



## References on the Administration of Growth Factors Using ALZET® Osmotic Pumps

### 1. Epidermal Growth Factor

**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;.

**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);.

**Q4918:** M. Zhang, *et al.* Growth factors and medium hyperglycemia induce Sox9+ ductal cell differentiation into β cells in mice with reversal of diabetes. *pnas* 2016;113(3):650-655

**ALZET Comments:** Gastrin; epidermal growth factor, human recombinant; Acetic acid; PBS; IP; Mice; 1007D; 7 days; Controls received mp w/ vehicle; animal info (male, WT or Ins1 CreERT); diabetes; Dose (gastrin 3 ug/kg/hr; EGF 10 ug/kg/hr);.

**Q5397:** N. K. Littlejohn, *et al.* Suppression of Resting Metabolism by the Angiotensin AT2 Receptor. *Cell Reports* 2016;16(6):1548-1560

**ALZET Comments:** Angiotensin II, CGP-42112a, Epidermal growth factor; Saline; SC; Mice (transgenic); 2 weeks; Controls received mp w/ vehicle; animal info (male, AT2-KO mice); functionality of mp verified by plasma levels; dose-response; Angiotensin AT2 receptor; Dose (CGP 50, 100 ng/kg/min, EGF 0.833 ug/hr);.

**Q3518:** M. S. Jeffers, *et al.* Epidermal Growth Factor and Erythropoietin Infusion Accelerate Functional Recovery in Combination With Rehabilitation. *Stroke* 2014;45(185-+)

**ALZET Comments:** Epidermal Growth Factor; erythropoietin; CSF, artificial; CSF/CNS; Rat; 2001; 14 days; Animal info (male, Sprague Dawley); pumps replaced every 7 days; ischemia (cerebral); behavioral testing (staircase test); pumps removed 7 days after serial implantation;.

**Q3481:** C. Giachino, *et al.* Molecular Diversity Subdivides the Adult Forebrain Neural Stem Cell Population. *Stem Cells* 2014;32(70-84)

**ALZET Comments:** Epidermal growth factor, human recombinant; Saline; BSA; CSF/CNS; Mice (transgenic); 1007D; 6 days; Controls received mp w/ vehicle; animal info (Hes5::GFP, 2-3 months old); ALZET brain infusion kit 3 used; 0.1% BSA used;.

**Q3843:** F. Clausen, *et al.* Combination of growth factor treatment and scaffold deposition following traumatic brain injury has only a temporary effect on regeneration. *Brain Research* 2014;1588(37-46)

**ALZET Comments:** Epidermal growth factor, recombinant human; CSF/CNS; Rat; 2001; 7 days; Controls received mp w/ saline or no mp w/ sham surgery; animal info (male, Sprague Dawley, 330-400g); ALZET brain infusion kit 2 used; behavioral testing (morris water maze); pumps removed after 7 days; traumatic brain injury;.



**Q3285:** L. Baeyens, *et al.* Transient cytokine treatment induces acinar cell reprogramming and regenerates functional beta cell mass in diabetic mice. NATURE BIOTECHNOLOGY 2014;32(1):76-+

**ALZET Comments:** Epidermal growth factor, human recombinant; ciliary neurotrophic factor, human recombinant; Acetic acid; IP; Mice; 1007D; 7 days; Controls received mp w/ vehicle; animal info (ALX35d, 13 weeks old, hyperglycemic); diabetes; ciliary neurotrophic factor aka CNTF; Epidermal growth factor aka EGF;

**Q3799:** O. Alluin, *et al.* Examination of the Combined Effects of Chondroitinase ABC, Growth Factors and Locomotor Training following Compressive Spinal Cord Injury on Neuroanatomical Plasticity and Kinematics. PLoS One 2014;9(U603-U621)

**ALZET Comments:** Chondroitinase ABC; platelet-derived growth factor-AA; basic fibroblast growth factor; epidermal growth factor;; Saline; rat serum albumin; CSF/CNS (intrathecal); Rat; 1007D; 7 days; Controls received mp w/ vehicle; animal info (female, Wistar, adult, 250-275g); spinal cord injury; behavioral testing (treadmill locomotion; coordination); used ALZET rat intrathecal catheter;

**Q3269:** Y. F. Wang, *et al.* Bioengineered sequential growth factor delivery stimulates brain tissue regeneration after stroke. JOURNAL OF CONTROLLED RELEASE 2013;172(1):1-11

**ALZET Comments:** Epidermal growth factor; erythropoietin; CSF, artificial; CSF/CNS; Mice; 1007D; 14 days; Animal info (male, C57BL6, 9-11 weeks old); EGF-PGF pumps replaced after 7 days with pump filled with ETO; ALZET brain infusion kit 3 used; comparison of epicortical composite vs mp; stress/adverse reaction: "Unlike the ICV catheter/minipump, which causes significant tissue damage, the epicortical composite provides a minimal invasiveness and no tissue damage." (see pg.9); immunology; Pumps implanted 4 days after stroke; BIK implanted same day as stroke;

**Q2380:** G. N. Paliouras, *et al.* Mammalian Target of Rapamycin Signaling Is a Key Regulator of the Transit-Amplifying Progenitor Pool in the Adult and Aging Forebrain. Journal of Neuroscience 2012;32(43):15012-15026

**ALZET Comments:** Rapamycin; epidermal growth factor; DMSO; CSF/CNS; Mice (pregnant); 1007D; 7 days; Control animals received mp w/ vehicle; animal info (C57BL/6, female, 2, 10, 18 mo old); ALZET brain infusion kit 3 used.

**Q2021:** S. Karimi-Abdolrezaee, *et al.* Chondroitinase and Growth Factors Enhance Activation and Oligodendrocyte Differentiation of Endogenous Neural Precursor Cells after Spinal Cord Injury. PLoS One 2012;7(5):U605-U620

**ALZET Comments:** Epidermal growth factor; fibroblast growth factor, basic; platelet derived growth factor-AA; Saline; albumin, rat serum; CSF/CNS (intrathecal); Rat; 1007D; 7 days; Controls received mp w/ vehicle; animal info (Wistar, female, 250 g); spinal cord injury; intrathecal catheter used (0007741).

**Q2719:** G. W. J. Hawryluk, *et al.* An In Vivo Characterization of Trophic Factor Production Following Neural Precursor Cell or Bone Marrow Stromal Cell Transplantation for Spinal Cord Injury. STEM CELLS AND DEVELOPMENT 2012;21(12):2222-2238

**ALZET Comments:** Epidermal growth factor; fibroblast growth factor, beta; platelet-derived growth factor, alpha; CSF/CNS (intrathecal); Rat; 1007D; 7 days; Animal info (adult, female, tg).

**Q1151:** N. M. Joseph, *et al.* Enteric glia are multipotent in culture but primarily form glia in the adult rodent gut. Journal of Clinical Investigation 2011;121(9):3398-3411

**ALZET Comments:** Epidermal growth factor; fibroblast growth factor; glial-derived neurotrophic factor; BSA; PBS; IP; Rat; 7 days; Controls received mp w/ vehicle; animal info (P90).

**Q0699:** K. Gampe, *et al.* EGF induces CREB and ERK activation at the wall of the mouse lateral ventricles. Brain Research 2011;1376(1):31-41

**ALZET Comments:** Epidermal growth factor, recomb.; CSF, artificial; CSF/CNS; Mice; 1007D; 6 days; Controls received mp w/ vehicle; animal info (male, C57BL/6N, 8-10 wks old); artificial CSF formula.



**Q1055:** A. Erlandsson, *et al.* Immunosuppression promotes endogenous neural stem and progenitor cell migration and tissue regeneration after ischemic injury. *Experimental Neurology* 2011;230(1):48-57

**ALZET Comments:** Epidermal growth factor, recomb. human; erythropoietin; cyclosporine A; CSF/CNS; SC; Mice (NOD/SCID); 1007D; Animal info (male, C57/BL6, 8-10 wks old); pumps replaced after 7 days; ALZET brain infusion kit 3 used.

**Q1335:** D. Sun, *et al.* The Effect of Epidermal Growth Factor in the Injured Brain after Trauma in Rats. *Journal of Neurotrauma* 2010;27(5):923-938

**ALZET Comments:** Epidermal growth factor, recomb. human; CSF, artificial; CSF/CNS; Rat; 1007D; 7 days; Controls received mp w/ vehicle; animal info (male, 3-4 mo old, Sprague Dawley, 300 g); functionality of mp verified by residual volume; ALZET brain infusion kit 2 used; artificial CSF recipe; cannula placement verified by injecting Evan's Blue dye into the cannula.

**Q0061:** S. Karimi-Abdolrezaee, *et al.* Synergistic Effects of Transplanted Adult Neural Stem/Progenitor Cells, Chondroitinase, and Growth Factors Promote Functional Repair and Plasticity of the Chronically Injured Spinal Cord. *Journal of Neuroscience* 2010;30(5):1657-1676

**ALZET Comments:** Chondroitinase ABC; epidermal growth factor; fibroblast growth factor; platelet-derived growth factor; Penicillinase; saline; albumin, rat serum; CSF, artificial; gentamicin; BSA; CSF/CNS (intrathecal, subarachnoid space); Rat; 1007D; 7 days; Controls received mp w/ vehicle; animal info (female, Wistar, 250 g.); ALZET intrathecal catheter used (0007741).

**Q0241:** S. H. Im, *et al.* INDUCTION OF STRIATAL NEUROGENESIS ENHANCES FUNCTIONAL RECOVERY IN AN ADULT ANIMAL MODEL OF NEONATAL HYPOXIC-ISCHEMIC BRAIN INJURY. *Neuroscience* 2010;169(1):259-268

**ALZET Comments:** Brain-derived neurotrophic factor; epidermal growth factor; ara-C; CSF/CNS; Mice; 1002; 2 weeks; Controls received mp w/ PBS; ALZET brain infusion kit 3 used; animal info (ICR, 6 wks old); behavioral testing (rotarod performance, forelimb-use asymmetry test).

**Q1565:** S. C. Hewitt, *et al.* Biological and biochemical consequences of global deletion of exon 3 from the ER-alpha gene. *FASEB Journal* 2010;24(12):4660-4667

**ALZET Comments:** Epidermal growth factor; Mice; 24 hours; Animal info (Ex3 alpha ERKO).

**Q0397:** A. Aguirre, *et al.* Notch and EGFR pathway interaction regulates neural stem cell number and self-renewal. *Nature* 2010;467(7313):323-U101

**ALZET Comments:** Ara-C; epidermal growth factor; Saline; CSF/CNS (surface); CSF/CNS; Mice (transgenic); 5, 6 days; Controls received mp w/vehicle; animal info (Cnp-hEGFR); incorrectly stated model 1007.

## 2. Fibroblast Growth Factor

**Q6795:** Y. Shi, *et al.* Fibroblast Growth Factor 21 Attenuates Vascular Calcification by Alleviating Endoplasmic Reticulum Stress Mediated Apoptosis in Rats. *International Journal of Biological Sciences* 2019;15(1):138-147

**ALZET Comments:** Fibroblast growth factor-21; Saline; SC; Rat; 2004; 28 days; Dose (70 µg/kg/d); Controls received mp w/ vehicle; animal info (Male Sprague-Dawley rats (180-200g));

**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;



**Q7215:** H. Li, *et al.* Fibroblast growth factor 21 increases insulin sensitivity through specific expansion of subcutaneous fat. *Nat Commun* 2018;9(1):272

**ALZET Comments:** Fibroblast growth factor 21, mouse recomb.; Saline; SC; Mice; Pump model not stated; 4 weeks; Dose (0.1 mg/kg/day); Controls received mp w/ vehicle; animal info (8 week old, FGF21KO); Resultant plasma level (1.5 ng/ml, which was 2–3 times of the 8-week HFD-induced endogenous FGF21 level of 0.6 ng/ml (Fig. 3f)); dependence;.

**Q6551:** E. Yulyaningsih, *et al.* Acute Lesioning and Rapid Repair of Hypothalamic Neurons outside the Blood-Brain Barrier. *Cell Rep* 2017;19(11):2257-2271

**ALZET Comments:** Uridine, bromodeoxy-; Fibroblast growth factor, basic; CSF, artificial; CSF/CNS (right lateral ventricle); Mice; 1007D; 7 days; Dose (3.2 mg/ml BrdU; 100 µg/ml bFGF); animal info (12- to 18-week-old Npy-GFP mice and Ai14(tdTomato) mice); Brain coordinates (anteroposterior –0.3 mm, lateral +1.0 mm to bregma and dorsoventral –2.5 mm below skull);.

**Q6198:** J. R. Munoz-Castaneda, *et al.* Differential regulation of renal Klotho and FGFR1 in normal and uremic rats. *FASEB J* 2017;31(9):3858-3867

**ALZET Comments:** Fibroblast growth factor -23, recomb.; Acetic Acid; Sucrose; Rat; 14 days; Dose (15 mg/d); Controls received mp w/ vehicle; animal info (9-10 week old Male Wistar rats weighing 230–260 g);.

**Q6199:** E. P. Mottillo, *et al.* FGF21 does not require adipocyte AMP-activated protein kinase (AMPK) or the phosphorylation of acetyl-CoA carboxylase (ACC) to mediate improvements in whole-body glucose homeostasis. *Mol Metab* 2017;6(6):471-481

**ALZET Comments:** Fibroblast growth factor-21; Saline; SC; Mice (knockout); 1002; 2 weeks; Dose (0.35 mg/kg/day); Controls received mp w/ vehicle; animal info (Mice lacking adipocyte AMPK b1b2 (ib1b2AKO); diabetes);.

**Q6052:** T. Lan, *et al.* FGF19, FGF21, and an FGFR1/beta-Klotho-Activating Antibody Act on the Nervous System to Regulate Body Weight and Glycemia. *Cell Metab* 2017;26(5):709-718 e3

**ALZET Comments:** Fibroblast growth factor-21; SC; Mice; 1002; 2 weeks; Controls received mp w/ vehicle; animal info (3-4 months old); Dose (1 mg/kg/day);.

**Q6291:** M. Kuroda, *et al.* Peripherally derived FGF21 promotes remyelination in the central nervous system. *J Clin Invest* 2017;127(9):3496-3509

**ALZET Comments:** Fibroblast growth factor-21, mouse recomb.; PBS; BSA; CSF/CNS (lateral ventricle); Mice; 1007D; 1002; 1 week; Dose (50 ng/kg/day); 0.5% BSA used; Brain coordinates (0 mm bregma, 1 mm lateral, and 2.5 mm ventral); Therapeutic indication (laminectomy);.

**Q6414:** L. D. BonDurant, *et al.* FGF21 Regulates Metabolism Through Adipose-Dependent and -Independent Mechanisms. *Cell Metab* 2017;25(4):935-944 e4

**ALZET Comments:** Fibroblast growth factor-21, recomb. human; SC; Mice (knockout); 2 weeks; Dose (1 mg/kg/day); Controls received mp w/ vehicle; animal info (16–18 week old WT and KLB AdipoKO male mice on HFD for 12 weeks); comparison of IP injection vs mp;.

**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);.



**Q6664:** G. Singhal, *et al.* Fibroblast growth factor 21 has no direct role in regulating fertility in female mice. *Mol Metab* 2016;5(8):690-698

**ALZET Comments:** Fibroblast growth factor 21, human; Saline; CSF/CNS (third ventricle); Mice (knockout); Mice(transgenic); 1007D; 7 days; Dose (.4 ug/12 uL/d); Controls received mp w/ vehicle; animal info (FGF21-KO mice; Mice overexpressing human FGF21); Brain coordinates (anterioposterior, \_0.5 mm and lateral, \_1 mm from the bregma.); cyanoacrylate adhesive;

**Q5978:** G. Schumann. KLB is associated with alcohol drinking, and its gene product  $\beta$ -Klotho is necessary for FGF21 regulation of alcohol preference. *Proceedings of the National Academy of Sciences* 2016;113(50):

**ALZET Comments:** Fibroblast growth factor-21, recombinant; SC; Mice; 1004; behavioral testing (Open field foraging, maze); Controls received mp w/ vehicle; animal info (2-4 months old); Therapeutic indication (Alcohol Drinking in Mice); Dose (0.7 mg/kg/day);.

