



## Recent References on Aging Research Using ALZET® Osmotic Pumps

### Aging Research (2024-Present)

**Q12425:** C. G. Turner, *et al.* The angiotensin II type 2 receptor attenuates aging-associated arterial stiffness in female mice. *American Journal of Physiological Heart and Circulatory Physiology* 2025;329(2):H388-H394

**Agents:** PD-123, 319 **Vehicle:** Saline, sterile; **Route:** SC; **Species:** Mice; **Strain:** C57Bl6; **Pump:** 1004; **Duration:** 28 days;  
**ALZET Comments:** Dose (3 mg/kg/d); controls received mp w/ vehicle; animal info (male and female, isoflurane anesthesia; angiotensin II type 2 receptor antagonist; cardiovascular; aging);

**Q12404:** K. M. Nist, *et al.* Losartan attenuates sex-dependent hypertension, neuroinflammation, and cognitive impairment in the aging male sprague-dawley rat. *Geroscience* 2025;47(3):3007-3026

**Agents:** Losartan potassium; hydrochlorothiazide **Vehicle:** Saline, sterile; DMSO; **Route:** SC; **Species:** Rats; **Strain:** Sprague-Dawley; **Pump:** 2ML4; **Duration:** 21 days; 14 days;  
**ALZET Comments:** Dose: Losartan (3 mg/kg/day); Hydrochlorothiazide (4 mg/kg/day); 50:50 DMSO:saline used; controls received mp w/ vehicle; animal info (Male, 16 months old, ketamine/xylazine anesthesia); blood pressure measurements (pg.8) Fig.1; behavioral testing (Novel object recognition task; Object location task) neurodegenerative (cognitive impairment); cardiovascular; hypertension

**Q12386:** D. R. Ji, *et al.* Intermedin(1-)(-)(53) improves aging-associated cardiac remodeling and dysfunction via mitochondrial SIRT3-mediated SOD2 deacetylation. *Journal of Molecular and Cellular Cardiology* 2025;205(86-98)

**Agents:** Angiotensin II **Vehicle:** Saline; **Route:** SC; **Species:** Mice; **Strain:** SIRT3 KO; **Pump:** 1002; 1004; **Duration:** 2 weeks; 4 w  
**ALZET Comments:** Dose (1000 ng/kg/min); controls received mp w/ vehicle; animal info (12–16 weeks and old 18 months males); blood pressure measured via computerized tail-cuff system; peptides; cardiovascular;

**Q12222:** A. Badea, *et al.* Neuroimaging biomarkers of neuroprotection: Impact of voluntary versus enforced exercise in Alzheimer's disease models. *Magnetic Resonance Imaging* 2025;121(110406)

**Agents:** Manganese chloride **Vehicle:** Bicine; **Route:** Not Stated; **Species:** Mice; **Strain:** CVN-AD; **Pump:** 1007D; **Duration:** Not Stated;  
**ALZET Comments:** Dose (64 µm/µl); animal info (female, ketamine xylazine anesthesia); behavioral testing (sucrose preference test; novel object recognition; novelty recognition trial); neurodegenerative (Alzheimer's); MRI;

**Q12626:** K. Yatsuzuka, *et al.* A fluorescence imaging technique suggests that sweat leakage in the epidermis contributes to the pathomechanism of palmoplantar pustulosis. *Scientific Reports* 2024;14(1):378

**Agents:** Interleukin-1 alpha, interleukin-1, beta **Vehicle:** PBS; **Route:** Intraepidermal (toe); **Species:** Mice; **Strain:** C57BL/6; **Pump:** Not Stated; **Duration:** 24 hours;  
**ALZET Comments:** Dose (10 ng/ml); controls received mp w/ vehicle; animal info (Six- to 22-week-old); "...continuous stimulation by IL-1α or IL-1β was shown to reduce E-cadherin expression in the epidermis of the C57BL/6 mouse toe, based on immunohistochemical analysis in which drug delivery was achieved using an osmotic pump system." pg. 9;

**Q11984:** K. Yatsuzuka, *et al.* A fluorescence imaging technique suggests that sweat leakage in the epidermis contributes to the pathomechanism of palmoplantar pustulosis. *Scientific Reports* 2024;14(1):378

**Agents:** Interleukin-1, alpha; Interleukin1, beta **Vehicle:** Not Stated; **Route:** Intraepidermal; **Species:** Mice; **Strain:** C57BL/6; **Pump:** Not Stated; **Duration:** 24 hours;  
**ALZET Comments:** Dose: (10 ng/ml); animal info (6-22 weeks old); peptides; "...continuous stimulation by IL-1a or IL-1b was shown to reduce E-cadherin expression in the epidermis of the C57BL/6 mouse toe, based on immunohistochemical analysis in which drug delivery was achieved using an osmotic pump system" pg. 9;

**Q11955:** H. Watanabe, *et al.* Cyb5r3 activation rescues secondary failure to sulfonylurea but not beta-cell dedifferentiation. *PLoS One* 2024;19(2):e0297555

**Agents:** Glibenclamide **Vehicle:** Not Stated; **Route:** IP; **Species:** Mice; **Strain:** C57BL/6; **Pump:** Not Stated; **Duration:** 6 weeks;  
**ALZET Comments:** Dose (20 mg/kg/day); animal info (8-12 weeks old); diabetes; aging; therapeutic indication (Type 2 Diabetes);



**Q11923:** D. Y. Sun, *et al.* Pro-ferroptotic signaling promotes arterial aging via vascular smooth muscle cell senescence. *Nature Communications* 2024;15(1):1429

**Agents:** Angiotensin II; Bleomycin **Vehicle:** Not Stated; **Route:** SC; **Species:** Mice; **Strain:** WT; R26-GPX4; **Pump:** 1004; **Duration:** 2 weeks;

**ALZET Comments:** Dose (Ang II 400 ng/kg/min; Bleo 40 ng/kg/min); animal info (8 weeks old); blood pressure measured via tail cuff method; peptides; cardiovascular;

**Q12550:** A. E. Salinero, *et al.* Treatment with brain specific estrogen prodrug ameliorates cognitive effects of surgical menopause in mice. *Hormones and Behavior* 2024;164(105594)

**Agents:** DHED **Vehicle:** Not Stated; **Route:** SC; **Species:** Mice; **Strain:** C57BL/6J; **Pump:** Not Stated; **Duration:** 1.5 months;

**ALZET Comments:** animal info (female); behavioral testing (Maze; Object recognition); aging;

**Q11882:** P. A. Pereira, *et al.* Effects of Aging and Nerve Growth Factor on Neuropeptide Expression and Cholinergic Innervation of the Rat Basolateral Amygdala. *Biology* 2024;13(3):

**Agents:** Neurotrophine nerve growth factor; methylene blue **Vehicle:** CSF, artificial; BSA; **Route:** CSF/CNS (right lateral ventricle); **Species:** Rat; **Strain:** Wistar; **Pump:** 2002; **Duration:** 12 days;

**ALZET Comments:** Dose (150 ug/150 ul); 0.1% bovine serum albumin; controls received mp w/ vehicle; animal info (male 6 months old, 24 months, promethazine/xylazine anesthesia); post op. care (saline injections to prevent dehydration/weight loss); pulsed delivery; Lynch coil; ALZET brain infusion kit used; brain coordinates: 1.7 mm lateral to the midline, 1.1 mm posterior to the bregma, 4.0 mm below the skull surface; aging

**Q12399:** D. Natarajan, *et al.* Chronic beta3-AR stimulation activates distinct thermogenic mechanisms in brown and white adipose tissue and improves systemic metabolism in aged mice. *Aging Cell* 2024;23(12):e14321

**Agents:** CL 316.243 **Vehicle:** Not Stated; **Route:** SC; **Species:** Mice; **Strain:** C57BL/6JN; **Pump:** 1004; **Duration:** 4 weeks;

**ALZET Comments:** Dose (0.75 nmol/hr; 0.38 nmol/hour); dose-response; animal info (male and female; 18 months old); Beta3-adrenergic receptor agonist; obesity; aging; "To investigate the metabolic response to prolonged  $\beta$ 3-AR stimulation in aged mice, 18-month-old C57BL/6J mice were treated with CL for 4 weeks via osmotic minipump infusion at 0.75 nmol/hour" pg. 12;

**Q12373:** A. Morin-Grandmont, *et al.* A murine model of hypertensive heart disease in older women. *PeerJ* 2024;12(e17434)

**Agents:** Angiotensin II **Vehicle:** Not Stated; **Route:** SC; **Species:** Mice; **Strain:** C57Bl6/J; **Pump:** 2004; **Duration:** 28 days; 14 d

**ALZET Comments:** Dose (1.5 mg/kg/day); controls received mp w/ vehicle; animal info (female; 8-12 week old, 12, 24 months old; isoflurane anesthesia); blood pressure measured via tail cuff method; peptides; cardiovascular; aging;

**Q12363:** L. R. Miller, *et al.* Vascular smooth muscle cell-specific Igf1r deficiency exacerbates the development of hypertension-induced cerebral microhemorrhages and gait defects. *Geroscience* 2024;46(3):3481-3501

**Agents:** Angiotensin II **Vehicle:** Saline, sterile; **Route:** SC; **Species:** Mice; **Strain:** Igf1rKD; **Pump:** 2006; **Duration:** 42 days;

**ALZET Comments:** Dose (1 ug/min/kg); controls received mp w/ vehicle; animal info (10-12 months of age, isoflurane anesthesia); blood pressure measured via femoral artery cannulation/blood pressure monitors; Measurements Fig1 E (pg. 3486); aging;

**Q11808:** B. Martin, *et al.* Designing a Time-Dependent Therapeutic Strategy using CDK4/6 Inhibitors in an Intracranial ATRT Model. *Neuro-Oncology* 2024;

**Agents:** Palbociclib **Vehicle:** Not Stated; **Route:** CSF/CNS (intrathecal); IP; **Species:** Mice; **Strain:** NSG; **Pump:** Not Stated; **Duration:** 28 days;

**ALZET Comments:** Dose (48 mg/kg, 6 mg/kg); animal info (female, 6-8 weeks, 17-25 g, isoflurane anesthesia); functionality of mp verified by plasma samples; comparison of bolus injection vs mp; brain coordinates (+1, -1, -2 mm); cannula placement verified via evan's blue dye; cyanoacrylate adhesive (Loctite); "First, targeted delivery into the CSF compartment allowed for administration of high drug doses into the CNS, while simultaneously limiting systemic exposure. Second, cannulation of the lateral ventricle with an OP infusion system allowed for long-term drug delivery, ultimately leveraging a well-tolerated metronomic chemotherapeutic strategy over a 4-week period; this strategy was consistent with the need for long-term CDK4/6 inhibitor exposure found in our in vitro results." pg. 12; BLI;



**Q11851:** D. I. Maltsev, *et al.* Aging Modulates the Ability of Quiescent Radial Glia-Like Stem Cells in the Hippocampal Dentate Gyrus to be Recruited into Division by Pro-neurogenic Stimuli. *Molecular Neurobiology* 2024;61(6):3461-3476

