

Recent References (2021-Present) on the Intracerebroventricular Administration of Agents Using ALZET[®] Osmotic Pumps

Q11038: J. Zicha, *et al.* Nitric oxide and salt resistance in Dahl rats: no role of inducible NO synthase. Physiological Research 2023;72(1):123-127

Agents: Aminoguanidine; 2-amino-5,6-dihydro-6-methyl-4H-1,3-thiazine Vehicle: Water; saline; Route: CSF/CNS (lateral cerebral ventricle); Species: Rat; Strain: Wistar; Pump: 2004; Duration: 4 weeks;

ALZET Comments: Dose: AMG (2 mg/kg/day); AMT (0.5 mg/kg/day); Controls received mp w/ vehicle; animal info: Male 8-week-old outbred rats; Blood pressure measured via pressure transducer

and a multichannel recorder; Blood pressure measurement see (pg.3 &4) fig.1,2,3 polyethylene catheter; AMG and AMT used as NOS II inhibitors; cardiovascular (blood pressure and high salt intake)

Q11003: H. L. Song, *et al.* Monoclonal antibody Y01 prevents tauopathy progression induced by lysine 280-acetylated tau in cell and mouse models. Journal of Clinical Investigation 2023;133(8):

Agents: Monoclonal antibody Y01 Vehicle: PBS; Route: CSF/CNS (right lateral ventricle); Species: Mice; Strain: tau-P301L; Pump: Not Stated; Duration: 28 days;

ALZET Comments: Dose (1.9 mg/ml); Controls received mp w/ vehicle; animal info: 8 months; comparison of ip injection vs mp; ALZET brain infusion kit used; Brain coordinates: 0.58 mm posterior to bregma, 1 mm lateral to the midline, and 2 mm from the skull surface; behavioral testing (Nest building test; Y maze; Morris water maze); neurodegenerative (Alzheimer's disease

Q10992: A. Saoudi, *et al.* Investigating the Impact of Delivery Routes for Exon Skipping Therapies in the CNS of DMD Mouse Models. Cells 2023;12(6):

Agents: Oligonucleotides, antisense **Vehicle:** Not Stated; **Route:** CSF/CNS (intracerebroventricular); **Species:** Mice; **Strain:** hDMD; mdx52; **Pump:** 1002; **Duration:** 2 weeks;

ALZET Comments: Dose (~700 nmol); animal info: 6–8-week-old mdx52 and WT mice; comparison of bolus injection vs mp; neurodegenerative (neurological disorder); brain tissue distribution

Q10988: J. G. Rosa, *et al.* BDNF is altered in a brain-region specific manner and rescues deficits in Spinocerebellar Ataxia Type 1. Neurobiology of Disease 2023;178(106023

Agents: Brain-derived neurotrophic factor, recombinant Vehicle: CSF, artificial; Route: CSF/CNS (right lateral ventricle); Species: Mice; Strain: Atxn154Q/2Q; Pump: 1004; Duration: 4 weeks;

ALZET Comments: Dose (0.71 µg/day); Controls received mp w/ vehicle; animal info: 7 week old mice; Brain coordinates ((A/P 1.1 mm; M/L 0.5 mm; D/V -2.5 mm from Bregma); behavioral testing (Cognitive testing; Barnes maze; Contextual fear conditioning); neurodegenerative, Spinocerebellar ataxia type-1;

Q10986: S. M. Robert, *et al.* The choroid plexus links innate immunity to CSF dysregulation in hydrocephalus. Cell 2023;186(4):764-785 e21

Agents: E. coli, wild type; E. coli, -LPS; lipopolysaccharide Vehicle: CSF, artificial; Route: CSF/CNS (right lateral ventricle); Species: Rat; Strain: Wistar; Pump: 1003D; Duration: 72 hours;

ALZET Comments: Dose (10 ng/mL); Controls received mp w/ vehicle; animal info 8-week-old; ALZET brain infusion kit 2 used; Brain coordinates ((coordinates, x= -0.8, y= -1.7 mm from bregma)cyanoacrylate adhesive; gene therapy; immunology

Q10657: M. V. Rao, *et al.* Autophagy is a Novel Pathway for Neurofilament Protein Degradation in Vivo. Autophagy 2023;19(4):1277-1292

Agents: 3-methyladenine Vehicle: DMSO; Route: CSF/CNS (lateral ventricle); Species: Mice; Strain: C57BL/6J; Pump: 2004; Duration: 4 weeks;

ALZET Comments: "Dose: 3-MA (09 mg/ml); 50% DMSO vehicle used; Controls received mp w/ vehicle; animal info :9-month-old mice; 3-methyladenine aka (3-MA)Brain coordinates (placement in the lateral ventricle were AP –0.3 mm to Bregma, ML 1.0 mm to Bregma, and DV 2.5 mm to cranium);"



Q10972: P. Pakataridis, *et al.* EVIDENCE FOR BIOLOGICAL EFFECTS OF THE HEXAPEPTIDE NOVOKININ. Journal of Chemical Technology and Metallurgy 2023;58(3):608-614

Agents: Novokinin Vehicle: Saline, sterile; Route: CSF/CNS (right lateral ventricle); Species: Mice; Strain: SHR; Pump: 2002; Duration: 14 days;

ALZET Comments: Dose: 0.3 ug/rat/day; Controls received mp w/ vehicle; animal info: 2-month-old female 220 - 280g; receptor agonist (angiotensin AT2 receptor agonist novokinin aggravates some diabetes mellitus-induced alterations in Wistar); ALZET brain infusion kit 2 used; Brain coordinates (1.5 mm lateral (right) to the sagittal suture, 1 mm caudal to bregma, and a depth of 3 mm); behavioral testing Open field test; Elevated plus maze test; Paw pressure test; T-maze rewarded alternating test; Novel object recognition; anxiety; memory

Q10961: S. Meng, *et al.* Catalpol Mitigates Alzheimer's Disease Progression by Promoting the Expression of Neural Stem Cell Exosomes Released miR-138-5p. Neurotoxicity Research 2023;41(1):41-56

Agents: miR-138-5p inhibitor; scramble RNA, negative control Vehicle: Not Stated; Route: CSF/CNS (left lateral ventricle); Species: Mice; Strain: C57BL/6; Pump: 1004; Duration: Not Stated;

