



Neuroscience Research Using ALZET® Osmotic Pumps: Neuromuscular Diseases

Neuromuscular disorders cover a wide range of conditions involving the dysfunction of nerves, muscles, or the communication between them. ALZET Osmotic Pumps have been a valuable tool in researching these disorders and their related symptoms, mechanisms, and therapeutics.

Highlighted below are some of the newest research applications on neuromuscular diseases. The following list of references is a more extensive compilation of research within the last few years. The short abstract following each reference in the attached list details the substance(s) infused, route of administration, animal model studied, solvent(s), model of pump, duration of infusion, and relevant notes. To obtain a complete listing of earlier references or additional technical information, please contact ALZET Technical Support by email at techsupport@alzet.com.

Recent Research on Neuromuscular Diseases

COMPOUND	ANIMAL	DURATION	APPLICATION	REFERENCE
Cyclosporine	Mice	4 weeks	Investigating effects of systemic Cyclosporine A in a mitochondrial myopathy mouse model	B. Chatel <i>et al.</i> Cyclosporine A Delays the Terminal Disease Stage in the Tfam KO Mitochondrial Myopathy Mouse Model Without Improving Mitochondrial Energy Production. <i>Muscle Nerve</i> ; 2025;71(2):265-274
FP802	Mice	30 days	Long-term delivery of neuroprotective compound to cross blood-spinal cord barrier in ALS mouse model	J. Yan <i>et al.</i> TwinF interface inhibitor FP802 stops loss of motor neurons and mitigates disease progression in a mouse model of ALS. <i>Cell Rep Med</i> ; 2024;5(2):101413
Paclitaxel; Vincristine	Rat	10 days	PK studies to assess total drug distribution in chemotherapy induced peripheral neuropathy	Y. Hu <i>et al.</i> Analysis of the contributing role of drug transport across biological barriers in the development and treatment of chemotherapy-induced peripheral neuropathy. <i>Fluids Barriers CNS</i> ; 2024;21(1):13
Salbutamol	Mice	28 days	Demonstrating systemic salbutamol administration recovers structural/functional neuromuscular junction defects in collagen VI-related myopathy	S. Calabro <i>et al.</i> Salbutamol repurposing ameliorates neuromuscular junction defects and muscle atrophy in Col6a1-/- mouse model of collagen VI-related myopathies; <i>Clin Transl Med</i> ; 2024;14(7):e1688
BDNF	Mice	4 weeks	Intracerebroventricular delivery of BDNF to test therapeutic effects on spinocerebellar ataxia type 1	J.-G. Rosa <i>et al.</i> BDNF is altered in a brain-region specific manner and rescues deficits in Spinocerebellar Ataxia Type 1; <i>Neurobiol Dis</i> ; 2023;178:106023

*If you are interested in a specific agent not listed, please request it at techsupport@alzet.com

Surgical Protocols:

Written protocols are available on our website. A surgical implantation video is also available, which describes proper preparation of the ALZET pump and surgical techniques for implantation in mice and rats. These can be found on <https://www.alzet.com/resources/downloads/>



References (2019-Present) on Neuromuscular Diseases Using ALZET® Osmotic Pumps

Q12074: B. Chatel, *et al.* Cyclosporine A Delays the Terminal Disease Stage in the Tfam KO Mitochondrial Myopathy Mouse Model Without Improving Mitochondrial Energy Production. *Muscle & Nerve* 2025;71(2):265-274

Agents: Cyclosporine A **Vehicle:** Saline; **Route:** SC; **Species:** Mice; **Strain:** Tfam KO; Wild type; **Pump:** 1004; **Duration:** 4 weeks; **ALZET Comments:** Dose: (120 µg/day); controls received mp w/ vehicle; animal info (male, female and control littermates, 12 weeks, isoflurane anesthesia);

Q11958: J. Yan, *et al.* TwinF interface inhibitor FP802 stops loss of motor neurons and mitigates disease progression in a mouse model of ALS. *Cell Reports Medicine* 2024;5(2):101413

