



**Recent References (2015-2019) on the Intrathecal Administration of Agents
Using ALZET® Osmotic Pumps**

Q6999: S. J. Shiue, *et al.* Mesenchymal stem cell exosomes as a cell-free therapy for nerve injury-induced pain in rats. *Pain* 2019;160(1):210-223

ALZET Comments: Exosomes, human umbilical cord mesenchymal stem cell; Saline; CSF/CNS (intrathecal); Rat; 2001; 7 days; Dose (1.2 mg/mL/ hr); Controls received mp w/ vehicle; animal info (Male Sprague–Dawley rats, 200 to 250 g); Therapeutic indication (neuropathic pain);.

Q7163: Y. Zhang, *et al.* Combination Treatment of C16 Peptide and Angiopoietin-1 Alleviates Neuromyelitis Optica in an Experimental Model. *Mediators Inflamm* 2018;2018(4187347

ALZET Comments: Antibody, NMO-IgG; Complement, human; CSF/CNS (intrathecal); CSF/CNS (lateral ventricle);; Rat; 1003D; 3 days; Dose (10 µg NMO-IgG and 50 µL (5µg/µL) human complement); NMO aka Neuromyelitis optica;.

Q7210: X. Wang, *et al.* Macrophage migration inhibitory factor mediates peripheral nerve injury-induced hypersensitivity by curbing dopaminergic descending inhibition. *Exp Mol Med* 2018;50(2):e445

ALZET Comments: ISO-1, Macrophage inhibitory factor; CSF/CNS (intrathecal); Mice; Mouse Intrathecal Catheter; animal info (7-9 week old male C57BL/6 mice weighting 20–25 g);.

Q7052: I. Rossetti, *et al.* Calcitonin gene-related peptide decreases IL-1beta, IL-6 as well as Ym1, Arg1, CD163 expression in a brain tissue context-dependent manner while ameliorating experimental autoimmune encephalomyelitis. *J Neuroimmunol* 2018;323(94-104

ALZET Comments: Calcitonin gene-related peptide; CSF, artificial; CSF/CNS (intrathecal); Mice; 2002; 2 weeks; Controls received mp w/ vehicle; animal info (7-8 week old C57BL/6 female mice); peptides;.

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

ALZET Comments: RNA, small interfering (Flt3, scrambled); CSF/CNS(Intrathecal); Mice; 1002; 6 days; Dose (12.53 ng/ml); animal info (C57BL/6 naive mice, Flt3KO mice 25–30 g.); behavioral testing (reflexive tail flick); spinal cord injury; stress/adverse reaction: (see pg. 10);.

Q7263: L. Riemann, *et al.* Transplantation of Neural Precursor Cells Attenuates Chronic Immune Environment in Cervical Spinal Cord Injury. *Front Neurol* 2018;9(428

ALZET Comments: Platelet-Derived Growth Factor, Epidermal Growth Factor, Basic Fibroblast Growth Factor; Platelet-Derived Growth Factor, Epidermal Growth Factor, Basic Fibroblast Growth Factor; CSF/CNS(Intrathecal); Rat; 1007D; 7 days; Dose (PDGF-AA, 1 µg/100 µL; EGF, 3 µg/100 µL; bFGF, 3 µg/100mL); 0.1% rat serum albumin used; animal info (female Wistar rats 250 g); post op. care (moxifloxacin, buprenorphine); spinal cord injury;.

Q6913: Michael Mousseau, *et al.* Microglial pannexin-1 channel activation is a spinal determinant of joint pain. *Science Advances* 2018;4(8):

ALZET Comments: A740003; mimetic peptide inhibitor of Panx1; 10panx; scrpanx; Mac1-saporin; Saporin; CSF/CNS (intrathecal); Rat; 7 days; animal info (adult male Sprague–Dawley rats); enzyme inhibitor (P2X7R antagonist A740003); Therapeutic indication (arthritis);.

Q7202: W. Liu, *et al.* Dextran-based biodegradable nanoparticles: an alternative and convenient strategy for treatment of traumatic spinal cord injury. *Int J Nanomedicine* 2018;13(4121-4132

ALZET Comments: Taxol; Cremophor EL; CSF/CNS (Intrathecal); Rat; 2004; 7 days; Dose (256 ng/day); animal info (Sprague Dawley rats); behavioral testing (Locomotor capacity, BBB open field 21 point scale); ALZET rat intrathecal catheter used; spinal cord injury; stress/adverse reaction: (see pg. 4130) ; .

Q7216: G. Li, *et al.* MiR-103 alleviates autophagy and apoptosis by regulating SOX2 in LPS-injured PC12 cells and SCI rats. *Iran J Basic Med Sci* 2018;21(3):292-300



ALZET Comments: miR-103 agomir; Saline; CSF/CNS (intrathecal); Rat; 1003D; 3 days; Dose (1 ul/hr/day); Controls received mp w/ vehicle; animal info (Male, Sprague-Dawley, 180-220 g); post op. care (Penicillin G); spinal cord injury;

Q7026: P. M. Grace, *et al.* Protraction of neuropathic pain by morphine is mediated by spinal damage associated molecular patterns (DAMPs) in male rats. *Brain Behav Immun* 2018;72(45-50

ALZET Comments: naloxone; A438079; YVAD-cmk, Ac-; CSF/CNS (intrathecal); Rat; 2001; Dose (naloxone: 60 ug/h; A438079: 30 ng/h; ac-YVAD-cmk: 1 ug/h); animal info (10-12 week old male Fischer 344 rats); enzyme inhibitor (caspase-1);

Q7141: N. Geribaldi-Doldan, *et al.* Specific inhibition of ADAM17/TACE promotes neurogenesis in the injured motor cortex. *Cell Death Dis* 2018;9(9):862

ALZET Comments: GM6001(N-[(2R)-2-(hydroxami-docarbonylmethyl)-4-methylpentanoyl]-L-tryptophan methylamide); DMSO, PBS; CSF/CNS (intrathecal); Mice; 1002, 1004; 14 days, 28 days; Dose (50-µM); 0.4% DMSO used; Controls received mp w/ vehicle; Controls received mp w/ vehicle; GM6001 is N-[(2R)-2-(hydroxami-docarbonylmethyl)-4-methylpentanoyl]-L-tryptophan methylamide; ALZET brain infusion kit II used;

Q7137: K. Fujita, *et al.* Targeting Tyro3 ameliorates a model of PGRN-mutant FTLTDP via tau-mediated synaptic pathology. *Nat Commun* 2018;9(1):433