**Q5190:** Y. H. Rhee, *et al.* Neural stem cells secrete factors facilitating brain regeneration upon constitutive Raf-Erk activation. *Sci Rep* 2016;6(32025)

**ALZET Comments:** Raf-Transducer cells, conditioned media; leukemia inhibitory factor; fibroblast growth factor 2; vascular endothelial growth factor; CSF, artificial; CSF/CNS; Mice; 1007D; 6 days; Controls received mp w/ vehicle or control media; animal info (male, C57Bl6, 50-100g); ALZET brain infusion kit 2 used; immunology; cyanoacrylate adhesive; Brain coordinates;

**Q5561:** A. E. Kline, *et al.* Combination therapies for neurobehavioral and cognitive recovery after experimental traumatic brain injury: Is more better? *Prog Neurobiol* 2016;142(45-67)

**ALZET Comments:** Vascular endothelial growth factor, Fibroblast Growth Factor 2; Saline; CSF/CNS (lateral ventricle); Mice; 7 days; Controls received mp w/ vehicle; VEGF and FGF-2 were administered singly or in combination in same pump; Therapeutic indication (Traumatic brain injury); Dose (VEGF (10 mg/mL), FGF-2 (2.5 mg/mL));.

**Q5568:** M. M. Daadi. Activation and Differentiation of Endogenous Neural Stem Cell Progeny in the Rat Parkinson Animal Model. *Neural Stem Cells: Methods and Protocols* 2016;198(265-270)

**ALZET Comments:** Epithelial growth factor; Fibroblast growth factor, basic; Glial cell derived conditioned media; CSF/CNS (lateral ventricle); CSF/CNS (striatum); Rat; 2002; 14 days; animal info (Sprague–Dawley rats weighing 200–250 g); good methods (Methods paper); neurodegenerative (Parkinson's);.

**Q4573:** R. J. Samms, *et al.* Discrete Aspects of FGF21 In Vivo Pharmacology Do Not Require UCP1. *CELL REPORT* 2015;11(991-999)

**ALZET Comments:** Fibroblast growth factor-21, human; PBS; SC; Mice; 4 days; 7 days; Controls received mp w/ vehicle; animal info (male, C57BL6, 10 weeks old);.

**Q4697:** R. Patel, *et al.* Glucocorticoids Regulate the Metabolic Hormone FGF21 in a Feed-Forward Loop. *MOLECULAR ENDOCRINOLOGY* 2015;29(213-223)

**ALZET Comments:** Fibroblast growth factor-21; SC; Mice; 7 days; Animal info (male, Fgf21 -/-);.

**Q4499:** R. H. Lin, *et al.* Neurogenesis is enhanced by stroke in multiple new stem cell niches along the ventricular system at sites of high BBB permeability. *NEUROBIOLOGY OF DISEASE* 2015;74(229-239)

**ALZET Comments:** Basic fibroblast growth factor, recombinant human; CSF, artificial; CSF/CNS; Rat; 14 days; Animal info (male, Sprague Dawley, adult, 275-300g, MCAO); ischemia (cerebral); cardiovascular;

**Q4333:** R. K. Boparai, *et al.* Resistance to the Beneficial Metabolic Effects and Hepatic Antioxidant Defense Actions of Fibroblast Growth Factor 21 Treatment in Growth Hormone-Overexpressing Transgenic Mice. *INTERNATIONAL JOURNAL OF ENDOCRINOLOGY* 2015;;(U1-U11)

**ALZET Comments:** Fibroblast growth factor-21, recomb. human; PBS; SC; Mice (transgenic); 1007D; 1 week; Controls received mp w/ vehicle; animal info (male, transgenic overexpress bovine growth hormone, 3-4 months old); diabetes;



**Q4326:** B. Bernardo, *et al.* FGF21 does not require interscapular brown adipose tissue and improves liver metabolic profile in animal models of obesity and insulin-resistance. *SCIENTIFIC REPORTS* 2015;5(U1-U13)

**ALZET Comments:** Fibroblast growth factor-21; PBS; SC; Mice; 8 days; Controls received mp w/ vehicle; animal info (male, DIO, 16, 21, or 32 weeks old); diabetes;.

**Q4034:** B. M. Owen, *et al.* FGF21 Acts Centrally to Induce Sympathetic Nerve Activity, Energy Expenditure, and Weight Loss. *Cell Metabolism* 2014;20(670-677)

**ALZET Comments:** Fibroblast growth factor, recombinant human; SC; Mice (transgenic); 2 weeks; Controls received mp w/ vehicle; animal info (diet induced obesity, Fgf21-Tg); functionality of mp verified by plasma levels;.

**Q4722:** G. W. J. Hawryluk, *et al.* An Examination of the Mechanisms by Which Neural Precursors Augment Recovery Following Spinal Cord Injury: A Key Role for Remyelination. *CELL TRANSPLANTATION* 2014;23(3):365-380

**ALZET Comments:** Epithelial growth factor; fibroblast growth factor; platelet-derived growth factor; CSF/CNS (intrathecal); Rat; 1007D; 7 days; Animal info (female, Wistar, 10-12 weeks old); spinal cord injury; post op. care (bladders manually evacuated TID, Minocycline 50 mg/kg 10 days, cyclosporine 10 mg/kg); behavioral testing (open field test); immunology;.

**Q3887:** H. F. Ge, *et al.* Fibroblast Growth Factor Receptor 4 (FGFR4) Deficiency Improves Insulin Resistance and Glucose Metabolism under Diet-induced Obesity Conditions. *Journal of Biological Chemistry* 2014;289(30470-30480)

**ALZET Comments:** Fibroblast growth factor 19, c-terminal deleted; SC; Mice; 1007D; 3 days; Controls received mp w/ PBS; animal info (FGFR4 KO); diabetes;c-terminal deleted Fibroblast growth factor 19 aka FGF19dCTD; obesity;.

**Q3388:** Y. Furusawa, *et al.* Nrf2 induces fibroblast growth factor 21 in diabetic mice. *GENES TO CELLS* 2014;19(864-878)

**ALZET Comments:** Fibroblast growth factor-21, recomb. murine; SC; Mice; 3, 7 days; Control animals received mp w/ saline; animal info (KEAP 1 flox -/-, Nrf2 KO).

**Q3880:** F. M. Fisher, *et al.* Fibroblast Growth Factor 21 Limits Lipotoxicity by Promoting Hepatic Fatty Acid Activation in Mice on Methionine and Choline-Deficient Diets. *Gastroenterology* 2014;147(1073-+)

**ALZET Comments:** Fibroblast growth factor-21, recomb. human; SC; Mice; 4 weeks; 10 days; Controls received mp w/ vehicle; animal info (male, FGF21-KO or C57BL6J WT, 20-24 weeks); immunology;.

**Q3186:** B. Emanuelli, *et al.* Interplay between FGF21 and insulin action in the liver regulates metabolism. *Journal of Clinical Investigation* 2014;124(2):515-527

**ALZET Comments:** Fibroblast growth factor-21; Saline; SC; Mice; 2 weeks; Controls received mp w/ vehicle; animal info (male, WT (IRLox) and LIRKO); diabetes;.

**Q3858:** E. M. Domouzoglou, *et al.* Fibroblast Growth Factor 21 and Thyroid Hormone Show Mutual Regulatory Dependency but Have Independent Actions In Vivo. *Endocrinology* 2014;155(2031-2040)

**ALZET Comments:** Fibroblast growth factor-21, recombinant; PBS; SC; Mice; 1003D; 3 days; Controls received mp w/ vehicle; animal info (FGF 21-KO or WT, 16 weeks old); functionality of mp verified by serum levels by ELISA;.

**Q3799:** O. Alluin, *et al.* Examination of the Combined Effects of Chondroitinase ABC, Growth Factors and Locomotor Training following Compressive Spinal Cord Injury on Neuroanatomical Plasticity and Kinematics. *PLoS One* 2014;9(U603-U621)

**ALZET Comments:** Chondroitinase ABC; platelet-derived growth factor-AA; basic fibroblast growth factor; epidermal growth factor;; Saline; rat serum albumin; CSF/CNS (intrathecal); Rat; 1007D; 7 days; Controls received mp w/ vehicle; animal info (female, Wistar, adult, 250-275g); spinal cord injury; behavioral testing (treadmill locomotion; coordination); used ALZET rat intrathecal catheter;.



**Q3192:** X. X. Yu, *et al.* Peripheral Reduction of FGFR4 with Antisense Oligonucleotides Increases Metabolic Rate and Lowers Adiposity in Diet-Induced Obese Mice. *PLoS One* 2013;8(7):U28-U41

**ALZET Comments:** Fibroblast growth factor 19; fibroblast growth factor receptor 4; Saline; SC; Mice; 7 days; Controls received mp w/ vehicle; animal info (male, diet-induced obese, C57BL6, 6-8 weeks old); functionality of mp verified by plasma FGF19 levels; cardiovascular;

**Q6786:** X. Wu, *et al.* Dual actions of fibroblast growth factor 19 on lipid metabolism. *J Lipid Res* 2013;54(2):325-32

**ALZET Comments:** Fibroblast growth factor 19; Fibroblast growth factor 21; PBS; SC; Mice; 1007D; 3 days; Dose (150 µg/kg/day); Controls received mp w/ vehicle; animal info (Six week-old B6.V- Lep ob /J male mice);

**Q2480:** M. Murphy, *et al.* Increased Responses to the Actions of Fibroblast Growth Factor 21 on Energy Balance and Body Weight in a Seasonal Model of Adiposity. *Journal of Neuroendocrinology* 2013;25(2):180-189

**ALZET Comments:** Fibroblast growth factor-21, recomb. human; Saline; SC; Hamster; 2002; 14 days; Control animals received mp w/ vehicle; animal info (adult, male); post op. care (Rimadyl).

**Q3108:** Z. F. Lin, *et al.* Adiponectin Mediates the Metabolic Effects of FGF21 on Glucose Homeostasis and Insulin Sensitivity in Mice. *Cell Metabolism* 2013;17(5):779-789

**ALZET Comments:** Fibroblast growth factor-21; SC; Mice; 4 weeks; Controls received mp w/ vehicle; animal info (male, FGF21 KO, ADNKO); functionality of mp verified by plasma serum levels; immunology; diabetes.

**Q2655:** A. Kharitonov, *et al.* Rational Design of a Fibroblast Growth Factor 21-Based Clinical Candidate, LY2405319. *PLoS One* 2013;8(3):U650-U659

**ALZET Comments:** Fibroblast growth factor-21; SC; Mice; 7, 14 days; Control animals received mp w/ vehicle; animal info (18 wks old, DIO, C57BL/6).

**Q3085:** W. L. Holland, *et al.* An FGF21-Adiponectin-Ceramide Axis Controls Energy Expenditure and Insulin Action in Mice. *Cell Metabolism* 2013;17(5):790-797

**ALZET Comments:** Fibroblast growth factor-21; PBS; SC; Mice; 2 weeks; Controls received mp w/ vehicle; animal info (Lep ob/ob, 14-16 weeks old); FGF21 dose (0.3 mg/kg); behavioral testing (energy expenditure); diabetes.

**Q3173:** J. P. G. Camporez, *et al.* Cellular Mechanisms by Which FGF21 Improves Insulin Sensitivity in Male Mice. *Endocrinology* 2013;154(9):3099-3109

**ALZET Comments:** Fibroblast growth factor-21, recomb. human; Saline; SC; Mice; 7 days; Controls received mp w/ vehicle; animal info (male, C57BL6, 3 months old); functionality of mp verified by plasma serum levels; behavioral testing (energy expenditure, locomotor activity); diabetes;

**Q5533:** S. Buchmann, *et al.* Refixation of the supraspinatus tendon in a rat model--influence of continuous growth factor application on tendon structure. *J Orthop Res* 2013;31(2):300-5

**ALZET Comments:** Granulocyte-colony stimulating factor, Fibroblast growth factor, basic; Acetate, PBS; SC; Rat; 2004; 4 weeks; Controls (untreated); animal info (14 week old, 492 g); functionality of mp verified by In vitro pretesting where the volume delivery rate was confirmed using methylene blue; "We developed a model for continuous GF application by an osmotic pump to avoid the early clearance or required repetitive local injections." Pg. 300; Therapeutic indication (Tendon injury); Dose (p. 301); Interesting (Tendon injury study: "the continuous application via an osmotic pump showed a relative high dislocation rate when applied in the rat Model");

### 3. Hepatocyte Growth Factor

**Q6207:** C. W. Mangieri, *et al.* Perioperative hepatocyte growth factor (HGF) infusions improve hepatic regeneration following portal branch ligation (PBL) in rodents. *Surg Endosc* 2017;31(7):2789-2797

**ALZET Comments:** Hepatocyte growth factor; Saline; IP; Rat; 1003D; 72 hours; Dose (1 µg/h); Controls received mp w/ vehicle; animal info (200-300g Sprague-Dawley rats);



**Q2494:** M. S. Katz, *et al.* Gene alterations and intestinal mucosal changes following growth factor and omega-3 exposure in a rat model of inflammatory bowel disease. *Journal of Pediatric Surgery* 2013;48(2):345-352

**ALZET Comments:** Hepatocyte growth factor; HCl, Tris-; PBS; IV (jugular); Rat; 14 days; Control animals received mp w/ saline; animal info (adult, female, tg, HLA-B27).

**Q1885:** M. S. Katz, *et al.* Hepatocyte growth factor and omega-3-enriched feeds have a synergistic effect on mucosal mass in an animal model of inflammatory bowel disease. *Journal of Pediatric Surgery* 2012;47(1):194-198

**ALZET Comments:** Hepatocyte growth factor, human recomb.; PBS; HCL, tris; IV (jugular); Rat; 2002; 14 days; Controls received mp w/ saline; animal info (female, adult, HLA-B27, 200-250 g).

**Q2105:** K. Kitamura, *et al.* Human Hepatocyte Growth Factor Promotes Functional Recovery in Primates after Spinal Cord Injury. *PLoS One* 2011;6(11):U83-U95

**ALZET Comments:** Hepatocyte growth factor, recomb. human; PBS; CSF/CNS (intrathecal); Monkey (marmoset); 2004; 4 weeks; Controls received mp w/ vehicle; animal info (adult, female, common, 295-350 g); ALZET rat intrathecal catheter used.

**Q1561:** M. S. Katz, *et al.* Dose Variation of Hepatocyte Growth Factor and its Effects on an Animal Model of TPN-Induced Liver Injury. *Journal of Surgical Research* 2010;163(2):294-298

**ALZET Comments:** Hepatocyte growth factor; IV (jugular); Rat; 14 days; Controls received mp w/ saline; animal info (Sprague Dawley, female, adult); dose response.

**Q0678:** K. A. Thatch, *et al.* Growth Factor Manipulation of Intestinal Angiogenesis: A Possible New Paradigm in the Management of Inflammatory Bowel Disease. *Journal of Surgical Research* 2009;156(2):245-249

**ALZET Comments:** Hepatocyte growth factor, recomb. human; HCl, Tris; PBS; IV (jugular); Rat; 1002; 14 days; Controls received mp w/ saline; animal info (female, adult, Fisher).

**P9077:** L. Ye, *et al.* HGF/SF up-regulates the expression of bone morphogenetic protein 7 in prostate cancer cells. *UROLOGIC ONCOLOGY-SEMINARS AND ORIGINAL INVESTIGATIONS* 2008;26(2):190-197

**ALZET Comments:** Hepatocyte growth factor, recomb. human; NK4, recomb. human; SC; Mice (nude); 2004; 4 weeks; Cancer (prostate); animal info (athymic, male, CD-1, 4-6 wks old).