Agents: FP802 **Vehicle:** Not Stated; **Route:** SC; **Species:** Mice; **Strain:** SOD1G93A; C57BL/6 bg; **Pump:** 2004; 1002; **Duration:** 30 days;

ALZET Comments: controls received mp w/ vehicle; animal info (male); TwinF interace inhibitor; behavioral testing (open field); neurodegenerative (ALS);

Q11740: Y. Hu, *et al.* Analysis of the contributing role of drug transport across biological barriers in the development and treatment of chemotherapy-induced peripheral neuropathy. *Fluids and Barriers of the CNS* 2024;21(1):13

Agents: Paclitaxel; Vincristine **Vehicle:** Not Stated; **Route:** SC; **Species:** Rat; **Strain:** Sprague-Dawley; Wistar-Han; **Pump:** Not Stated; **Duration:** 10 days;

ALZET Comments: animal info (male; 240-340 g); functionality of mp verified by plasma concentrations;

Q11829: S. Calabro, *et al.* Salbutamol repurposing ameliorates neuromuscular junction defects and muscle atrophy in Col6a1(-/-) mouse model of collagen VI-related myopathies. *Clinical and Translational Medicine* 2024;14(7):e1688

Agents: Salbutamol **Vehicle:** Saline; **Route:** SC; **Species:** Mice; **Strain:** Col6a1-/-; WT; **Pump:** Not Stated; **Duration:** 28 days;

ALZET Comments: Dose (4 and 8 mg/kg/d); dose-response (multiple, different doses given see pg. 3); controls received mp w/ vehicle; animal info (male; 5 months old); short-acting beta-2 adrenergic agonist; "In conclusion, our results show that 1-month systemic treatment with salbutamol stabilises NMJ structures while ameliorating the myopathic phenotype of Col6a1-/- mice" pg. 8; therapeutic indication (collagen VI-related myopathies);

Q11020: S. H. Wang, *et al.* Hyperbaric Oxygen Therapy Alleviates Paclitaxel-Induced Peripheral Neuropathy Involving Suppressing TLR4-MyD88-NF-kappaB Signaling Pathway. *International Journal of Molecular Sciences* 2023;24(6):

Agents: TAK-242 **Vehicle:** Saline; **Route:** CSF/CNS (intrathecal); **Species:** Rat; **Strain:** Sprague Dawley; **Pump:** Not Stated; **Duration:** 14 days;

ALZET Comments: Dose; TAK-242 (20 ug); 0.9% normal saline used; Controls received mp w/ vehicle; animal info: Male 180-200 g; TAK-242 is a TLR4 antagonist; chemotherapy induced neuropathy

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;

Q10963: S. Minamiyama, *et al.* Efficacy of oligodendrocyte precursor cells as delivery vehicles for single-chain variable fragment to misfolded SOD1 in ALS rat model. *Molecular Therapy: Methods and Clinical Development* 2023;28(312-329

Agents: D3-1 antibody, mouse **Vehicle:** PBS; **Route:** CSF/CNS (intrathecal); **Species:** Rat; **Strain:** SOD1H46R; **Pump:** 2ML4; **Duration:** 4 weeks;

ALZET Comments: Dose (1 mg/mL); Controls received mp w/ vehicle; animal info: 1- to 2-day-old Sprague-Dawley rats; behavioral testing (Hindfoot reflex test; Inclined plate test; Grip test); functionality of mp verified by D3-1 concentrations with ELISA; neurodegenerative: Amyotrophic lateral sclerosis; good methods p. 14



Q11139: Q. Liu, *et al.* Identification of a novel small-molecule inhibitor of miR-29b attenuates muscle atrophy. *Molecular Therapy: Nucleic Acids* 2023;31(527-540

Agents: Angiotensin II **Vehicle:** PBS; **Route:** SC; **Species:** Mice; **Strain:** C57BL/6J; **Pump:** 2001; **Duration:** Not Stated;