ALZET Comments: Gö6976; PBS; CSF/CNS (intrathecal); Mouse; 2006; 2 weeks; Dose (0.15 ul/h); animal info (PGRN-KI and C57BL/6J, 10-12 weeks old); behavioral testing (Morris water maze test, Fear-conditioning test, Probe test, Rotarod test, Open-field test, Light-dark box test); enzyme inhibitor (PKC inhibitor); gene therapy;

Q7031: M. Fregosi, *et al.* Changes of motor corticobulbar projections following different lesion types affecting the central nervous system in adult macaque monkeys. *Eur J Neurosci* 2018;48(4):2050-2070

ALZET Comments: Antibody, anti-Nogo-A; CSF/CNS (Intrathecal), SC; Monkey (Macaca fascicularis); 2ML2; 4 weeks; Dose (3 mg/ml); One pump administered the treatment intrathecally to the cervical spinal cord, whereas the other pump delivered the antibody close to the lesioned site in M1 below the dura; Multiple pumps per animal (2);

Q7131: S. Dyck, *et al.* Perturbing chondroitin sulfate proteoglycan signaling through LAR and PTPsigma receptors promotes a beneficial inflammatory response following spinal cord injury. *J Neuroinflammation* 2018;15(1):90

ALZET Comments: Intracellular leukocyte common antigen-related peptide (ILP), Intracellular sigma peptide (ISP), TAT-conjugated peptides; Saline; CSF/CNS (intrathecal); Rat; 2001D, 1003D, 2001, 2002, 2004; 1, 3, 5, 7, or 14 days; Dose (10 ug/day); Controls received mp w/ vehicle; animal info (Sprague-Dawley, adult, female, 250 g); animal info (Sprague-Dawley, adult, female, 250 g); spinal cord injury; .

Q3539: Y. C. Cheng, *et al.* Melatonin regulation of transcription in the reversal of morphine tolerance: Microarray analysis of differential gene expression. *Int J Mol Med* 2018;

ALZET Comments: Morphine; Saline; CSF/CNS (intrathecal); Rat; 7 days; Dose (15 µg/h); Controls received mp w/ vehicle; animal info (27 Male Wistar rats (350 400 g), each rat (with 12 weeks of age)); neurodegenerative ();

Q7097: A. Alastrue-Agudo, *et al.* FM19G11 and Ependymal Progenitor/Stem Cell Combinatory Treatment Enhances Neuronal Preservation and Oligodendrogenesis after Severe Spinal Cord Injury. *Int J Mol Sci* 2018;19(1):

ALZET Comments: FM19G11; DMSO; CSF/CNS (intrathecal); Rat; 1007D; 3 days; Controls received mp w/ vehicle; animal info (2-month-old Sprague Dawley rats weighing ~200 g); FM19G11 is an inhibitor of Hypoxia inducible factor-alpha protein expression; spinal cord injury;

Q6332: J. Zhang, *et al.* Prevention and reversal of latent sensitization of dorsal horn neurons by glial blockers in a model of low back pain in male rats. *J Neurophysiol* 2017;118(4):2059-2069

ALZET Comments: Minocycline, fluorocitrate; PBS, artificial cerebrospinal fluid; CSF/CNS (intrathecal); Rat; 2002; 6 days, 3 days; Dose (200 µg/day); Controls received mp w/ vehicle; animal info (adult male Sprague- Dawley rats);

Q5911: X. Wang, *et al.* Threshold Effect of G9a/Glp on Peripheral Nerve Injury Induced Hypersensitivity. *Mol Pain* 2017;13(1744806917729305



ALZET Comments: CSF/CNS (intrathecal); Mice; animal info (male, C57BL6, 20-25g, 7-9 weeks old); post op. care (10000 IU sodium penicillin IM); ALZET intrathecal catheter only;

Q6270: A. S. Wahl, *et al.* Optogenetically stimulating intact rat corticospinal tract post-stroke restores motor control through regionalized functional circuit formation. *Nat Commun* 2017;8(1):1187

ALZET Comments: Antibody, anti-Nogo-A; CSF/CNS (intrathecal); Rat; 2ML2; 2 weeks; animal info (adult female Long-Evans rats); post op. care (animals received analgesics and antibiotics);

Q5992: H. Suzuki, *et al.* Neural stem cell mediated recovery is enhanced by Chondroitinase ABC pretreatment in chronic cervical spinal cord injury. *PLoS One* 2017;12(8):e0182339

ALZET Comments: Chondroitinase AB; CSF, artificial; CSF/CNS (intrathecal); Mice; 1007D; 7 days; Controls received mp w/ vehicle; animal info (female, 15-20g); spinal cord injury; Therapeutic indication (Spinal cord injury); Dose (2.64 mU/mL);

Q6181: R. Simeoli, *et al.* Exosomal cargo including microRNA regulates sensory neuron to macrophage communication after nerve trauma. *Nat Commun* 2017;8(1):1778

ALZET Comments: miR-21-5p antagomir; in vivo transfection reagent; SC; CSF/CNS (intrathecal); Mice; 1007D; 7 days; Dose (12 pmol/day); Controls received mp w/ vehicle and scrambled oligomer; functionality of mp verified (Catheter and pump were checked at the end of treatment to ascertain efficient delivery) ; spinal cord injury;

Q5981: S. Shen, *et al.* Regulation of transient receptor potential cation channel subfamily V1 protein synthesis by the phosphoinositide 3-kinase/Akt pathway in colonic hypersensitivity. *Exp Neurol* 2017;295(104-115

ALZET Comments: LY294002; DMSO, Saline; CSF/CNS (intrathecal); Rat; 2001; Controls received mp w/ vehicle; animal info (Sprague-dawley, 200g); enzyme inhibitor (PI3K); Dose (2.4 ug/rat/day or 90 ug/kg/body weight);

Q5891: K. T. Santhosh, *et al.* Design and optimization of PLGA microparticles for controlled and local delivery of Neuregulin-1 in traumatic spinal cord injury. *J Control Release* 2017;261(147-162

ALZET Comments: Neuregulin-1, human recombinant; CSF, artificial; BSA; CSF/CNS (intrathecal); Rat; 1003D; 2001; 2002; 2004; 3 days, 7 days, 14 days, 28 days; Controls received mp w/ vehicle; animal info (female, Sprague Dawley, 250g); Dose (500ng/day); 1% BSA used; comparison of microparticles vs mp; spinal cord injury; peptides; Dose (500ng/day); Comparison of PLGA Microparticles with ALZET pumps;