**P9298:** S. Takeo, *et al.* Hepatocyte growth factor suppresses ischemic cerebral edema in rats with microsphere embolism. *Neuroscience Letters* 2008;448(1):125-129

**ALZET Comments:** Hepatocyte growth factor, recomb. human; Saline, physiological; CSF/CNS; Rat; 2001; 3 days; Controls received no treatment; peptides; ischemia (cerebral); animal info (male, Wistar, 220-250 g.).

**P8815:** H. K. Jin, *et al.* MetMAB, the one-armed 5D5 anti-c-Met antibody, inhibits orthotopic pancreatic tumor growth and improves survival. *Cancer Research* 2008;68(11):4360-4368

**ALZET Comments:** Hepatocyte growth factor, human; Dextran sulfate; IP; Mice (nude); 1002; Controls received mp w/ vehicle; functionality of mp verified by human HGF serum levels; pumps replaced every 12 to 14 days; cancer (pancreatic); peptides; animal info (female, nu/nu).

**P8925:** L. Ye, *et al.* Hepatocyte growth factor up-regulates the expression of the bone morphogenetic protein (BMP) receptors, BMPR-IB and BMPR-II, in human prostate cancer cells. *INTERNATIONAL JOURNAL OF ONCOLOGY* 2007;30(2):521-529

**ALZET Comments:** Hepatocyte growth factor, recomb. human; SC; Mice (nude); 2004; 4 weeks; Controls received mp w/ BSA buffer; cancer (prostate); peptides; animal info (female, athymic, nude, CD-1, 4-6 wks old); HGF antagonist.





**P8908:** A. Ishigaki, *et al.* Intrathecal delivery of hepatocyte growth factor from amyotrophic lateral sclerosis onset suppresses disease progression in rat amyotrophic lateral sclerosis model. *Journal of Neuropathology and Experimental Neurology* 2007;66(11):1037-1044

**ALZET Comments:** Hepatocyte growth factor, recomb. human; PBS, sulfoxide; CSF/CNS (intrathecal, subarachnoid space); Rat (transgenic); 2002; 2004; 2, 4 weeks; Controls received mp w/ vehicle; dose-response (fig. 2); peptides; animal info (G93A Tg, 100 and 115 days old); neurodegenerative (ALS); "we examined the effects of continuous intrathecal delivery of human recombinant HGF (hrHGF) into Tg rats using implanted infusion pumps for selective and less invasive supply of HGF to the spinal cord." (p.1038).

**P7654:** S. J. Timmapuri, *et al.* Hepatocyte growth factor increases glucagon immunoreactivity in jejunal cells during intestinal adaptation. *Journal of Pediatric Surgery* 2006;41(1):150-153

**ALZET Comments:** Hepatocyte growth factor; IV (jugular); Rat; 2002; 14 days; Controls received mp w/ saline; animal info (male, Sprague-Dawley, adult, 200-225 g); PE catheter used.

**P7925:** T. Tada, *et al.* Intraventricular administration of hepatocyte growth factor treats mouse communicating hydrocephalus induced by transforming growth factor beta 1. *NEUROBIOLOGY OF DISEASE* 2006;21(3):576-586

**ALZET Comments:** Hepatocyte growth factor, recomb. human; PBS; BSA; CSF/CNS; Mice (neonate); 1007D; 1002; 7,14 days; Animal info (C57BL/6, 10-day old).

**P8008:** M. Niimura, *et al.* The protective effect of hepatocyte growth factor against cell death in the hippocampus after transient forebrain ischemia is related to the improvement of apurinic/apurimidinic endonuclease/redox factor-1 level and inhibition of NADPH oxidase activity. *Neuroscience Letters* 2006;407(2):136-140

**ALZET Comments:** Hepatocyte growth factor; CSF/CNS (right hippocampal region); Rat; 1003D; 3 days; Animal info (male, Wistar, 200-250 grams); ischemia (cerebral); tissue perfusion (hippocampal region).

**P8009:** M. Niimura, *et al.* Prevention of apoptosis-inducing factor translocation is a possible mechanism for protective effects of hepatocyte growth factor against neuronal cell death in the hippocampus after transient forebrain ischemia. *Journal of Cerebral Blood Flow and Metabolism* 2006;26(11):1354-1365

**ALZET Comments:** Hepatocyte growth factor; Saline; CSF/CNS (right hippocampal region); Rat; 1003D; 3 days; Animal info (male, Wistar, 200-250 grams); ischemia (cerebral); tissue perfusion (hippocampal region).

**P7846:** M. Niimura, *et al.* Effects of hepatocyte growth factor on phosphorylation of extracellular signal-regulated kinase and hippocampal cell death in rats with transient forebrain ischemia. *European Journal of Pharmacology* 2006;535(1-3):114-124

**ALZET Comments:** Hepatocyte growth factor, recomb. human; Saline, physiological; CSF/CNS (hippocampus); Rat; 1003D; 1, 2, 3 days; 0.5, 1, 6 hours; Controls received mp w/ vehicle; dose-response (fig. 2); peptides; ischemia (cerebral); animal info (male, Wistar, 200-250g., transient forebrain ischemia by carotid artery occlusion); mp primed in 37 celsius saline.

**P8085:** I. Date, *et al.* Hepatocyte growth factor attenuates cerebral ischemia-induced increase in permeability of the blood-brain barrier and decreases in expression of tight junctional proteins in cerebral vessels. *Neuroscience Letters* 2006;407(2):141-145

**ALZET Comments:** Hepatocyte growth factor, recomb. human; CSF/CNS; Rat; 2001; 7 days; Controls received mp w/ physiological saline; peptides; ischemia (cerebral); animal info (male, Wistar, 180-220g, microsphere-induced cerebral embolism).

**P8927:** J. H. Chen, *et al.* Effects of COX-2 inhibitor on growth of human gastric cancer cells and its relation to hepatocyte growth factor. *Cancer Letters* 2006;239(2):263-270

**ALZET Comments:** Hepatocyte growth factor; IP; Mice (SCID); 28 days; Controls received sham operation; pumps replaced after 14 days; cancer (gastric); peptides; post op. care (streptomycin, penicillin); animal info (male, SCID, 6-8 wks old, 20-25 g.).



**P7262:** Y. Ohda, *et al.* Effects of hepatocyte growth factor on rat inflammatory bowel disease models. *Digestive Diseases and Sciences* 2005;50(5):914-921

**ALZET Comments:** Hepatocyte growth factor, recomb. human; IP; Rat; 2001; 7 weeks; Controls received mp w/ PBS; functionality of mp verified by serum rhHGF levels.

**P6951:** K. Isogawa, *et al.* Anxiolytic effect of hepatocyte growth factor infused into rat brain. *NEUROPSYCHOBIOLOGY* 2005;51(1):34-38

**ALZET Comments:** Hepatocyte growth factor; Ringer's solution; CSF/CNS; Rat; 1003D; 3 days; ALZET brain infusion kit used; behavioral study.

**P7668:** S. Hasuike, *et al.* Hepatocyte growth factor accelerates the proliferation of hepatic oval cells and possibly promotes the differentiation in a 2-acetylaminofluorene/partial hepatectomy model in rats. *Journal of Gastroenterology and Hepatology* 2005;20(11):1753-1761

**ALZET Comments:** Hepatocyte growth factor, recomb. human; PBS; IP; Rat; 7 days; Controls received mp w/ vehicle; functionality of mp verified by human HGF serum levels; replacement therapy (hepatectomy); half-life (pg. 1758) < 3 min; animal info (male, Fisher, 8 wk. old).

**P7047:** P. Biswas, *et al.* Hepatocyte growth factor induces an endothelin-mediated decline in glomerular filtration rate. *American Journal of Physiology-Renal Physiology* 2005;288(1):F8-F15

**ALZET Comments:** Hepatocyte growth factor; Saline; IV (jugular); Rat; 1 week; Controls received mp w/ vehicle; functionality of mp verified by plasma and urine HGF levels; comparison of acute IV infusions vs. mp; no stress (see pg. F12); post op. care (atipamezole).

**P6391:** L. D. Dworkin, *et al.* Hepatocyte growth factor ameliorates progression of interstitial fibrosis in rats with established renal injury. *Kidney International* 2004;65(2):409-419

**ALZET Comments:** Hepatocyte growth factor; Saline; IV (jugular); Rat; 2002; 2 weeks; Controls received mp w/ vehicle; PE-50 used.

**P6816:** I. Date, *et al.* Hepatocyte growth factor improved learning and memory dysfunction of microsphere-embolized rats. *Journal of Neuroscience Research* 2004;78(3):442-453

**ALZET Comments:** Hepatocyte growth factor, recomb. human; Saline, physiological; CSF/CNS; Rat; 2001; 7 days; Controls received sham ischemia operation and were HGF-untreated; dose-response (fig. 1); ischemia (cerebral); memory.

**P6779:** I. Date, *et al.* Hepatocyte growth factor attenuates cerebral ischemia-induced learning dysfunction. *Biochemical and Biophysical Research Communications* 2004;319(4):1152-1158

**ALZET Comments:** Hepatocyte growth factor, recomb. human; Saline, physiological; CSF/CNS; Rat; 2001; 7 days; Controls received mp w/ vehicle; dose-response (fig 1); cardiovascular; ischemia (cerebral); learning/memory study.

**P6413:** L. G. Arthur, *et al.* Hepatocyte growth factor treatment ameliorates diarrhea and bowel inflammation in a rat model of inflammatory bowel disease. *Journal of Pediatric Surgery* 2004;39(2):139-143

**ALZET Comments:** Hepatocyte growth factor; Saline; IV (jugular); Rat; 2002; 14 days; Controls received mp w/ vehicle.

#### 4. Insulin-like Growth Factor

**Q5699:** A. Heinen, *et al.* IGF1 Treatment Improves Cardiac Remodeling after Infarction by Targeting Myeloid Cells. *Mol Ther* 2019;27(1):46-58

**ALZET Comments:** Insulin-like growth factor-I; SC; Mice (knockout); 1003D; 3 days; Dose (1 µg/g/day); Controls received mp w/ vehicle; animal info (IGF1RKO mice); post op. care (buprenorphine (0.05–0.1 mg/kg body weight, s.c.) for 5 days); cardiovascular;.



**Q4964:** S. Bake, *et al.* Insulin-like Growth Factor (IGF)-1 treatment stabilizes the microvascular cytoskeleton under ischemic conditions. *Exp Neurol* 2019;311(162-172)

**ALZET Comments:** Insulin-like growth factor-I, recomb. Human; JB-1; CSF, artificial; CSF/CNS (right lateral ventricle); Rat; 1003D; 1007D; 1 day; 5 days; Dose (100 µg/ml rhIGF-1; 20 µg/ml JB-1); Controls received mp w/ vehicle; animal info (Female Sprague Dawley rats; 10–12 months; weight range 325–350 g); JB-1 is an IGFR inhibitor; Brain coordinates (–1.0mm posterior to bregma, –1.4mm medial lateral, –3.5mm from dural surface); cyanoacrylate adhesive; ischemia (cerebral);.

**Q7102:** D. Cabrera, *et al.* Somatotrophic Axis Dysfunction in Non-Alcoholic Fatty Liver Disease: Beneficial Hepatic and Systemic Effects of Hormone Supplementation. *Int J Mol Sci* 2018;19(5):

**ALZET Comments:** Insulin-like growth factor-1, growth hormone; SC; Mice; 4 weeks; Dose (9 µg/g/day GH, 0.02 µg/g/day IGF-1); animal info (C57BL/6 mice);.

**Q6519:** A. Trueba-Saiz, *et al.* Circulating Insulin-Like Growth Factor I Regulates Its Receptor in the Brain of Male Mice. *Endocrinology* 2017;158(2):349-355

**ALZET Comments:** Insulin-like growth factor 1, human; SC; Mice; Dose (50 µg/kg/d); animal info (8-9 week old male C57BL/6J mice weighing 25–30 g);.

**Q6627:** J. Mysoet, *et al.* Reorganization of motor cortex and impairment of motor performance induced by hindlimb unloading are partially reversed by cortical IGF-1 administration. *Behav Brain Res* 2017;317(434-443)

**ALZET Comments:** Insulin-like Growth Factor I; CSF, artificial; CSF/CNS (motor cortex); Rat; 2002; 2 weeks; Dose (50 µg/mL); animal info (Male wistar rats weighing 280–320 g); Brain coordinates (coordinates from Bregma: 3.5 mm posterior and 3 mm lateral));.

**Q6698:** S. Mir, *et al.* IGF-1 mediated Neurogenesis Involves a Novel RIT1/Akt/Sox2 Cascade. *Sci Rep* 2017;7(1):3283

**ALZET Comments:** Insulin-like Growth Factor-1; Saline; SC; Mice (knockout); 1 week; Dose (500ng/day); Controls received mp w/ vehicle; animal info (WT and 12 week old RIT1<sup>-/-</sup> mice);.

**Q6438:** A. H. Leko, *et al.* Insulin-like growth factor I and its binding protein-3 are regulators of lactation and maternal responsiveness. *Sci Rep* 2017;7(1):3396

**ALZET Comments:** NBI-31772; Insulin-like growth factor I; CSF, artificial; DMSO; CSF/CNS; Rat; 2002; 14 days; Dose (48 µg IGF-I/day; 19,92 µg NBI-31772/day); 1% DMSO used; Controls received mp w/ vehicle; animal info (85 female Wistar rats weighing 250–300 g); post op. care (Tardomyocel® comp. III antibiotics (0.1 ml/kg body weight) was given s.c. to the animals for 5 days); enzyme inhibitor (brain IGFBP-3); ALZET brain infusion kit 2 used; Brain coordinates (antero-posterior, –0.5; lateral, 1.4; ventral, 3.6 mm);.

**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 µg/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;.

**Q6244:** S. C. Hewitt, *et al.* Role of ERalpha in Mediating Female Uterine Transcriptional Responses to IGF1. *Endocrinology* 2017;158(8):2427-2435

**ALZET Comments:** Insulin-like growth factor 1; Acetic acid; Mice (knockout); 1003D; 24 hours; Dose (0.5 mg IGF1/mL); 0.1N acetic acid used; animal info (Eight weeks or older female Ex3aERKO or ERaUtckO mice); replacement therapy (ooverectomy);.



**Q4783:** Shameena Bake, *et al.* Insulin-Like Growth Factor (IGF)-I Modulates Endothelial Blood-Brain Barrier Function in Ischemic Middle-Aged Female Rats. *Endocrinology* 2016;157):61-69

**ALZET Comments:** Insulin-like growth factor-I, human recombinant; CSF, artificial; SC; Rat; 1003D; 48 hours; Controls received mp w/ vehicle; animal info (female, Sprague Dawley, 9-11 months old); animal info (female, Sprague Dawley, 9-11 months old); animal info (female, Sprague Dawley, 9-11 months old); immunology; cyanoacrylate adhesive; pumps primed overnight;.

**Q6633:** H. Nishizawa, *et al.* IGF-I induces senescence of hepatic stellate cells and limits fibrosis in a p53-dependent manner. *Sci Rep* 2016;6(34605

**ALZET Comments:** Insulin-like Growth Factor 1, recomb.; Growth Hormone, human; Saline; SC; Rat; Mice; 2004; 4 weeks; 6 weeks; Dose (10 mg/mL); Controls received mp w/ vehicle; animal info (Eight-week-old male ICR mice, Sprague-Dawley (SD) rats; db/db mice with a C57BL/6 backgrounddb); Insulin-like Growth Factor aka IGF-I;.

**Q6611:** T. D. Luo, *et al.* Effects of age and insulin-like growth factor-1 on rat neurotrophin receptor expression after nerve injury. *Muscle Nerve* 2016;54(4):769-75

**ALZET Comments:** Insulin-like Growth Factor 1, recomb. human; Saline; Bone (tibia); Rat; 1002; Controls received mp w/ vehicle; animal info (Male Fischer 3443Brown-Norway hybrid rats); post op. care (buprenorphine);.