**Agents:** uridine, 5-bromo-2'-deoxy **Vehicle:** DMSO, sterile; **Route:** SC; **Species:** Mice; **Strain:** C57Bl/6; **Pump:** 1007D; **Duration:** 7 days;

**ALZET Comments:** Dose: (50 mg/kg/d); controls received mp w/ vehicle; animal info (female, isoflurane anesthesia); post op. care (ketoprofen inj 5 mg/kg; Iodine wound spray); good methods (p. 2-3);

**Q12330:** Z. L. Liu, *et al.* Aging aggravates aortic aneurysm and dissection via miR-1204-MYLK signaling axis in mice. *Nature Communications* 2024;15(1):5985

**Agents:** Angiotensin II **Vehicle:** Saline; **Route:** SC; **Species:** Mice; **Strain:** C57BL/6; **Pump:** 2004; **Duration:** Not Stated;

**ALZET Comments:** Dose (1000 ng/kg/min); controls received mp w/ vehicle; animal info (4 months old; male and female); blood pressure measured via tail cuff method; peptides; cardiovascular; aging;

**Q12318:** J. H. Lim, *et al.* Placental growth factor deficiency initiates obesity- and aging-associated metabolic syndrome. *Metabolism* 2024;161(156002

**Agents:** Placenta growth factor, recomb. human **Vehicle:** Not Stated; **Route:** SC; **Species:** Mice; **Strain:** C57BL6/J; **Pump:** 2006; **Duration:** 6 weeks;

**ALZET Comments:** Dose (10 ug/kg/day); animal info (male; 34 weeks old); blood pressure measured via tail cuff method; cardiovascular; obesity;

**Q12271:** H. Kim, *et al.* Unacylated Ghrelin Protects Against Age-Related Loss of Muscle Mass and Contractile Dysfunction in Skeletal Muscle. *Aging Cell* 2024;23(12):e14323

**Agents:** Ghrelin, unacylated **Vehicle:** Saline; **Route:** SC; **Species:** Mice; **Strain:** C57BL/6N; **Pump:** 2004; **Duration:** 10 months;

**ALZET Comments:** Dose (100 ug/kg/day); controls received mp w/ vehicle; animal info (female, male; 4, 18 months old); functionality of mp verified by plasma levels; pumps replaced every 2 months; long-term study; aging;

**Q12165:** A. A. Frame, *et al.* Integrated renal and sympathetic mechanisms underlying the development of sex- and age-dependent hypertension and the salt sensitivity of blood pressure. *Geroscience* 2024;46(6):6435-6458

**Agents:** Hydrochlorothiazide **Vehicle:** DMSO; Saline, isotonic; **Route:** SC; **Species:** Rat; **Strain:** Sprague-Dawley; **Pump:** 2ML4; **Duration:** Not Stated;

**ALZET Comments:** Dose (4 mg/kg/day); 50:50 DMSO/isotonic saline used; controls received mp w/ vehicle; animal info (male; 3 and 16-months old); blood pressure measured via femoral artery cannula; antihypertensive; cardiovascular (hypertension);

**Q11715:** J. Faakye, *et al.* Preventing spontaneous cerebral microhemorrhages in aging mice: a novel approach targeting cellular senescence with ABT263/navitoclax. *Geroscience* 2024;46(1):21-37

**Agents:** Angiotensin II **Vehicle:** Saline; **Route:** SC; **Species:** Mice; **Strain:** C57BL/6; **Pump:** 2006; **Duration:** 47 days;

**ALZET Comments:** Dose (1 ug/min/kg); controls received mp w/ vehicle; animal info (6 months old); isoflurane anesthesia; post op. care (buprenorphine analgesia 0.1 mg/kg); blood pressure measured via tail-cuff; 115 mmHg-155 mmHg; cardiovascular;

**Q12123:** Y. El-Hakim, *et al.* Peripheral, but not central, IGF-1 treatment attenuates stroke-induced cognitive impairment in middle-aged female Sprague Dawley rats: The gut as a therapeutic target. *Brain Behavior and Immunity* 2024;122(150-166

**Agents:** Insulin-like growth factor-1, human recombinant **Vehicle:** PBS; **Route:** CSF/CNS (intracerebroventricular); **Species:** Rat; **Strain:** Sprague- Dawley; **Pump:** 1007D; **Duration:** 48 hours;

**ALZET Comments:** controls received mp w/ vehicle; animal info (female; 12 months old); ischemia (stroke); behavioral testing (maze; memory; social interaction); aging;

**Q12122:** S. Eitmann, *et al.* Activity of the hypothalamic neuropeptide Y increases in adult and decreases in old rats. *Scientific Reports* 2024;14(1):22676

**Agents:** Neuropeptide Y **Vehicle:** Saline, pyrogen-free; **Route:** CSF/CNS (right lateral ventricle); **Species:** Rat; **Strain:** Wistar; **Pump:** 2001; **Duration:** 7 days;

**ALZET Comments:** Dose (1 µg/µl/h); controls received mp w/ vehicle; animal info (male 3, 6, 12, 18, 24 months of age); post op. care (intramuscular gentamycin 2 mg/kg); ALZET brain infusion kit used; obesity; aging;



### Alzheimer's Research (2024-Present)

**Q12070:** A. Carles, *et al.* Neuroprotection by chronic administration of Fluoroethylnormemantine (FENM) in mouse models of Alzheimer's disease. *Alzheimers Research & Therapy* 2025;17(1):7

**Agents:** Fluoroethylnormemantine **Vehicle:** Saline; **Route:** SC; **Species:** Mice; **Strain:** C57BL/6, APP/PS1; **Pump:** 1007D; 1004; **Duration:** 7 days; 11 days;

**ALZET Comments:** dose-response (0.03 - 0.3 mg/kg/day); 0.9%, saline used; controls received mp w/ vehicle; animal info (6 weeks, 10 months old, isoflurane anesthesia); comparison of IP injection vs mp; behavioral testing (novel objective test; Y-maze); neurodegenerative (Alzheimer's); "...we confirmed the neuroprotective efficacy of FENM and demonstrated the efficacy of SC infusion in two mouse models of AD, namely the pharmacological A $\beta$ 25-35 model and the transgenic APP/PS1 line" p 14;

**Q12222:** A. Badea, *et al.* Neuroimaging biomarkers of neuroprotection: Impact of voluntary versus enforced exercise in Alzheimer's disease models. *Magnetic Resonance Imaging* 2025;121(110406

**Agents:** Manganese chloride **Vehicle:** Bicine; **Route:** Not Stated; **Species:** Mice; **Strain:** CVN-AD; **Pump:** 1007D; **Duration:** Not Stated;

**ALZET Comments:** Dose (64  $\mu$ m/ $\mu$ l); animal info (female, ketamine xylazine anesthesia); behavioral testing (sucrose preference test; novel object recognition; novelty recognition trial); neurodegenerative (Alzheimer's); MRI;

**Q12615:** H. J. Yang, *et al.* Efficacy and Mechanism of Schisandra chinensis Fructus Water Extract in Alzheimer's Disease: Insights from Network Pharmacology and Validation in an Amyloid-beta Infused Animal Model. *Nutrients* 2024;16(21):

**Agents:** Amyloid-B Peptide (25-35) **Vehicle:** Not Stated; **Route:** CSF/CNS (hippocampus); **Species:** Rats; **Strain:** Sprague Dawley; **Pump:** Not Stated; **Duration:** 14 days;

**ALZET Comments:** Dose (3.6 nmol/day); animal info (Male 192  $\pm$  30 g, ketamine, xylazine anesthesia); peptides; brain coordinates (lateral: -3.3 mm from bregma; posterior: 2.0 mm from midline; ventral: -2.5 mm from dura); behavioral testing (Y-shaped maze; passive avoidance tes; water maze setup); neurodegenerative (Alzheimer's);

**R0481:** S. Scheggi, *et al.* Expanding the therapeutic potential of neuro(active)steroids: a promising strategy for hyperdopaminergic behavioral phenotypes. *Neuroscience and Biobehavioral Reviews* 2024;164(105842

**Agents:** Allopregnanolone **Vehicle:** Not Stated; **Route:** Not Stated; **Species:** Not Stated; **Strain:** Not Stated; **Pump:** Not Stated; **Duration:** Not Stated;

**ALZET Comments:** neurodegenerative (Alzheimer's disease); "Continuous AP exposures through implanted Alzet® osmotic pump impairs learning and memory in mice models of Alzheimer's disease" pg. 8;

**Q12358:** M. Mey, *et al.* Therapeutic benefits of central LH receptor agonism in the APP/PS1 AD model involve trophic and immune regulation and are reproductive status dependent. *BBA - Molecular Basis of Disease* 2024;1870(5):167165

**Agents:** Gonadotropin; human chorionic **Vehicle:** Cerebrospinal fluid, artificial; **Route:** CSF/CNS (right lateral ventricle); **Species:** Mice; **Strain:** C57/BJ6; **Pump:** 1004; **Duration:** 8 weeks;

**ALZET Comments:** Dose (30 mIU/day); controls received mp w/ vehicle; animal info (female; 8 months old); pumps replaced after 4 weeks; peptides; ALZET brain infusion kit 3 used; brain coordinates (from bregma; anterior posterior -0.05 mm, medial/lateral -0.11, and dorsal ventral -0.25 mm); cannula placement verified via injecting fast green through the tubing at sacrifice; behavioral testing (Maze; Open field; Light/dark box procedure); neurodegenerative (Alzheimer's);

**Q12323:** C. F. Liu, *et al.* Lactocaseibacillus-deglycosylated isoflavones prevent Abeta 40-induced Alzheimer's disease in a rat model. *AMB Express* 2024;14(1):90

**Agents:** Amyloid-beta 40 **Vehicle:** Acetonitrile; Trifluoroacetic acid; **Route:** CSF/CNS (intracerebroventricular); **Species:** Rats; **Strain:** Sprague-Dawley; **Pump:** 2004; **Duration:** 28 days;

**ALZET Comments:** Dose (24.299  $\mu$ g/180  $\mu$ l); 35% acetonitrile, 0.1% trifluoroacetic acid used; controls received mp w/ vehicle; animal info (male; 6-8 weeks old; 300 g, sodium pentobarbital anesthesia); peptides; brain coordinates (left skull relative to bregma 0.8 mm posterior, 1.4 mm lateral); dental cement used; behavioral testing (maze; memory; learning); neurodegenerative (Alzheimer's disease);



**Q12290:** C. Leal, *et al.* Effects of the therapeutic correction of U1 snRNP complex on Alzheimer's disease. *Scientific Reports* 2024;14(1):30085

**Agents:** APT20TTMG **Vehicle:** aCSF; **Route:** CSF/CNS (intracerebroventricular); **Species:** Mice; **Strain:** SAMP8/8TaHsd; **Pump:** 2006; **Duration:** 42 days;