Q6755: U. N. Ramirez-Jarquin, *et al.* Chronic GABAergic blockade in the spinal cord in vivo induces motor alterations and neurodegeneration. *Neuropharmacology* 2017;117(85-92

ALZET Comments: AMPA; CNQX; MK801; bicuculline methbromide; strychnine; Ringer's solution; CSF/CNS (intrathecal); Rat; 2004; 16 days; Dose (bicuculline methbromide 5, 10 or 17.5 mM; strychnine 20 mM; Bic 10 mM + CNQX 1 mM; Bic10 mM + MK801 14 mM; AMPA 3.8 mM; and AMPA 3.8 mM + Bic 10 mM.); Controls received mp w/ vehicle; animal info (adult Wistar male rats (270-300 g)); cyanoacrylate adhesive;

Q5884: U. N. Ramirez-Jarquin, *et al.* Chronic infusion of SOD1(G93A) astrocyte-secreted factors induces spinal motoneuron degeneration and neuromuscular dysfunction in healthy rats. *J Cell Physiol* 2017;232(10):2610-2615

ALZET Comments: ACM-hG93A; CSF/CNS (intrathecal); Rat; 2004; 16 days; animal info (male, Wistar, 270-300g, adult); neurodegenerative (amyotrophic lateral sclerosis); post op. care (IM penicillin); behavioral testing (rotarod test; paw grip endurance); Pumps primed in 37C saline for 28 hours; used wound clips;

Q6600: C. Mazur, *et al.* Development of a simple, rapid, and robust intrathecal catheterization method in the rat. *J Neurosci Methods* 2017;280(36-46

ALZET Comments: Oligonucleotide, antisense; CSF/CNS (intrathecal); Rat; animal info (Sixteen male Sprague-Dawley rats); Publication describes the development of a rapid and robust intrathecal catheterization method for the testing of putative ASO therapeutics for diseases of the CNS.

Q5828: K. Matoba, *et al.* Leptin sustains spontaneous remyelination in the adult central nervous system. *Sci Rep* 2017;7(40397



ALZET Comments: Antibody, leptin neutralizing; leptin, recombinant mouse; PBS; CSF/CNS (intrathecal); Mice; 1007D, 1002; Controls received mp w/ vehicle; animal info (7-8 weeks old) ; ALZET brain infusion kit used; neurodegenerative (Demyelination); Therapeutic indication (Demyelination); Dose ((12 μ g/kg body weight per day, 10 μ g/kg of body weight per day));

Q5832: C. P. Lin, *et al.* CXCL12/CXCR4 Signaling Contributes to the Pathogenesis of Opioid Tolerance: A Translational Study. *Anesth Analg* 2017;124(3):972-979

ALZET Comments: CXCL12; Saline; CSF/CNS (intrathecal); Rat; 2001; 5, 6 days; Controls received mp w/ vehicle; animal info (250-275 g); Therapeutic indication (Analgesia, anesthesiology); Dose ((3.6 ng/h x 24 hrs));

Q5846: B. V. Ineichen, *et al.* Direct, long-term intrathecal application of therapeutics to the rodent CNS. *Nat Protoc* 2017;12(1):104-131

ALZET Comments: Ringer's solution; SC, CSF/CNS (Intrathecal); Rat; 2ML2; 1 week - 6 weeks; Controls received mp w/ vehicle; animal info (8-24 weeks old); dose-response; good methods p. 109; no stress; The pump does not interfere with behavioral assessments of animals, but from our experience we recommend a recovery interval of 2–3 d after surgery until behavioral testing is resumed; Therapeutic indication (CNS therapeutics);

Q6431: M. Hlavica, *et al.* Intrathecal insulin-like growth factor 1 but not insulin enhances myelin repair in young and aged rats. *Neurosci Lett* 2017;648(41-46

ALZET Comments: Insulin-like Growth Factor 1, insulin; Acetic acid, Saline, Tween; CSF/CNS (intrathecal); Rat; 2ML2; 21 days; Dose (100 μ g/day); 0.1% Tween used; Controls received mp w/ vehicle; animal info (12–14 weeks-old and 12 months-old female Long Evans rats); Insulin-like Growth Factor 1 aka IGF-1;

Q6043: V. Hernandez-Torres, *et al.* BDNF effects on functional recovery across motor behaviors after cervical spinal cord injury. *J Neurophysiol* 2017;117(2):537-544

ALZET Comments: Brain-derived neurotrophic factor; CSF, artificial; CSF/CNS (intrathecal); Rat; 2002; 14 days; Controls received mp w/ vehicle; animal info (280-300g); spinal cord injury; Dose (180 ng/day);

Q5812: M. Flinspach, *et al.* Insensitivity to pain induced by a potent selective closed-state Nav1.7 inhibitor. *Sci Rep* 2017;7(39662

ALZET Comments: JNJ63955918, Morphine; Saline; CSF/CNS (intrathecal); Rat; 2002, 2001; 14 days, 2 weeks; Controls received mp w/ vehicle; animal info (250-300g) behavioral testing (Hargreaves test, hotplate test, tail-flick test, formalin flinching); JNJ63955918 is a tarantula venom-derived peptide (a potent, highly selective, closed-state Nav1.7 blocking peptide) ; Therapeutic indication (Pain, analgesia, electrophysiology);

Q5759: Y. Cao, *et al.* Synchrotron radiation micro-CT as a novel tool to evaluate the effect of agomir-210 in a rat spinal cord injury model. *Brain Res* 2017;1655(55-65

ALZET Comments: Agomir-210; Saline; CSF/CNS (intrathecal); Rat; 1002; 3 days; Controls received mp w/ vehicle saline, and Agomir-negative; animal info (180-220 g); spinal cord injury; Therapeutic indication (spinal cord injury); Dose (agomir-NC (1 μ L/h, 20 nmol/ mL) or agomir-210 (1 μ L/h, 20 nmol/mL));

Q5871: J. E. Aguirre, *et al.* Neonatal immune challenge followed by adult immune challenge induces epigenetic-susceptibility to aggravated visceral hypersensitivity. *Neurogastroenterol Motil* 2017;29(9):

ALZET Comments: Garcinol; DMSO, water; CSF/CNS (intrathecal); Rat; 7 days; 50% DMSO; Garcinol is a HAT inhibitor; Therapeutic indication (Colon Inflammation); Dose (4 nmol per μ L);

Q5514: K. Zweckberger, *et al.* Self-assembling peptides optimize the post-traumatic milieu and synergistically enhance the effects of neural stem cell therapy after cervical spinal cord injury. *Acta Biomater* 2016;42(77-89

ALZET Comments: Basic fibroblast growth factor; epidermal growth factor; brain-derived growth factor; CSF; artificial; gentamycin; CSF/CNS (intrathecal); Rat; 1007D; 7 days; Controls received mp w/ vehicle; animal info (Wistar, 250g); spinal cord injury; post op. care (0.05 mg/kg buprenorphine SC; QD SC injection of cyclosporine A (10 mg/kg); QD minocycline 50



mg/kg); "catheter tip was located sub- durally at the epicenter of the lesion. It was fixed with several sutures in the paraspinal muscles to avoid any movement- associated dislocation and finally connected to the pump located in a subcutaneous recess." pg 79; behavioral testing (Grip strength test, Basso, Beattie, Bresnahan Locomotor Rating Scale, Inclined plane test); Therapeutic indication (spinal cord injury);Dose (Gentamycin: 50ug/mL);.