**Q4807:** Jayne C. Charnock, *et al.* The impact of a human IGF-II analog ([Leu27]IGF-II) on fetal growth in a mouse model of fetal growth restriction. *Am J Physiol Endocrinol Metab* 2016;310):E24-E31

**ALZET Comments:** Insulin-like growth factor 2, Leu27; HCl; SC; 5 days; Controls received mp w/ vehicle; animal info (female, eNOS -/-, E12.5); teratology; Dose (1 mg/kg/day); noted using "100ul miniosmotic pump (200D)" pgE25;.

**Q4624:** L. Van Landeghem, *et al.* IGF1 stimulates crypt expansion via differential activation of 2 intestinal stem cell populations. *FASEB JOURNAL* 2015;29(2828-2842

**ALZET Comments:** Insulin-like growth factor, recombinant human; NaCl; SC; Mice; 5 days; Controls received mp w/ vehicle; animal info (Sox9-EGFP);.

**Q4119:** S. Sukhanov, *et al.* Insulin-like growth factor I reduces lipid oxidation and foam cell formation via downregulation of 12/15-lipoxygenase. *Atherosclerosis* 2015;238(313-320

**ALZET Comments:** Insulin-like growth factor-1, human recombinant; Mice; 4 weeks; Controls received mp w/ saline; animal info (ApoE -/-, 8 weeks old); cardiovascular; immunology;.

**Q4592:** P. Standen, *et al.* Maternal insulin-like growth factor 1 and 2 differentially affect the renin-angiotensin system during pregnancy in the guinea pig. *GROWTH HORMONE & IGF RESEARCH* 2015;25(141-147

**ALZET Comments:** Insulin-like growth factor-1; insulin-like growth factor 2; Acetic acid; SC; Guinea pig; 2002; 18 days; Controls received mp w/ vehicle; animal info (GD20); teratology; cardiovascular;.

**Q4260:** A. J. Simmons, *et al.* Cytometry-based single-cell analysis of intact epithelial signaling reveals MAPK activation divergent from TNF-alpha-induced apoptosis in vivo. *Molecular Systems Biology* 2015;11(U60-U73

**ALZET Comments:** Insulin-like growth factor-1, human, recomb.; Water; Mice; animal info (female, C57BL/6).

**Q4541:** J. Mysoet, *et al.* role of IGF-1 in cortical plasticity and functional deficit induced by sensorimotor restriction. *BEHAVIOURAL BRAIN RESEARCH* 2015;290(117-123

**ALZET Comments:** Insulin-like growth factor-1; CSF, artificial; CSF/CNS; Rat; 2002; 14 days; Controls received mp w/ vehicle; animal info (male, Wistar, 280-320g); behavioral testing (mechanical withdrawal); pumps primed overnight;.

**Q5021:** M. Ikemoto-Uezumi, *et al.* Pro-Insulin-Like Growth Factor-II Ameliorates Age-Related Inefficient Regenerative Response by Orchestrating Self-Reinforcement Mechanism of Muscle Regeneration. *Stem Cells* 2015;33(8):2456-68

**ALZET Comments:** Insulin-like growth factor II, pro; PBS; SC; Mice; 1003D; 2001; 3 days; 7 days; Controls received mp w/ vehicle; animal info (C57BL6, 2 months or 24-27 months old); Dose (0.5 ug/hr);.



**Q4120:** K. Sundstroem, *et al.* Combined Treatment With GH and IGF-I: Additive Effect on Cortical Bone Mass But Not on Linear Bone Growth in Female Rats. *Endocrinology* 2014;155(4798-4807

**ALZET Comments:** Insulin-like growth factor-1; NaCl; acetic acid; water, sterile, sodium acetate trihydrate; polysorbate 20; sodium citrate; citric acid monohydrate; phenol; SC; Rat; 1007D; 2001; 4 weeks; Animal info (female, Wistar, 23 days old); functionality of mp verified by ELISA of serum; pumps replaced every week; stress/adverse reaction: (see pg. 4799 seroma); post op. care (bupivacaine 1 mg/kg, carprofen 5 mg/kg); "Problems with drug absorption could also have affected the results because many animals developed a seroma at the site of pump implantation, being most pronounced in animals treated with combination therapy. The seromas did not resolve and were first noted after 2 weeks of therapy. These could theoretically have affected the uptake of the drug into the circulation. However, when evaluating the growth rates of animals with seromas with group mates without seromas, no differences were observed." pg 4805-4806;.

**Q3662:** Y. Sumino, *et al.* Therapeutic Effects of IGF-1 on Stress Urinary Incontinence in Rats with Simulated Childbirth Trauma. *Journal of Urology* 2014;191(2):529-538

**ALZET Comments:** Insulin-like growth factor-1, human recombinant; Saline; SC; Mice; 2001; 4 days; 7 days; Controls received mp w/ vehicle; animal info (female, Sprague Dawley, vaginal distension); functionality of mp verified by ELISA of blood serum;.

**Q4017:** G. Neal-Perry, *et al.* Insulin-Like Growth Factor-I Regulates LH Release by Modulation of Kisspeptin and NMDA-Mediated Neurotransmission in Young and Middle-Aged Female Rats. *Endocrinology* 2014;155(1827-1837

**ALZET Comments:** JB-1; insulin-like growth factor-1; CSF, artificial; CSF/CNS (third ventricle); Rat; 2002; Controls received mp w/ vehicle; animal info (female, Sprague Dawley, 3-4 months or 9-11 months old, ovariectomized); peptides; cannula placement verified via dye infusion; used Plastics One cannula; JB-1 is a selective antagonist of IGF-Ir;.

**Q3564:** T. J. Mellott, *et al.* IGF2 Ameliorates Amyloidosis, Increases Cholinergic Marker Expression and Raises BMP9 and Neurotrophin Levels in the Hippocampus of the APPswePS1dE9 Alzheimer's Disease Model Mice. *PLoS One* 2014;9(U264-U275

**ALZET Comments:** Insulin-like growth factor, human recombinant; CSF/CNS; Mice; 1002; 7 days; Controls received mp w/ vehicle; animal info (APP.PS1, 6 months old); neurodegenerative (Alzheimers); post op. care (ampicillin 35 mg/kg SC; 1 ml of sterile saline SC; heating pad; buprenex 0.04 mg/kg SC); cyanoacrylate adhesive; used Loctite and dental cement;.

**Q3931:** B. Johannesson, *et al.* Insulin-like growth factor-1 induces regulatory T cell-mediated suppression of allergic contact dermatitis in mice. *Disease Models & Mechanisms* 2014;7(977-985

**ALZET Comments:** Insulin-like growth factor-1, recombinant human; SC; Mice; 2004; Controls received sham surgery; animal info (C57BL6J, 8-10 weeks old); immunology; peptides;.

**Q3419:** C. D. Blackstock, *et al.* Insulin-like Growth Factor-1 Increases Synthesis of Collagen Type I via Induction of the mRNA-binding Protein LARP6 Expression and Binding to the 5' Stem-loop of COL1a1 and COL1a2 mRNA. *Journal of Biological Chemistry* 2014;289(7264-7274

**ALZET Comments:** Insulin-like growth factor-1, human recombinant; SC; Mice; 5 days; Controls received mp w/ saline; animal info (Apoe -/-); functionality of mp verified by serum plasma levels; cardiovascular;.

**Q3412:** S. Bake, *et al.* Blood Brain Barrier and Neuroinflammation Are Critical Targets of IGF-1-Mediated Neuroprotection in Stroke for Middle-Aged Female Rats. *PLoS One* 2014;9(3):U897-U907

**ALZET Comments:** Insulin-like growth factor, human recombinant; CSF, artificial; CSF/CNS; Rat; 1003D; 24 hours; Controls received mp w/ vehicle; animal info (Female, Sprague Dawley, 9-11 months, 325-350g); ischemia (Cerebral); immunology; cyanoacrylate adhesive; "Previous studies have shown that IGF-1 is stable in Alzet minipumps for upto 7 days and the dose of IGF-1 was found to be effective" pg e91427; Pump and cannula primed overnight; cannula implanted one week prior to MCAO and pump implantation;.



**Q2675:** M. Secco, *et al.* Systemic Delivery of Human Mesenchymal Stromal Cells Combined with IGF-1 Enhances Muscle Functional Recovery in LAMA2 (dy/2j) Dystrophic Mice. *Stem Cell Reviews and Reports* 2013;9(1):93-109

**ALZET Comments:** Insulin-like growth factor-1, R3, long; Acetic acid; SC; Mice; 1002; 8 weeks; Control animals received mp w/ vehicle; animal info (1 mo old, B6.WK-Lama2 dy/2J); pumps replaced every 2 weeks.

**Q2957:** J. K. Sabo, *et al.* Investigation of Sequential Growth Factor Delivery during Cuprizone Challenge in Mice Aimed to Enhance Oligodendroglial Myelination and Myelin Repair. *PLoS One* 2013;8(5):U1142-U1152

**ALZET Comments:** Bone morphogenetic protein-4, recombinant human; mouse Noggin; insulin-like growth factor-1; CSF, artificial; CSF/CNS; Mice; 1002; 14 days; Animal info (C57BL/6); pumps replaced every 7 days; mp were used to sequentially deliver BMP4, Noggin, and IGF-1 during a cuprizone challenge; Bone morphogenetic protein-4 aka BMP4.

**Q2855:** K. J. B. Martins, *et al.* Intramuscular administration of PEGylated IGF-I improves skeletal muscle regeneration after myotoxic injury. *GROWTH HORMONE & IGF RESEARCH* 2013;23(4):128-133

**ALZET Comments:** Insulin-like growth factor-I, recomb. human; SC; Mice; 1002; 7, 14 days; Animal info (C57BL/6, male, 8 wks old); comparison of IM injections vs SC mp.

**Q3236:** L. M. Lashinger, *et al.* Dietary Energy Balance Modulation of Kras- and Ink4a/ Arf(+/-)-Driven Pancreatic Cancer: The Role of Insulin-like Growth Factor-I. *Cancer Prevention Research* 2013;6(10):1046-1055

**ALZET Comments:** Insulin-like growth factor I, recomb. human; SC; Mice; 2004; 28 days; Controls received mp w/ vehicle; animal info (LID, WT FVB/N, 6-9 weeks old); functionality of mp verified by serum IGF-I levels; cancer (pancreatic); post op. care (Carprofen); Increlex IGF-1; incision closed using wound clips.

**Q3102:** A. Kurabayashi, *et al.* Conditional VHL Gene Deletion Causes Hypoglycemic Death Associated with Disproportionately Increased Glucose Uptake by Hepatocytes through an Upregulated IGF-I Receptor. *PLoS One* 2013;8(7):U1405-U1415

**ALZET Comments:** L-NAME; Insulin-like growth factor 1 receptor; Saline; acetic acid; SC; Mice; 14 days; Controls received mp w/ vehicle; animal info (VHL-KO); 25% acetic acid used; immunology.

**Q2981:** J. Knapp, *et al.* Effects of intracerebroventricular application of insulin-like growth factor 1 and its N-terminal tripeptide on cerebral recovery following cardiac arrest in rats. *RESUSCITATION* 2013;84(5):684-689

**ALZET Comments:** Insulin-like growth factor-1; SC; Rat; 7 days; Peptides; functionality of mp verified by counting Nissl-positive neurons and TUNEL positive cells; half-life (12 min); ischemia (cerebral ischemia); neurodegenerative (cerebral); mp were used to infuse IGF-1 to study its neuroprotective role on cerebral recovery following cardiac arrest;.

**Q2963:** B. King, *et al.* Weight control, endocrine hormones and cancer prevention. *EXPERIMENTAL BIOLOGY AND MEDICINE* 2013;238(5):502-508

**ALZET Comments:** Insulin-like growth factor-1; leptin; SC; Mice; 20 weeks; Animal Info (SENCAR mice); cancer (colon); cancer.

**Q1988:** L. L. Xian, *et al.* Matrix IGF-1 maintains bone mass by activation of mTOR in mesenchymal stem cells. *Nature Medicine* 2012;18(7):1095-U126

**ALZET Comments:** Insulin-like growth factor I; insulin-like growth factor binding protein; SC; Mice; 4 weeks; Controls received mp w/ vehicle; animal info (4 wks old, male, LID).

**Q2050:** H. Nishizawa, *et al.* GH-independent IGF-I action is essential to prevent the development of nonalcoholic steatohepatitis in a GH-deficient rat model. *Biochemical and Biophysical Research Communications* 2012;423(2):295-300

**ALZET Comments:** Growth hormone; insulin-like growth factor I, recomb. human; Saline; SC; Rat; 2004; 4 weeks; Controls received mp w/ vehicle; animal info (SDR, GH-def, male, 16 wks old).



**R0296:** M. Iikubo, *et al.* Morphological and Histopathological Changes in Orofacial Structures of Experimentally Developed Acromegaly-Like Rats: An Overview. *INTERNATIONAL JOURNAL OF ENDOCRINOLOGY* 2012;;(1):U1-U11

**ALZET Comments:** Insulin-like growth factor-1, human, recomb.; Saline; SC; Rat; 1002; 4 weeks; Animal info (male, Wistar, 10 wks old).

**Q2623:** C. Franco, *et al.* Frataxin deficiency unveils cell-context dependent actions of insulin-like growth factor I on neurons. *Molecular Neurodegeneration* 2012;7(1):U1-U10

**ALZET Comments:** Insulin-like growth factor-1; SC; Mice; 1 month; Animal info (YG8R, wt, 4-6 mo old).

**Q1521:** Y. Sun, *et al.* Differential Effects of Hypothalamic IGF-I on Gonadotropin Releasing Hormone Neuronal Activation During Steroid-Induced LH Surges in Young and Middle-Aged Female Rats. *Endocrinology* 2011;152(11):4276-4287

**ALZET Comments:** JB-1; insulin-like growth factor-1; CSF, artificial; CSF/CNS (third ventricle); Rat; 2002; 7 days; animal info (young, 3-4 mo old, middle-aged, retired breeders, 9-11 mo old, female Sprague Dawley, ovariectomized); guide cannula used; cannula placement verified by tracking the cannula path in brain sections; artificial CSF recipe; peptides;.

**Q1506:** S. Sukhanov, *et al.* Differential requirement for nitric oxide in IGF-1-induced anti-apoptotic, anti-oxidant and anti-atherosclerotic effects. *FEBS Letters* 2011;585(19):3065-3072

**ALZET Comments:** Insulin-like growth factor-1, recomb. human; Mice; 4, 8, 12 weeks; Controls received mp w/ saline; animal info (Apoe -/-, C57BL/6, 8 wks old); long-term study.

**Q1502:** A. I. Duarte, *et al.* IGF-1 protects against diabetic features in an in vivo model of Huntington's disease. *Experimental Neurology* 2011;231(2):314-319

**ALZET Comments:** Insulin-like growth factor-1, recomb. human; Saline; SC; Mice; 1002; 14 days; Controls received mp w/ vehicle; animal info (R6/2, wt, male, 9 wks old); neurodegenerative (Huntington's disease).

**Q0683:** A. R. Demonbreun, *et al.* Impaired muscle growth and response to insulin-like growth factor 1 in dysferlin-mediated muscular dystrophy. *Human Molecular Genetics* 2011;20(4):779-789

**ALZET Comments:** Insulin-like growth factor-1; 28 days; Controls received mp w/ PBS; animal info (Dysferlin null, wt).

## 5. Nerve Growth Factor

**Q7045:** N. Shimizu, *et al.* Effects of nerve growth factor neutralization on TRP channel expression in laser-captured bladder afferent neurons in mice with spinal cord injury. *Neurosci Lett* 2018;683(100-103)

**ALZET Comments:** Antibody, anti Nerve growth factor; SC; Mice; 1002; 2 weeks; Dose (10 µg/Kg/hour); Controls received mp w/ vehicle; animal info (9-10-week-old female C57BL/6 N mice weighing 18-22 g); spinal cord injury;.