ALZET Comments: Dose (0.2 ml/minute); animal info: WT C57BL/6 mice; Brain coordinates (bregma: – 0.22 mm; dorsoventral: 3 mm; lateral: 1 mm); neurodegenerative (Alzheimer's disease);

Q11057: M. McNicholas, *et al.* A Compendium of Syngeneic, Transplantable Pediatric High-Grade Glioma Models Reveals Subtype-Specific Therapeutic Vulnerabilities. Cancer Discovery 2023;13(7):1592-1615

Agents: Trametinib; alpelisib Vehicle: Elacridar; saline, SBE-B-CD; Route: CSF/CNS (fourth ventricle); Species: Mice; Strain: C57BL/6J; Pump: 2002; Duration: 15 days;

ALZET Comments: Dose: (30mg/kg); controls received mp w/ vehicle; animal info: 8-week-old; comparison of oral gavage vs mp; ALZET brain infusion kit 2 used; brain coordinates (0.5 mm anterior and 1.8 mm lateral from bregma for striatal targeting, and 0.8 mm posterior 761 and 1.1 mm lateral from lambda for pontine targeting); cyanoacrylate adhesive; (loctite); cancer (Pediatric High-Grade Glioma);

Q11055: Y. Madokoro, *et al.* Direct Enhancement Effect of Hippocampal Cholinergic Neurostimulating Peptide on Cholinergic Activity in the Hippocampus. International Journal of Molecular Sciences 2023;24(10):

Agents: Hippocampal cholinergic neurostimulating peptide **Vehicle:** Bicarbonate buffer; **Route:** CSF/CNS (cerebral ventricle); **Species:** Mice; **Strain:** HCNP-pp cKO; **Pump:** 1002; **Duration:** 2 weeks;

ALZET Comments: animal info: 87-91 weeks; brain coordinates (0.6 mm posterior and 1.2 mm lateral from the bregma); dental cement used; neurodegenerative (Alzheimer's disease and Lewy body dementia.);

Q11088: A. Lozano-Urena, *et al.* IGF2 interacts with the imprinted gene Cdkn1c to promote terminal differentiation of neural stem cells. Development 2023;150(1):

Agents: Insulin-like growth factor 2 Vehicle: PBS; Route: CSF/CNS (lateral ventricle); Species: Mice; Strain: C57BL/6; Pump: 1007D; Duration: 7 days;

ALZET Comments: Controls received mp w/ vehicle; animal info (Male; 2-4 months old); Brain coordinates (Anteroposterior -0.1 mm; Mediolateral -0.8 mm from bregma; Dorsoventral -3 mm from skull surface);

Q11086: C.-W. Lin, *et al.* Monascus-fermented metabolites repressed amyloid β-peptide-induced neurotoxicity and inflammatory response in in vitro and in vivo studies. Journal of Functional Foods 2023;104(**Agents:** Amyloid beta-peptide-40 **Vehicle:** Acetonitrile; trifluoroacetic acid; **Route:** CSF/CNS (left ventricle); **Species:** Rat; **Strain:** Sprague-Dawley; **Pump:** Not Stated; **Duration:** 28 days;

ALZET Comments: 35% acetonitrile solution; Controls received mp w/ vehicle; animal info (Male; 6-8 weeks old); peptides; ALZET brain infusion kit 2 used; dental cement used; Alzheimer's



Q11083: D. S. Lee, *et al.* CDDO-Me Abrogates Aberrant Mitochondrial Elongation in Clasmatodendritic Degeneration by Regulating NF-kappaB-PDI-Mediated S-Nitrosylation of DRP1. International Journal of Molecular Sciences 2023;24(6): **Agents:** CDDO-Me; SN50; RNA, small interfering, non-targeting control; RNA, small interfering, PDI **Vehicle:** Not Stated; **Route:** CSF/CNS (right lateral ventricle); **Species:** Rat; **Strain:** Sprague-Dawley; **Pump:** 1007D; **Duration:** Not Stated; **ALZET Comments:** Dose: Controls received mp w/ vehicle; animal info (Male; 7 weeks old); ALZET brain infusion kit 1 used; Brain coordinates (1 mm posterior; 1.5 mm lateral; -3.5 mm depth to bregma); SN50 is a nuclear factor-KB inhibitor; clasmatodendrosis

Q11082: J. E. Kim, *et al.* PLPP/CIN inhibits dopamine D1 receptor-mediated seizure activity via DARPP-32 serine 97 dephosphorylation in the mouse hippocampus. Neuropharmacology 2023;228(109462 **Agents:** TMCB **Vehicle:** Not Stated; **Route:** CSF/CNS (ventricle); **Species:** Mice; **Strain:** PLPP/CIN-/-; PLPP/CINTg; **Pump:** 1007D; **Duration:** Not Stated;

ALZET Comments: Dose (0.5 uM); Controls received mp w/ vehicle; animal info (Male; 8 weeks old); ALZET brain infusion kit 3 used; Brain coordinates (0 mm posterior; 0 mm lateral; 2 mm depth from bregma); epilepsy (seizure)

Q11046: J. E. Kim, *et al.* Distinct Roles of CK2- and AKT-Mediated NF-kappaB Phosphorylations in Clasmatodendrosis (Autophagic Astroglial Death) within the Hippocampus of Chronic Epilepsy Rats. Antioxidants (Basel) 2023;12(5): Agents: 2-[4,5,6,7-Tetrabromo-2-(dimethylamino)-1H-benzo[d]imidazole-1-yl]acetic acid; 3-chloroacetyl-indole Vehicle: Not Stated; Route: CSF/CNS (right lateral ventricle); **Species:** Rat; **Strain:** Sprague-Dawley; **Pump:** 1007D; **Duration:** 7 days; **ALZET Comments:** Dose: TMCB 0.5 ul, 3CAI 25 uM; animal info: Male 200–250 g; ALZET brain infusion kit 1 used; brain coordinates (coordinates: 1 mm posterior; 1.5 mm

lateral; 3.5 mm depth); TMCB is a selective CK2 inhibitor; 3CAI is an AKT inhibitor; seizure

Q11045: T. P. Kilpelainen, *et al.* Nonpeptidic Oxazole-Based Prolyl Oligopeptidase Ligands with Disease-Modifying Effects on alpha-Synuclein Mouse Models of Parkinson's Disease. Journal of Medicinal Chemistry 2023;66(11):7475-7496 **Agents:** KYP-2047; HUP-55 **Vehicle:** DMSO; Tween; **Route:** IP; CSF/CNS (lateral ventricle); **Species:** Mice; **Strain:** C57BL/6JRccHsd; **Pump:** 1004; **Duration:** 28 days;