Q5106: A. Zendedel, *et al.* Activation and Regulation of NLRP3 Inflammasome by Intrathecal Application of SDF-1a in a Spinal Cord Injury Model. *Mol Neurobiol* 2016;53(5):3063-75

ALZET Comments: Stromal cell-derived factor-1, alpha; PBS; BSA; CSF/CNS (intrathecal); Rat; 2001; 7 days; Controls received mp w/ vehicle; animal info (male, Wistar, 14 weeks old, 350-400g); 1% BSA used; post op. care (saline rehydration; baytril 0.3 ml SC BID; manual bladder emptying BID); behavioral testing (BBB locomotor test); immunology;.

Q5105: J. E. Zadina, *et al.* Endomorphin analog analgesics with reduced abuse liability, respiratory depression, motor impairment, tolerance, and glial activation relative to morphine. *Neuropharmacology* 2016;105(215-27

ALZET Comments: Morphine; endomorphine analog; Saline; CSF/CNS (intrathecal); Rat; 2001; 7 days; Controls received mp w/ vehicle; animal info (male, Sprague Dawley, 250-400g); half-life (p. 219); behavioral testing (tail flick test; rotarod testing); stability verified by (internal testing; stability >1 year at 37C); pumps primed in 37C saline for 16 hours; used PE-8 IT catheter; Dose (2 ug/hr morphine; 0.056-0.075 ug/hr analog);.

Q4914: H. Yamanaka, *et al.* Annexin A2 in primary afferents contributes to neuropathic pain associated with tissue type plasminogen activator. *Neuroscience* 2016;314(189-99

ALZET Comments: Homocysteine; tPA; PBS; CSF/CNS (intrathecal); Rat; 2001; 2001D; 9 days; Controls received mp w/ vehicle; animal info (male, Sprague Dawley, 200-250g); dose-response (pg195); behavioral testing (mechanical withdrawal threshold); Dose (homocysteine 1.2 umol/day or 120 nmol/day; tPA 2 ug/day);.

Q4781: Vipin Arora, *et al.* Disruption of Spinal Noradrenergic Activation Delays Recovery of Acute Incision-Induced Hypersensitivity and Increases Spinal Glial Activation in the Rat. *The Journal of Pain* 2016;17(2):190-202

ALZET Comments: Atipamezole; CSF/CNS (intrathecal); Rat; 2002; 14 days; Controls received mp w/ vehicle; animal info (male, Sprague Dawley, 180-250g); dose-response (pg197); atipamezole is a selective alpha2 AR antagonist; Dose (0, 50, 100, 200 ug/day);.

Q5076: R. Y. Tsai, *et al.* Resveratrol reverses morphine-induced neuroinflammation in morphine-tolerant rats by reversal HDAC1 expression. *J Formos Med Assoc* 2016;115(6):445-54

ALZET Comments: Morphine; CSF/CNS (intrathecal); Rat; 120 hours; Controls received mp w/ saline; animal info (male, Wistar); behavioral testing (tail-flick); Dose (15 ug/h);.

Q6179: M. Shinozaki, *et al.* Combined treatment with chondroitinase ABC and treadmill rehabilitation for chronic severe spinal cord injury in adult rats. *Neurosci Res* 2016;113(37-47

ALZET Comments: Chondroitinase ABC; CSF/CNS (intrathecal); Rat; 2001; 7 days; Dose (40 U/200 ul); Controls received mp w/ vehicle and inactivated C-ABC; animal info (Adult female Sprague-Dawley rats weighing 200–220 g); behavioral testing (Open field hindlimb locomotor activity test); Chondroitinase-ABC is a CSPG-digesting enzyme; enzyme inhibitor (chondroitin sulfate proteoglycans); ALZET Rat Intrathecal Catheter used; spinal cord injury;.

Q6662: J. Shen, *et al.* NMDA receptors participate in the progression of diabetic kidney disease by decreasing Cdc42-GTP activation in podocytes. *J Pathol* 2016;240(2):149-60

ALZET Comments: RNA, NR1-short hairpin; CSF/CNS (Intrathecal); Mice; Intrathecal catheter; 10.1002/path.4764; animal info (Diabetes-induced C57BL/6 J mice, 8 weeks of age); diabetes; ALZET intrathecal catheter used with another product.

Q5186: U. N. Ramirez-Jarquín, *et al.* Neuropathological characterization of spinal motor neuron degeneration processes induced by acute and chronic excitotoxic stimulus in vivo. *Neuroscience* 2016;331(78-90

ALZET Comments: AMPA; Phosphate buffer; CSF/CNS (intrathecal); Rat; 2004; 5 days; Controls received mp w/ vehicle; animal info (male, Wistar, 270-300g); neurodegenerative (amyotrophic lateral sclerosis); post op. care (IM penicillin);



behavioral testing (rotarod, paw grip endurance; stride analysis); AMPA aka a-amino-3-hydroxy-5-methyl-4-isoxazoleacetic acid; pumps primed for 48 hours in 37C saline; used surgical clips;

Q5052: G. Murlidharan, *et al.* CNS-restricted Transduction and CRISPR/Cas9-mediated Gene Deletion with an Engineered AAV Vector. *Mol Ther Nucleic Acids* 2016;5(7):

ALZET Comments: Viral vector, adeno-associated (AAV9, AAV2g0); Gene, CBh-ScGFP; CSF/CNS (intrathecal); Mice; 2001D; 24 hrs; animal info (8 weeks old C57/Bl6 male mice); comparison of IT bolus injections vs mp; ALZET mouse intrathecal catheter used (lumbar cannulation); gene therapy;