ALZET Comments: Dose (2 ug/uL); Controls received mp w/ vehicle; animal info (Male; 8-10 weeks old); peptides;

Q12278: C. J. Kreple, *et al.* Protective Effects of Lovastatin in a Population-Based ALS Study and Mouse Model. *Annals of Neurology* 2023;93(5):881-892

Agents: Lovastatin; Silfasalazine; Telmisartan **Vehicle:** DMSO; Water; Ethanol; **Route:** SC; **Species:** Mice; **Strain:** SOD1 G93A; **Pump:** 2006; **Duration:** 82 days;

ALZET Comments: Dose (Lovastatin 0.7 mg/kg/day; Sulfasalazine 6.6 mg/kg/day; Telmisartan 1 mg/kg/day) 50% DMSO; 35% water; 15% ethanol used; control animals received mp w/ vehicle; animal info (~1.5 months, isoflurane anesthesia); pumps replaced after 44 days; long-term study; enzyme inhibitor (Lovastatin is a HMG-CoA reductase inhibitor); Telmisartan is an angiotensin receptor blocker (antihypertensive); behavioral testing (gait assessment); neurodegenerative (ALS);

Q11261: R. Chen, *et al.* CircTmeff1 Promotes Muscle Atrophy by Interacting with TDP-43 and Encoding A Novel TMEFF1-339aa Protein. *Advanced Science* 2023;10(17):e2206732

Agents: Angiotensin II **Vehicle:** PBS; **Route:** Not Stated; **Species:** Mice; **Strain:** C57BL/6J; **Pump:** 2001; **Duration:** 7 days;

ALZET Comments: Dose (1.5 ug/kg/min); Controls received mp w/ vehicle; animal info (Male; 8 weeks old); peptides;

Q11090: A. Aslan, *et al.* Denervation Atrophy of Skeletal Muscle is Not Influenced by Numb Levels in Mice. *International Journal of Medical Sciences* 2023;20(3):376-384

Agents: Nandrolone; testosterone **Vehicle:** Ethanol; propylene glycol; **Route:** SC; **Species:** Mice; **Strain:** C57B6J; **Pump:** 1002; 1004; **Duration:** Not Stated;

ALZET Comments: Dose (Nandrolone 0.75 mg/kg/week; Testosterone 2.8 mg/kg/week); 5% ethanol in propylene glycol used; animal info (Male; 12-20 weeks old);

Q10692: S. Talele, *et al.* Central Nervous System Distribution of the Ataxia-Telangiectasia Mutated Kinase Inhibitor AZD1390: Implications for the Treatment of Brain Tumors. *Journal of Pharmacology and Experimental Therapeutics* 2022;383(1):91-102

Agents: AZD1390 **Vehicle:** DMSO; **Route:** IP; **Species:** Mice; **Strain:** Wild-type, TKO; **Pump:** 1003D; **Duration:** 24 hours;

ALZET Comments: Dose (10 mg/ml); Controls received mp w/ vehicle; animal info (Male; Female; 8-14 weeks old); enzyme inhibitor (AZD1390 is a ataxia telangiectasia mutant kinase inhibitor); cancer (Glioblastoma);

Q10638: Y. Ozaki, *et al.* Neuron-Derived Neurotrophic Factor Protects Against Dexamethasone-Induced Skeletal Muscle Atrophy. *Biochemical and Biophysical Research Communications* 2022;593(5-12

Agents: Dexamethasone **Vehicle:** Not Stated; **Route:** Not Stated; **Species:** Mice; **Strain:** Wild-type; NDNF-KO; **Pump:** 2002; **Duration:** 14 days;

ALZET Comments: Dose (23 ug/day); Controls received mp w/ vehicle; animal info (; 8-10 weeks old); immunology; Therapeutic indication (Muscle atrophy);

Q10823: J. Li, *et al.* Engineered Circular RNA CircmiR-29b Attenuates Muscle Atrophy by Sponging MiR-29b. *Advanced Therapeutics* 2022;5(7):