ALZET Comments: Dose: 10 mg/kg/day; 0.2% dimethyl sulfoxide; 5% Tween in saline used; animal info (10 to 11 weeks old male C57BL/6JRccHsd mice); post op. care: Topical lidocaine (10 mg/mL), buprenorphine, (0.1 mg/kg) and carprofen (5 mg/kg) s.c.injections; KYP-2047 is a peptide-like PREP inhibitor; ALZET brain infusion kit 3 used; brain coordinates: 0.7 mm anterior and 1.4 mm lateral to bregma; behavioral testing (Cylinder Test.); neurodegenerative (Parkinson's);

Q10955: A. Kaur, *et al.* A protocol for collection and infusion of cerebrospinal fluid in mice. STAR Protocols 2023;4(1):102015 Agents: CSF, artificial Vehicle: Not Stated; Route: CSF/CNS (lateral ventricle); Species: Mice; Strain: C57BL/6; Pump: 1007D; Duration: 7 days;

ALZET Comments: animal info: (18–22 months old) post op. care: (Buprenorphine slow release (analgesic, 1 mg/kg) and Baytril (antibiotic, 5 mg/kg) prior to surgery per animal protocol.); keep the mouse on a warm surface area (37degC); lynch coil method: catheter; 1.5 cm catheter to connect to the pump; ALZET brain infusion kit 3 used; cyanoacrylate adhesive; Loctite glue; good methods: detailed, includes troubleshooting tips

Q10954: K. Karino, *et al.* Inhibitor of NF-kappaB Kinase Subunit epsilon Contributes to Neuropsychiatric Manifestations in Lupus-Prone Mice Through Microglial Activation. Arthritis & Rheumatology 2023;75(3):411-423

Agents: MCCK1 Vehicle: PBS; Route: CSF/CNS (right lateral ventricle); Species: Mice; Strain: MRL/lpr; Pump: Not Stated; Duration: 14 days;

ALZET Comments: Controls received mp w/ vehicle; animal info: 6 week old; ALZET brain infusion kit III used; Brain coordinates (1.1 mm lateral, -0.5 mm anterioposterior to the bregma, and 2.5 mm deep to target the right lateral ventricle); behavioral testing (Open field test; Novel objective recognition test; Object location test); MCCK1 is an IKBKe inhibitor; immunology; (lupus)



Q11079: A. Huang, *et al.* Modulation of foraging-like behaviors by cholesterol-FGF19 axis. Cell & Bioscience 2023;13(1):20 **Agents:** Fibroblast growth factor 19 **Vehicle:** CSF, artificial; **Route:** CSF/CNS (right lateral ventricle); **Species:** Mice; **Strain:** C57BL/6; **Pump:** 2006; **Duration:** 2 weeks;

ALZET Comments: Dose: FGF19 (15 ng/0.5 ul/h); Controls received mp w/ vehicle; animal info (Male; 5 months old); peptides; pumps replaced twice; functionality of mp verified by measuring residual volume; Brain coordinates: (Anteroposterior -0.3 mm to bregma, lateral 1 mm to bregma, -2.5 mm below skull); vinyl tubing used; behavioral testing (Open field);

Q10534: C. Grijota-Martinez, *et al.* Intracerebroventricular High Doses of 3,3',5-Triiodothyroacetic Acid at Juvenile Stages Improve Peripheral Hyperthyroidism and Mediate Thyromimetic Effects in Limited Brain Regions in a Mouse Model of Monocarboxylate Transporter 8 Deficiency. Thyroid 2023;

Agents: Artificial cerebrospinal fluid Vehicle: Not Stated; Route: CSF/CNS (lateral ventricle); Species: Mice; Strain: MCT8-DIO2-deficient; Wild-type; Pump: 2002; Duration: Not Stated;

ALZET Comments: Controls received mp w/ vehicle; animal info (Male; Mice; 3 months old;); catheter; ALZET brain infusion kit 3 used; Brain coordinates (Bregma -0.5 mm; 1 mm lateral in skull);

Q11077: A. G. George, *et al.* Sudden unexpected death in epilepsy is prevented by blocking postictal hypoxia. Neuropharmacology 2023;231(109513

Agents: Nicardipine Vehicle: DMSO; PEG; EtOH; Route: CSF/CNS (left lateral ventricle); Species: Mice; Strain: Kcna1-/-; Pump: 2006; Duration: 42 days;

ALZET Comments: Dose (2 mg/mL); 50:40:10 DMSO:PEG:EtOH; Controls received mp w/ vehicle; animal info (Male and female; 4-10 weeks old; Weighed 23-31 g); post op. care: buprenorphine injection (0.05 mg/kg) every 12 h for 3 days; Cannula placement verified via methylene blue dye; Brain coordinates: (AP) +0.3, (ML) -1.0, (DV) -3.0; epilepsy

Q11073: L. Dias, *et al.* Increased Synaptic ATP Release and CD73-Mediated Formation of Extracellular Adenosine in the Control of Behavioral and Electrophysiological Modifications Caused by Chronic Stress. ACS Chem Neuroscience 2023;14(7):1299-1309 **Agents:** Alpha, beta-methylene ADP **Vehicle:** Saline; **Route:** CSF/CNS (right lateral ventricle); **Species:** Rat; **Strain:** Wistar; **Pump:** 1004; **Duration:** 14 days;

ALZET Comments: Controls received mp w/ vehicle; animal info (Male; Weighed 220-250 g); enzyme inhibitor (CD73); ALZET brain infusion kit 2 used; Brain coordinates (anter-posterior = 0 relative to bregma; lateral = 1.5 mm to midline; depth = 4.5 mm down from surface of skull); behavioral testing (restraint test, open-field test, object displacement, elevated-plus maze, forced swimming test); stress, memory

Q11099: F. De Lorenzo, *et al.* CDNF rescues motor neurons in models of amyotrophic lateral sclerosis by targeting endoplasmic reticulum stress. Brain 2023;146(9):3783-3799