**ALZET Comments:** Dose (83.3 ug/mL/0.3 ug/d or 833.3 ug/mL/3 ug/d); animal info (female 7–8 weeks, isoflurane anesthesia); post op. care: Carprofen, 5 mg/kg via s.c.; brain coordinates (A/P -0.5 mm, M/L 1.0 mm, and D/V 1.7 mm); cyanoacrylate adhesive; behavioral testing (Morris water maze test; CFC test, freezing behavior); neurodegenerative (Alzheimer's); good methods (p. 13);

**Q11767:** Y. K. Kim, *et al.* Identification of IGF-1 Effects on White Adipose Tissue and Hippocampus in Alzheimer's Disease Mice via Transcriptomic and Cellular Analysis. *International Journal of Molecular Sciences* 2024;25(5):

**Agents:** siRNA-siPORTNeoFX **Vehicle:** Not Stated; **Route:** CSF/CNS (lateral ventricle); **Species:** Mice; **Strain:** APP/PS2; **Pump:** Not Stated; **Duration:** Not Stated;

**ALZET Comments:** animal info (male; 3 months old); ALZET brain infusion kit used; brain coordinates (ML 1 mm, AP 0.3 mm based on bregma); neurodegenerative (Alzheimer's); gene therapy;

**Q12043:** L. K. Hamilton, *et al.* Central inhibition of stearyl-CoA desaturase has minimal effects on the peripheral metabolic symptoms of the 3xTg Alzheimer's disease mouse model. *Scientific Reports* 2024;14(1):7742

**Agents:** SCD1 inhibitor **Vehicle:** DMSO; **Route:** CSF/CNS (intracerebroventricular); **Species:** Mice; **Strain:** 3xTg-AD; WT; **Pump:** 1004; **Duration:** 28 days;

**ALZET Comments:** controls received mp w/ DMSO/aCSF; animal info (9 month old, isoflurane anesthesia); brain coordinates (0.0 mm antero-posterior and 0.9 mm lateral to Bregma); neurodegenerative (Alzheimer's); "The ICV infusion paradigm for SCD1 used here results in remarkable improvements in brain structure and function of 3xTg-AD mice, including a recovery of learning and memory in mid-life" pg. 8;

**Q12193:** H. J. Ham, *et al.* Inhibition of Amyloid-beta (Abeta)-Induced Cognitive Impairment and Neuroinflammation in CH13L1 Knockout Mice through Downregulation of ERK-PTX3 Pathway. *International Journal of Molecular Sciences* 2024;25(10):

**Agents:** Amyloid-beta (1-42), oligomeric **Vehicle:** Saline; **Route:** CSF/CNS (dentate gyrus of hippocampus); **Species:** Mice; **Strain:** WT:CH13L1KO, C57BL/L6; **Pump:** 1002; **Duration:** 14 days;

**ALZET Comments:** Dose (300 pmol/day); controls received mp w/ vehicle; animal info (10 weeks old); peptides; ALZET brain infusion kit 3 used; brain coordinates (AP, -2 mm; ML, ±1.3 mm; DV, -2.2 mm); behavioral testing (morris water maze; probe; memory); neurodegenerative (Alzheimer's);

**Q12164:** L. M. Frago, *et al.* Reduction in Hippocampal Amyloid-beta Peptide (Abeta) Content during Glycine-Proline-Glutamate (Gly-Pro-Glu) Co-Administration Is Associated with Changes in Inflammation and Insulin-like Growth Factor (IGF)-I Signaling. *International Journal of Molecular Sciences* 2024;25(11):

**Agents:** Amyloid beta 25-35 **Vehicle:** Acetic acid; **Route:** CSF/CNS (right ventricle); **Species:** Rat; **Strain:** Wistar; **Pump:** Not Stated; **Duration:** 14 days;

**ALZET Comments:** Dose (300 pmol/day); 1% acetic acid used; controls received mp w/ vehicle; animal info (female, 8 weeks of age, 250-280g); peptides; brain coordinates (-0.3 mm anteroposterior, 1.1 mm lateral); neurodegenerative (Alzheimer's); "Here, we report that GPE blocks most of the changes in cytokine content in the hippocampus induced by the continuous infusion of Aβ and that this effect may be mediated by preserving the activation of leptin- and IGF-I-related signaling pathways," pg. 8;

**Q12130:** A. K. Evans, *et al.* Impact of noradrenergic inhibition on neuroinflammation and pathophysiology in mouse models of Alzheimer's disease. *Journal of Neuroinflammation* 2024;21(1):322

**Agents:** Clozapine-N-oxide **Vehicle:** Not Stated; **Route:** Not Stated; **Species:** Mice; **Strain:** 5XFAD; **Pump:** 1004; **Duration:** 1 month;

**ALZET Comments:** Dose (2 mg/kg/day); animal info (6.5 months old); brain coordinates (A/P -5.45 mm, M/L +/- 1.3 mm, D/V -3.8 mm & -3.4 mm); behavioral testing (Activity chamber; Y-maze: forced alternation); neurodegenerative (Alzheimer's);



### Arthritis Research (2021-Present)

**Q12541:** L. Romero-Castillo, *et al.* Tolerogenic antigen-specific vaccine induces VISTA-enriched regulatory T cells and protects against arthritis in DRB1 \*04:01 mice. *Molecular Therapy* 2025;33(8):3528-3545

**Agents:** DR4-peptide complexes **Vehicle:** Not Stated; **Route:** SC; **Species:** Mice; **Strain:** Parker; **Pump:** 2001D; **Duration:** 72 h  
**ALZET Comments:** Dose (100 µg); animal info (8–10 week-old male and female); post op. care (subcutaneous buprenorphine (temgesic) at 0.2 mg/kg); comparison of three s.c. injections spaced every 4 hours injection vs mp; immunology;

**Q12430:** M. Dolmat, *et al.* Disease modifying biomaterials for modulating mechanical allodynia in a preclinical model of rheumatoid arthritis. *Bioengineering & Translational Medicine* 2025;

**Agents:** Tofacitinib **Vehicle:** Not Stated; **Route:** Not Stated; **Species:** Mice; **Strain:** SKG; **Pump:** Not Stated; **Duration:** Not Stated;

**ALZET Comments:** continuous tofacitinib delivery is effective in delayed-onset arthritis model;

**Q12238:** H. K. Collins, *et al.* Adipose-derived leptin and complement factor D mediates osteoarthritis severity and pain. *Science Advances* 2025;

**Agents:** Leptin **Vehicle:** Saline; **Route:** SC; **Species:** Mice; **Strain:** C57BL/6J; **Pump:** 2006; **Duration:** 13 weeks;

**ALZET Comments:** Dose (1 mg); controls received mp w/ vehicle; animal info (15 weeks); pumps replaced once at week 5; long-term study; behavioral testing (pain-related); replacement therapy; obesity; "To understand the impact of systemic leptin repletion in LD mice, and whether that would be sufficient to reintroduce cartilage damage and pain, we implanted LD mice with osmotic pumps 1 week before DMM to administer leptin (0.15 µl/hour) or saline over 6 weeks." p. 4;

**Q12159:** M. N. Ferrao Blanco, *et al.* A multi-model approach identifies ALW-II-41-27 as a promising therapy for osteoarthritis-associated inflammation and endochondral ossification. *Heliyon* 2024;10(23):e40871

**Agents:** ALW-II-41-27 **Vehicle:** DMSO, PEG; **Route:** SC; **Species:** Mice; **Strain:** C57BL/6; **Pump:** 1004; **Duration:** 14 days;

**ALZET Comments:** Dose (1.7 µg/hr, 6.6 µg/hr); 55:45 DMSO:PEG used; controls received mp w/ vehicle; animal info (12-week-old male 27.01 g ± 2.05 g); tyrosine kinase inhibitor; "Additionally, systemic subcutaneous administration of ALW II-41-27 in a mouse osteoarthritic model attenuated joint degeneration by reducing local inflammation and pathological endochondral ossification." pg. 1;

**Q11480:** M. S. Valerio, *et al.* Effect of Targeted Cytokine Inhibition on Progression of Post-Traumatic Osteoarthritis Following Intra-Articular Fracture. *International Journal of Molecular Sciences* 2023;24(17):

**Agents:** Anakinra; infliximab **Vehicle:** Saline; **Route:** SC; **Species:** Rat; **Strain:** Lewis; **Pump:** Not Stated; **Duration:** 14 days;

**ALZET Comments:** Dose (INX 10 mg/kg/day); (ANR 100 µg/kg/day) 0.9% physiologic saline used; controls received mp w/ vehicle; animal info (male 300–350 g); post op. care (buprenorphine SR 1 mg/kg or pain management); ANR is an IL-1 receptor antagonist;

**Q11771:** A. Kumari, *et al.* The emerging potential of siRNA nanotherapeutics in treatment of arthritis. *Asian Journal of Pharmaceutical Science* 2023;18(5):100845

**Agents:** AMD3100 **Vehicle:** Not Stated; **Route:** SC; **Species:** Guinea pig; **Strain:** Not Stated; **Pump:** Not Stated; **Duration:** Not Stated;

**ALZET Comments:** Dose (44.44 mg/ml); immunology; "SDF-1 entered the cartilage, leading to reduced proteoglycan staining. The blocked of SDF-1, CXCR4 signaling reduced the levels of SDF-1, MMPs, GAG and IL-1b in synovial fluid showing promising therapeutics option to decreased cartilage degeneration in OA.";

**Q11273:** Y. Fu, *et al.* Effects of Leptin and Body Weight on Inflammation and Knee Osteoarthritis Phenotypes in Female Rats. *JBMR Plus* 2023;7(7):e10754

**Agents:** Leptin, recombinant **Vehicle:** Tris hydrochloride; **Route:** SC; **Species:** Rat; **Strain:** Zucker (F344 BN F1); **Pump:** 2006; **Duration:** 23 weeks;

**ALZET Comments:** Dose (3.6 µg/day); Controls received mp w/ vehicle; animal info (Female; Obese; 12 months old, hybrid); pumps replaced every 5 weeks; long-term study; functionality of mp verified by plasma levels p. 7



### Atherosclerosis Research (2021-Present)

**Q11809:** S. Oh, *et al.* The Effects of Nicotine on Re-endothelialization, Inflammation, and Neoatherosclerosis After Drug-Eluting Stent Implantation in a Porcine Model. *Korean Circulation Journal* 2025;55(1):50-64

**Agents:** Nicotine **Vehicle:** Not Stated; **Route:** SC; **Species:** Pig; **Strain:** Yorkshire x Landrace; **Pump:** 2ML4; **Duration:** 8 weeks; **ALZET Comments:** functionality of mp verified by blood nicotine concentration; pumps replaced after 4 weeks; dependence;

**Q12261:** H. X. Zhu, *et al.* Intermedin(1-53) Improves Atherosclerosis by Reducing Local Endothelial Damage via AMPK Signaling Pathway in Obese apoE-Deficient Mice. *Journal of Inflammation Research* 2025;18(6583-6596