Agents: Angiotensin II **Vehicle:** PBS; **Route:** Not Stated; **Species:** Mice; **Strain:** Not Stated; **Pump:** 2001; **Duration:** 7 days;

ALZET Comments: Dose: (1.5 ug/kg/min); Controls received mp w/ vehicle; animal info: Mouse muscle atrophy models; behavioral testing: grip-strength test

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);



Q10429: C. Cordero-Sanchez, *et al.* CIC-39Na reverses the thrombocytopenia that characterizes tubular aggregate myopathy. *Blood Advances* 2022;6(15):4471-4484

Agents: CIC-39Na **Vehicle:** Saline; **Route:** IP; **Species:** Mice; **Strain:** Wild-type; KISTIM1; **Pump:** 1002; **Duration:** 2 weeks; **ALZET Comments:** Dose (60 mg/kg); Controls received mp w/ vehicle; animal info: 12-week-old mice (16 and 16 (27-28 g for WT and 23-24 g for KI-STIM1115F mice); CIC-39Na is a Ca²⁺ entry inhibitor; Therapeutic indication (Thrombocytopenia);

Q11334: C. Tohda, *et al.* A Novel Heptapeptide, GPPGPAG Transfers to the Brain, and Ameliorates Memory Dysfunction and Dendritic Atrophy in Alzheimer's Disease Model Mice. *Frontiers in Pharmacology* 2021;12(680652

Agents: GPPGPAG **Vehicle:** CSF, artificial; **Route:** CSF/CNS (left lateral ventricle); **Species:** Mice; **Strain:** 5XFAD; WT; **Pump:** 1004; **Duration:** 28 days;

ALZET Comments: Dose: (1.64 µM); Controls received mp w/ vehicle; animal info: male or female, 5–7 months; peptides; stability of drug in saline, mouse plasma, mouse cerebral cortex confirmed by LC-MS quantification; ALZET BIK 3 used; Brain coordinates (left ventricle (bregma: –0.2 mm, lateral: 1.0 mm, depth: –3.0 mm); behavioral testing: object recognition test; "Direct infusion of GPPGPAG into the lateral ventricle of 5XFAD mice for 28 days improved object recognition memory."

Q10345: L. Staurengo-Ferrari, *et al.* Sexual dimorphism in the contribution of neuroendocrine stress axes to oxaliplatin-induced painful peripheral neuropathy. *Pain* 2021;162(3):907-918

Agents: Epinephrine **Vehicle:** Saline; **Route:** SC; **Species:** Rat; **Strain:** Sprague-Dawley; **Pump:** 2004; **Duration:** Not Stated;

ALZET Comments: Dose: Epinephrine (5.4 mg/0.25 mL/h_i); Controls received mp w/ vehicle; animal info: adults, male and female 8 weeks old; neurodegenerative (Peripheral neuropathy);

Q10066: R. A. Smith, *et al.* Development of a molecular therapy for the SOD1 familial variant of ALS. *Neurotherapeutics in the Era of Translational Medicine* 2021;1-18

Agents: Oligonucleotides; Methylene blue **Vehicle:** Not Stated; **Route:** CSF/CNS (right lateral ventricle); **Species:** Rat; **Strain:** G93A SOD1 transgenic; **Pump:** Not Stated; **Duration:** 14 days;

ALZET Comments: Animal info (rats, 2-3 months of age); neurodegenerative (ALS);

Q9457: C. Sheeler, *et al.* Post-symptomatic Delivery of Brain-Derived Neurotrophic Factor (BDNF) Ameliorates Spinocerebellar Ataxia Type 1 (SCA1) Pathogenesis. *Cerebellum* 2021;20(3):420-429

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

ALZET Comments: Dose (0.71 µg/day); Controls received mp w/ vehicle; animal info (Male and female mice, 12 weeks old); behavioral testing (Rotarod test); brain-derived neurotrophic factor aka BDNF; Brain coordinates (A/P, 1.1 mm; M/L, 0.5 mm; D/V, – 2.5 mm from Bregma); neurodegenerative (Spinocerebellar ataxia type 1);