Agents: Cerebral dopamine neurotrophic factor Vehicle: PBS; Route: CSF/CNS (lateral ventricle); Species: Rat; Strain: TDP43-M337V Pump: Not Stated; Duration: 28 days;

ALZET Comments: Dose (6 ug/day); Controls received mp w/ vehicle; catheter; behavioral testing (Rotarod test); neurodegenerative (Amyotrophic lateral sclerosis);

Q10927: M. M. A. de Almeida, *et al.* Fractalkine enhances oligodendrocyte regeneration and remyelination in a demyelination mouse model. Stem Cell Reports 2023;18(2):519-533

Agents: FKN-647 Vehicle: BSA; PBS; Route: CSF/CNS (right lateral ventricle); Species: Mice; Strain: Wildtype, C57BL/6J; Pump: 1007D; 1004; Duration: 3 days; 7 days;

ALZET Comments: 200 ng/day; Controls received mp w/ vehicle; animal info (2- to 3-month-old mice); Brain coordinates (coordinates relative to bregma: -1.0 ML, -0.3 AP,-2.5 DV.); cyanoacrylate glue; brain tissue distribution; neurodegenerative (demyelination)



Q11072: V. Csikos, *et al.* Microglia depletion prevents lactation by inhibition of prolactin secretion. iScience 2023;26(3):106264 Agents: Pexidartinib 3397 Vehicle: CSF, artificial; Route: CSF/CNS (lateral ventricle); Species: Rat; Strain: Wistar; Pump: 2004; Duration: 28 days;

ALZET Comments: Dose (0.5 mg/ml); Controls received mp w/ vehicle; animal info (Female; Wild-type; 2-4 months old; Pregnant); comparison of oral treatment vs mp; post op. care (Antibiotics III 0.1 ml/kg); ALZET brain infusion kit 2 used; Brain coordinates (-0.5 mm anteroposterior to bregma; 1.4 mm lateral to bregma; 3.6 mm ventral to brain surface); dental cement used; behavioral testing (Pup retrieval test; Spontaneous maternal behavior); PLX3397 inhibits colony stimulating factor 1 receptor

R0438: G. Canet, *et al.* The pathomimetic oAbeta(25)(-)(35) model of Alzheimer's disease: Potential for screening of new therapeutic agents. Pharmacology &Therapeutics 2023;245(108398

Agents: Galantamine memantine hybrid Vehicle: Not Stated; Route: CSF/CNS (lateral ventricle); Species: Mice; Strain: Not Stated; Pump: Not Stated; Duration: 7 days;

ALZET Comments: Dose (2.5. or 7.5 µg/day); peptides; Alzheimer's disease; review of different approaches for AD prevention and therapy

Q11069: J. A. Bonds, *et al.* Why Some Mice Are Smarter than Others: The Impact of Bone Morphogenetic Protein Signaling on Cognition. eNeuro 2023;10(1):

Agents: Noggin; BMP4 Vehicle: Not Stated; Route: CSF/CNS (lateral ventricle); Species: Mice; Strain: C57BL/6; Pump: 1002; Duration: 15 days;

ALZET Comments: Dose (Noggin 50 ng/ul; BMP4 30 ng/ul); animal info (Wild-type; Male); Brain coordinates (-0.4 mm and 1 mm lateral to bregma); behavioral testing (Novel object recognition; Y-maze); neurodegenerative (cognition)

Q11065: Y. Bai, *et al.* Single-nucleus RNA sequencing unveils critical regulators in various hippocampal neurons for anti-N-methyl-D-aspartate receptor encephalitis. Brain Pathology 2023;33(4):e13156

Agents: Anti-N-methyl-D-aspartate receptor antibody Vehicle: Saline; Route: CSF/CNS (lateral ventricle); Species: Mice; Strain: C57BL/6; Pump: 2002; Duration: Not Stated;

ALZET Comments: Dose (2 µg/ml); animal info (Female; 8-10 weeks old); behavioral testing (Shuttle box active escape experiment; Elevated plus-maze test; Open-field test; 3 chamber test; Forced swimming test; Marble burying test; Novel object recognition; Nest building test); ALZET brain infusion kit 3 used; good methods pg. 3; immunology

Q10895: J. Zheng, *et al.* cPKCgamma Deficiency Exacerbates Autophagy Impairment and Hyperphosphorylated Tau Buildup through the AMPK/mTOR Pathway in Mice with Type 1 Diabetes Mellitus. Neuroscience Bulletin 2022;38(10):1153-1169 **Agents:** Rapamycin **Vehicle:** DMSO; **Route:** CSF/CNS (right lateral ventricle); **Species:** Mice; **Strain:** Wild-type (cPKCy-/-); cPKCc knockout (cPKCc-/-) C57BL/6; **Pump:** Not Stated; **Duration:** 14 days;

ALZET Comments: Dose: (0.2 mg/kg); Controls received mp w/ vehicle; animal info: Adult male mice (18 g–22 g, 6–8 weeks) diabetes mellitus; behavioral testing: Morris Water Maze (MWM) Test; Brain coordinates (AP - 0.5 mm, ML + 1.0 mm, and DV - 2.8 mm relative to bregma); diabetes;

Q10831: L. Xu, et al. Fibroblasts Repair Blood-Brain Barrier Damage and Hemorrhagic Brain Injury Via TIMP2. Cell Reports 2022;41(8):111709

Agents: Diphtheria toxin; TIMP2 Vehicle: Saline, sterile; Route: CSF/CNS (lateral ventricle); Species: Mice; Strain: FKO; Pump: 1002; Duration: 5 days; 4 days;

ALZET Comments: Dose: 1500ng DT; Controls received mp w/ vehicle; animal info (mice); post op. care (Treated with carprofen (5mg/kg of body weight subcutaneously); Diphtheria toxin aka (DT);ALZET brain infusion kit used; Brain coordinates (0.2mm posterior to bregma, 2.4mm lateral from the midline, and 3.7mmin depth);



Q10803: P. Xiao, *et al.* RTN4/Nogo-A-S1PR2 Negatively Regulates Angiogenesis and Secondary Neural Repair Through Enhancing Vascular Autophagy in the Thalamus After Cerebral Cortical Infarction. Autophagy 2022;18(11):2711-2730 **Agents:** RTN4-d20-Fc; Immunoglobulin G, recombinant **Vehicle:** PBS; PEG 300; **Route:** CSF/CNS (right lateral ventricle); **Species:** Rat; **Strain:** Sprague-Dawley; **Pump:** 1003D; **Duration:** 24 hours;