**Agents:** Intermedin (1-53), human **Vehicle:** Saline, sterile; **Route:** SC; **Species:** Mice; **Strain:** ApoE-/- **Pump:** 2004 **Duration:** 4w **ALZET Comments:** Dose (300 ng/kg/h); animal info (Twenty-week-old male); cardiovascular; obesity; therapeutic indication (atherosclerosis);

**Q12329:** Y. Liu, *et al.* Deficiency of 5-HT(2B) receptors alleviates atherosclerosis by regulating macrophage phenotype through inhibiting interferon signalling. *British Journal of Pharmacology* 2025;182(20):4894-4910

**Agents:** BW723C86 **Vehicle:** DMSO; Water, distilled; **Route:** SC; **Species:** Mice; **Strain:** ApoE-/-; **Pump:** 2004; **Duration:** 8 w **ALZET Comments:** Dose (3 mg/kg/day); 20% DMSO in distilled water used; controls received mp w/ vehicle; animal info (male; 8 weeks old, isoflurane anesthesia); pumps replaced every month; receptor agonist (5-HT2B);cardiovascular;

**Q12293:** Y. N. Lee, *et al.* Fluorescent gold nanoclusters possess multiple actions against atherosclerosis. *Redox Biology* 2024;78(103427

**Agents:** Nanodusters, fluorescent gold **Vehicle:** PBS; **Route:** IP; **Species:** Mice; **Strain:** ApoE-deficient, C57BL/6J background; **Pump:** 2004; **Duration:** 8 weeks;

**ALZET Comments:** Dose (20 uM); controls received mp w/ vehicle; animal info (male, eight week-old, pentobarbital IP anesthesia); pumps replaced after 4 weeks; comparison of oral vs mp; cardiovascular; atherosclerosis; "...suggesting a stable, continuous delivery of FANC into the animals by the osmotic minipumps rather than a discontinuous, intermittent delivery by oral intake of FANC" pg. 11;

**Q12049:** Z. He, *et al.* Resolvin D1 delivery to lesional macrophages using antioxidative black phosphorus nanosheets for atherosclerosis treatment. *Nanotechnology* 2024;19(9):1386-1398

**Agents:** Angiotensin II **Vehicle:** Saline; **Route:** SC; **Species:** Mice; **Strain:** ApoE-/-, C5BL/6J background; **Pump:** 2004; **Duration:** 28 days;

**ALZET Comments:** Dose (1000 ng/kg/min); controls received mp w/ vehicle; animal info (14 weeks old); blood pressure measured via tail-cuff method; peptides; cardiovascular;

**Q11400:** A. Mallen, *et al.* Sex Differences in Glomerular Lesions, in Atherosclerosis Progression, and in the Response to Angiotensin-Converting Enzyme Inhibitors in the ApoE(-/-) Mice Model. *International Journal of Molecular Sciences* 2023;24(17):

**Agents:** Angiotensin II **Vehicle:** PBS; **Route:** SC; **Species:** Mice; **Strain:** C57BL/6; **Pump:** 1002; **Duration:** 2 weeks;

**ALZET Comments:** Dose: 6 ug/kg/min; controls received mp w/ vehicle; animal info (male and female; 8 weeks old); blood pressure measured via tail cuff method; peptides; cardiovascular; nephrology;

**Q11032:** Q. Yu, *et al.* Urotensin II Enhances Advanced Aortic Atherosclerosis Formation and Delays Plaque Regression in Hyperlipidemic Rabbits. *International Journal of Molecular Sciences* 2023;24(4):

**Agents:** Urotensin II **Vehicle:** Saline; **Route:** SC; **Species:** Rabbit; **Strain:** Not Stated; **Pump:** 2006; **Duration:** 6 weeks; 12 weeks; 24 weeks;

**ALZET Comments:** Dose: 5.4 ug/kg/h; Controls received mp w/ vehicle; animal info: Male/female rabbits, six weeks old; pumps replaced every 6 weeks; Blood pressure/heart rate measured via medial auricular artery; cardiovascular; atherosclerosis



**Q11030:** D. Ye, *et al.* Antisense oligonucleotides targeting hepatic angiotensinogen reduce atherosclerosis and liver steatosis in hypercholesterolemic mice. *Global Translational Medicine* 2023;2(1):

**Agents:** Losartan **Vehicle:** Water; **Route:** SC; **Species:** Mice; **Strain:** LDL receptor -/-; **Pump:** 2006; **Duration:** 12 weeks;  
**ALZET Comments:** Dose: Losartan 15 mg/kg/day; Controls received mp w/ vehicle; animal info: Male ~8 weeks old; pumps replaced after 6 weeks; Blood pressure measured via: Tail cuff; Blood pressure measurement results (see pg. 3) fig. 1; cardiovascular (liver steatosis, atherosclerosis)

**Q11018:** Y. Wang, *et al.* Moxonidine Increases Uptake of Oxidised Low-Density Lipoprotein in Cultured Vascular Smooth Muscle Cells and Inhibits Atherosclerosis in Apolipoprotein E-Deficient Mice. *International Journal of Molecular Sciences* 2023;24(4):

**Agents:** Angiotensin II **Vehicle:** Not Stated; **Route:** SC; **Species:** Mice; **Strain:** ApoE-/-; **Pump:** 2004; **Duration:** 28 days;  
**ALZET Comments:** Dose: (1 ug/kg body weight/min); animal info: Male 3 months old; cardiovascular; atherosclerosis

**Q11136:** W. Lian, *et al.* CXCL12 Inhibition Prevents Telomere Shortening and Repression of Telomerase Activity in Both Early and Late Post-menopausal Atherosclerosis via ABCA1 Upregulation. *Proceedings of the Bulgarian Academy of Sciences* 2023;76(3):429-439

**Agents:** POL5551 **Vehicle:** PBS; **Route:** SC; **Species:** Mice; **Strain:** C57BL/6; **Pump:** 1007D; **Duration:** 2 weeks;  
**ALZET Comments:** Dose (30 mg/kg/day); Controls received mp w/ vehicle; animal info (Female; 8-9 weeks old); receptor antagonist (CXCR4); cardiovascular;

**Q11236:** J. An, *et al.* Nicotine exacerbates atherosclerosis and plaque instability via NLRP3 inflammasome activation in vascular smooth muscle cells. *Theranostics* 2023;13(9):2825-2842

**Agents:** Nicotine **Vehicle:** Saline; **Route:** Not Stated; **Species:** Mice; **Strain:** Apoe-/-; **Pump:** 2006; **Duration:** 6 weeks;  
**ALZET Comments:** Dose (5 mg/kg/day); 0.9% NaCl used; Controls received mp w/ vehicle; animal info (Male; 8 weeks old; Fed Western diet of 21% milk fat and 0.15% cholesterol); toxicology; "...nicotine infusion for 6 weeks significantly increased the plaque size and plaque area percentage of internal elastic lamina area in BA compared with that of vehicle-treated mice. These data suggest that nicotine, the core component in cigarette smoking and electronic cigarette smoking, markedly aggravates atherogenesis in Apoe-/- mice." p. 4

**Q11623:** H. A. Uchida, *et al.* Edaravone Attenuated Angiotensin II-Induced Atherosclerosis and Abdominal Aortic Aneurysms in Apolipoprotein E-Deficient Mice. *Biomolecules* 2022;12(8):

**Agents:** Angiotensin II **Vehicle:** Saline; **Route:** SC; **Species:** Mice; **Strain:** Apo-/-; **Pump:** 2004; **Duration:** 28 days;  
**ALZET Comments:** Dose (1000 ng/kg/min); Controls received mp w/ vehicle; animal info (Male; 8-12 weeks old); Blood pressure measured via tail-cuff method; peptides; cardiovascular;

**R0404:** H. Williams, *et al.* Use of Mouse Carotid Artery Ligation Model of Intimal Thickening to Probe Vascular Smooth Muscle Cell Remodeling and Function in Atherosclerosis. *Methods in Molecular Biology* 2022;2419(537-560

**Agents:** Uridine, bromodeoxy- **Vehicle:** Not Stated; **Route:** SC; **Species:** Mice; **Strain:** Not Stated; **Pump:** Not Stated;  
**Duration:** 1 day; 6 weeks;

**ALZET Comments:** Dose: (0.11 )animal info: male and female adult 2 mos old; post op. care: 1.5 µg of buprenorphine hydrochloride (Vetergesic); Bromodeoxyuridine aka (BrdU)

**Q10707:** P. F. Tsui, *et al.* An Octimibate Derivative, Oxa17, Enhances Cholesterol Efflux and Exerts Anti-Inflammatory and Atheroprotective Effects in Experimental Atherosclerosis. *Biochemical Pharmacology* 2021;188(114581

**Agents:** Oxa17 **Vehicle:** DMSO; **Route:** SC; **Species:** Mice; **Strain:** C57BL/6; Oxa17; **Pump:** 2006; **Duration:** 8 weeks;  
**ALZET Comments:** Controls received mp w/ vehicle; animal info: Eight-week-old male mice, is an octimibate derivative; Therapeutic indication (atherosclerosis)

**Q10333:** S. K. Sinha, *et al.* Local M-CSF (Macrophage Colony-Stimulating Factor) Expression Regulates Macrophage Proliferation and Apoptosis in Atherosclerosis. *Arteriosclerosis Thrombosis and Vascular Biology* 2021;41(1):220-233

**Agents:** Uridine, bromodeoxy- **Vehicle:** Not Stated; **Route:** SC; **Species:** Mice; **Strain:** Wild-type; **Pump:** 1002; **Duration:** 2 w  
**ALZET Comments:** Dose: (50 µg per day); animal info: 8- to 10-week-old female and male; cardiovascular



### Dementia Research (2017-Present)

**Q11399:** 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; **Species:** Mice; **Strain:** C57BL/6; **Pump:** 1002; **Duration:** 14 days;

**ALZET Comments:** Dose (0.75 pg/h); controls received mp w/ vehicle; animal info (male; 23 weeks old); peptides; brain coordinates (0.6 mm posterior and 1.2 mm lateral from the bregma); dental cement used; therapeutic indication (Alzheimer's and Lewy body dementia);

**Q9406:** S. Park, *et al.* Intermittent fasting with a high-protein diet mitigated osteoarthritis symptoms by increasing lean body mass and reducing inflammation in osteoarthritic rats with Alzheimer's disease-like dementia. *British Journal of Nutrition* 2021;1-13

**Agents:** Amyloid protein, beta (25-35) **Vehicle:** Saline, sterile; **Route:** CSF/CNS (hippocampus); **Species:** Rat; **Duration:** 14d

**ALZET Comments:** Dose (3 to 6 nmol/d); animal info (Sprague-Dawley female rats, 10 weeks, 235 g); Brain coordinates (lateral, -3-3 mm from the bregma; posterior, 2-0 mm from the midline; ventral, -2.5 mm from the dura);

**Q9277:** A. K. E. Hornsby, *et al.* Unacylated-Ghrelin Impairs Hippocampal Neurogenesis and Memory in Mice and Is Altered in Parkinson's Dementia in Humans. *Cell Report Medicine* 2020;1(7):100120