Q6616: R. Matos, *et al.* Bladder pain induced by prolonged peripheral alpha 1A adrenoceptor stimulation involves the enhancement of transient receptor potential vanilloid 1 activity and an increase of urothelial adenosine triphosphate release. *Acta Physiologica* 2016;218(4):265-275

ALZET Comments: Phenylephrine; Saline; CSF/CNS (intrathecal); Rat; 1002; Dose (0.0498 mg/day); Controls received mp w/ vehicle; animal info (female Wistar rats); enzyme inhibitor (selective α 1-adrenoceptor agonist); Therapeutic indication (chronic visceral pain);

Q4820: C. D. Luca, *et al.* Astrocytes and Microglia-Mediated Immune Response in Maladaptive Plasticity is Differently Modulated by NGF in the Ventral Horn of the Spinal Cord Following Peripheral Nerve Injury. *Cell Mol Neurobiol* 2016;36):37-46

ALZET Comments: Nerve growth factor, b-; CSF, artificial; CSF/CNS (intrathecal); Rat; 2001; 7 days; Controls received mp w/ vehicle; animal info (male, Sprague Dawley, 250-300g); Cannula placement verified via induced lower body paralysis (IT lidocaine injection); spared nerve injury; Dose (12 μ g/kg/day);

Q6685: J. Y. Lee, *et al.* Jmjd3 mediates blood-spinal cord barrier disruption after spinal cord injury by regulating MMP-3 and MMP-9 expressions. *Neurobiol Dis* 2016;95(66-81

ALZET Comments: Virus, adeno-associated shjmjd3; CSF/CNS (intrathecal); Rat; 1003D; Controls received mp w/ control adeno-associated virus; animal info (adult male Sprague-Dawley rats weighing 250-270g); spinal cord injury;

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

ALZET Comments: DNAXT-1as; CSF/CNS (intrathecal); Rat; 1007D; 2 weeks; Controls received mp w/ control enzyme or PBS; animal info (female, Wistar, 200-250g); pumps replaced every week; pumps replaced every week; spinal cord injury; post op. care (Baytril; manual bladder emptying; Rimadyl); behavioral testing (horizontal ladder task); used self-made intrathecal catheter from 32-gauge polyurethane; enzyme inhibitor (DNA enzyme of mRNA of xylosyltransferase-1);

Q5622: D. Kim. Anti-miR delivery strategies to bypass the blood-brain barrier in glioblastoma therapy. *Oncotarget* 2016;7(20):29400-11

ALZET Comments: Oligonucleotide, anti-miR, anti-let-7; Saline; CSF/CNS (intrathecal); Mice; 1004D; 7 days; Controls received mp w/ vehicle; animal info (6-7 weeks); ALZET brain infusion kit 3 used; "Among them, the osmotic pump system is one of the most useful convection-enhanced delivery methods for delivering drugs to brain tumors and bypassing the BBB" pg 29408; Dose (20 μ M, 50 μ M); good figures (p29402);

Q4840: Z. Jiang, *et al.* Blocking mammalian target of rapamycin alleviates bone cancer pain and morphine tolerance via u-opioid receptor. *International Journal of Cancer* 2016;138(2013-2020

ALZET Comments: Rapamycin; CTOP; LY297002; DMSO; saline; CSF/CNS (intrathecal); Rat; 14 days; Controls received mp w/ saline; animal info (Wistar, 200-250g); 50% DMSO used; cancer (breast; bone); dose-response (pg 2015); behavioral testing (hindpaw withdrawal latency); Rapamycin is an mTOR antagonist; CTOP is an MOR antagonist; LY297002 an a PI3K inhibitor;

Q6048: Y. Hayano, *et al.* Dorsal horn interneuron-derived Netrin-4 contributes to spinal sensitization in chronic pain via Unc5B. *J Exp Med* 2016;213(13):2949-2966



ALZET Comments: Netrin-4; Saline; CSF/CNS (intrathecal); Rat; 1002; 28 days; Controls received mp w/ vehicle; animal info (8-10 weeks old, Wistar; 200-280g); behavioral testing (von Frey filament test); Therapeutic indication (Chronic pain);.

Q4825: P.-c. FU, *et al.* ROCK Inhibition with Fasudil Promotes Early Functional Recovery of Spinal Cord Injury in Rats by Enhancing Microglia Phagocytosis. *J Huazhong Univ Sci Technol [Med Sci]* 2016;36(1):31-36

ALZET Comments: Fasudil; Saline; CSF/CNS (intrathecal); Rat; 1007D; 3 days; 7 days; 14 days; Controls received mp w/ vehicle; animal info (male, Dprague Dawley, adult, 260-300g); animal info (male, Dprague Dawley, adult, 260-300g); behavioral testing (BBB behavioral testing); Dose (180 ug/day);.

Q5348: J. D. Figueroa, *et al.* Fatty Acid Binding Protein 5 Modulates Docosahexaenoic Acid-Induced Recovery in Rats Undergoing Spinal Cord Injury. *J Neurotrauma* 2016;33(15):1436-49

ALZET Comments: Oligonucleotides, scramble nontargeting; siRNA; Ethanol; CSF/CNS (Intrathecal); Rat; 2001; 7 days; Controls received mp w/ vehicle; animal info (Young adult female Sprague-dawley rats); good methods (pg 1443); spinal cord injury; "Pumps were primed with DHA-albumin complex (DHA), FABP5 siRNA, and vehicle controls" (pg 1443); ALZET rat intrathecal catheter used;.

Q4823: E. E. Ewan, *et al.* Intrathecal Acetyl-L-Carnitine Protects Tissue and Improves Function after a Mild Contusive Spinal Cord Injury in Rats. *Journal of Neurotrauma* 2016;33(269-277

ALZET Comments: Carnitine, acetyl-L-; PBS; CSF/CNS (intrathecal); Rat; 2001; 6 days; animal info (female, Sprague Dawley, 200g); spinal cord injury; post op. care (wound rinsed in sterile saline, bacitracin applied topically, gentamicin IM 0, 2 or 4 days later, buprenorphine IM every 12 hours, bladders manually expressed BID); behavioral testing (locomotor function, grid walking, open field); pumps primed overnight; pumps removed after 6 days; Dose (1 mg/day);.

Q5767: S. A. Choi, *et al.* In vivo bioluminescence imaging for leptomeningeal dissemination of medulloblastoma in mouse models. *BMC Cancer* 2016;16(1):723

ALZET Comments: CSF/CNS (intrathecal); Mice; ALZET brain infusion kit 3 used;.