ALZET Comments: Dose: (40 µg/kg); 2% DMSO; 40% PEG300 vehicle used Controls received mp w/ vehicle; animal info: rats weighting 90–110 g; Recombinant human IgG Fc aka (IgG Fc); Brain coordinates (into the right lateral ventricle under a stereotaxic apparatus (–1.0 mm anteroposterior, 1.4 mm mediolateral,–4.0 mm dorsoventral relative to the bregma); neurodegenerative (cerebral cortical infarction);

Q10284: H. Tran, *et al.* Suppression of mutant C9orf72 expression by a potent mixed backbone antisense oligonucleotide. Nature Medicine 2022;28(1):117-124

Agents: Oligonucleotide, antisense Vehicle: PBS; Route: CSF/CNS (right lateral ventricle); Species: Mice; Strain: C9BAC; Pump: 1007D; Duration: 10 days;

ALZET Comments: Dose (2.5-20 nmol/day); dose-response (dose-dependent reduction in V1 and V3 repeat-containing transcripts in both the cortex and spinal cord regions after being treated with ASO3 and ASO5); animal info (transgenic mice); antisense oligonucleotides aka ASO; antisense (oligonucleotide); ALZET brain infusion kit 3 used; bilateral cannula used; 2.5-20 nmol/day of each ASO were continuously infused over 10 d into the right lateral ventricle of age-matched heterozygous C9BAC mice through a cannula using an implanted Alzet osmotic pumptissue perfusion (brain); neurodegenerative (ALS);(FTD) Therapeutic indication (ALS, FTD); "In our C9BAC mice, we were not able to safely perform ICV bolus injections with more than 10 nmol of LNA-modified ASO3 due to induction of severe motor phenotypes. To overcome this limitation, we use osmotic pumps to compare the potency of ASO3 and ASO5" pg3; gene therapy

Q10696: S. A. Tapanes, *et al.* Inhibition of Glial D-Serine Release Rescues Synaptic Damage After Brain Injury. Glia 2022;70(6):1133-1152

Agents: BMS-466442; L-4-Chlorophenylglycine Vehicle: PBS; Route: CSF/CNS (contralateral lateral ventricle); Species: Mice; Strain: Not Stated; Pump: 1007D; 2002; Duration: 7 days; 14 days;

ALZET Comments: Dose (250 uM); Controls received mp w/ vehicle; animal info (Male; 2-4 months old); behavioral testing (Fear-conditioning); (L-4-chlorophenylglycine is a selective Slc1a4 inhibitor; BMS is selective noncompetitive Slc7a10 inhibitor); Brain infusion kit 3 used; Brain coordinates (-2.0 mm from dura); gene therapy; Therapeutic indication (Traumatic brain injury);

Q10680: P. K. Singh, *et al.* Specific Inhibition of NADPH Oxidase 2 Modifies Chronic Epilepsy. Redox Biology 2022;58(102549 Agents: Gp91ds-tat Vehicle: Not Stated; Route: CSF/CNS (right lateral ventricle); Species: Rat; Strain: Sprague–Dawley; Pump: 2002; Duration: 2 weeks;

ALZET Comments: "Dose (800 ng/kg/day); Controls received mp w/ vehicle; animal info (Naïve male and female rats (200–250 g); post op. care (Before initiating the surgery, rats were injected with buprenorphine (0.2 mg/kg; SC) and Metacam (1 mg/kg; SC) for pain relief); After surgery rats were injected with 3–5 ml of warmed Ringer's solution and amoxicillin (Betamox LA, 100 mg/kg); peptides; catheter; ALZET brain infusion kit 2 used; Brain coordinates (vinyl catheter tube was implanted into the right lateral ventricle of brain [1 mm posterior, 1.2 mm lateral, 4.5 mm ventral from the bregma); dental cement used; neurodegenerative (Epilepsy); "

Q10675: G. Sekerci, *et al.* Effects of Meteorin-Like Hormone on Endocrine Function of Hypothalamo-Hypophysial System and Peripheral Uncoupling Proteins in Rats. Molecular Biology Reports 2022;49(7):5919-5925

Agents: Meteorin-like hormone Vehicle: CSF, artificial; Route: CSF/CNS (right lateral ventricle); Species: Rat; Strain: Sprague–Dawley; Pump: 2ML2; Duration: 14 days;

ALZET Comments: Dose: 10 nM, 100 nM; Controls received mp w/ vehicle; animal info: malerats with approximate body weight of 432 gaCSF aka (Artificial cerebrospinal fluid)ALZET brain infusion kit 1 used; Brain coordinates (The right lateral ventricle coordinates (1.40 mm lateral, 0.8 mm posterior and 4.8 mm vertical from the bregma); dental cement used; (Thyroid hormones); "



Q10671: A. Sancho-Balsells, *et al.* Meridianins Inhibit GSK3beta In Vivo and Improve Behavioral Alterations Induced by Chronic Stress. Marine Drugs 2022;20(10):

Agents: Meridianins Vehicle: Saline; Route: CSF/CNS (left lateral ventricle; Species: Mice; Strain: C57BL/6JOlaHsd; Pump: 1002; Duration: 28 days;

ALZET Comments: "Dose (0.11 uL/hr); Controls received mp w/ vehicle; ALZET brain infusion kit 2 used; Brain coordinates ((0.1 mm posterior to bregma, 0.8 mm lateral to the midline, and -2.5 mm ventral to the parenchyma surface); cyanoacrylate adhesive; (Loctite 454); behavioral testing (Open-field; Forced swim test); Therapeutic indication (Chronic stress);

Q10665: A. Romero-Pico, *et al.* Kappa-Opioid Receptor Blockade Ameliorates Obesity Caused by Estrogen Withdrawal via Promotion of Energy Expenditure through mTOR Pathway. International Journal of Molecular Sciences 2022;23(6): **Agents:** PF-04455242 **Vehicle:** Not Stated; **Route:** CSF/CNS (intracerebroventricular); **Species:** Mice; **Strain:** C57/BL6 Wild-type; Oprk1-/; **Pump:** 1007D; **Duration:** 7 days;

ALZET Comments: Dose (3.4 nmol/day); Controls received mp w/ vehicle; animal info (Female8-10 weeks old); ALZET brain infusion kit 3 used; Therapeutic indication (Metabolic disorders);