**Agents:** Ghrelin, unacylated **Vehicle:** Saline, sterile; **Route:** SC; **Species:** Mice; **Pump:** 1007D; **Duration:** 7 days;

**ALZET Comments:** Dose (48 ug/day); Controls received mp w/ vehicle; animal info (six-month old homozygous GOAT null mice); unacylated Ghrelin aka UAG; neurodegenerative (Parkinson's Dementia);

**Q8384:** S. K. S. Bengtsson, *et al.* GABA-A receptor modulating steroids in acute and chronic stress; relevance for cognition and dementia? *Neurobiology of Stress* 2020;12

**Agents:** Allopregnanolone; **Route:** SC; **Species:** Mice; **Duration:** 4 weeks;

**ALZET Comments:** Controls received mp w/ vehicle; animal info (wild-type mice, 10 weeks old); Allopregnanolone aka AP $\alpha$ ; neurodegenerative (Cognitive dysfunction, dementia and Alzheimer's disease);

**Q9052:** M. Wang, *et al.* Astrocytic connexin 43 potentiates myelin injury in ischemic white matter disease. *Theranostics* 2019;9(15):4474-4493

**Agents:** Cabenexolone; Meclofenamic Acid; Gap 26; Gap 19 **Vehicle:** Saline; **Route:** CSF/CNS; **Species:** Mice; **Pump:** 1004; **Duration:** 4 weeks;

**ALZET Comments:** Dose (CBX- 0.1, 0.5 or 2.5 ug/ul, MFA- 0.1, 1, or 10 mM, Gap 26- 2.0 ug/ul, Gap 19 2.0 ug/ul ); Controls received mp w/ vehicle; animal info (Male, C57BL/6, 10-12 weeks old, 22-27 g); Cabenexolone aka CBX, Meclofenamic Acid aka MFA, Gap 26, or Gap 19 aka XX; ALZET brain infusion kit 3 used; Brain coordinates (anterior-posterior = -0.4 mm, medial-lateral = 1.0 mm, and dorsal-ventral = 3.0 mm); dental cement used; neurodegenerative (Dementia);

**Q8135:** A. Montagne, *et al.* Pericyte degeneration causes white matter dysfunction in the mouse central nervous system. *Nat Med* 2018;24(3):326-337

**Agents:** Anrod **Vehicle:** Saline; **Route:** SC; **Species:** Mice; **Pump:** 2002; **Duration:** 14 days;

**ALZET Comments:** Dose (0.52 ul/hr); Controls received mp w/ vehicle; animal info (12 weeks old, ); neurodegenerative

**Q5727:** Y. Zhu, *et al.* Protective Effect of 17beta-Estradiol Upon Hippocampal Spine Density and Cognitive Function in an Animal Model of Vascular Dementia. *Sci Rep* 2017;7(42660

**Agents:** Estradiol, 17b- **Vehicle:** Not Stated; **Route:** SC; **Species:** Rat; **Pump:** 2006; **Duration:** Not Stated;

**ALZET Comments:** Controls received mp w/ 20% cyclodextrin; animal info (male, Sprague Dawley, 250-300g, adult); functionality of mp verified by serum levels; behavioral testing (Morris water maze); replacement therapy (estradiol infusion); long-term study; cardiovascular; Dose (0.05 ug/h); "exogenous E2 replacement produced E2 levels of 25-33pg/ml" (pg 2);



### Glaucoma Research

**Q11654:** S. F. Brown, *et al.* ANGPTL7 and Its Role in IOP and Glaucoma. *Investigative Ophthalmology & Visual Science*, 2024;65(3):22

**Agents:** Dexamethasone-cyclodextran solution **Vehicle:** PBS; **Route:** SC; **Species:** Mice; **Strain:** C57BL/6; **Pump:** 1004; **Duration:** 28 days;

**ALZET Comments:** Dose (4 mg/kg/d); controls received mp w/ vehicle; animal info (9-12 weeks old, 30 g); Industry authored (Broadwing Bio);

**Q11426:** J. O'Callaghan, *et al.* Matrix metalloproteinase-3 (MMP-3)-mediated gene therapy for glaucoma. *Science Advances* 2023;

**Agents:** Dexamethasone; cyclodextrin **Vehicle:** PBS; **Route:** SC; **Species:** Mice; **Strain:** C57BL/6; **Pump:** 1004; **Duration:** 2 w

**ALZET Comments:** Dose (2 mg/kg per day); controls received mp w/ vehicle; animal info (Adult, 10 to 12 weeks of age);

**Q11049:** S. Kumar, *et al.* Neuroprotection of Retinal Ganglion Cells Suppresses Microglia Activation in a Mouse Model of Glaucoma. *ARVO Journals* 2023;64(7):24

**Agents:** Meclofenamic acid **Route:** CSF/CNS; **Species:** Mice; **Strain:** C57BL/6; **Pump:** 2004; **Duration:** 4 weeks;

**ALZET Comments:** Dose (20 mg/kg/d); animal info: adult, 3-4 months old, both sexes; pumps replaced after 4 weeks;

**Q10222:** S. Kumar, *et al.* Neuroprotection of the Inner Retina Also Prevents Secondary Outer Retinal Pathology in a Mouse Model of Glaucoma. *Investigative Ophthalmology & Visual Science*, 2021;62(9):35

**Agents:** Meclofenamic Acid **Vehicle:** Not Stated; **Route:** SC; **Species:** Mice; **Strain:** C57BL/6; WT; **Pump:** 2004;

**ALZET Comments:** Dose: (20 mg/kg/day); Controls received mp w/ no vehicle; animal info: mice and on connexin 36 knock-out mice; pumps replaced at 4 weeks; Meclofenamic acid aka (MFA); neurodegenerative (Glaucoma);

**Q6465:** J. M. Harder, *et al.* Early immune responses are independent of RGC dysfunction in glaucoma with complement component C3 being protective. *Proc Natl Acad Sci U S A* 2017;114(19):E3839-E3848

**Agents:** AG1478 **Vehicle:** DMSO; **Route:** SC; **Species:** Mice **Strain:** D2.C3-/-; B6;129S4-C3tm1Crr/J **Pump:** 2004;

**Duration:** 3.5 months;

**ALZET Comments:** Dose (12 mg/kg/d); Controls received mp w/ vehicle; pumps replaced every 39 days; enzyme inhibitor (EGFR); Lynch coil;

**Q5942:** A. Akopian, *et al.* Targeting neuronal gap junctions in mouse retina offers neuroprotection in glaucoma. *J Clin Invest* 2017;127(7):2647-2661

**Agents:** Meclofenamic acid **Route:** SC; **Species:** Mice; **Strain:** C57BL/6; CxWT; **Pump:** 2004; **Duration:** 8 weeks;

**ALZET Comments:** animal info (3-4 months); pumps replaced every 4 weeks; comparison of injection vs mp; stress/adverse reaction: We found that animals in which sc minipumps were inserted for MFA delivery had significant problems swimming the water maze, which compromised the ability to assess the visual behavioral tests (page 2659); Dose (5, 10, 20 mg/kg/d);

**Q5012:** J. K. a. M.-S. Kim. The Evaluation of Osmotic Pump as Glaucoma Drug Delivery System in Normal Dogs. *Pakistan Veterinary Journal* 2015;35(2):239-241

**Agents:** Dorzolamide; timolol; **Route:** SC (Eye); **Species:** Dog; **Strain:** Beagle; **Pump:** 2004; **Duration:** 24 days;

**ALZET Comments:** Controls received no mp; Controls received no mp; "Osmotic pump, as one of the constant drug delivery systems, can be placed in the subcutaneous pocket with minimal surgical skills, and continuously administer the wanted drugs into the target regions" pg 241; picture of implantation pg 240; Interesting (use of pump in veterinary application);

**Q2860:** E. Nitta, *et al.* Aldosterone: a mediator of retinal ganglion cell death and the potential role in the pathogenesis in normal-tension glaucoma. *Cell Death & Disease* 2013;4(:):U109-U114

**Agents:** Aldosterone **Vehicle:** DMSO; **Route:** SC; **Species:** Rat; **Strain:** Sprague Dawley; **Pump:** 2006; **Duration:** 6 weeks;

**ALZET Comments:** Control animals received mp w/ vehicle; animal info (male, 200-250 g); up to 5% DMSO used; long-term



**Q2976:** G. Foureaux, *et al.* Antiglaucomatous Effects of the Activation of Intrinsic Angiotensin-Converting Enzyme 2. INVESTIGATIVE OPHTHALMOLOGY & VISUAL SCIENCE 2013;54(6):4296-4306

**Agents:** A-779 **Vehicle:** Not Stated; **Route:** SC; **Species:** Rat; **Strain:** Wistar; **Pump:** Not Stated; **Duration:** Not Stated; **ALZET Comments:** Animal info (male, 180-220g)

**P9208:** C. J. Dong, *et al.* alpha-2 adrenergic modulation of NMDA receptor function as a major mechanism of RGC protection in experimental glaucoma and retinal excitotoxicity. Investigative Ophthalmology & Visual Science 2008;49(10):4515-4522

**Agents:** Brimonidine; Memantine; Atipamezole **Vehicle:** Not Stated; **Route:** SC; **Species:** Rat; **Strain:** Sprague Dawley; **Pump:** Not Stated; **Duration:** 2 weeks;

**ALZET Comments:** Enzyme inhibitor (PDE-4); animal info (male, 350-400 g.); Brimonidine also known as UK14304

**Q7597:** L. A. Wheeler, *et al.* Alpha-2 adrenergic receptor agonists are neuroprotective in experimental models of glaucoma. European Journal of Ophthalmology 2001;11 Suppl 2(S30-5)

**Agents:** Brimonidine; timolol **Vehicle:** Not Stated; **Route:** SC; **Species:** Rat; **Strain:** Sprague Dawley; **Pump:** Not Stated; **Duration:** 3 weeks;

**ALZET Comments:** Dose ((brimonidine 1 mg/kg/day),(timolol 2 mg/kg/day)); Controls received mp w/ vehicle; Therapeutic indication (neuroprotection of retinal ganglion cells);

### Parkinson's Disease Research (2022-Present)

**Q12624:** S. Yaqoob, *et al.* Exploring the Potential of Pyridine Carboxylic Acid Isomers to Discover New Enzyme Inhibitors. Drug Design, Development and Therapy 2025;19(4039-4091)

**Agents:** Pyridine-4-carboxylic acid derivative **Vehicle:** Not Stated; **Route:** Not Stated; **Species:** Not Stated; **Strain:** Not Stated; **Pump:** 2002; **Duration:** Not Stated;

**ALZET Comments:** neurodegenerative (Parkinson's); chronic inhibition against CCR3 evaluated in vivo in several ND animal models;

**Q12600:** Y. Li, *et al.* Shared pathogenic mechanisms of Parkinson's disease and ulcerative colitis: alpha7 nicotinic acetylcholine receptor as a potential therapeutic target. International Journal of Biological Macromolecules 2025;319(Pt 4):145701