**Q5675:** Y. Sone, *et al.* Nerve Growth Factor Facilitates the Innervation of Perivascular Nerves in Tumor-Derived Neovasculature in the Mouse Cornea. *Pharmacology* 2017;99(1-2):57-66

**ALZET Comments:** Nerve growth factor; SC; Mice; 1002; 7 days; Controls received mp w/ saline; animal info (male BALB/C Cr Slc, 5 weeks old); cancer (prostate DU145 or fibrosarcoma HT1080); cardiovascular; Dose (40 ng/h);.

**Q6595:** A. Matsuyama, *et al.* Effect of Nerve Growth Factor on Innervation of Perivascular Nerves in Neovasculatures of Mouse Cornea. *Biological and Pharmaceutical Bulletin* 2017;40(4):396-401

**ALZET Comments:** Nerve growth factor; SC; Mice; 1002; 7 days; Dose (48 µg/kg/d); animal info (5-7 week old Male BALB/c Cr Slc mice); comparison of pellet vs mp;.

**Q4917:** A. Yokomizo, *et al.* Nerve growth factor facilitates redistribution of adrenergic and non-adrenergic non-cholinergic perivascular nerves injured by phenol in rat mesenteric resistance arteries. *Eur J Pharmacol* 2016;770(110-6)

**ALZET Comments:** Nerve growth factor; Saline, sterile; IP; Rat; 1007D; 7 days; animal info (Wistar, 8 weeks old); Dose (20 µg/kg/day);.



**Q5177:** P. A. Pereira, *et al.* Effects of chronic alcohol consumption, withdrawal and nerve growth factor on neuropeptide Y expression and cholinergic innervation of the rat dentate hilus. *Neurotoxicology* 2016;54(153-60)

**ALZET Comments:** Nerve growth factor; Methylene blue; BSA; CSF, artificial; CSF/CNS; Rat; 2002; 12 days; animal info (male, Wistar); functionality of mp verified by residual volume; ALZET brain infusion kit used; post op. care (SC injections of 0.9% saline (2ml)); pulsed delivery; used PE-60 tubing; used lynch coil;

**Q6640:** P. A. Pereira, *et al.* Nerve growth factor-induced plasticity in medial prefrontal cortex interneurons of aged Wistar rats. *Exp Gerontol* 2016;85(59-70)

**ALZET Comments:** Nerve Growth Factor; CSF, artificial; BSA; CSF/CNS (Right ventricle); Rat; 2002; 12 days; Dose ( $10.1 \pm 2.4$  µg per rat); 0.1% bovine serum albumin used; animal info (Adult (6 months) and old (26–27 months) male Wistar rats); Nerve Growth Factor aka NGF; ALZET brain infusion kit used; Brain coordinates (1.1 mm posterior to the bregma, 1.7 mm lateral to the midline, and 4.0 mm below the surface of the skull);

**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 lidocane injection); spared nerve injury; Dose (12 µg/kg/day);

**Q5856:** M. Goda, *et al.* Nerve growth factor facilitates perivascular innervation in neovasculatures of mice. *J Pharmacol Sci* 2016;131(4):251-8

**ALZET Comments:** Nerve Growth Factor; Saline; SC; IP; Mice; 1003D, 1007D, 1002; 3 days, 7 days, 10 days, 14 days; Controls received mp w/ vehicle; Therapeutic indication (Angiogenesis);

**Q3960:** J. Y. Lee, *et al.* Simultaneous Inferior Alveolar Nerve Regeneration and Osseointegration With a Nerve Growth Factor-Supplying Implant: A Preliminary Study. *Journal of Oral and Maxillofacial Surgery* 2015;73(410-423)

**ALZET Comments:** Nerve growth factor, human B-; PBS; CSF/CNS (inferior alveolar nerve); Dog (beagle); 2ML2; 6 weeks; Controls received mp w/ vehicle; animal info (male, beagle, 18 weeks old, 10-12 kg); good methods (picture of implant pg 413); Multiple pumps per animal (2; one pump delivered NGF other delivered PBS); used rat jugular catheter, 15 cm long; pump body placed into retromandibular area; long-term study;

**Q4368:** W. H. Chen, *et al.* Beta-nerve growth factor promotes neurogenesis and angiogenesis during the repair of bone defects. *Neural Regeneration Research* 2015;10(1159-1165)

**ALZET Comments:** Nerve growth factor, b-; PBS; Evans blue dye; Bone (parietal); Rat; 2001; 7 days; Controls received mp w/ vehicle; animal info (male, Sprague Dalwey, 250-300g); 1% Evans blue used; good methods (picture of dual cannula implantation pg 1161); Multiple pumps per animal (2); pump with agent inserted into right pocket, pump with PBS inserted into left pocket; bilateral infusion;

**Q3650:** B. Yegla, *et al.* EFFECTS OF SUSTAINED PRONGF BLOCKADE ON ATTENTIONAL CAPACITIES IN AGED RATS WITH COMPROMISED CHOLINERGIC SYSTEM. *Neuroscience* 2014;261(;):118-132

**ALZET Comments:** Antibody, pro-nerve growth factor; PBS; CSF/CNS; Rat; 1004; 4 weeks; Controls received mp w/ vehicle; animal info (male, Wistar, 23 months old); ALZET brain infusion kit used; good methods (cannula placement pg.124, fig.2); post op. care (triple antibiotic cream on wound; Baytril injected; buprenorphine); behavioral testing (sustained attention task, performance measures); Cannula placement verified via Nissl staining; used dental cement and bone screws; pumps and cannula removed after 4 weeks;

**Q3207:** T. Tomioka, *et al.* LIM Homeobox 8 (Lhx8) Is a Key Regulator of the Cholinergic Neuronal Function via a Tropomyosin Receptor Kinase A (TrkA)-mediated Positive Feedback Loop. *Journal of Biological Chemistry* 2014;289(2):1000-1010

**ALZET Comments:** Nerve growth factor, murine; PBS; CSF/CNS; Rat; 2001; 2 weeks; Control animals received mp w/ vehicle; animal info (adult, male, Sprague Dawley, 8 wks old); ALZET brain infusion kit 2 used.





**Q3742:** M. Shaqura, *et al.* New insights into mechanisms of opioid inhibitory effects on capsaicin-induced TRPV1 activity during painful diabetic neuropathy. *Neuropharmacology* 2014;85(142-150

**ALZET Comments:** Nerve growth factor, beta; albumin, rat serum; CSF, artificial; CSF/CNS (intrathecal); Rat; 2001; 7 days; Control animals received mp w/ animal info (male, Wistar, STZ induced diabetes).

**Q4739:** J. C. M. Schlachetzki, *et al.* Intracerebroventricular Administration of Nerve Growth Factor Induces Gliogenesis in Sensory Ganglia, Dorsal Root, and within the Dorsal Root Entry Zone. *BIOMED RESEARCH INTERNATIONAL* 2014;;(;)U1-U9

**ALZET Comments:** Nerve growth factor, human recombinant; Cytochrome C; CSF, artificial; CSF/CNS; Rat; 2002; 14 days; Controls received mp w/ vehicle; animal info (male, Fischer 344 albino, 281.8 +/- 2g); used Plastics One cannula;

**Q3749:** P. A. Pereira, *et al.* Chronic alcohol consumption leads to neurochemical changes in the nucleus accumbens that are not fully reversed by withdrawal. *NEUROTOXICOLOGY AND TERA TOLOGY* 2014;44(53-61

**ALZET Comments:** Nerve growth factor; CSF, artificial; methylene blue; CSF/CNS; Rat; 2002; 12 days; Control animals received mp w/ vehicle; animal info (male, Wistar); Lynch coil; PE60 tubing used; ALZET brain infusion kit used; "The cannulae were connected to methylene blue... filled Alzet osmotic minipumps... via sterile coiled polyethylene tubing... This tubing was filled with air-oil spacer at the pump end and with NGF." pg 54; pump functionality verified via residual volume.

**Q3152:** M. Shaqura, *et al.* Reduced Number, G Protein Coupling, and Antinociceptive Efficacy of Spinal Mu-Opioid Receptors in Diabetic Rats Are Reversed by Nerve Growth Factor. *JOURNAL OF PAIN* 2013;14(7):720-730

**ALZET Comments:** Nerve growth factor; CSF, artificial; rat serum albumin; CSF/CNS (intrathecal); Rat; 2001; 7 days; Controls received mp w/ vehicle; animal info (male, Wistar, 225g); behavioral testing (paw pressure test); peptides; used PE-10 attached to PE-60 catheter.

**Q3171:** P. A. Pereira, *et al.* Nerve growth factor retrieves neuropeptide Y and cholinergic immunoreactivity in the nucleus accumbens of old rats. *NEUROBIOLOGY OF AGING* 2013;34(8):1988-1995

**ALZET Comments:** Nerve growth factor; CSF, artificial; bovine serum albumin; CSF/CNS; SC; Rat; 2002; 12 days; Animal info (male, Wistar, 6-24 months old); functionality of BIK verified by methylene blue staining; ALZET brain infusion kit used; 0.1% Bovine Serum Albumin used; neurodegenerative (aging); post op. care (SC injections 2ml of 0.9% saline); pulsatile delivery (used coiled Intramedic PE-60; 0.1% methylene blue with air-oil spacer at pump end with agent); peptides;.

**Q2571:** S. A. Mousa, *et al.* Rab7 Silencing Prevents mu-Opioid Receptor Lysosomal Targeting and Rescues Opioid Responsiveness to Strengthen Diabetic Neuropathic Pain Therapy. *Diabetes* 2013;62(4):1308-1319

**ALZET Comments:** Nerve growth factor, beta; CSF, artificial; albumin, rat serum; CSF/CNS (intrathecal); Rat; 2001; 7 days; Control animals received mp w/ vehicle; animal info (Wistar, male, STZ induced diabetes).

**Q3154:** Y. S. Lee, *et al.* Neurotrophic factors rescue basal forebrain cholinergic neurons and improve performance on a spatial learning test. *Experimental Neurology* 2013;249(;):178-186

**ALZET Comments:** Nerve growth factor; neurotrophin-3; PBS; CSF/CNS; Rat; 2004; 4 weeks; Controls received mp w/ saline; animal info (Sprague Dawley, 8 weeks old, 180g); bilateral Y-connector used; post op. care (restricted diet); behavioral testing (Delayed match to position T maze); peptides; bilateral infusion;

**Q2953:** J. J. Guo, *et al.* proNGF Inhibits Neurogenesis and Induces Glial Activation in Adult Mouse Dentate Gyrus. *Neurochemical Research* 2013;38(8):1695-1703

**ALZET Comments:** Nerve growth factor, precursor;; PBS; BSA; Mice; 1007D; 7 Days; Animal info (10 week old, male, C57BL/6J, 21-25g); neurodegenerative (Alzheimer's disease).

**Q3286:** A. M. Birch, *et al.* Chronic intracerebroventricular infusion of nerve growth factor improves recognition memory in the rat. *Neuropharmacology* 2013;75(;):255-261

**ALZET Comments:** Nerve growth factor, b-; CSF, artificial; CSF/CNS; Rat; 42 days; Controls received mp w/ vehicle or no surgery; animal info (Male, wistar, 250-300g); functionality of mp verified by analysis of NGF concentration in brain; behavioral testing (object recognition memory); long-term study;.



**Q1986:** C. Cabeza, *et al.* Cholinergic Abnormalities, Endosomal Alterations and Up-Regulation of Nerve Growth Factor Signaling in Niemann-Pick Type C Disease. *Molecular Neurodegeneration* 2012;7(7):U1-U18

**ALZET Comments:** Nerve growth factor; CSF, artificial; CSF/CNS; Mice; 1002; 7 days; Controls received mp w/ vehicle; animal info (BALB/c, NPC/1 -/-); aCSF recipe; brain infusion kit used.

**Q0685:** S. Toda, *et al.* A local anesthetic, ropivacaine, suppresses activated microglia via a nerve growth factor-dependent mechanism and astrocytes via a nerve growth factor-independent mechanism in neuropathic pain. *Molecular Pain* 2011;7(7):U1-U11

**ALZET Comments:** Nerve growth factor, beta, recomb., rat; Saline; albumin, rat, serum; CSF/CNS (intrathecal); Rat; 2001; 7 days; Controls received mp w/ vehicle; animal info (male, Sprague-Dawley, 220-300 g); chronic constrictive injury (CCI).

**Q2205:** J. H. Liu, *et al.* Contribution of nerve growth factor to upregulation of P2X(3) expression in DRG neurons of rats with femoral artery occlusion. *American Journal of Physiology-Heart and Circulatory Physiology* 2011;301(3):H1070-H1079

**ALZET Comments:** Nerve growth factor; Saline; Intramuscular (hindlimb); Rat; 1003D; 3 days; Controls received mp w/ vehicle to opposite leg; animal info (Sprague Dawley, male, 5-7 wks old); "Note that the pumps were placed in the femoral triangle region and outlet of the pump was 2-3 mm distal to the inguinal ligament" pg H1071.

**Q0682:** G. Cirillo, *et al.* Reactive astrocytosis-induced perturbation of synaptic homeostasis is restored by nerve growth factor. *NEUROBIOLOGY OF DISEASE* 2011;41(3):630-639

**ALZET Comments:** Nerve growth factor, beta, recomb.; GM6001; CSF, artificial; albumin, rat serum; CSF/CNS (intrathecal, subarachnoid space); Rat; 2001; 7 days; Controls received mp w/ vehicle; animal info (Sprague-Dawley, male, 250-300 g); enzyme inhibitor (metalloproteinase); PE10 connected to PE60 tubing.

**Q0668:** P. C. Beguin, *et al.* Nestin(+) Stem Cells Independently Contribute to Neural Remodelling of the Ischemic Heart. *Journal of Cellular Physiology* 2011;226(5):1157-1165

**ALZET Comments:** Nerve growth factor, 2.5S; SC; Rat; 2ML1; 1 week; Controls received mp w/ saline; animal info (adult, male, Sprague-Dawley).

**Q2225:** T. Aboukassim, *et al.* Ligand-Dependent TrkA Activity in Brain Differentially Affects Spatial Learning and Long-Term Memory. *MOLECULAR PHARMACOLOGY* 2011;80(3):498-508

**ALZET Comments:** Nerve growth factor, recomb; nerve growth factor TrkA agonist; CSF, artificial; CSF/CNS; Mice; 1002; 2 weeks; Controls received mp w/ vehicle; animal info (4-5 mo old, 670/671 KM-NL, 717 V-F); post op. care (buprenorphine); aCSF recipe; behavioral testing (Morris water maze test).

**Q0157:** O. M. Lazo, *et al.* Axotomy-induced neurotrophic withdrawal causes the loss of phenotypic differentiation and downregulation of NGF signalling, but not death of septal cholinergic neurons. *Molecular Neurodegeneration* 2010;5(7):U1-U12

**ALZET Comments:** Nerve growth factor; CSF, artificial; CSF/CNS; Rat; 2ML2; 14 days; Controls received mp w/ vehicle; animal info (Sprague Dawley, 280-300 g.); aCSF recipe; incorrectly stated 2002 pump.

**Q0129:** M. Goda, *et al.* Nerve Growth Factor Suppresses Prostate Tumor Growth. *JOURNAL OF PHARMACOLOGICAL SCIENCES* 2010;112(4):463-466

**ALZET Comments:** Nerve growth factor; SC; Mice (nude); 1002; 2 weeks; Controls received mp w/ saline; cancer (prostate); animal info (BALB/c, Slc, 5 wks old, nu/nu).

**Q0009:** G. Cirillo, *et al.* Intrathecal NGF Administration Reduces Reactive Astrocytosis and Changes Neurotrophin Receptors Expression Pattern in a Rat Model of Neuropathic Pain. *Cellular and Molecular Neurobiology* 2010;30(1):51-62

**ALZET Comments:** Nerve growth factor, b-, recomb. rat; CSF, artificial; CSF/CNS (intrathecal); Rat; 2001; 7 days; Controls received mp w/ vehicle; peptides; animal info (adult, male, Sprague-Dawley, 250-300 g); SCI; spinal cord injury; behavioral testing (thermal nociceptive testing, mechanical allodynia).