Q9420: J. Post, *et al.* A Novel Anti-Inflammatory d-Peptide Inhibits Disease Phenotype Progression in an ALS Mouse Model. *Molecules* 2021;26(6):

Agents: All-D-peptide RD2 **Vehicle:** Saline; **Route:** IP; **Species:** Mice; **Strain:** SOD1*G93A; **Pump:** 1004; **Duration:** 28 days;

ALZET Comments: Dose (19 mg/kg/d); Controls received mp w/ vehicle; animal info: Twelve weeks old female; all-D-peptide RD2 aka RD2RD2; neurodegenerative (Amyotrophic lateral sclerosis);

Q10619: T. Nagase, *et al.* Skeletal Muscle Atrophy-Induced Hemopexin Accelerates Onset of Cognitive Impairment in Alzheimer's Disease. *Journal of Cachexia, Sarcopenia and Muscle* 2021;12(6):2199-2210

Agents: Hemopexin, recombinant **Vehicle:** CSF, artificial; **Route:** CSF/CNS (intracerebroventricular); **Species:** Mice; **Strain:** Wildtype; 5XFAD; **Pump:** 1002; **Duration:** 14 days;

ALZET Comments: Controls received mp w/ vehicle; animal info: 6–7 weeks old, male and female; behavioral testing: Object location test; Brain coordinates (A/P: 0.2 mm, M/L: +1.0 mm, depth: 3.0 mm); neurodegenerative (Alzheimer's disease);

Q10240: Q. Liu, *et al.* Exercise attenuates angiotensin-induced muscle atrophy by targeting PPARgamma/miR-29b. *Journal of Sport and Health Science* 2021;

Agents: Angiotensin II **Vehicle:** PBS; Acetic acid; **Route:** SC; **Species:** Mice; **Strain:** C57BL/6J; **Pump:** 2001; **Duration:** 7 days;

ALZET Comments: Dose: 1.5 µg/kg/min; Controls received mp w/ vehicle; animal info: Male weight of 25 g on average 10 weeks old; behavioral testing: Test of grip strength; cardiovascular



Q10229: J. Li, *et al.* Angiotensin II-induced muscle atrophy via PPARgamma suppression is mediated by miR-29b. *Molecular Therapy Nucleic Acid* 2021;23(743-756

Agents: Angiotensin II **Vehicle:** Saline; acetic acid; **Route:** Not Stated; **Species:** Mice; **Strain:** C57BL/6; **Pump:** 2001; **Duration:** 7 days;

ALZET Comments: Dose: (1.5 ug/kg/min); 0.9% NaCl vehicle used; Controls received mp w/ vehicle; animal info: Ten-week-old male mice; behavioral testing: Grip-strength test; Angiotensin II aka (Ang II)cardiovascular;

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; **Duration:** Not Stated;

ALZET Comments: Dose: (20 mg/kg/day); Controls received mp w/ no vehicle; pumps replaced at 4 weeks; (Glaucoma);

Q8968: J. Zheng, *et al.* Sirtuin 3 deficiency accelerates Angiotensin II-induced skeletal muscle atrophy. *Connective Tissue Research* 2020;61(6):586-593

Agents: AnII **Vehicle:** Saline; **Route:** SC; **Species:** Mice; **Strain:** SIRT3 KO; C57BL/6; **Pump:** Not Stated; **Duration:** 4 weeks

ALZET Comments: Dose (1000 ng/kg/min); Controls received mp w/ vehicle; animal info (8 weeks old, Male); Blood pressure measured via Tail Cuff Plethysmography; cardiovascular;

Q9918: K. Yamanashi, *et al.* Branched-chain amino acid supplementation ameliorates angiotensin II-induced skeletal muscle atrophy. *Life Sciences* 2020;250(117593

Agents: Angiotensin II **Vehicle:** Saline; **Route:** SC; **Species:** Mice; **Strain:** C57BL/6J; **Pump:** 2004; **Duration:** 4 weeks;