**Agents:** Nicotine **Vehicle:** Saline; **Route:** SC; **Species:** Mice; **Strain:** C57BL/6; **Pump:** 1002; **Duration:** 2 weeks;

**ALZET Comments:** Dose (2.0 mg/kg/day); controls received mp w/ vehicle; animal info (Male); behavioral testing (open field test, rotarod); neurodegenerative (Parkinson's disease);

**Q12437:** B. Hyeon, *et al.* Integrating artificial intelligence and optogenetics for Parkinson's disease diagnosis and therapeutics in male mice. Nature Communications 2025;16(1):7797

**Agents:** BT44 **Vehicle:** Propylene Glycol; **Route:** CSF/CNS (striatum); **Species:** Mice; **Strain:** C57BL/6J; **Pump:** 2006; **Duration:** 6 weeks;

**ALZET Comments:** Dose (120 µM); controls received mp w/ vehicle; animal info (Male, 20 weeks at cannulation); Multiple pumps per animal (2); RET receptor agonist; ALZET brain infusion kit 2 used; brain coordinates (AP = 0.7, ML = 1.8, DV = -3 mm); bilateral cannula used; behavioral testing (rotarod, beam walking, open field, tail suspension, AI-based AVATAR 3D kinematic assessments); neurodegenerative (Parkinson's Disease); therapeutic indication (BT44 used to test RET activation as a therapy for Parkinson's);

**Q12434:** F. Gonzalez-Lizarraga, *et al.* Protein Coaggregation in Caribbean Atypical Parkinsonism: The Contribution of Annonacin. Neuropathology and Applied Neurobiology 2025;51(4):e70026

**Agents:** Annonacin **Vehicle:** Not Stated; **Route:** Not Stated; **Species:** Not Stated; **Strain:** Not Stated; **Pump:** Not Stated; **Duration:** Not Stated;

**ALZET Comments:** enzyme inhibitor (mitochondrial Complex I inhibitor); neurodegenerative (Caribbean atypical parkinsonism; tauopathy/synucleinopathy); "Notably, experimental evidence demonstrates that short-term or subchronic administration of annonacin through Alzet minipumps in rodents leads to neurodegenerative changes in the brain without significant formation of LB-like aggregates." p. 10;



**Q12243:** C. V. L. Delmas, *et al.* Serotonin innervation of the subthalamic nucleus in parkinsonian monkeys. *Neurobiology of Disease* 2025;211(106938)

**Agents:** MPTP **Vehicle:** Not Stated; **Route:** SC; **Species:** Monkey; **Strain:** Macaca fascicularis; **Pump:** Not Stated; **Duration:** 14 days;

**ALZET Comments:** Dose (11.3 mg-29.0 mg); animal info (ovariectomized adult female, aged between 3 and 5 years old and weighing between 2.6 and 4.8 kg); behavioral testing (Parkinsonian motor symptoms scored); neurodegenerative (Parkinson's);

**Q12491:** J. A. Parmasad, *et al.* Genetic and pharmacological reduction of CDK14 mitigates synucleinopathy. *Cell Death and Disease* 2024;15(4):246

**Agents:** FMF-04-159-216 **Vehicle:** DMSO; Tween 80; Water, double distilled; **Route:** CSF/CNS (ventricle); **Species:** Mice; **Strain:** Not Stated; **Pump:** 2004; **Duration:** 28 days;

**ALZET Comments:** Dose (0.35 mg/kg/day) 8% DMSO; 2% Tween 80, 90% ddH<sub>2</sub>O used; controls received mp w/ vehicle; animal info (4-month-old); ALZET brain infusion kit used; brain coordinates (-1.1 mm ML; -0.5 mm AP, -3 mm DV); behavioral testing (Grip strength tests; elevated plus maze test; Y maze test; open field test; rotarod test); neurodegenerative (Parkinson's); therapeutic indication (Parkinson's disease);

**Q12410:** A. C. L. Nunes, *et al.* Adenosine A(2A) Receptor Blockade Provides More Effective Benefits at the Onset Rather than after Overt Neurodegeneration in a Rat Model of Parkinson's Disease. *International Journal of Molecular Sciences* 2024;25(9):

**Agents:** 1-methyl-4-phenylpyridinium **Vehicle:** Saline; **Route:** CSF/CNS (lateral ventricle); **Species:** Rats; **Strain:** Wistar; **Pump:** 1002; **Duration:** 14 days;

**ALZET Comments:** Dose (0.15 mg/kg/day); controls received mp w/ vehicle; animal info (male and female; 3 months old; 221.4±4.3 g, ketamine/xylazine anesthesia); ALZET brain infusion kit 2 used; brain coordinates (relative to bregma: 1.5 mm posterior, 1.0 mm lateral, and 3.7 mm below the horizontal plane of bregma); behavioral testing (Balance; Motor coordination); neurodegenerative (Parkinson's);

**Q12282:** Y. Y. Kuo, *et al.* Decrease of K(ATP) channel expression through D3 receptor-mediated GSK3beta signaling alleviates levodopa-induced dyskinesia (LID) in Parkinson's disease mouse model. *Life Science Alliance* 2024;359(123255)

**Agents:** Diazoxide; Glibenclamide **Vehicle:** PEG400; DMSO; Tween 80; **Route:** CSF/CNS (striatum); **Species:** Mice; **Strain:** C57BL/6N; TH-Cre,Kir6.2-FcF/F; **Pump:** 1002; **Duration:** 2 weeks;

**ALZET Comments:** Dose: Diazoxide 5 µg/µl; Glibenclamide 0.4 µg/µl; 88% PEG 400; 10% DMSO; 2% Tween 80 used; controls received mp w/ vehicle; animal info (8 week old male); brain coordinates (anteroposterior +0.14; lateral +2.1; dorsal-ventral -3.5); behavioral testing (abnormal involuntary movements); neurodegenerative (Parkinson's Disease);

**Q12139:** E. Gouriou, *et al.* Exploring Magnetic and Electrical Brain Stimulation in Parkinsonian Dyskinetic Monkeys. *The Canadian Journal of Neurological Sciences* 2024;1-12

**Agents:** MPTP **Vehicle:** Not Stated; **Route:** SC; **Species:** Monkey; **Strain:** Macaca fascicularis; **Pump:** Not Stated; **Duration:** Not Stated;

**ALZET Comments:** Dose (0.5 mg/24 h); animal info (female ovariectomized cynomolgus, 3.75-4.9 kg, 7-17 years old); behavioral testing (posture: mobility; gait; vocalization; social interaction, tremor; climbing; grooming); neurodegenerative

**Q12059:** A. Boyzo Montes de Oca, *et al.* Chronic pramipexole and rasagiline treatment enhances dendritic spine structural neuroplasticity in striatal and prefrontal cortex neurons of rats with bilateral intrastriatal 6-hydroxydopamine lesions. *Journal of Chemical Neuroanatomy* 2024;141(102468)

**Agents:** Pramipexole **Vehicle:** Saline; **Route:** SC; **Species:** Rats; **Strain:** Wistar Hannover; **Pump:** 2006; **Duration:** 84 days;

**ALZET Comments:** Dose (0.5 mg/kg/day); controls received mp w/ vehicle; animal info (6-week-old male, ~250 g); post op. care (Aluspray®, Vetoquinol); pumps replaced after 42 days; D3 receptor agonist; behavioral testing (Beam test);

**Q11646:** A. Benitez-Castaneda, *et al.* Transfection of the BDNF Gene in the Surviving Dopamine Neurons in Conjunction with Continuous Administration of Pramipexole Restores Normal Motor Behavior in a Bilateral Rat Model of Parkinson's Disease. *Parkinson's Disease* 2024;2024(3885451)

**Agents:** Pramipexole dihydrochloride **Vehicle:** Not Stated; **Route:** SC; **Species:** Rats; **Strain:** Wistar **Pump:** 2006 **Duration:** 10w

**ALZET Comments:** Dose (0.5 mg/kg/day); animal info (6 weeks old; 250 g; male); pumps replaced every 1.5 months; long-term study; D3 receptor agonist; behavioral testing (motor performance and learning; coordination; balance; memory);



**Q11477:** S. Torii, *et al.* Involvement of casein kinase 1 epsilon/delta (Csnk1e/d) in the pathogenesis of familial Parkinson's disease caused by CHCHD2. *EMBO Press Journal* 2023;15(9):e17451

**Agents:** PF-670462 **Vehicle:** DMSO; CSF, artificial; **Route:** CSF/CNS; **Species:** Mice; **Strain:** Chchd2T611 knock-in; **Pump:** 2004; **Duration:** 28 days;

**ALZET Comments:** Dose (50 ng/g/day.); 5% DMSO used; controls received mp w/ vehicle; animal info (16 weeks); pumps replaced every 28 days; catheter; ALZET brain infusion kit 3 used; brain coordinates (~1.5 mm lateral, and 3.0–4.0 mm posterior from the bregma); behavioral testing (rotarod test); neurodegenerative (Parkinson's);

**Q11004:** S. Song, *et al.* Dysfunction of the noradrenergic system drives inflammation, alpha-synucleinopathy, and neuronal loss in mouse colon. *Frontiers in Immunology* 2023;14(1083513)

**Agents:** Salmeterol; dipheyleineiodonim **Vehicle:** Saline; **Route:** SC; **Species:** Mice; **Strain:** SNCA; **Pump:** Not Stated; **Duration:** 28 days;

**ALZET Comments:** Dose: (salmeterol 10 ug/kg/day, dipheyleineiodonim: 10 mg/kg/day); animal info: 8-week-old male; Controls received mp w/ vehicle; salmeterol: B2-adrenoreceptor agonist, DPI: NADPH oxidase inhibitor; behavioral testing (Accelerated Rotarod behavioral test); neurodegenerative (Parkinson's disease);

**Q11456:** C. Saraiva, *et al.* CtBP Neuroprotective Role in Toxin-Based Parkinson's Disease Models: From Expression Pattern to Dopaminergic Survival. *Molecular Neurobiology* 2023;60(8):4246-4260

**Agents:** Paraquat **Vehicle:** Saline, sterile; **Route:** SC; **Species:** Rat; **Strain:** Wistar; **Pump:** 2004; **Duration:** 4 weeks;

**ALZET Comments:** Dose (2.5 mg/kg/d); controls received mp w/ vehicle; animal info: (male 8–10 weeks)neurodegenerative (Parkinson's); "PQ-challenged animals are the only rat model, and they also have a different administration paradigm (chronic) compared to the other two toxins (acute) [MPTP & 6-ODHA]." pg. 11;

**Q11213:** M. A. Pedrosa, *et al.* AT1 receptor autoantibodies mediate effects of metabolic syndrome on dopaminergic vulnerability. *Brain Behavior and Immunity* 2023;108(255-268)

**Agents:** AT1-AA **Vehicle:** Saline; **Route:** IP; **Species:** Rat; **Strain:** Not Stated; **Pump:** Not Stated; **Duration:** 14 days;

