: Dose (0.25 µL/hr); animal info (Male Wistar rats; 250–300 g, 3-months-old); Wnt7a and Wnt5a are Wnt agonists, and Dkk-1 is a Wnt antagonist; Brain coordinates (AP –3.6, L –3.1, and V + 2.0); bilateral cannula used(3.5 mm long bilateral cannula made with silicate capillaries); neurodegenerative ();

Q7607: M. Okada, *et al.* Effects of acute and sub-chronic administrations of guanfacine on catecholaminergic transmissions in the orbitofrontal cortex. *Neuropharmacology* 2019;156(**Agents:** Guanfacine **Vehicle:** Saline; **Route:** CSF/CNS; **Species:** Rat;

Pump: 1007D; **Duration:** 7 days;

ALZET Comments: Dose (0.12 mg/kg/day); animal info (Male, Sprague Dawley, 7 weeks old); neurodegenerative (ADHD);

Q8270: M. Luisetto*, *et al.* Role of plants, environmental toxins and physical neurotoxicological factors in Amyotrophic lateral sclerosis, Alzheimer Disease and other Neurodegenerative Diseases. *Journal of Neuroscience and Neurological Disorders* 2019;3(1):001-086

Agents: Rotenone **Vehicle:** Not stated; **Route:** CSF/CNS; **Species:** Rat; **Pump:** Not stated; **Duration:** 6 days;

ALZET Comments: Dose (3 mg/kg/day); Controls received mp w/ vehicle; Rotenone aka Rot; neurodegenerative (Alzheimer's Disease, Parkinson's Disease, Lou Gehrig's Disease);

Q8260: Y. T. Liu, *et al.* Effects of porcine brain hydrolysate on impairment of cognitive learning ability in amyloid beta(1-40)-infused rats. *Anim Sci J* 2019;90(2):271-279

Agents: Amyloid B (1-40) **Vehicle:** Not stated; **Route:** CSF/CNS; **Species:** Rat; **Pump:** 2004; **Duration:** 4 weeks;

ALZET Comments: Dose (10, 50, or 100 mg/kg/day); Controls received mp w/ vehicle; animal info (Male, Wistar, 8 weeks old, 200-300g); behavioral testing (Morris Water Maze Test, Spatial Memory Test, Working Memory Test); Alpha B (1-40) aka AB; peptides; ALZET brain infusion kit 3 used; Brain coordinates (relative to bregma; 0.8 mm posterior, 1.4 mm lateral); dental cement used; neurodegenerative (Alzheimer's Disease);



Q8876: Y. Li, *et al.* Activation of Nrf2 signaling by sitagliptin and quercetin combination against beta-amyloid induced Alzheimer's disease in rats. *Drug Development Research* 2019;80(6):837-845

Agents: Peptide, beta-amyloid (1-42) **Vehicle:** Saline; **Route:** CSF/CNS; **Species:** Rat; **Pump:** Not Stated; **Duration:** 14 days; **ALZET Comments:** Dose (300 pmol/day); Controls received mp w/ vehicle; animal info (Male, Sprague-Dawley, 250-300 g); behavioral testing (Morris Water Maze Test,); B-amyloid (1-42) peptide aka AB amyloid (1-42); peptides; Brain coordinates (Relative to bregma: A, 0.8; L, 1.4; V, 4.5); neurodegenerative (Alzheimer's Disease);

Q8240: T. A. Lanz, *et al.* Postmortem transcriptional profiling reveals widespread increase in inflammation in schizophrenia: a comparison of prefrontal cortex, striatum, and hippocampus among matched tetrads of controls with subjects diagnosed with schizophrenia, bipolar or major depressive disorder. *Transl Psychiatry* 2019;9(1):151

Agents: Haloperidol or Risperidone **Vehicle:** Acetic Acid; **Route:** CSF/CNS; **Species:** Rat; **Pump:** Not stated; **Duration:** 21 days; **ALZET Comments:** Dose (haloperidol-0.25 mg/kg/day or risperidone-5 mg/kg/day); 1% Acetic Acid used; Controls received mp w/ vehicle; animal info (2 months old, Sprague Dawley, Male); neurodegenerative (Psychiatric Disorder);

Q8239: D. Lana, *et al.* Microglial distribution, branching, and clearance activity in aged rat hippocampus are affected by astrocyte meshwork integrity: evidence of a novel cell-cell interglial interaction. *FASEB J* 2019;33(3):4007-4020

Agents: Lipopolysaccharide **Vehicle:** Artificial Cerebrospinal Fluid; **Route:** CSF/CNS; **Species:** Rat; **Pump:** Not stated; **Duration:** 4 weeks; **ALZET Comments:** "Dose (1.6 ug/mL); Controls received mp w/ vehicle; animal info (Male, Wistar, 3-22 week sold); Lipopolysaccharide aka LPS ; Brain coordinates (on midline: 22.5 mm posterior to the lambda, 7 mm ventral to the dura); bilateral cannula used; neurodegenerative (Microglia Dysregulation); "

Q8226: M. Kongstorp, *et al.* High Accumulation of Methadone Compared with Buprenorphine in Fetal Rat Brain after Maternal Exposure. *J Pharmacol Exp Ther* 2019;371(1):130-137

Agents: Methadone; Buprenorphine **Vehicle:** Saline; **Route:** CSF/CNS; **Species:** Rat; **Pump:** 2ML4; **Duration:** 28 days; **ALZET Comments:** Dose (Buprenorphine- 1 mg/kg/day or Methadone 10mg/kg/day); Controls received mp w/ vehicle; animal info (Female); post op. care (Metacam); dependence;

Q9273: J. Holland, *et al.* A Brain-Melanocortin-Vagus Axis Mediates Adipose Tissue Expansion Independently of Energy Intake. *Cell Reports* 2019;27(8):2399-2410 e6

Agents: Melanocortin-3; MC4r blocker **Vehicle:** Saline; **Route:** CSF/CNS; **Species:** Mice; Rat; **Pump:** 1002, 2001, 2002; **Duration:** 2 weeks, 7 days, 14 days; **ALZET Comments:** Dose (1 nmol/day); Controls received mp w/ vehicle; animal info (Mice- 8-10 weeks old, Male, C57BL/6J/Rat- 257-300, g Wistar, Male); ALZET brain infusion kit 3 used; bilateral cannula used; dependence;

Q7524: R. B. S. Harris. Low-dose infusions of leptin into the nucleus of the solitary tract increase sensitivity to third ventricle leptin. *American Journal of Physiology Endocrinology and Metabolism* 2019;316(5):E719-E728

Agents: Leptin **Vehicle:** Saline; **Route:** CSF/CNS; **Species:** Rat; **Pump:** 1004; **Duration:** 14 days; **ALZET Comments:** Dose (5, 10 ng/day); 0.9% saline used; animal info (Male, Sprague-Dawley, 275-300 g); bilateral cannula used; dependence;

Q8723: M. H. Fu, *et al.* Anti-neuroinflammation ameliorates systemic inflammation-induced mitochondrial DNA impairment in the nucleus of the solitary tract and cardiovascular reflex dysfunction. *Journal of Neuroinflammation* 2019;16(1):224

Agents: Lipopolysaccharide **Vehicle:** Saline; **Route:** CSF/CNS; **Species:** Rat; **Pump:** 1007D; **Duration:** 7 days; **ALZET Comments:** Dose (1.2 mg/kg/day); animal info (Sprague Dawley, 8 weeks old, 250-280 g, Male); Blood pressure measured via Femoral Artery Cannulation ; +C19ALZET brain infusion kit 2 used; cardiovascular;

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;