**P9466:** J. H. Xing, *et al.* Contribution of nerve growth factor to augmented TRPV1 responses of muscle sensory neurons by femoral artery occlusion. *American Journal of Physiology-Heart and Circulatory Physiology* 2009;296(5):H1380-H1387

**ALZET Comments:** Nerve growth factor; SC; Rat; 1003D; 72 hours; Controls received mp w/ saline to contralateral leg; cardiovascular; peptides; multiple pumps per animal (2); ischemia (muscle); animal info (male, Sprague Dawley, 5-7 wks old); SC in the hindlimb.

**P9539:** D. N. Xanthos, *et al.* The roles of nerve growth factor and cholecystokinin in the enhancement of morphine analgesia in a rodent model of central nervous system inflammation. *Neuropharmacology* 2009;56(3):684-691

**ALZET Comments:** Nerve growth factor, beta; CSF, artificial; CSF/CNS (intrathecal); Rat; 2001; 7 days; Controls received mp w/ vehicle; animal info (male, Long Evans, hooded).

**P9516:** A. M. Wissman, *et al.* The Role of Neurotrophins in the Seasonal-Like Growth of the Avian Song Control System. *Journal of Neuroscience* 2009;29(20):6461-6471

**ALZET Comments:** TrkB-Fc; TrkC-Fc; brain-derived neurotrophic factor; nerve growth factor; PBS; CSF/CNS (robust nucleus of the arcopallium); Bird (Gambel's white crowned sparrow); 1002; Controls received mp w/ vehicle; functionality of mp verified by residual volume; ALZET brain infusion kit 2 used.

**P9872:** S. Unezaki, *et al.* Effects of neurotrophic factors on nerve regeneration monitored by in vivo imaging in thy1-YFP transgenic mice. *Journal of Neuroscience Methods* 2009;178(2):308-315

**ALZET Comments:** Nerve growth factor; glial-derived neurotrophic factor; Saline; CSF/CNS (sciatic nerve); Mice (transgenic); 1004; 4 weeks; Controls received mp w/ vehicle; half-life (p. 308) "short"; animal info (10 wks old, 20 g., Thy1-YEP); image of pump pg. 309; schematic of drug delivery system with pump+silicone, fig. 1); "Because of the short biological half-life of neurotrophic factors, a delivery system that protects the protein and slowly releases it locally over a prolonged period of time is required." pg. 308; tissue perfusion (sciatic nerve).

**Q1126:** Z. Q. Hu, *et al.* Functional Evaluation of a Cell Replacement Therapy in the Inner Ear. *OTOLOGY & NEUROTOLOGY* 2009;30(4):551-558

**ALZET Comments:** Nerve growth factor; Hank's based salt solution; albumin, guinea pig serum; Ear (cochlea); Guinea pig; 2002; Controls received mp w/ vehicle; animal info (pigmented, adult, 270-470 g); pumps replaced after 13 days; post op. care (daily injections of cyclosporin and doxycycline); tissue perfusion.

**Q0468:** J. M. Conner, *et al.* NGF Is Essential for Hippocampal Plasticity and Learning. *Journal of Neuroscience* 2009;29(35):10883-10889

**ALZET Comments:** Nerve growth factor, recomb. human; CSF, artificial; albumin, rat; CSF/CNS (septum); Rat; 2002; Controls received mp w/ vehicle; animal info (adult, female F344, 175-200 g, 3-4 months old); behavioral testing (Morris water maze test).

**Q0544:** N. Hobara, *et al.* Neurotrophic Effect of Hepatic Growth Factor (HGF) on Reinnervation of Perivascular Calcitonin Gene-Related Peptide (CGRP)-Containing Nerves Following Phenol-Induced Nerve Injury in the Rat Mesenteric Artery. *JOURNAL OF PHARMACOLOGICAL SCIENCES* 2008;108(4):495-504

**ALZET Comments:** Hepatic growth factor, human; nerve growth factor; PBS; Triton-X; saline, sterile; IP; Rat; 2001; 7 days; Controls received mp w/ saline; animal info (8 wks old, Wistar).

**P9324:** S. Averill, *et al.* Reg-2 expression in dorsal root ganglion neurons after adjuvant-induced monoarthritis. *Neuroscience* 2008;155(4):1227-1236

**ALZET Comments:** Nerve growth factor, recomb. human; glial-derived neurotrophic factor, recomb. human; leukemia inhibitory factor, recomb. human; Saline; albumin, rat serum; CSF/CNS (intrathecal); Rat; 2002; 14 days; Controls received mp w/ vehicle; peptides, animal info (male, Wistar, 220-400 g.).



**P8526:** C. L. Randolph, *et al.* Regulation of NGF and NT-3 protein expression in peripheral targets by sympathetic input. *Brain Research* 2007;1144(59-69)

**ALZET Comments:** Nerve growth factor, mouse; Bisbenzimidazole; CSF/CNS; Rat; 2002; 2 weeks; Controls received no treatment; peptides; animal info (female, Sprague-Dawley, 3 months old); bisbenzimidazole (fluorescent marker) added to infusate to monitor cannula placement.

**P8890:** N. Hobara, *et al.* Angiotensin II type 2 receptors facilitate reinnervation of phenol-lesioned vascular calcitonin gene-related peptide-containing nerves in rat mesenteric arteries. *Neuroscience* 2007;150(3):730-741

**ALZET Comments:** Angiotensin II; nerve growth factor; PD123319; losartan; Saline; water; IP; Rat; 2001; 7 days; Controls received mp w/ vehicle; functionality of mp verified by systolic blood pressure; peptides; post op. care (penicillin); animal info (8 wks old, Wistar).

**P8426:** N. Hobara, *et al.* Adrenomedullin facilitates reinnervation of phenol-injured perivascular nerves in the rat mesenteric resistance artery. *Neuroscience* 2007;144(2):721-730

**ALZET Comments:** Adrenomedullin, recomb. human; nerve growth factor; Saline, sterile; IP; Rat; 2001; 7 days; Controls received mp w/ vehicle; dose-response (fig. 2); peptides; animal info (Wistar, 8 wk old, perivascular denervation).

**P7978:** M. Engelhardt, *et al.* Differential effects of NT-4, NGF and BDNF on development of neurochemical architecture and cell size regulation in rat visual cortex during the critical period. *European Journal of Neuroscience* 2007;25(2):529-540

**ALZET Comments:** Nerve growth factor, mouse; NT-4, human recomb.; brain-derived neurotrophic factor, recomb. human; CSF/CNS (visual cortex); Rat; 1007D; 8 days; Post op. care (antibiotics and local anesthetics); animal info (Long-Evans); dental cement used; 30 G cannula used; tissue perfusion (visual cortex).

**P9004:** R. S. B. Clark, *et al.* boc-Aspartyl(OMe)-fluoromethylketone attenuates mitochondrial release of cytochrome c and delays brain tissue loss after traumatic brain injury in rats. *Journal of Cerebral Blood Flow and Metabolism* 2007;27(2):316-326

**ALZET Comments:** Nerve growth factor; CSF, artificial; albumin, mouse; CSF/CNS (parietal cortex); Rat; 2002; 14 days; Controls received mp w/ vehicle; no stress (see pg. 321); peptides; cardiovascular; animal info (male, Sprague Dawley, 280-400 g., CCI brain injury); behavioral testing (beam balance, beam walking, Morris water maze).

## 6. Placental Growth Factor

**Q4908:** MingWu, *et al.* Placental growth factor 2 — A potential therapeutic strategy for chronic myocardial ischemia. *International Journal of Cardiology* 2016;203(534-542)

**ALZET Comments:** Placental growth factor-2, recombinant human; PBS; IV; Pig; 2ML2; 14 days; Controls received mp w/ vehicle; animal info (Sus Scrofa, 20-25kg); functionality of mp verified by plasma levels; ischemia (myocardial); cardiovascular; Dose (15 ug/kg/day);

**Q3967:** J. Li, *et al.* Impaired proliferation of pancreatic beta cells, by reduced placental growth factor in pre-eclampsia, as a cause for gestational diabetes mellitus. *Cell Proliferation* 2015;48(166-174)

**ALZET Comments:** Placental growth factor, human; PBS; SC; Mice; 10 days; Controls received mp w/ vehicle; animal info (female, Balb/c, GD9); functionality of mp verified by plasma levels; cardiovascular; bp measured using tail cuff;

**Q0490:** Y. Takeda, *et al.* Treatment With Recombinant Placental Growth Factor (PIGF) Enhances Both Angiogenesis and Arteriogenesis and Improves Survival After Myocardial Infarction. *CIRCULATION JOURNAL* 2009;73(9):1674-1682

**ALZET Comments:** Placental growth factor, recomb. human; sFlt-1, recomb. human; IP; Mice; 3, 7 days; Controls received mp w/ vehicle; animal info (C57BL/6, 12 wks old); polyethylene IP catheter used.



**P6669:** R. Tamarat, *et al.* Impairment in ischemia-induced neovascularization in diabetes - Bone marrow mononuclear cell dysfunction and therapeutic potential of placenta growth factor treatment. *American Journal of Pathology* 2004;164(2):457-466

**ALZET Comments:** Placental growth factor; SC; Mice; 2001; 14 days; Diabetes, placenta growth factor (PlGF) is a VEGF homologue; ischemia.

**P5645:** F. Pipp, *et al.* VEGFR-1-selective VEGF homologue PlGF is arteriogenic - Evidence for a monocyte-mediated mechanism. *Circulation Research* 2003;92(4):378-385

**ALZET Comments:** Vascular endothelial growth factor; Vascular endothelial growth factor-E; Monocyte chemoattractant protein-1; Placental growth factor; Phosphate buffer; albumin; IA (femoral); Mice; rabbit; 1 week; Controls received mp w/ vehicle; dose-response (p.381); peptides; placenta growth factor (PlGF) is a VEGF homologue; VEGF-E is a chimera containing the heparin-binding domain of VEGF; MCP-1.

**P5978:** A. Luttun, *et al.* Revascularization of ischemic tissues by PlGF treatment, and inhibition of tumor angiogenesis, arthritis and atherosclerosis by anti-Flt1. *Nature Medicine* 2002;8(8):831-840

**ALZET Comments:** Placental growth factor; vascular endothelial growth factor; SC; Mice; 2001; 7 days; Angiogenesis.

**P7114:** P. Carmeliet, *et al.* Synergism between vascular endothelial growth factor and placental growth factor contributes to angiogenesis and plasma extravasation in pathological conditions. *Nature Medicine* 2001;7(5):575-583

**ALZET Comments:** Placental growth factor-1, recomb. human; Mice; 2001; 7 days; Controls received mp w/ vehicle; replacement therapy (PgF -/- mice); cardiovascular; ischemia (retinal); embryology.

## 7. Transforming Growth Factor

**Q6900:** Tramullas M, *et al.* MicroRNA-30c-5p modulates neuropathic pain in rodents. *Science Translational Medicine* 2018;10(453):

**ALZET Comments:** Transforming growth factor-b1; Hydrochloric acid; albumin; PBS; Mice (knockout); 1002; 14 days; Dose (6.2 ng/hour); animal info (BAMBI-/- mice); Therapeutic indication (chronic pain);

**Q6604:** D. Z. Milikovsky, *et al.* Electrocorticographic Dynamics as a Novel Biomarker in Five Models of Epileptogenesis. *J Neurosci* 2017;37(17):4450-4461

**ALZET Comments:** Transforming growth factor-β1; SJN2511; Interleukin-6; Bovine serum albumin; CSF; artificial; dextran; CSF/CNS; Mice; 7 days; Dose (0.4mM BSA, 100 ng/ml (TGF)- β1, 300μM SJN2511); Controls received mp w/ vehicle; animal info (2- to 3-month-old FVB/N and C57BL/6 mice); SJN2511 is a selective blocker of the TGF-B type I receptor/ALK5; Brain coordinates (0.5 mm posterior, 1 mm lateral to bregma);

**Q5489:** P. J. Wermuth, *et al.* Stimulation of Transforming Growth Factor-beta1-Induced Endothelial-To-Mesenchymal Transition and Tissue Fibrosis by Endothelin-1 (ET-1): A Novel Profibrotic Effect of ET-1. *PLoS One* 2016;11(9):e0161988

**ALZET Comments:** Transforming growth factor-B1; endothelin-1; Saline; Mice; 3 weeks; Controls received mp w/ vehicle; animal info (FVB/N, 4 weeks old); used 28 day model pump;

**Q5879:** F. Heindryckx, *et al.* Endoplasmic reticulum stress enhances fibrosis through IRE1alpha-mediated degradation of miR-150 and XBP-1 splicing. *EMBO Mol Med* 2016;8(7):729-44

**ALZET Comments:** Transforming growth factor, beta; BSA, saline; SC; Mice; 1003D; Controls received mp w/ vehicle; animal info (8 weeks old); post op. care (Temgesic); Therapeutic indication (Fibrosis, cirrhosis); Dose (200 ng in .1% BSA in saline);

**Q4028:** S. Okizaki, *et al.* Suppressed recruitment of alternatively activated macrophages reduces TGF-beta1 and impairs wound healing in streptozotocin-induced diabetic mice. *BIOMEDICINE & PHARMACOTHERAPY* 2015;70(317-325

**ALZET Comments:** Transforming growth factor-B1; PBS; SC; Mice; 1007D; 7 days; Controls received mp w/ vehicle; animal info (male, C57Bl6, 8 weeks old, diabetes induced STZ); immunology; diabetes;



- Q3543:** A. Lantero, *et al.* TGF-beta and Opioid Receptor Signaling Crosstalk Results in Improvement of Endogenous and Exogenous Opioid Analgesia under Pathological Pain Conditions. *Journal of Neuroscience* 2014;34(5385-5395)  
**ALZET Comments:** Transforming growth factor-B1; HCl; albumin; SC; Mice (transgenic); 1002; 14 days; Controls received mp w/ vehicle; animal info (male, BAMBI-KO or WT, 14-18 weeks old); behavioral testing (von Frey monofilaments; formalin test); Transforming growth factor-B1 aka TGF-B1; sciatic nerve crush injury;
- Q2324:** C. Holmberg, *et al.* Release of TGF beta ig-h3 by gastric myofibroblasts slows tumor growth and is decreased with cancer progression. *Carcinogenesis* 2012;33(8):1553-1562  
**ALZET Comments:** Transforming growth factor-beta-induced gene h3; Mice (SCID); Animal info (SCID, 6-8 wks old); cancer.
- Q2327:** H. Chim, *et al.* Stromal-cell-derived factor (SDF) 1-alpha in combination with BMP-2 and TGF-beta1 induces site-directed cell homing and osteogenic and chondrogenic differentiation for tissue engineering without the requirement for cell seeding. *Cell and Tissue Research* 2012;350(1):89-94  
**ALZET Comments:** Stromal-cell-derived factor-1, alpha; bone morphogenic protein 2; transforming growth factor-1, beta; IP (abdominal wall); Rat; 2004; 4 weeks; Negative control animals received no cytokines; animal info (Sprague Dawley, adult); "A custom-made apparatus for the constant delivery of cytokines was assembled consisting in a microneedle system and Alzet osmotic pump" pg 90; fig 1b, image of custom-made cytokine delivery apparatus; tissue perfusion (anterior abdominal wall).
- Q1047:** S. Echeverry, *et al.* Peripheral Nerve Injury Alters Blood-Spinal Cord Barrier Functional and Molecular Integrity through a Selective Inflammatory Pathway. *Journal of Neuroscience* 2011;31(30):10819-10828  
**ALZET Comments:** Minocycline hydrochloride; MCP-1, recomb., rat; antibody, MCP-1 neutralizing; IL-10, recomb.; transforming growth factor, beta-1; Saline, sterile, isotonic; CSF/CNS (intrathecal); Rat; 2001; 3, 7 days; Controls received mp w/ vehicle; animal info (male, Sprague Dawley, 250-275 g, naive, nerve-injured).
- Q1643:** M. Kandasamy, *et al.* Stem Cell Quiescence in the Hippocampal Neurogenic Niche Is Associated With Elevated Transforming Growth Factor-beta Signaling in an Animal Model of Huntington Disease. *Journal of Neuropathology and Experimental Neurology* 2010;69(7):717-728  
**ALZET Comments:** Transforming growth factor, beta 1, recomb.; CSF, artificial; CSF/CNS; Rat; 2002; 14 days; Controls received mp w/ vehicle; animal info (Fischer 344, female, 2-3 mo old, 180 g).
- P9848:** L. J. McGrath, *et al.* Exogenous transforming growth factor beta1 replacement and fertility in male Tgfb1 null mutant mice. *REPRODUCTION FERTILITY AND DEVELOPMENT* 2009;21(4):561-570  
**ALZET Comments:** Transforming growth factor beta-1, recomb. human; BSA; PBS; SC; Mice (transgenic); 1002; 2 weeks; Controls received mp w/ vehicle; comparios of PO gavage vs. mp; half-life (p. 563) 1 hour; animal info (Tgfb1 null); "continuous supply of rhLTGFB1 by subcutaneous insertion of osmotic pumps successfully increased circulating TGFB1 to detectable levels" pg. 568.
- Q0790:** R. R. Leker, *et al.* TRANSFORMING GROWTH FACTOR alpha INDUCES ANGIOGENESIS AND NEUROGENESIS FOLLOWING STROKE. *Neuroscience* 2009;163(1):233-243  
**ALZET Comments:** Transforming growth factor, alpha; CSF, artificial; CSF/CNS (infarct border); Mice; 1002; 14 days; Controls received mp w/ vehicle; animal info (C57B, male, 4-6 wks old).
- P9807:** M. Guerra-Crespo, *et al.* TRANSFORMING GROWTH FACTOR-ALPHA INDUCES NEUROGENESIS AND BEHAVIORAL IMPROVEMENT IN A CHRONIC STROKE MODEL. *Neuroscience* 2009;160(2):470-483  
**ALZET Comments:** Transforming growth factor; CSF/CNS; Rat; 2004; 28 days; Controls received mp w/ PBS; ALZET brain infusion kit used; animal info (90 days old, MCAO); behavioral testing (cylinder corner test).
- P9873:** S. Echeverry, *et al.* Transforming growth factor-beta-1 impairs neuropathic pain through pleiotropic effects. *Molecular Pain* 2009;5(;):U1-U18