ALZET Comments: Dose (1000 ng/kg/min); Controls received mp w/ vehicle; animal info (10–12-week-old male); behavioral testing (Treadmill testing); Blood pressure measured via tail-cuff method;106 mmHg - 158 mmHg

Q9951: Y. Wang, *et al.* Calpain-2 as a therapeutic target in repeated concussion-induced neuropathy and behavioral impairment. *Neuroscience* 2020;

Agents: Selective Calpain 2 Inhibitor **Vehicle:** Not stated; **Route:** CSF/CNS; **Species:** Mice; **Strain:** C57Bl/6; **Pump:** 2002; **Duration:** 10 days;

ALZET Comments: Dose (0.3 mg/kg/day); Controls received mp w/ vehicle; Selective Calpain 2 Inhibitor aka C21; enzyme inhibitor (Selective Calpain 2 Inhibitor); neurodegenerative (Traumatic Brain Injury);

Q9500: W. M. Tierney, *et al.* Transplanted Human Neural Progenitor Cells Attenuate Motor Dysfunction and Lengthen Longevity in a Rat Model of Ataxia. *Cell Transplantation* 2020;29(963689720920275

Agents: Cyclosporine **Vehicle:** Not Stated; **Route:** SC; **Species:** Rat; **Strain:** spastic Han Wistar; **Pump:** 2ML4; **Duration:** 28 d;

ALZET Comments: Dose (15 mg/ kg/d); animal info (rat); behavioral testing (Motor Activity); pumps replaced every 23 days;

Q8668: P. S. Mishra, *et al.* Transmission of ALS pathogenesis by the cerebrospinal fluid. *Acta Neuropathologica Communications* 2020;8(1):65

Agents: CSF, amyotrophic lateral sclerosis **Vehicle:** CSF, artificial; **Route:** CSF/CNS (right lateral ventricle); **Species:** Mice; **Strain:** hTDP43 WT; **Pump:** 1002; **Duration:** 14 days;

ALZET Comments: Controls received mp w/ vehicle; animal info (mice (mean age 230.41 ± 37.7 days)); behavioral testing (open-field test); amyotrophic lateral sclerosis CSF aka ALS-CSF; Brain coordinates (1.50 mm lateral, – 1.00 mm antero-posterior and – 2.00 dorsoventral from Bregma); neurodegenerative (Amyotrophic Lateral Sclerosis);

Q8483: J. F. Garbincius, *et al.* Enhanced dimethylarginine degradation improves coronary flow reserve and exercise tolerance in Duchenne muscular dystrophy carrier mice. *American Journal of Physiology Heart and Circulatory Physiology* 2020;319(3):H582-H603

Agents: Dimethylarginine, asymmetric **Vehicle:** Saline, Sterile; **Route:** SC; **Species:** Mice; **Strain:** Wild-type C57BL; **Pump:** 1002; **Duration:** 3 days;

ALZET Comments: Dose: 60 mg/kg/day; 0.9% sterile saline used; Controls received mp w/ vehicle; animal info (3 to 4 months old); behavioral testing (Voluntary running wheel activity); Blood pressure measured via tail-cuff method; 133 mmHg - 147.5 mmHg; Asymmetric Dimethylarginine aka ADMA; cardiovascular;



Q8390: K. A. Bockerstett, *et al.* Interleukin 27 Protects From Gastric Atrophy and Metaplasia During Chronic Autoimmune Gastritis. *Cellular and Molecular Gastroenterology Hepatology* 2020;10(3):561-579

Agents: Interleukin-27, recombinant **Vehicle:** PBS; **Route:** SC; **Species:** Mice; **Strain:** TxA23; **Pump:** 2004; **Duration:** 4 weeks;
ALZET Comments: Dose (800 ng); Controls received mp w/ vehicle; animal info (mice, 20 g, 5 weeks of age); recombinant Interleukin-27 aka rIL27; cancer (gastric cancer);