Q5768: A. C. Choi. In vivo bioluminescence imaging for leptomeningeal dissemination of medulloblastoma in mouse models. *BMC Cancer* 2016;16(723):

ALZET Comments: Cells, MB-effLuc; CSF/CNS (Intrathecal); Mice; Mouse Intrathecal Catheter;.

Q4264: Y. Zhu, *et al.* Hematogenous macrophage depletion reduces the fibrotic scar and increases axonal growth after spinal cord injury. *NEUROBIOLOGY OF DISEASE* 2015;74(114-125

ALZET Comments: Sunitinib malate; DMSO; CSF/CNS (intrathecal); Mice; 1002; 2 weeks; enzyme inhibitor (tyrosine kinase); Animal info (female, 8 weeks old); functionality of mp verified by use of Evans blue dye; 2.5% DMSO used; spinal cord injury; immunology; used ALZET mouse IT catheter;.

Q4191: C. Xu, *et al.* Pharmacologically inhibiting kinesin-5 activity with monastrol promotes axonal regeneration following spinal cord injury. *Experimental Neurology* 2015;263(172-176

ALZET Comments: Chondroitinase ABC; Trehalos; PBS; monastrol; DMSO; CSF/CNS (intrathecal); Rat; 2002; Controls received mp w/ vehicle; animal info (female, Sprague Dawley, 225-250g, adult); spinal cord injury; behavioral testing (open field testing); use ReCathCo IT catheter;.

Q4940: D. Wu, *et al.* Expressing Constitutively Active Rheb in Adult Neurons after a Complete Spinal Cord Injury Enhances Axonal Regeneration beyond a Chondroitinase-Treated Glial Scar. *J Neurosci* 2015;35(31):11068-80

ALZET Comments: Chondroitinase ABC; PBS; trehalos; CSF/CNS (intrathecal); Rat; 2002; 2 weeks; Controls received mp w/ vehicle; animal info (female, Wistar, adult, 225-250g); spinal cord injury; post op. care (buprenorphine, cefazolin, Lactated Ringer's solution, bladders manually expressed BID); "Because ChABC alone is thermolabile, we mixed it with the sugar trehalos to thermostabilize it" pg 11069; pumps primed in 37C saline overnight;.

Q4632: J. Wang, *et al.* Hyaluronan Tetrasaccharide Exerts Neuroprotective Effect and Promotes Functional Recovery After Acute Spinal Cord Injury in Rats. *NEUROCHEMICAL RESEARCH* 2015;40(98-108



ALZET Comments: Hyaluronan tetrasaccharide; CSF/CNS (intrathecal); Rat; 4 weeks; Controls received mp w/ vehicle; animal info (Sprague Dawley, 12 weeks old, 250-300g); spinal cord injury; post op. care (Baytril antibacterial applied SC for 3 days); behavioral testing (locomotor activity); immunology;.

Q5458: C. F. Vogelaar, *et al.* Pharmacological Suppression of CNS Scarring by Deferoxamine Reduces Lesion Volume and Increases Regeneration in an In Vitro Model for Astroglial-Fibrotic Scarring and in Rat Spinal Cord Injury In Vivo. PLoS One 2015;10(7):e0134371

ALZET Comments: cAMP, BPY-DCA; DFO; PBS; CSF/CNS (intrathecal); Rat; 1007D, 2001, 2002; 1 week, 2 weeks; Controls received mp w/ vehicle; animal info (female Wistar rats (200–250 g)); spinal cord injury, complete laminectomy of T8, T9, T11; post op. care (manual bladder emptying, antibiotics, pain relief); Individually housed until animal recovered from anesthesia; scar reduction; healing, recovery; Therapeutic indication (Spinal Cord Injury); Dose (cAMP 50, 100 ug/day; DFO 10, 50 ug/day; BPY-DCA 1.1, 7.8 ug/day);.

Q5282: Y. Tsenkina, *et al.* EphB3 receptors function as dependence receptors to mediate oligodendrocyte cell death following contusive spinal cord injury. Cell Death Dis 2015;6(e1922

ALZET Comments: EphrinB3; PBS; CSF/CNS (intrathecal); Mice; 1007D; 1 week; Controls received mp w/ vehicle; animal info (Female wild type (WT), EphB3 knockout EphB3^{-/-}55), PLP-GFP-WT, PLP-GFP-EphB3^{-/-} mice (2–3 months of age, weighing 26±6 g)); ALZET brain infusion kit 3 used; good methods (pg. 8); spinal cord injury; behavioral testing (locomotor behavior); Dose (100 ug/ml);.

Q4134: E. Tatsumi, *et al.* RhoA/ROCK Pathway Mediates p38 MAPK Activation and Morphological Changes Downstream of P2Y12/13 Receptors in Spinal Microglia in Neuropathic Pain. Glia 2015;63(216-228

ALZET Comments: H1152; MRS2395; MRS2211; 2Me-SADP; Saline; DMSO; CSF/CNS (intrathecal); Rat; 2001; 1003D; 3 days; Controls received mp w/ vehicle; animal info (male, Sprague Dawley, 200-250g); 5% DMSO used; behavioral testing (hindpaw withdrawal test); H1152 is a ROCK inhibitor; sciatic nerve injury;.

Q4607: S. Tashiro, *et al.* BDNF Induced by Treadmill Training Contributes to the Suppression of Spasticity and Allodynia After Spinal Cord Injury via Upregulation of KCC2. NEUROREHABILITATION AND NEURAL REPAIR 2015;29(677-689

ALZET Comments: TrkB/Fc, recombinant human; PBS; CSF/CNS (intrathecal); Rat; 2002; 2 weeks; Controls received mp w/ vehicle; animal info (female, Sprague Dawley, 8-9 weeks old, 190-220g); spinal cord injury; used ALZET intrathecal catheters; pumps removed after 2 weeks;.

Q3737: E. S. Smith, *et al.* SEMA4D compromises blood-brain barrier, activates microglia, and inhibits remyelination in neurodegenerative disease. NEUROBIOLOGY OF DISEASE 2015;73(254-268

ALZET Comments: Antibody, anti-SEMA 4D, monoclonal; CSF/CNS (intrathecal, subarachnoid space); Rat; 2002; 14 days; Control animals received mp w/ control IgG; animal info (Sprague Dawley, male, 8 wks old).

Q4589: M. M. Siddiq, *et al.* Metallothionein-I/II Promotes Axonal Regeneration in the Central Nervous System. JOURNAL OF BIOLOGICAL CHEMISTRY 2015;290(16343-16356

ALZET Comments: Metallothionein-I/II; Saline, sterile; CSF/CNS (intrathecal); Rat; 1007D; 24 hours; Controls received mp w/ vehicle; animal info (Long Evans, P28); dose-response (p.16347);.