**ALZET Comments:** Dose (0.15 ug/ul, 0.25 ug/ul); Controls received mp w/ vehicle; animal info: Male young adult rats 2–3-month-old; Blood pressure measured via non-invasive pressure system meter; Blood pressure measurement (p.261) Fig.4; AAT1-AA are agonistic autoantibodies to the ang II type 1 receptor; neurodegenerative (Parkinson's, Alzheimer's); "Our data using osmotic minipump infusions suggest that circulating AT1-AA can disrupt BBB, enter CSF and affect brain." p.11

**Q11418:** H. Murata, *et al.* Phosphorylated SARM1 is involved in the pathological process of rotenone-induced neurodegeneration. *Journal of Biochemistry* 2023;174(6):533-548

**Agents:** Rotenone **Vehicle:** DMSO; PEG400; **Route:** SC; **Species:** Mice; **Strain:** C57BL/6J; **Pump:** 2004; **Duration:** 4 weeks;

**ALZET Comments:** Dose (10 mg/kg/day); controls received mp w/ vehicle; animal info (Male; 9 weeks old; Weighed about 25 g); neurodegenerative (Parkinson's Disease);

**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 20; **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); 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);

**Q11380:** R. Khashab, *et al.* Dihydroxyphenylacetaldehyde Lowering Treatment Improves Locomotor and Neurochemical Abnormalities in the Rat Rotenone Model: Relevance to the Catecholaldehyde Hypothesis for the Pathogenesis of Parkinson's Disease. *International Journal of Molecular Science* 2023;24(15):

**Agents:** Rotenone **Vehicle:** DMSPO; PEG; **Route:** SC; **Species:** Rat; **Strain:** Sprague Dawley; **Pump:** Not Stated; **Duration:** 28 d

**ALZET Comments:** Dose (2 mg/kg/day); controls received mp w/ vehicle; animal info (male 350 ± 30 g, 10 weeks old); behavioral testing (Motor function tests, open field activity and rearing); neurodegenerative (Parkinson's)



**Q10588:** R. Landau, *et al.* The Rat Rotenone Model Reproduces the Abnormal Pattern of Central Catecholamine Metabolism Found in Parkinson's Disease. *Disease Models & Mechanisms* 2022;15(1):

**Agents:** Rotenone **Vehicle:** DMSO; PEG; **Route:** SC; **Species:** Rat; **Strain:** Sprague Dawley; **Pump:** Not Stated; **Duration:** 10 d  
**ALZET Comments:** Dose (2 mg/kg/day); 1:1 DMSO:PEG used; animal info (Male; 10 weeks old; Acclimated for at least 3 days before mp implantation); enzyme inhibitor (Rotenone); neurodegenerative (Parkinson's disease);

**Q11541:** R. Pavia-Collado, *et al.* Intracerebral administration of a modified antisense oligonucleotide targeting the dopamine system in a mouse model of Parkinson's disease. *STAR Protocols* 2022;3(2):

**Agents:** Oligonucleotide, antisense **Vehicle:** CSF, artificial; **Route:** CSF/CNS (lateral ventricle); **Species:** Mice; **Strain:** C57BL6; **Pump:** 1004; **Duration:** 28 days;

**ALZET Comments:** Dose: (100 mg/day); Controls received mp w/ vehicle; animal info: adult male 8–12 weeks; post op. care: buprenorphine or other analgesic treatment; ALZET brain infusion kit 3 used; Brain coordinates: –0.34mm posterior; +1.0mm lateral to bregma; –2.2mm ventral from skull; dental cement powder; good methods (ICV infusion);

**Q10612:** M. Morissette, *et al.* Prevention of L-Dopa-Induced Dyskinesias by MPEP Blockade of Metabotropic Glutamate Receptor 5 Is Associated with Reduced Inflammation in the Brain of Parkinsonian Monkeys. *Cells* 2022;11(4):

**Agents:** MPTP **Vehicle:** Not Stated; **Route:** SC; **Species:** Monkey (cynomolgus); **Strain:** Cynomolgus; **Pump:** Not Stated; **Duration:** 24 hrs;

**ALZET Comments:** animal info (Drug-naïve; Ovariectomized; Female); behavioral testing (Motor Behavior Measures); MPTP aka 1-methyl-4-phenyl-1,2,3,6-tetrahydropyridine; neurodegenerative (Parkinson's Disease);

**Q10608:** E. Montalban, *et al.* Translational Profiling of Mouse Dopaminergic Neurons Reveals Region-Specific Gene Expression, Exon Usage, and Striatal Prostaglandin E2 Modulatory Effects. *Molecular Psychiatry* 2022;27(4):2068-2079

**Agents:** Misoprostol; Haloperidol **Vehicle:** PBS; Saline; **Route:** IP; CSF/CNS (intracerebral); **Species:** Mice; **Strain:** D1- and D2-TRAP transgenic; *Drd1-Cre, Drd2-Cre, Drd1-tdTomato, Ai14-tdTomato; C57BL/6; ; Pump: 1004; 2004; **Duration:** Not Stated;*

**ALZET Comments:** behavioral testing (rotarod/food-cued Y maze); bilateral cannula used; neurodegenerative (Parkinson's; Addiction; Schizophrenia); Therapeutic indication (Neuromodulators);

**Q11507:** Y. Liu, *et al.* Ghrelin Bridges DMV Neuropathology and GI Dysfunction in the Early Stages of Parkinson's Disease. *Advance Science* 2022;9(30):e2203020

**Agents:** Ghrelin peptide, scrambled; ghrelin, acylated **Vehicle:** Saline; **Route:** SC; **Species:** Mice; **Strain:** A53T; **Pump:** Not Stated; **Duration:** 8 weeks;

**ALZET Comments:** Controls received mp w/ vehicle; peptides; neurodegenerative (Parkinson's disease);

**R0398:** M. Klonarakis, *et al.* The Three Sisters of Fate: Genetics, Pathophysiology and Outcomes of Animal Models of Neurodegenerative Diseases. *Neuroscience and Biobehavioral Reviews* 2022;135(104541

**Agents:** Sodium azide **Vehicle:** Not Stated; **Route:** SC; **Species:** Rat; **Strain:** Sprague-Dawley; **Pump:** Not Stated **Duration:** 4 w  
**ALZET Comments:** animal info (Male); neurodegenerative (Alzheimer's; Parkinson's; Huntington's disease);

**Q10552:** F. Imafuku, *et al.* Central and Enteric Neuroprotective Effects by *Eucommia ulmoides* Extracts on Neurodegeneration in Rotenone-induced Parkinsonian Mouse. *Acta Medica Okayama* 2022;

**Agents:** Rotenone **Vehicle:** DMSO; PEG; **Route:** SC; **Species:** Mice; **Strain:** C57BL/6J; **Pump:** 2004; **Duration:** 4 weeks;

**ALZET Comments:** Dose: (2.5 mg/kg/day); Controls received mp w/ vehicle; animal info: Eight-week-old male, behavioral testing: open field test; neurodegenerative (Parkinson's disease);

**Q10502:** M. Bourque, *et al.* AV-101, a Pro-Drug Antagonist at the NMDA Receptor Glycine Site, Reduces L-Dopa Induced Dyskinesias in MPTP Monkeys. *Cells* 2022;11(22):

**Agents:** 1-methyl-4-phenyl-1,2,3,6-tetrahydropyridine **Vehicle:** Not Stated; **Route:** SC; **Species:** Monkey; **Strain:** Cynomolgus; **Pump:** Not Stated; **Duration:** 24 hours;

**ALZET Comments:** Dose (0.5 mg/24 h); animal info (Female; Ovariectomized; Monkey; 9.2-12.7 years old; Weighed 3.6-5.2 kg); behavioral testing (Motor responses); 1-methyl-4-phenyl-1,2,3,6-tetrahydropyridine aka MPTP; neurodegenerative



### Sirtuin Research (2024-Present)

**Q12561:** Y. Wu, *et al.* Echinacoside alleviates Ang II-induced cardiac fibrosis by enhancing the SIRT1/IL-11 pathway. *Iranian Journal of Basic Medical Sciences* 2025;28(1):130-139

**Agents:** Angiotensin II **Vehicle:** Saline; **Route:** SC; **Species:** Mice; **Strain:** C57BL/6; **Pump:** 2004; **Duration:** 28 days;  
**ALZET Comments:** Dose: (2.0 mg/kg/day); controls received mp w/ vehicle; animal info (8-10 weeks old, 20-25 g); blood pressure measured via tail cuff; Measurements Fig. 1A, B (pg.133); cardiovascular;

**Q12559:** M. Wortham, *et al.* The protein deacetylase SIRT2 exerts metabolic control over adaptive beta cell proliferation. *Journal of Clinical Investigation* 2025;135(19):

**Agents:** S961 **Vehicle:** Not Stated; **Route:** SC; **Species:** Mice; **Strain:** Sirt2deltaB; WT; **Pump:** 1007D; **Duration:** 1 week;  
**ALZET Comments:** Dose (20 nmol/week); animal info (male and female, 12-15 weeks old); S961 is the insulin receptor antagonist peptide diabetes; therapeutic indication (SIRT2 inhibition/knockdown as a strategy to increase  $\beta$ -cell mass in diabetes);

**Q12428:** D. Ma, *et al.* Norepinephrine exacerbates LPS-induced cardiomyopathy via SIRT3/HO-1 axis-mediated ferroptosis. *Critical care* 2025;29(1):354

**Agents:** Norepinephrine **Vehicle:** Not Stated; **Route:** SC; **Species:** Mice; **Strain:** C57BL-6; **Pump:** Not Stated; **Duration:** 9 days;  
**ALZET Comments:** Dose (1–3 ug/kg/min); animal info (8–12 weeks old, 25–28 g); blood pressure measured via tail cuff occlusion method; cardiovascular; cardiomyopathy;

**Q12458:** M. Jiang, *et al.* Mitochondrial Calcium Uniporter-Mediated Regulation of the SIRT3/GSK3beta/beta-Catenin Signaling Pathway in Vascular Remodeling. *Federations of American Societies for Experimental Biology* 2025;39(13):e70761

**Agents:** Angiotensin II **Vehicle:** Saline; **Route:** SC; **Species:** Rats; **Strain:** Sprague-Dawley; **Pump:** Not Stated; **Duration:** 21 d  
**ALZET Comments:** Dose (0.7 mg/kg/day); control animals received sham surgery, mp w/ vehicle; animal info (Male, 200 g); blood pressure measured via non-invasive tail-cuff photoplethysmographic method; cardiovascular; hypertension, vascular remodeling;

**Q12386:** D. R. Ji, *et al.* Intermedin(1)-(53) improves aging-associated cardiac remodeling and dysfunction via mitochondrial SIRT3-mediated SOD2 deacetylation. *Journal of Molecular and Cellular Cardiology* 2025;205(86-98)

**Agents:** Angiotensin II **Vehicle:** Saline; **Route:** SC; **Species:** Mice; **Strain:** SIRT3 KO; **Pump:** 1002; 1004; **Duration:** 2 weeks; 4 w  
**ALZET Comments:** Dose (1000 ng/kg/min); controls received mp w/ vehicle; animal info (12–16 weeks and old 18 months males); blood pressure measured via computerized tail-cuff system; peptides; cardiovascular;