**ALZET Comments:** Transforming growth factor-1, beta; CSF/CNS (intrathecal); Rat; 1007D; 2002; 7, 14 days; Animal info (male, Sprague Dawley, 250-275 g); incorrectly stated pump model as 2002D.

**P9186:** R. E. White, *et al.* TGF-alpha increases astrocyte invasion and promotes axonal growth into the lesion following spinal cord injury in mice. *Experimental Neurology* 2008;214(1):10-24

**ALZET Comments:** Transforming growth factor-alpha; Serum, mouse; PBS; CSF/CNS (intrathecal); Mice; 2002; 14 days; Controls received mp w/ vehicle; functionality of mp verified by residual volume; post op. care (Baytril); animal info (female, adult, C57BL/6, 10 wks old, 17-20 g.); spinal cord injury; pumps were primed in saline at 37 degree Celsius for 24 hours; pumps were weighed before and after filling; good methods; PE-50 used for catheter.

**P9315:** D. Gleason, *et al.* Ependymal stem cells divide asymmetrically and transfer progeny into the subventricular zone when activated by injury. *Neuroscience* 2008;156(1):81-88

**ALZET Comments:** Transforming growth factor-a; PBS; CSF/CNS (caudate putamen); Rat; 1, 3, 5, 7, 28 days; Peptides, animal info (male, 10 wks old); neurodegenerative (Parkinson's Disease); neural stem cell research.

**P9532:** C. Dufour, *et al.* Transforming growth factor-beta prevents osteoblast apoptosis induced by skeletal unloading via PI3K/Akt, Bcl-2, and phospho-Bad signaling. *J Physiol Endocrinol Metab* 2008;294:E794-E801

**ALZET Comments:** Transforming growth factor-beta 2; Rat; 2, 4, 7 days; Animal info (adult, 4 wks old, Wistar, 130g.).

**P9402:** A. de Chevigny, *et al.* Fate mapping and lineage analyses demonstrate the production of a large number of striatal neuroblasts after transforming growth factor alpha and noggin striatal infusions into the dopamine-depleted striatum. *Stem Cells* 2008;26(9):2349-2360

**ALZET Comments:** Transforming growth factor-a; noggin; PBS; CSF/CNS (striatum); Rat; 1002; 2004; 14, 28, 41 days; Controls received mp w/ vehicle; ALZET brain infusion kit 2 used; brain tissue distribution; peptides; animal info (female, Sprague Dawley, 250-300 g.); behavioral testing (rotation behavior); noggin is a bone morphogenetic protein antagonist; neurodegenerative (Parkinson's Disease).

**P8988:** F. P. Wachs, *et al.* Transforming growth factor-beta 1 is a negative modulator of adult neurogenesis. *Journal of Neuropathology and Experimental Neurology* 2006;65(4):358-370

**ALZET Comments:** Transforming growth factor-B1, recomb.; CSF, artificial; CSF/CNS; Rat; 2002; 7 days; Controls received mp w/ vehicle; peptides; animal info (female, Fischer-344, 2-3 months old, 180 g.).

**P7353:** P. Snodgrass-Belt, *et al.* Central administration of transforming growth factor-alpha and neuregulin-1 suppress active behaviors and cause weight loss in hamsters. *Brain Research* 2005;1038(2):171-182

**ALZET Comments:** Transforming growth factor-alpha; BSA; acetic acid; CSF, artificial; CSF/CNS (third ventricle); Hamster; 2002; 16-20 days; Circadian; plastics one cannula; cannula/tubing were filled with aCSF to allow for a 48 delay; behavioral study; delayed delivery;.

**P7136:** A. Bandyopadhyay, *et al.* Systemic administration of a soluble betaglycan suppresses tumor growth, angiogenesis, and matrix metalloproteinase-9 expression in a human xenograft model of prostate cancer. *PROSTATE* 2005;63(1):81-90

**ALZET Comments:** Transforming growth factor-B3 receptor, recomb. soluble; PBS; SC; Mice (nude); 2002; 14 days; Controls received mp w/ vehicle; comparison of IP injections vs. mp; no stress (see pg. 84,88); cancer (prostate); multiple pumps per animal (2).

**P7068:** M. E. Harris-White, *et al.* Role of LRP in TGFbeta2-mediated neuronal uptake of A beta and effects on memory. *Journal of Neuroscience Research* 2004;77(2):217-228

**ALZET Comments:** Amyloid protein, beta; transforming growth factor-B2; receptor-associated protein; HEPES buffer; CSF/CNS; Mice; 1002; 2 weeks; Controls received mp w/ vehicle; stability verified by incubation at 37 degree Celsius for 2,4 weeks; peptides; RAP is a LRP (lipoprotein receptor-related protein) antagonist; memory.



**P9772:** O. Cooper, *et al.* Intrastratial Transforming Growth Factor Delivery to a Model of Parkinson's Disease Induces Proliferation and Migration of Endogenous Adult Neural Progenitor Cells without Differentiation into Dopaminergic Neurons. *The Journal of Neuroscience* 2004;24(41):8924-8931

**ALZET Comments:** Transforming growth factor, alpha; PBS; CSF/CNS (striatum); Rat; 2004; 1, 2, 4 weeks; Controls received mp w/ vehicle; ALZET brain infusion kit 2 used; animal info (naive, adult, male, Sprague Dawley); neurodegenerative (Parkinson's Disease); brain tissue distribution; tissue perfusion (striatum).

**P6205:** H. L. Guo, *et al.* Manganese superoxide dismutase-plasmid/liposome (MnSOD-PL) intratracheal gene therapy reduction of irradiation-induced inflammatory cytokines does not protect orthotopic Lewis Lung Carcinomas. *In Vivo* 2003;17(1):13-21

**ALZET Comments:** Tumor necrosis factor-alpha; transforming growth factor-beta; interleukin-1; Saline, normal; SC; Mice; 1007D; 7 days; Controls received mp w/ vehicle; no stress (see pg. 17); cancer (lung).

**P6364:** C. Gregg, *et al.* Generation of functional radial glial cells by embryonic and adult forebrain neural stem cells. *Journal of Neuroscience* 2003;23(37):11587-11601

**ALZET Comments:** Fibroblast growth factor-2; epidermal growth factor; transforming growth factor; Saline; serum albumin; CSF/CNS; Mice; 1007D; 6,12 days; Pumps replaced at day 7 for 12 d EGF infusions.

**P6033:** K. Boengler, *et al.* Arteriogenesis is associated with an induction of the cardiac ankyrin repeat protein (carp). *Cardiovascular Research* 2003;59(3):573-581

**ALZET Comments:** Monocyte chemoattractant protein-1; doxorubicin; transforming growth factor-B1; IA (femoral); Rabbit; 2ML1; 24 hours; Cardiovascular.

**P5729:** K. Boengler, *et al.* The ankyrin repeat containing SOCS box protein 5: a novel protein associated with arteriogenesis. *Biochemical and Biophysical Research Communications* 2003;302(1):17-22

**ALZET Comments:** Monocyte chemoattractant protein-1; Transforming Growth Factor-B; Doxorubicin; IA (femoral); Rabbit; 2ML1; 24 hours; Cardiovascular; peptides; MCP-1 is monocyte chemoattractant protein 1.

**P5046:** A. Scharstuhl, *et al.* Inhibition of endogenous TGF-beta during experimental osteoarthritis prevents osteophyte formation and impairs cartilage repair. *Journal of Immunology* 2002;169(507-514)

**ALZET Comments:** Transforming Growth Factor-B2, soluble receptor; Polymyxin B; IP; mice; 1007D; 2002; 7,14 or 21 days; Arthritis; controls received empty pumps or mp w/ vehicle; functionality of mp verified by residual aspiration; pumps replaced after 14 days; stability verified by ELISA after infusion (p. 508, 510); soluble TGF-B RII selectively inhibits transforming growth factor-B; peptides; polymyxin B included as endotoxin inhibitor; 2002 pumps used for 7 and 14 day administration, 21-day group received a 1007D pump for final 7 days.

**P5149:** F. Nakazato, *et al.* Disturbed spatial learning of rats after intraventricular administration of transforming growth factor-beta 1. *NEUROLOGIA MEDICO-CHIRURGICA* 2002;42(151-157)

**ALZET Comments:** Transforming Growth Factor-B1; Saline; CSF/CNS; Rat; 2001D; controls received mp w/ vehicle; comparison of ICV injections vs. mp; peptides; human recombinant TGF-B used.

**R0155:** J. R. Lieberman, *et al.* The role of growth factors in the repair of bone - Biology and clinical applications. *JOURNAL OF BONE AND JOINT SURGERY-AMERICAN VOLUME* 2002;84A(1032-1044)

**ALZET Comments:** Transforming Growth Factor-B; insulin-like Growth Factor I; Rabbit; 6 weeks; peptides; review article: TGF administration via pump mentioned p. 1034; IGF-I administration mentioned on p. 1037.

**P4999:** H. Tamada, *et al.* The effect of transforming growth factor-alpha on the progression of decidualization in rats. *LIFE SCIENCES* 2001;69(1549-1558)

**ALZET Comments:** Transforming growth factor-a; PB1 medium; Intrauterine; Rat; 2001; 2 days; controls received mp w/ vehicle; tissue perfusion (uterine horn lumen); TGF-a was recombinant human.





**P5015:** A. Kramer, *et al.* Regulation of daily locomotor activity and sleep by hypothalamic EGF receptor signaling. *Science* 2001;294(5551):2511-2515

**ALZET Comments:** Transforming growth factor- $\alpha$ ; Brain-derived neurotrophic factor; Vasoactive intestinal polypeptide; Peptide, histidine-isoleucine; Gastrin releasing peptide; Substance P; Neuromedin-C; Neurokinin A; Neuropeptide K; Neuropeptide Y; Somatostatin; Antrin; Cholecystokinin; Thyrotropin-releasing hormone; Neurotensin; Neuromedin N;; CSF, artificial; CSF/CNS (third ventricle); hamster; 2002; 18-22 days; peptides.

**P4739:** R. D. Kopke, *et al.* Growth factor treatment enhances vestibular hair cell renewal and results in improved vestibular function. *PNAS* 2001;98(10):5886-5891

**ALZET Comments:** Transforming growth factor; insulin-like growth factor I; retinoic acid; brain-derived neurotrophic factor;; PBS; BSA;; Ear (vestibule); Guinea pig; 2002; 4 weeks; Controls received mp w/ vehicle; pumps replaced after 2 weeks; peptides; IntraEAR catheter used; GFI group pumps filled with TGF, IGF and Retinoic acid; GFII group pumps filled with TGF, IGF, BDNF and retinoic acid; tissue perfusion (vestibule).

**P4780:** D. G. Dillard, *et al.* Transforming growth factor and neutralizing antibodies in subglottic stenosis. *Annals of Otolaryngology and Laryngology* 2001;110(393-400)

**ALZET Comments:** Transforming growth factor-B1; Antibody, anti-human TGF-B1;; PBS; BSA;; Larynx;; Rat;; 1, 7, 21 days;; Controls received mp w/ vehicle; immunology; peptides; special delivery device attached to pump, p. 394; wound healing study;.

## 8. Vascular Endothelial Growth Factor

**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

**ALZET Comments:** Vascular endothelial growth factor, mouse recomb.; Vascular endothelial growth factor, synthetic peptide (Nano-VEGF); CSF, artificial; CSF/CNS (right lateral ventricle); Mice; 1002; 2 weeks; 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);.

**Q6340:** M. Piazza, *et al.* Simulating vasogenic brain edema using chronic VEGF infusion. *J Neurosurg* 2017;127(4):905-916

**ALZET Comments:** Vascular endothelial growth factor; PBS; Rat serum albumin; CSF/CNS; Rat; 2001; 1007D; Dose (2, 10, and 20 ng/hr); 0.1% rat serum albumin used; Controls received mp w/ vehicle; animal info (275-350g Male Fischer-344 rats); Brain coordinates (2.5 mm to the right of and 1 mm anterior to bregma); cyanoacrylate adhesive;.

**Q6022:** Y. Dai, *et al.* The paracrine effect of cobalt chloride on BMSCs during cognitive function rescue in the HIBD rat. *Behav Brain Res* 2017;332(99-109)

**ALZET Comments:** Vascular Endothelial Growth Factor; Saline; CSF/CNS (Left Lateral Ventricle); Rat; 2001; 7 days; Controls received mp w/ vehicle; animal info (17 weeks); behavioral testing (Morris water maze); Therapeutic indication (Hypoxia-inducible factor-1 $\alpha$  Cobalt chloride Hypoxic-ischemic encephalopathy);.

**Q5190:** Y. H. Rhee, *et al.* Neural stem cells secrete factors facilitating brain regeneration upon constitutive Raf-Erk activation. *Sci Rep* 2016;6(32025)

**ALZET Comments:** Raf-Transducer cells, conditioned media; leukemia inhibitory factor; fibroblast growth factor 2; vascular endothelial growth factor; CSF, artificial; CSF/CNS; Mice; 1007D; 6 days; Controls received mp w/ vehicle or control media; animal info (male, C57Bl6, 50-100g); ALZET brain infusion kit 2 used; immunology; cyanoacrylate adhesive; Brain coordinates;.