Q4930: A. Ruban, *et al.* Combined Treatment of an Amyotrophic Lateral Sclerosis Rat Model with Recombinant GOT1 and Oxaloacetic Acid: A Novel Neuroprotective Treatment. Neurodegener Dis 2015;15(4):233-42

ALZET Comments: Kanic acid; cyclothiazide; CSF, artificial; CSF/CNS (intrathecal); Rat; 2001; 14 days; 36 days; animal info (male, Wistar, 8-9 weeks old, 240-250g); pumps replaced every week; neurodegenerative (ALS amyotrophic lateral sclerosis); behavioral testing (rotarod testing); pumps primed in 37C sterile saline overnight; catheter placement verified by visual examination;.

Q4976: F. A. Oladosu, *et al.* Mu Opioid Splice Variant MOR-1K Contributes to the Development of Opioid-Induced Hyperalgesia. PLoS One 2015;10(8):e0135711



ALZET Comments: RNA, small interfering 13 antisense; CSF, artificial; CSF/CNS (intrathecal); Mice; 7 days; Controls received mp w/ sense siRNA; animal info (C57BL6J or CXB7/ByJ, 8-12 weeks old, 20-30g);.

Q4690: A. Okada-Ogawa, *et al.* Involvement of medullary GABAergic system in extraterritorial neuropathic pain mechanisms associated with inferior alveolar nerve transection. *EXPERIMENTAL NEUROLOGY* 2015;267(42-52

ALZET Comments: R-DIOA; DMSO; saline; CSF/CNS (intrathecal); Rat (transgenic); 2001; 7 days; Controls received mp w/ vehicle; animal info (male, VGAT-Venus Tg); 10% DMSO used; behavioral testing (von Frey filaments); used microsilicon tubing (0.8 mm in diameter) see pg. 44; R-DIOA is a KCC2 (potassium-chloride co-transporter 2) blocker; neuropathic pain;.

Q4547: F. R. Nieto, *et al.* Calcitonin Gene-Related Peptide-Expressing Sensory Neurons and Spinal Microglial Reactivity Contribute to Pain States in Collagen-Induced Arthritis. *ARTHRITIS & RHEUMATOLOGY* 2015;67(1668-1677

ALZET Comments: Calcitonin gene-related peptide (8-37); CSF/CNS (intrathecal); Rat; 2001; 7 days; Controls received mp w/ vehicle; animal info (female, Lewis, 180-200g); behavioral testing (Von Frey filaments; Plantar test); immunology; peptides;.

Q4540: R. Muramatsu, *et al.* Prostacyclin Prevents Pericyte Loss and Demyelination Induced by Lysophosphatidylcholine in the Central Nervous System. *JOURNAL OF BIOLOGICAL CHEMISTRY* 2015;290(11515-11525

ALZET Comments: Iloprost; Saline; CSF/CNS (intrathecal); Mice; 1007D; 1 day; Controls received mp w/ vehicle; animal info (C57BL6J);.

Q3785: L. Micheli, *et al.* Acute and subchronic antinociceptive effects of nociceptin/orphanin FQ receptor agonists infused by intrathecal route in rats. *European Journal of Pharmacology* 2015;754(79-87

ALZET Comments: Morphine; UFP-112; UFP-113; Saline, sterile; CSF/CNS (intrathecal); Rat; 9, 14 days; Control animals received mp w/ vehicle; animal info (male, Sprague Dawley, Wistar, NOP -/-, male); ALZET intrathecal catheter used; UFP-112 is a full NOP agonist (N/OFQ peptide); UFP-113 is a partial NOP agonist.

Q4997: S. L. Lin, *et al.* Predicting Neuroinflammation in Morphine Tolerance for Tolerance Therapy from Immunostaining Images of Rat Spinal Cord. *PLoS One* 2015;10(10):e0139806

ALZET Comments: Morphine; gabapentin; CSF/CNS (intrathecal); Rat; 5 days; Controls received mp w/ saline; animal info (male, Wistar, 320-400g); behavioral testing (anti-nociceptive test;); dependence; Dose (Morphine 15 ug/h; gabapentin 15 ug/h);.

Q3979: C. P. Lin, *et al.* Role of Spinal CXCL1 (GROalpha) in Opioid Tolerance A Human-to-rodent Translational Study. *Anesthesiology* 2015;122(666-676

ALZET Comments: CXCL1; antibody, CXCL1; CXCR2 antileukine hexapeptide; morphine; CSF/CNS (intrathecal); Rat; 5 days; 2 days; Controls received mp w/ saline; animal info (male, Sprague Dawley, 250-275g, adult); behavioral testing (tail flick response); dependence; used PE10 intrathecal catheter tubing;.

Q5223: R. Li, *et al.* Antinociceptive effects of dexmedetomidine via spinal substance P and CGRP. *Transl Neurosci* 2015;6(1):259-264

ALZET Comments: Dexmedetomidine, BRL44408; CSF, artificial; CSF/CNS (intrathecal); Rat; 2001; 1 week; Controls received mp w/ vehicle; animal info: Wistar rats (both male and female) weighing 200-250 g; functionality of mp verified by levels of behavior from rats; dose-response (xpg 260-261); spinal cord injury; behavioral testing (mechanical sensitivity of the hindpaw); Intrathecal catheter used; BRL44408 is an α 2-AR antagonist; Dose: 20, 50 μ M (DEX); 15,50 μ M (BRL44408).

Q5003: Y. Lefevre, *et al.* Neuropathic pain depends upon D-serine co-activation of spinal NMDA receptors in rats. *Neurosci Lett* 2015;603(42-7

ALZET Comments: Fluoroacetate; CSF, artificial; CSF/CNS (intrathecal); Rat; 2002; 14 days; Controls received mp w/ vehicle; animal info (male, adult, Wistar, 150-175g); Dose (5 nmoles/hr);.

Q3950: J. M. Kwicien, *et al.* Subdural infusion of dexamethasone inhibits leukomyelitis after acute spinal cord injury in a rat model. *FOLIA NEUROPATHOLOGICA* 2015;53(41-51



ALZET Comments: Dexamethasone; PBS; CSF/CNS (intrathecal); Rat; 2ML2; 7 days; Controls received mp w/ vehicle; animal info (Long Evans); spinal cord injury; post op. care (ketoprofen 0.3 ml of 10 mg/ml injection, saline administration 1-2 times daily); behavioral testing (Open field testing); "Subdural infusion of dexamethasone, a powerfully anti-inflammatory, stable, synthetic analogue of glucocorticoids, allowed for circumvention of the blood-brain barrier and apparently for achieving a sufficiently high concentration of this drug in the cerebrospinal fluid in proximity of the crush lesion to prevent severe, phagocyte-rich inflammation." pg 48; used rat IT catheter; dose: 2 mg/ml.