Q10660: L. Rezacova, *et al.* Both Central Sympathoexcitation and Peripheral Angiotensin II-Dependent Vasoconstriction Contribute to Hypertension Development in Immature Heterozygous Ren-2 Transgenic Rats. Hypertension Research 2022;45(3):414-423

Agents: Losartan Vehicle: Not Stated; Route: IP; CSF/CNS (lateral ventricle); Species: Rat (transgenic); Strain: mRen-2; Pump: 2004; Duration: Not Stated;

ALZET Comments: Dose (1 or 2 mg/kg/day); animal info (immature Male heterozygous ()27 transgenic; 6 weeks old; Fed Sniff diet); Blood pressure measured via pressure transducer and multichannel recorder; Brain coordinates: (AP = -1.0, L= 1.5, V= 4.1); polyethylene catheter used; antihypertensive; cardiovascular;

Q10653: M. Radosevic, *et al.* Allosteric Modulation of NMDARs Reverses Patients' Autoantibody Effects in Mice. Neurology Neuroimmunology & Neuroinflammation 2022;9(1):

Agents: CSF, patient; CSF, control Vehicle: Not Stated; Route: CSF/CNS (intracerebroventricular); Species: Mice; Strain: C57BL/6J; Pump: 1002; Duration: 14 days;

ALZET Comments: animal info (141 male ; 8-10 weeks old); immunology; Therapeutic indication (Anti-NMDAR encephalitis);

Q10637: N. Orti-Casan, *et al.* A TNF Receptor 2 Agonist Ameliorates Neuropathology and Improves Cognition in an Alzheimer's Disease Mouse Model. Proceedings of the National Academy of Sciences 2022;119(37):e2201137119 **Agents:** NewStar2 **Vehicle:** PBS; **Route:** CSF/CNS (lateral ventricle); **Species:** Mice; **Strain:** C57BL/6 (background); **Pump:** 2006; **Duration:** 6 weeks;

ALZET Comments: Controls received mp w/ vehicle; animal info:; Male mice 6 mo of age behavioral testing: EPM; Y-Maze spontaneous alternation; MWM; stability of compound verified by cytotoxicity assay; Brain coordinates (anteroposterior, 0.05 mm; lateral, 0.1 mm; dorsoventral, 0.25 mm),); dental cement used; neurodegenerative (Alzheimer's disease); "

Q10593: B. Lv, *et al.* Exenatide improves the luteinizing hormone pulse in obese polycystic ovary syndrome rats by upregulating sirtuin-1 in the hypothalamus. The American Journal of Drug and Alcohol Abuse 2022; **Agents:** EX527 **Vehicle:** DMSO; **Route:** CSF/CNS (third ventricle); **Species:** Rat; **Strain:** PCOS; **Duration:** 3 weeks; **ALZET Comments:** Dose: EX527 (5 µg/24 h)Controls received mp w/ vehicle; animal info: Obese rats(EX-527) is an SIRT1 inhibitor; enzyme inhibitor (EX527);

Q10570: D. Keller, *et al.* A Thalamo-Preoptic Pathway Promotes Social Grooming in Rodents. Current Biology 2022;32(21):4593-4606 e8

Agents: HYWH-TIP39 **Vehicle:** CSF, artificial; **Route:** CSF/CNS (lateral ventricle); **Species:** Rat; **Strain:** Not Stated; **Pump:** 2002; **ALZET Comments:** Controls received mp w/ vehicle; animal info: female rats; behavioral testing: Social behavioral tests; Freely moving social behavior test; Social interaction test without direct contact; Social novelty test; HYWH-TIP39 is Parathyroid hormone 2 antagonist; ALZET brain infusion kit 2 used; Brain coordinates (AP = 0.5mmfrom bregma, ML = +1.6mmfrom the midline.); dental cement used; cranioplastic cement



Q10560: B. Joubert, et al. Human CASPR2 Antibodies Reversibly Alter Memory and the CASPR2 Protein Complex. Annals of Neurology 2022;91(6):801-813

Agents: CSF Vehicle: Not Stated; Route: CSF/CNS (lateral ventricle); Species: Mice; Strain: C57BL6/J; Pump: 1002; ALZET Comments: animal info (; Male; 55 total; 8-10 weeks old; Weighed 25-30 g); behavioral testing (Novel object location; Locomotor activity; Sucrose preference; Open field; Rotarod test); multiple pumps per animal (2); bilateral catheters used; brain coordinates: (0.02 mm anterior and 1.00 mm lateral from bregma, depth 0.22 mm); cannula placement verified via methylene blue; dental cement used

Q10758: Y. Ito, *et al.* Protein Tyrosine Phosphatase 1B Deficiency Improves Glucose Homeostasis in Type 1 Diabetes Treated With Leptin. Diabetes 2022;71(9):1902-1914

Agents: Leptin, recombinant Vehicle: Saline; Route: CSF/CNS (cerebral lateral ventricle); Species: Mice; Strain: T1D WT; T1D KO; Pump: 1002; Duration: 10 days;

ALZET Comments: Dose: (0.25 mg/day)Controls received mp w/ vehicle; animal info: mice Brain coordinates (anterior-posterior 0.50 mm, medial-lateral ±1.3 mm, dorsal-ventral 2.3 mm)diabetes; (Type 1 diabetes)

Q10947: T. Iram, *et al.* Young CSF restores oligodendrogenesis and memory in aged mice via Fgf17. Nature 2022;605(7910):509-515

Agents: CSF, young mouse; aCSF; CSF, human; Fibroblast growth factor 17; Fibroblast growth factor 8b, recombinant carrier-free human; anti-Fgf17 blocking antibody **Vehicle:** CSF, artificial; **Route:** CSF/CNS (right lateral ventricle); **Species:** Mice; **Strain:** C57BL/6; **Pump:** 1007D; 1004; **Duration:** 7 days;

ALZET Comments: Controls received mp w/ vehicle; animal info: Aged C57BL/6 mice (18–22 months old); post op. care: buprenorphine and Baytril; ALZET brain infusion kit 3 used; good methods; lynch coil technique p. 8; Brain coordinates +1 mm medio-lateral, 0 mm anterior– and –3 mm dorso-ventral relative to the bregma; neurodegenerative (aging, memory)