Q9062: C. Wu, *et al.* Salidroside Attenuates Denervation-Induced Skeletal Muscle Atrophy Through Negative Regulation of Pro-inflammatory Cytokine. *Frontiers in Physiology* 2019;10(665

Agents: Recomb. murine interleukin 6 **Vehicle:** Saline; **Route:** SC; **Species:** Rat; **Strain:** Not Stated; **Pump:** 2002 **Duration:** 14d;
ALZET Comments: Controls received mp w/ vehicle; animal info (Male, 2 months old); Recombinant Murine Interleukin 6 aka IL6; dependence;

Q7417: R. A. Seaborne, *et al.* UBR5 is a Novel E3 Ubiquitin Ligase involved in Skeletal Muscle Hypertrophy and Recovery from Atrophy. Not Stated 2019;

Agents: Tetrodotoxin **Vehicle:** Saline; **Route:** SC; **Species:** Rat; **Strain:** Wistar; **Pump:** 2002; **Duration:** 14 Days;
ALZET Comments: Dose (350 µg/ml); animal info (adult male rats); neurodegenerative (skeletal muscle atrophy);

Q7006: R. Malik, *et al.* The molecular tweezer CLR01 inhibits aberrant superoxide dismutase 1 (SOD1) self-assembly in vitro and in the G93A-SOD1 mouse model of ALS. *J Biol Chem* 2019;294(10):3501-3513

Agents: CLR01 **Vehicle:** Saline; **Route:** SC; **Species:** Mice; **Strain:** B6SJL-Tg; **Pump:** 1004; **Duration:** 6 weeks;
ALZET Comments: Dose (0, 0.5, or 5.0 mg/kg); 0.9% saline used; Controls received mp w/ vehicle; behavioral testing (grip-strength test, rotarod test); half-life: 1-2 hours (p.5); CLR01 is a broad-spectrum inhibitor of the self-assembly and toxicity of amyloid proteins; enzyme inhibitor (superoxide dismutase 1 (SOD1); neurodegenerative (amyotrophic lateral sclerosis);

Q6971: Y. S. Hu, *et al.* Self-assembling vascular endothelial growth factor nanoparticles improve function in spinocerebellar ataxia type 1. *Brain* 2019;142(2):312-321

Agents: Vascular endothelial growth factor, mouse recomb.; Vascular endothelial growth factor, synthetic peptide (Nano-VEGF)
Vehicle: CSF, artificial; **Route:** CSF/CNS (right lateral ventricle); **Species:** Mice; **Strain:** Not Stated; **Pump:** 1002; **Duration:** 2 w;
ALZET Comments: animal info (8-10, and 24 week-old mice); behavioral testing (rotating rod assay); Brain coordinates (A/P -0.5mm, M/L -1.1mm, D/V -2.5mm);

Q7520: Y. Gong, *et al.* Intrathecal Adeno-Associated Viral Vector-Mediated Gene Delivery for Adrenomyeloneuropathy. *Hum Gene Ther* 2019;30(5):544-555

Agents: Viral vector, adeno-associated serotype 9 **Vehicle:** Not Stated; **Route:** SC; **Species:** Mice; **Strain:** C57BL/6; **Pump:** 2001D; **Duration:** 1 day;
ALZET Comments: Dose (2 ul/min/day); animal info (12-20 weeks old, Male,); neurodegenerative (Adrenoleukodystrophy);

Q9161: E. Blacher, *et al.* Potential roles of gut microbiome and metabolites in modulating ALS in mice. *Nature* 2019;572(7770):474-480

Agents: Nicotinamide; Phenol Sulfate **Vehicle:** Not Stated; **Route:** SC; **Species:** Mice; **Strain:** Sod1-Tg; **Pump:** 1004; **Duration:** 4 months;
ALZET Comments: Dose (NAM- 30.8 mg/kg/week or 49.28 mg/kg/week); Controls received mp w/ vehicle; animal info (40-180 days old); pumps replaced every 4 weeks; Nicotinamide aka NAM; neurodegenerative (Amyotrophic Lateral Sclerosis);