Q4461: Y. Ishikawa, *et al.* A combination of keratan sulfate digestion and rehabilitation promotes anatomical plasticity after rat spinal cord injury. *NEUROSCIENCE LETTERS* 2015;593(13-18

ALZET Comments: Keratanase II; chondroitinase ABC; Saline; CSF/CNS (intrathecal); Rat; 2006; 6 weeks; Controls received mp w/ vehicle; animal info (female, Sprague Dalwey, 200-230g); spinal cord injury; behavioral testing (single pellet reaching task); used silicone tubing; long-term study;.

Q4457: J. Z. Hu, *et al.* miR-126 promotes angiogenesis and attenuates inflammation after contusion spinal cord injury in rats. *BRAIN RESEARCH* 2015;1608(191-202

ALZET Comments: miR-126; Saline; CSF/CNS (intrathecal); Rat; 1003D; Controls received mp w/ control agomir; animal info (male, Sprague Dawley, 180-220g); spinal cord injury; post op. care (Ringer's solution administered IP 5 ml, penicillin G 40000 U IM QD for 3 days, bladders manually expressed BID); behavioral testing (locomotor testing, open field); immunology; pumps primed overnight at 37C.

R0345: A. R. Harvey, *et al.* Neurotrophic factors for spinal cord repair: Which, where, how and when to apply, and for what period of time? *Brain Res* 2015;1619(36-71

ALZET Comments: Neurotrophic factors; CSF/CNS (intrathecal); 14-28 days; spinal cord injury; behavioral testing (done for 2-3 months); "using minipumps or via extracellular matrix or cellular delivery has been reported to enhance the sprouting and local growth of CST axons" pg 57; "Improved tissue sparing has been seen in most contusion studies with FGF2 infusions" pg. 58; "...these approaches have generally been found to be effective" pg. 60; Comparison of various delivery mechanisms for administering neurotrophic factors to the spinal cord.

Q4512: T. Fukuoka, *et al.* A POTENTIAL ANTI-ALLODYNIC MECHANISM OF GDNF FOLLOWING L5 SPINAL NERVE LIGATION; MITIGATION OF NPY UP-REGULATION IN THE TOUCH SENSE PATHWAY. *NEUROSCIENCE* 2015;304(240-249

ALZET Comments: Glial cell line-derived neurotrophic factor; Saline; CSF/CNS (intrathecal); Rat; 2001; 10 days; Controls received mp w/ vehicle; animal info (male, Sprague Dawley, young adult, 220-230g); behavioral testing (paw withdrawal);.

Q3903: B. Frias, *et al.* The Role of Brain-Derived Neurotrophic Factor (BDNF) in the Development of Neurogenic Detrusor Overactivity (NDO). *Journal of Neuroscience* 2015;35(2146-2160

ALZET Comments: Brain-derived neurotropic factor; TrkB-Ig2; Tris buffer; glycerol; CSF/CNS (intrathecal); Rat; 2001; 2004; 7 days; 28 days; Controls received mp w/ saline; animal info (female, Wistar, 250-275g); 10% glycerol used; spinal cord injury; no stress (see pg. 2154); post op. care (ciprofloxacin 1 mg/kg IP injection; bladders manually emptied twice a day); used silicone catheter;.

Q5139: W. Dabrowski, *et al.* Prolonged Subdural Infusion of Kynurenic Acid Is Associated with Dose-Dependent Myelin Damage in the Rat Spinal Cord. *PLoS One* 2015;10(11):e0142598

ALZET Comments: Kynurenic Acid; PBS; CSF/CNS (intrathecal); Rat; 2ML1; 1 week; Controls received mp w/ vehicle; animal info: 42 healthy adult rats; spinal cord injury; post op. care (ketoprofen); Rat intrathecal catheter used; Dose: 0.0002 pmol/min, 0.01 nmol/min, 0.1 nmol/min, 1 nmol/min and 10 nmol/min of Kynurenic acid.

Q3840: J. Chu, *et al.* Gamma Secretase-Activating Protein Is a Substrate for Caspase-3: Implications for Alzheimer's Disease. *Biological Psychiatry* 2015;77(720-728

ALZET Comments: Z-DEVD-FMK; CSF/CNS (intrathecal); Mice (transgenic); 1007D; 1 week; Animal info (Tg2576, 15 months old; 3Tg, 10 months old); neurodegenerative (Alzheimer's disease); z-DEVD-fmk is a caspase-3 inhibitor;.



Q4369: Y. L. Chen, *et al.* Chronic intrathecal infusion of mibefradil, ethosuximide and nickel attenuates nerve ligation-induced pain in rats. BRITISH JOURNAL OF ANAESTHESIA 2015;115(105-111)

ALZET Comments: Mibefradil; ethosuximide; nickel chloride; Saline; CSF/CNS (intrathecal); Rat; 2001; 7 days; Controls received mp w/ vehicle; animal info (male, Sprague Dawley, 200-250g, spinal ligation); behavioral testing (von frey filament, hindpaw withdrawal latency);.

Q4334: S. Bradesi, *et al.* Identification of Spinal Cord MicroRNA and Gene Signatures in a Model of Chronic Stress-Induced Visceral Hyperalgesia in Rat. PLoS One 2015;10(U148-U167)

ALZET Comments: miR17-5p; CSF/CNS (intrathecal); Rat; 2002; 10 days; Controls received mp w/ vehicle; animal info (male, Wistar, 250-275g); post op. care (buprenorphine 0.03 mg/kg); behavioral testing (chronic water avoidance test); pumps primed prior to implantation; catheter positioning verified postmortem;.

Q4319: Y. J. Bao, *et al.* Engagement of signaling pathways of protease-activated receptor 2 and -opioid receptor in bone cancer pain and morphine tolerance. INTERNATIONAL JOURNAL OF CANCER 2015;137(1475-1483)

ALZET Comments: FSLRY-NH2; Saline; CSF/CNS (intrathecal); Rat; 20 hours; Controls received mp w/ vehicle; animal info (Wistar 200-250g); cancer (bone); no stress (see pg. 1476); behavioral testing (mechanical paw withdrawal, thermal hyperalgesia); peptides;.