Q10551: Y. Inoue, *et al.* alpha-Enolase reduces cerebrovascular Abeta deposits by protecting Abeta amyloid formation. Cellular and Molecular Life Sciences 2022;79(8):462

Agents: alpha-Enolase Vehicle: Tris-HCL; MgSO4; Glycerol; Route: CSF/CNS (right lateral ventricle; Species: Mice; Strain: APP23; Pump: 1007D; Duration: 7 days;

ALZET Comments: "Dose: (20 uM)Controls received mp w/ vehicle; animal info: male mice; behavioral testing: Y-maze; testα-Enolase aka (ENO1); ALZET brain infusion kit (3) used; Brain coordinates (coordinates of injection sites relative to bregma: anteroposterior: – 2.5 mm, lateral (right): + 2.0 mm, dorsoventral: – 2.8 mm); neurodegenerative (Cerebral amyloid angiopathy); "

Q10385: Y. Hasuike, *et al.* CAG repeat-binding small molecule improves motor coordination impairment in a mouse model of Dentatorubral-pallidoluysian atrophy. Neurobiology of Disease 2022;163(105604

Agents: Naphthyridine-azaquinolone Vehicle: PBS; Route: CSF/CNS (right lateral ventricle); Species: Mice; Strain: Not Stated; Pump: 2004; Duration: 16 weeks;

ALZET Comments: Dose (2 mM); Controls received mp w/ vehicle; animal info (6 weeks old); behavioral testing (Tested motor function with rotarod device; Beam-walking test); pumps replaced every 4 weeks; long-term study; ALZET brain infusion kit used; Brain coordinates (0.4 mm posterior; 1.0 mm right lateral; 2.5 mm ventral); neurodegenerative (Dentatorubral-pallidoluysian atrophy); Therapeutic indication (DRPLA);

Q10934: L. K. Hamilton, *et al.* Stearoyl-CoA Desaturase inhibition reverses immune, synaptic and cognitive impairments in an Alzheimer's disease mouse model. Nature Communications 2022;13(1):2061

Agents: ab142089 Vehicle: DMSO; aCSF; Route: CSF/CNS (lateral ventricles); Species: Mice; Strain: 3xTg/ WT; Pump: 1004; Duration: 1 month;

ALZET Comments: Dose: (80 uM); 0.8% DMSO vehicle used; Controls received mp w/ vehicle; animal info: 9-month-old female mice; behavioral testing; Open field test; Elevated plus maze; Light dark box; Morris water maze; SCD inhibitor; Brain coordinates (0.0 mm antero-posterior and 0.9 mm lateral to Bregma); pumps primed 48h; neurodegenerative (Alzheimer's disease, learning, memory);



Q10379: L. A. Ezerskiy, *et al.* Astrocytic 4R tau expression drives astrocyte reactivity and dysfunction. JCI Insight 2022;7(1): **Agents:** Oligonucleotide, antisense **Vehicle:** Not Stated; **Route:** CSF/CNS (right ventricle); **Species:** Mice **ALZET Comments:** Dose (15 ug/d); animal info (hTau); Brain coordinates (1.1 mm lateral; 0.5 mm posterior; 2.5 mm ventral from bregma); neurodegenerative (); Therapeutic indication (neurodegenerative diseases); gene therapy

Q10430: M. Crespo-Masip, *et al.* Elimination of Vitamin D Signaling Causes Increased Mortality in a Model of Overactivation of the Insulin Receptor: Role of Lipid Metabolism. Nutrients 2022;14(7):

Agents: Glucose, D-(+); Mannitol, D- Route: CSF/CNS (intracerebroventricular); **Species:** Mice; **Pump:** 2006; **Duration:** 42 days; **ALZET Comments:** Controls received mp w/ vehicle; animal info: Cre-negative littermates were used as controls (CNT). Twenty-one days after birth, dependence; Taken together, the results shown in the present paper point to the paramount role of an adequate (vitamin D) signaling pathway in hypoglycemia induced by overactivation of the insulin receptor. Thus, in T1 diabetic patients, especially in the lean phenotype, maintaining

correct levels of vitamin D could support proper lipid metabolism and decrease deaths induced by insulin dosing errors. (pg.13)"; diabetes

Q10455: J. Cheng, *et al.* Diet-induced inflammation in the anterior paraventricular thalamus induces compulsive sucrose-seeking. Nature Neuroscience 2022;25(8):1009-1013

Agents: Palmitic Acid Vehicle: NaOH; BSA; Route: CSF/CNS (lateral ventricle); **Species:** Mice; **Pump:** 2002; ALZET Comments: Dose: (5 mg kg)Controls received mp w/ vehicle; animal info: Male mice behavioral testing: Open field test; Elevated plus maze test; Pain threshold test; Cued fear memory test; Clozapine-N-oxide aka (CNO); Brain coordinates (–0.45 mm AP, –1.0 mm ML, –2.5 mm DV); cannula placement verified via injection of 1% methylene blue solution and detecting the staining on the ventricular surface at the end of the behavioral experiments; dental cement used; cyanoacrylate adhesive;

Q10418: A. B. Caglayan, *et al.* The Unconventional Growth Factors Cerebral Dopamine Neurotrophic Factor and Mesencephalic Astrocyte-Derived Neurotrophic Factor Promote Post-ischemic Neurological Recovery, Perilesional Brain Remodeling, and Lesion-Remote Axonal Plasticity. Translational Stroke Research 2022;

Agents: Cerebral dopamine neurotrophic factor, recombinant human; Mesencephalic astrocyte-derived neurotrophic factor, recombinant human Vehicle: NaCl; Route: CSF/CNS (left ventricle); Species: Mice; Pump: 2004; Duration: 28 days; ALZET Comments: "Dose: (1 ug/day); (0.9% NaCl), vehicle used; Controls received mp w/ vehicle; animal info: male C57Bl6/j mice (8–10 weeks)behavioral testing: RotaRod test, Grip strength; Open field test; Elevated o maze test); ALZET brain infusion kit 3 used; Brain coordinates (contralateral motor cortex (0.5 mm rostral and 2.5 mm lateral to the bregma); neurodegenerative (stroke); ischemia (cerebral); "

Q10414: L. Bourhy, *et al.* Silencing of amygdala circuits during sepsis prevents the development of anxiety-related behaviours. Brain 2022;145(4):1391-1409