**Q12263:** Y. Hao, *et al.* Sirt6 deficiency exacerbates angiotensin II-induced lipid nephrotoxicity by affecting PLD6-derived cardiolipin metabolism in podocytes. *Cellular Signalling* 2025;133(111858)

**Agents:** Angiotensin II **Vehicle:** Saline, normal; **Route:** Not Stated; **Species:** Mice; **Strain:** Sirt6flox/flox/Nphs2-Cre + Sirt6flox/flox/Nphs2-Cre; **Pump:** 2004; **Duration:** 8 weeks;

**ALZET Comments:** Dose (700 ng/kg/min); controls received mp w/ vehicle; animal info (male 8 weeks old); pumps replaced after 4 weeks; nephrology; chronic kidney disease;

**Q11981:** L. Yang, *et al.* SIRT6-mediated vascular smooth muscle cells senescence participates in the pathogenesis of abdominal aortic aneurysm. *Atherosclerosis* 2024;392(117483)

**Agents:** Angiotensin II **Vehicle:** Not Stated; **Route:** SC; **Species:** Mice; **Strain:** ApoE<sup>-/-</sup>, C57BL6/J; **Pump:** 2004; **Duration:** 28 d  
**ALZET Comments:** Dose (1.44 mg/kg/day); animal info (male; 8-10 weeks old); peptides; abdominal aortic aneurysm;

**Q12590:** Y. Xie, *et al.* miR-485-3p targets SIRT1 in vascular smooth muscle cells mediating the occurrence of aortic dissection. *Journal of Cellular and Molecular Medicine* 2024;28(13):e18454

**Agents:** Angiotensin II **Vehicle:** Not Stated; **Route:** SC; **Species:** Mice; **Strain:** Not Stated; **Pump:** Not Stated; **Duration:** 4 w  
**ALZET Comments:** Dose (1 ug/kg/min); animal info (male; 8 weeks old); peptides; immunology;



### Stroke (Cerebral ischemia) Research (2020-Present)

**Q11989:** U. Yilmaz, *et al.* Intracerebroventricular BDNF infusion may reduce cerebral ischemia/reperfusion injury by promoting autophagy and suppressing apoptosis. *Journal of Cellular and Molecular Medicine* 2024;28(8):e18246

**Agents:** Brain-derived neurotrophic factor **Vehicle:** CSF, artificial; **Route:** CSF/CNS (right lateral ventricle); **Species:** Rats; **Strain:** Sprague-Dawley; **Pump:** 2001; **Duration:** 7 days;

**ALZET Comments:** Dose (0.06 ug/hr); controls received mp w/ vehicle; animal info (male; 220-280 g); ALZET brain infusion kit used; brain coordinates (1.6 mm lateral, 0.8 mm posterior and 4 mm vertical from bregma); ischemia (cerebral); behavioral testing (balance; coordination; sensorimotor dysfunction; neurological); "In these three studies, ICV BDNF was administered with osmotic minipumps after CI. All three studies reported that ICV BDNF administration with osmotic minipumps reduced the post-CI infarct area and exhibited neuroprotective properties." pg. 10;

**Q10629:** T. Numaga-Tomita, *et al.* Inhibition of Transient Receptor Potential Cation Channel 6 Promotes Capillary Arterialization During Post-Ischaemic Blood Flow Recovery. *British Pharmaceutical Society* 2023;180(1):94-110

**Agents:** Pyrazol-2; CAY-10441 **Vehicle:** DMSO; PEG300; **Route:** Not Stated; **Species:** Mice (transgenic); **Strain:** 129Sv, C57BL/6; ApoE-KO; **Pump:** 2004; **Duration:** 7 days;

**ALZET Comments:** Dose: (0.1 mg/kg/day) Controls received mp w/ vehicle; animal info: Eight- to 10-week-old male mice (20- to 22-g body weight,) post op. care: (0.1 mg/kg) of buprenorphine hydrochloride; ischemia (hindlimb ischaemia);

**Q11324:** A. Kheyar, *et al.* The novel cyclophilin inhibitor C105SR reduces hepatic ischaemia-reperfusion injury via mitoprotection. *JHEP Rep* 2023;5(11):100876

**Agents:** C105SR **Vehicle:** DMSO; **Route:** SC; **Species:** Mice; **Strain:** C57BL/6; **Pump:** Not Stated; **Duration:** Not Stated;

**ALZET Comments:** Dose (50 mg/kg); controls received mp w/ vehicle; animal info (Male; 10-12 weeks old); ischemia (Hepatic ischaemia-reperfusion injury)

**Q11510:** J. A. A. Maclean, *et al.* Development of a carotid artery thrombolysis stroke model in mice. *Blood Advances* 2022;6(18):5449-5462

**Agents:** Argatroban **Vehicle:** Not Stated; **Route:** SC; **Species:** Mice; **Strain:** C57BL/6J; **Pump:** 2001D; **Duration:** 23 hrs;

**ALZET Comments:** Dose: (40ug/kg/min); animal info: male, 8-12 weeks old, 20-30 g; ischemia (cerebral);

**Q10886:** Y. Zhao, *et al.* Vascular Endothelium Deploys Caveolin-1 to Regulate Oligodendrogenesis After Chronic Cerebral Ischemia in Mice. *Nature Communications* 2022;13(1):6813

**Agents:** Antagomir, PEI; Antagomir, PEI, Cy5 labelled **Vehicle:** Not Stated; **Route:** CSF/CNS (corpus callosum); **Species:** Mice; **Strain:** C57BL/6J; **Pump:** 1002; **Duration:** 14 days;

**ALZET Comments:** Dose (2 µg /day); Controls received mp w/ vehicle; animal info (Adult male (24–29 g; for BCAS surgery) and mice (6–8 weeks old); Brain coordinates: (0.5mm anterior-posterior, 1.0mm medial-lateral, –2.1mm dorsalventral relative to bregma); ischemia (cerebral); behavioral testing (cognitive test);

**R0405:** S. E. Yang, *et al.* Therapeutic Potential and Mechanisms of Novel Simple O-Substituted Isoflavones against Cerebral Ischemia Reperfusion. *International Journal of Molecular Sciences* 2022;23(18):

**Agents:** Genistein **Vehicle:** Not Stated; **Route:** SC; **Species:** Mice; **Strain:** balb/c; **Pump:** Not Stated; **Duration:** 2 weeks;

**ALZET Comments:** Dose (0.1 mg/kg); ischemia (Cerebral); Therapeutic indication (Cerebral Ischemia); animal info. mice

**Q10592:** E. R. Louet, *et al.* tPA-NMDAR Signaling Blockade Reduces the Incidence of Intracerebral Aneurysms. *Translational Stroke Research* 2022;13(6):1005-1016

**Agents:** Angiotensin II **Vehicle:** Saline; **Route:** SC; **Species:** Mice; **Strain:** C57BL6/129; **Pump:** 1002; **Duration:** 14 days;

**ALZET Comments:** Dose (800 ug); 0.9% saline used; animal info (tPA null, Male; 8 weeks old); peptides; ischemia (cerebral); Therapeutic indication (Intracranial aneurysms);



**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 **Strain:** C57Bl6/j; **Pump:** 2004; **Duration:** 28 d **ALZET Comments:** "Dose: (1 ug/day); (0.9% NaCl), vehicle used; Controls received mp w/ vehicle; animal info: male mice (8–10 weeks) behavioral testing: RotaRod test, Grip strength; Open field test; Elevated o maze test; Cerebral Dopamine Neurotrophic Factor aka (CDNF); 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); "

**Q10239:** F. Liu, *et al.* Electroacupuncture Improves Cerebral Ischemic Injury by Enhancing the EPO-JAK2-STAT5 Pathway in Rats. *Neuropsychiatric Disease and Treatment* 2021;17(2489-2498

**Agents:** AG490 **Vehicle:** Not Stated; **Route:** CSF/CNS (lateral ventricle); **Species:** Rat; **Strain:** Sprague-Dawley; **ALZET Comments:** "Controls received mp w/ vehicle; animal info: Adult rats (male: female=1:1, 200–250 g); post op. care: After suturing the skin, analgesics and antibiotics were injected intraperitoneally to prevent postoperative pain and infection; AG-490 (a Janus-tyrosine kinase-2 (JAK-2) phosphorylation inhibitor); ALZET brain infusion kit used; Brain coordinates (bregma, 0.8 mm posterior, –4.8 mm dorsoventral, –1.5 mm lateral); ischemia (cerebral ischemia); "

**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:** aCSF; **Route:** CSF/CNS; **Species:** Mice; **Strain:** C57BL/6N; **Pump:** 1003D; **Duration:** 3 days; **ALZET Comments:** Dose (8.3 pmole/ul); animal info (3 months old, 20-30 g, ); antisense (eRNA\_06347: 5'-GATTGGGAATTGCTAG-3' ; eRNA\_093384: 5'-GGAAGCAGGTGAACAG-3'); ALZET brain infusion kit 3 used; ischemia (Cerebral);

**Q9829:** L. Zheng, *et al.* Rhythmic light flicker rescues hippocampal low gamma and protects ischemic neurons by enhancing presynaptic plasticity. *Nature Communications* 2020;11(1):3012

**Agents:** GK23; GK13; Conotoxin, w-; **Vehicle:** CSF, Artificial; **Route:** CSF/CNS (left ventricle); **Species:** Mice; **Strain:** C57Bl/6; Thy1-YFP-H; **Pump:** 1003D; **Duration:** 3 days; **ALZET Comments:** Dose (2 mg/kg/day GK23, GK13; 2.28 ng/kg/day w-Conotoxin); animal info (Adult male C57Bl/6 mice (3-months-old)); behavioral testing (Open field test; Morris water maze; Y-maze test); peptides; ALZET brain infusion kit 3 used; Brain coordinates (coordinates from bregma: anterior-posterior = –0.5 mm; lateral = 1.0 mm); dental cement used;

**Q9564:** W. Xu, *et al.* Blockade of Nogo-A/Nogo-66 receptor 1 (NgR1) Inhibits Autophagic Activation and Prevents Secondary Neuronal Damage in the Thalamus after Focal Cerebral Infarction in Hypertensive Rats. *Neuroscience* 2020;431(103-114

**Agents:** NEP1-40 **Vehicle:** PBS; **Route:** CSF/CNS (right lateral ventricle); **Species:** Rat; **Strain:** SD; **Duration:** 3 days; **ALZET Comments:** Dose (270 ug/kg); Controls received mp w/ vehicle; animal info (male Sprague-Dawley rats, weighing 60–90 g); behavioral testing (adhesive removal test); NEP1-40 aka Nogo-66 receptor antagonist peptide; peptides; Brain coordinates (relative to bregma: -1.0 mm anteroposterior, 1.4 mm lateral, and -4.0 mm dorsoventral); ischemia (cerebral);