Agents: Levetiracetam **Vehicle:** Saline; **Route:** CSF/CNS (right lateral ventricle); **Species:** Mice; **Pump:** 1003D; **Duration:** 3 days; **ALZET Comments:** Dose: (1 μl/h); Controls received mp w/ vehicle; animal info: Adult 2–5months old wild-type male C57BI/6JRj mice and adult male and female FOS-CreERT2; post op. care: treated with (0.1 mg/kg) buprenorphine 30 mins. before surgery; behavioral testing (Morris water maze; novel object location/recognition; Open field test; Light/dark box test; olfactory habituation; fear conditioning); Levetiracetam aka (LEV); ALZET brain infusion kit 3 used; Brain coordinates (stereotaxic coordinates relative to bregma, antero-posterior: –0.5 mm; medial lateral: 1 mm; dorsoventral: 2.5 mm); dental cement used; liquid bonding resin; dental acrylic; neurodegenerative (anxiety; PTSD); immunology

Q10497: Q. Bi, et al. Microglia-derived PDGFB promotes neuronal potassium currents to suppress basal sympathetic tonicity and limit hypertension. Immunity 2022;55(8):1466-1482 e9

Agents: Diphtheria toxin; Growth factor, platelet-derived Vehicle: PBS; Route: CSF/CNS (intracerebroventricular); Species: Mice; Pump: 1002; Duration: 2 weeks;

ALZET Comments: Dose: (Diphtheria toxin 0.5 ng/g/day; PDGF 2.5 ng/g/day); animal info: CD11b- DTR mice; Blood pressure measured via: Tail cuff; Blood pressure measurement (p.1468) see fig.1F; Platelet-derived growth factor aka (PDGF)ALZET brain infusion kit 3 used; Brain coordinates (0.3-0.5 mm post Bregma; 1-1.5 mm lateral to the midline; 3 mm ventral to the dura); bio-adhesive glue; immunology;



Q10408: V. Barrios, *et al.* Chronic Central Leptin Infusion Promotes an Anti-Inflammatory Cytokine Profile Related to the Activation of Insulin Signaling in the Gastrocnemius of Male Rats. Biomedicines 2022;10(7):

Agents: Leptin **Vehicle:** Saline; BSA; **Route:** CSF/CNS (right ventricle); **Species:** Rat; **Pump:** Not Stated; **Duration:** 14 days; **ALZET Comments:** Dose (12 µg/day); 0.9% saline and 1% serum albumin used; Controls received mp w/ vehicle; animal info (Male; Weighed about 250 g); diabetes;

Q10407: S. L. Baringer, et al. Regulation of brain iron uptake by apo- and holo-transferrin is dependent on sex and delivery protein. Fluids Barriers CNS 2022;19(1):49

Agents: Apotransferrin; Holo-transferrin Vehicle: Not Stated; Route: CSF/CNS (lateral ventricle); Species: Mice; Pump: 2004; Duration: 48 hours;

ALZET Comments: Controls received mp w/ vehicle; animal info (3 months old; Wild-type); post op. care: The incision was then sutured with nylon sutures. The mice were then placed in a heated recovery chamber until they regained consciousness.; artificial cerebrospinal fluid aka aCSF; Brain coordinates (1 mm lateral to Bregma; 0.5 mm posterior to lateral ventricle); dependence;

Q10490: Y. M. Arenas, *et al.* The S1PR2-CCL2-BDNF-TrkB pathway mediates neuroinflammation and motor incoordination in hyperammonaemia. Neuropathology and Applied Neurobiology 2022;48(4):e12799

Agents: JTE-013 Vehicle: Saline, sterile; DMSO; Route: CSF/CNS (ventricle); Species: Rat; Pump: Not Stated; Duration: 28 days;

ALZET Comments: "Dose: (1.22 uM); 1% DMSO vehicle used; Controls received mp w/ vehicle; animal info: Male Wistar rats (220–250 g); behavioral testing: Beam walking; Footprint analysis of locomotor gait in the CatWalk; Motorater; JTE-013 is a S1PR2 (sphingosine-1-phosphate receptor 2) antagonist; ALZET brain infusion kit 2 used; neurodegenerative (hyperammonaemia and minimal hepatic encephalopathy); "

Q10489: B. Anand, *et al.* Significance of native PLGA nanoparticles in the treatment of Alzheimer's disease pathology. Bioactive Materials 2022;17(506-525

Agents: PLGA Vehicle: CSF; Route: CSF/CNS (right lateral ventricle); **Species:** Mice; **Pump:** 2004; **Duration:** 28 days; ALZET Comments: Dose: (25 uM)); animal info: Three-month old 5xFAD mice along with age-matched wild-type (WT) control mice; behavioral testing: Novel-object recognition test; PLGA aka Acidic poly(D,L-lactide-co-glycolide) nanoparticles; ALZET Brain Infusion Kit used; Brain coordinates (right ventricle (-0.8 mm mid/lateral, -0.1 mm antero/posterior and -3.0 mm dorso/ventral from Bregma); neurodegenerative (Alzheimer's);

Q10437: A. Abot, *et al.* How does apelin affect LH levels? An investigation at the level of GnRH and KNDy neurons. Molecular and Cellular Endocrinology 2022;557(111752

Agents: aCSF; Apelin-13 Vehicle: Not Stated; Route: CSF/CNS (lateral ventricle); Species: Mice; Pump: 2004; Duration: 2 weeks;

ALZET Comments: animal info (16 total; Male; 9 weeks old); peptides; ALZET brain infusion kit 3 used; Brain coordinates (-1 mm lateral; -0.2 mm anteroposterior from bregma; 1.7 mm below skull surface);

Q10739: V. Zhuravleva, *et al.* Rab35 and Glucocorticoids Regulate APP and BACE1 Trafficking to Modulate Abeta Production. Cell Death & Diseases 2021;12(12):1137

Agents: Amyloid-beta, 1-40 Vehicle: Saline; Route: CSF/CNS (intracerebroventricular); Species: Rat; Pump: 2002; Duration: 14 days;

ALZET Comments: animal info (12-months old; male Wistar rats); AB1-40 aka toxic amyloid beta peptides; ALZET brain infusion kit used; Brain coordinates (-0.6 mm anteroposterior; -1.4 mm mediolateral; -3.5 mm dorsoventral); neurodegenerative (Alzheimer's disease);