**Q5561:** A. E. Kline, *et al.* Combination therapies for neurobehavioral and cognitive recovery after experimental traumatic brain injury: Is more better? *Prog Neurobiol* 2016;142(45-67)

**ALZET Comments:** Vascular endothelial growth factor, Fibroblast Growth Factor 2; Saline; CSF/CNS (lateral ventricle); Mice; 7 days; Controls received mp w/ vehicle; VEGF and FGF-2 were administered singly or in combination in same pump; Therapeutic indication (Traumatic brain injury); Dose (VEGF (10 mg/mL), FGF-2 (2.5 mg/mL));

**Q4609:** S. L. Taylor, *et al.* VEGF can protect against blood brain barrier dysfunction, dendritic spine loss and spatial memory impairment in an experimental model of diabetes. *NEUROBIOLOGY OF DISEASE* 2015;78(1-11)

**ALZET Comments:** Vascular endothelial growth factor (165); CSF, artificial; CSF/CNS; Mice; 2006; 8 weeks; Controls received mp w/ vehicle; animal info (male, C57BL6J, 2 months old); ALZET brain infusion kit 3 used; behavioral testing (Morris water maze); diabetes;

**Q5243:** J. Oller, *et al.* C/EBPbeta and Nuclear Factor of Activated T Cells Differentially Regulate Adamts-1 Induction by Stimuli Associated with Vascular Remodeling. *Mol Cell Biol* 2015;35(19):3409-22

**ALZET Comments:** Vascular Endothelial Growth Factor, Angiotensin II, Losartan, Cyclosporine; Saline; SC; Mice; 21 days; Controls received mp w/ vehicle; animal info (Calcineurin (CN) B1 (Cnb1<sup>-/-</sup>) conditional knockout mice, C57BL/6 mice); dose-response; vegf aka vascular endothelial growth factor; Dose (VEGF 25 ug/kg/day, AngII 1 ug/kg/min, CsA 5 mg/kg/day, Losartan 10 mg/kg/day);

**Q3348:** A. D. Lassaletta, *et al.* Microvascular Notch Signaling Is Upregulated in Response to Vascular Endothelial Growth Factor and Chronic Myocardial Ischemia. *CIRCULATION JOURNAL* 2014;78(3):743-751

**ALZET Comments:** Vascular endothelial growth factor, recombinant human; Heparin; Saline; Intrapericardial; Pig; 2ML4; 4 weeks; Animal info (male, Yorkshire miniswine, 13-22kg); ischemia (cardiac, chronic); stress/adverse reaction: (see pg. 746); post op. care (Enrofloxacin 68mg PO daily for 5 days; aspirin 325 mg/day for 5 days; buprenorphine HCL 0.3 mg/kg, transdermal fentanyl patch 4mcg/kg for 72h); cardiovascular;

**Q3833:** F. Chehrehasa, *et al.* An Acute Growth Factor Treatment that Preserves Function after Spinal Cord Contusion Injury. *Journal of Neurotrauma* 2014;31(1807-1813)

**ALZET Comments:** Vascular endothelial growth factor; platelet-derived growth factor-BB; PBS; CSF/CNS (intrathecal); Rat; 2001; 7 days; Controls received mp w/ saline; animal info (female, Wistar, 20-25 weeks, 300g); spinal cord injury; post op. care (cephalothin; buprenorphine; manual bowel and bladder expression BID); behavioral testing (locomotor behavior; gait and footprint analysis); used Rat intrathecal catheter; pumps primed in 37C saline overnight;

**Q2881:** A. Zechariah, *et al.* Vascular Endothelial Growth Factor Promotes Pericyte Coverage of Brain Capillaries, Improves Cerebral Blood Flow During Subsequent Focal Cerebral Ischemia, and Preserves the Metabolic Penumbra. *Stroke* 2013;44(6):1690-U393

**ALZET Comments:** Vascular endothelial growth factor; Saline; CSF/CNS; Mice; 2004; 3, 10 days; Controls received mp w/ saline; animal info (male C57BL6/j, 20-25g); ischemia.

**Q2468:** X. W. Xiao, *et al.* Hypoglycemia Reduces Vascular Endothelial Growth Factor A Production by Pancreatic Beta Cells as a Regulator of Beta Cell Mass. *Journal of Biological Chemistry* 2013;288(12):8636-8646

**ALZET Comments:** Vascular endothelial growth factor, A; Mice; 2004; Animal info (C57BL/6, MIP-GFP, male, 8 wks old);

**Q2611:** A. H. Siddiqui, *et al.* Angiotensin Receptor Agonistic Autoantibody-Mediated Soluble Fms-Like Tyrosine Kinase-1 Induction Contributes to Impaired Adrenal Vasculature and Decreased Aldosterone Production in Preeclampsia. *Hypertension* 2013;61(2):472-U526

**ALZET Comments:** Vascular endothelial growth factor, 121; Mice (pregnant); 5 days; Animal info (C57BL/6).



**Q2990:** J. W. Shim, *et al.* VEGF, which is elevated in the CSF of patients with hydrocephalus, causes ventriculomegaly and ependymal changes in rats. *Experimental Neurology* 2013;247(7):703-709

**ALZET Comments:** Vascular endothelial growth factor-A165; Bevacizumab; Saline; BSA; CSF/CNS; Rat; 2001D; 1 day; Controls received mp w/vehicle, or (saline, BSA); Peptides; animal info (male Sprague-Dawley rats, 250g); Brain infusion kit (2) used;.

**Q2593:** L. Shan, *et al.* Vascular endothelial growth factor B prevents the shift in the ocular dominance distribution of visual cortical neurons in monocularly deprived rats. *Experimental Eye Research* 2013;109(1):17-21

**ALZET Comments:** Vascular endothelial growth factor B; CSF, artificial; CSF/CNS; Rat; 1007D; Control animals received mp w/ vehicle; animal info (Long Evans hooded); PE60 tubing used.

**Q2833:** L. Wang, *et al.* Hepatic Vascular Endothelial Growth Factor Regulates Recruitment of Rat Liver Sinusoidal Endothelial Cell Progenitor Cells. *Gastroenterology* 2012;143(6):1555-U239

**ALZET Comments:** Vascular endothelial growth factor; IP; Rat; Animal info (Lewis, VEGF KO, hepatectomy); infusion rate of 1 ul/hr.

**Q1819:** O. Thau-Zuchman, *et al.* SUBACUTE TREATMENT WITH VASCULAR ENDOTHELIAL GROWTH FACTOR AFTER TRAUMATIC BRAIN INJURY INCREASES ANGIOGENESIS AND GLIOGENESIS. *Neuroscience* 2012;202(1):334-341

**ALZET Comments:** Vascular endothelial growth factor; Saline; CSF/CNS; Mice; 7 days; Controls received mp w/ vehicle; animal info (adult, Sabra, 40 g).

**Q1655:** O. Thau-Zuchman, *et al.* Combination of Vascular Endothelial and Fibroblast Growth Factor 2 for Induction of Neurogenesis and Angiogenesis after Traumatic Brain Injury. *Journal of Molecular Neuroscience* 2012;47(1):166-172

**ALZET Comments:** Vascular endothelial growth factor; Saline; CSF/CNS; Mice; 1007D; 7 days; Controls received mp w/ vehicle; animal info (male, Sabra, adult, 40 g).

**Q1620:** R. Reitmeir, *et al.* Vascular endothelial growth factor induces contralesional corticobulbar plasticity and functional neurological recovery in the ischemic brain. *Acta Neuropathologica* 2012;123(2):273-284

**ALZET Comments:** Vascular endothelial growth factor; NaCl; CSF/CNS; Mice; 2002; 2004; 4 weeks; Controls received mp w/ vehicle; animal info (male, C57Bl6/j, 8-10 wks old, 23-25 g); ischemia (MCAO); stress/adverse effects, "complications related to pump insertion" pg 274; behavioral testing (Rotarod, grip strength test).

**Q1775:** C. Lutton, *et al.* Combined VEGF and PDGF Treatment Reduces Secondary Degeneration after Spinal Cord Injury. *Journal of Neurotrauma* 2012;29(5):957-U479

**ALZET Comments:** Vascular endothelial growth factor; platelet-derived growth factor; Saline; CSF/CNS (intrathecal); Rat; 2001; 7 days; Controls received mp w/ vehicle; animal info (Wistar, male, adult, 300 g, 20-25 wks old); functionality of mp verified in vitro; "catheter was... sutured to the muscle to keep it in place" pg 959.

**Q1810:** J. Herz, *et al.* Intracerebroventricularly delivered VEGF promotes contralesional corticorubral plasticity after focal cerebral ischemia via mechanisms involving anti-inflammatory actions. *NEUROBIOLOGY OF DISEASE* 2012;45(3):1077-1085

**ALZET Comments:** Vascular endothelial growth factor, recomb. human; CSF/CNS; Mice; 2002; 2004; 4 weeks; Controls received mp w/ saline; animal info (male, C57BL/6J, 8-10 wks old, 23-25 g); ischemia.

**Q2316:** E. G. Argandona, *et al.* Effect of intracortical vascular endothelial growth factor infusion and blockade during the critical period in the rat visual cortex. *Brain Research* 2012;1473(1):141-154

**ALZET Comments:** Vascular endothelial growth factor; anti-VEGF; PBS; CSF/CNS (cortex); Rat; 1007D; Control animals received mp w/ vehicle; animal info (Long Evans, P18); ALZET brain infusion kit used; cyanoacrylate adhesive used.

**Q1347:** A. H. Siddiqui, *et al.* Recombinant Vascular Endothelial Growth Factor 121 Attenuates Autoantibody-Induced Features of Pre-eclampsia in Pregnant Mice. *American Journal of Hypertension* 2011;24(5):606-612

**ALZET Comments:** Vascular endothelial growth factor 121; SC; Mice (pregnant); 1007D; 5 days; Animal info (C57BL/6, 8 wks old).



**Q0878:** N. Ortuzar, *et al.* Combination of intracortically administered VEGF and environmental enrichment enhances brain protection in developing rats. *Journal of Neural Transmission* 2011;118(1):135-144

**ALZET Comments:** Vascular endothelial growth factor; CSF/CNS (cortex); Rat; 1007D; 7 days; Controls received mp w/ PBS or no implantation; animal info (Long-Evans, P18); cyanoacrylate adhesive; ALZET brain infusion kit 3 used; "Total operating time was approximately 25 min." pg 137.

**Q1236:** E. A. Miyasaka, *et al.* In vivo growth of a bioengineered internal anal sphincter: comparison of growth factors for optimization of growth and survival. *PEDIATRIC SURGERY INTERNATIONAL* 2011;27(2):137-143

**ALZET Comments:** Fibroblast growth factor-2; vascular endothelial growth factor-2; platelet-derived growth factor; SC; Mice; 1004; 28 days; Controls received mp with no growth factors; animal info (C57BL/6); good methods, pg 138; tissue perfusion (internal anal sphincter); silicone catheter used; "the osmotic pumps we used completed delivery of the growth factors by 28 days, which would clearly limit the duration of exposure to the growth factor, lessening the risk of malignancy" pg 143.

**Q2201:** J. Mateus, *et al.* Endothelial growth factor therapy improves preeclampsia-like manifestations in a murine model induced by overexpression of sVEGFR-1. *American Journal of Physiology-Heart and Circulatory Physiology* 2011;301(5):H1781-H1787

**ALZET Comments:** Vascular endothelial growth factor 121; PBS; SC; Mice (pregnant); 2002; 10 days; Controls received mp w/ vehicle; animal info (CD-1); functionality of mp verified by residual volume and plasma drug levels.

**Q1664:** L. M. Chu, *et al.* Resveratrol supplementation abrogates pro-arteriogenic effects of intramyocardial vascular endothelial growth factor in a hypercholesterolemic swine model of chronic ischemia. *Surgery* 2011;150(3):390-399

**ALZET Comments:** Vascular endothelial growth factor, recomb. human; Intrapericardial; Pig; Animal info (intact, male, Yorkshire); stress/adverse effects "sudden cardiac death", pg 393.

**Q1355:** O. Thau-Zuchman, *et al.* Vascular endothelial growth factor increases neurogenesis after traumatic brain injury. *Journal of Cerebral Blood Flow and Metabolism* 2010;30(5):1008-1016

**ALZET Comments:** Vascular endothelial growth factor; CSF/CNS; Mice; 6, 7 days; Controls received mp w/ vehicle or were sham operated; animal info (adult, Sabra, male, 40 g); infusion rate of 0.5 ul/hr.

**Q1592:** L. B. Romo, *et al.* VEGF protects spinal motor neurons against chronic excitotoxic degeneration in vivo by activation of PI3-K pathway and inhibition of p38MAPK. *Journal of Neurochemistry* 2010;115(5):1090-1101

**ALZET Comments:** Isoxazolepropionate, alpha amino-3-hydroxy-5-; vascular endothelial growth factor, recomb., 164; SU14980, tyrphostin; LY294002; wortmannin; PD-98059; SB203580; neurodegenerative (amyotrophic lateral sclerosis); PBS; DMSO; CSF/CNS (intrathecal, spinal cord); Rat; 2004; 2, 10, 20 days; Controls received mp w/ vehicle; animal info (Wistar, male, 270-290 g, adult); alpha amino-3-hydroxy-5-isoxazolepropionate also known as AMPA; wound clips used; post op. care, pg 1091 (penicillin); good methods, pg 1091; multiple pumps used (2); multiple intrathecal catheters used; wound clips used; 2% DMSO used; enzyme inhibitor (p38 mitogen-activated protein kinase, p38MAPK).

**Q0712:** J. N. Nicoletti, *et al.* Vascular endothelial growth factor attenuates status epilepticus-induced behavioral impairments in rats. *EPILEPSY & BEHAVIOR* 2010;19(3):272-277

**ALZET Comments:** Vascular endothelial growth factor, 165, recomb. human; vascular endothelial growth factor, inactivated; PBS, sterile; CSF/CNS (hippocampus); Rat; 2002; 2 weeks; Controls received no surgical manipulations or protein infusions; animal info (male Sprague-Dawley, 250-350 g); behavioral testing (Morris water maze, Grid locomotor activity, Light-dark exploration).

**Q1197:** C. Lee, *et al.* Vascular Endothelial Growth Factor Is Involved in Mediating Increased De Novo Hippocampal Neurogenesis in Response to Traumatic Brain Injury. *Journal of Neurotrauma* 2010;27(3):541-553

**ALZET Comments:** Vascular endothelial growth factor 164; SU5416; uridine, bromodeoxy; CSF, artificial; DMSO; CSF/CNS; Rat; 2002; 13 days; Controls received mp w/ vehicle; animal info (young, Sprague Dawley, male, 270-300 g); 1% DMSO used.



**R0287:** S. S. Glaser, *et al.* Vascular factors, angiogenesis and biliary tract disease. CURRENT OPINION IN GASTROENTEROLOGY 2010;26(3):246-250

**ALZET Comments:** Vascular endothelial growth factor, alpha; BSA; IP; Rat; 1 week; animal info (BDL+HAL).

**Q0400:** E. Bogaert, *et al.* VEGF protects motor neurons against excitotoxicity by upregulation of GluR2. NEUROBIOLOGY OF AGING 2010;31(12):2185-2191

**ALZET Comments:** Vascular endothelial growth factor; CSF/CNS; Rat; 2004; 1 week; Controls received mp w/ vehicle; animal info (80 days old).

**Q0354:** A. Ahmed, *et al.* A New Mouse Model to Explore Therapies for Preeclampsia. PLoS One 2010;5(10):U325-U333

**ALZET Comments:** Vascular endothelial growth factor (121); PBS, sterile; SC; Mice; 7 days; Animal info (CBA/J x DBA/2 and CBA/J x BALB/c).

**P9708:** N. O. Schmidt, *et al.* Vascular endothelial growth factor-stimulated cerebral microvascular endothelial cells mediate the recruitment of neural stem cells to the neurovascular niche. Brain Research 2009;1268(:):24-37

**ALZET Comments:** Vascular endothelial growth factor, recomb. human; CSF/CNS (parenchyma); Mice (nude); 2004; Controls received mp w/PBS; animal info (6 wks old).

**Q0282:** C. Schmidt, *et al.* Rapid three-dimensional quantification of VEGF-induced scaffold neovascularisation by microcomputed tomography. Biomaterials 2009;30(30):5959-5968

**ALZET Comments:** Vascular endothelial growth factor (165); SC; Rat; 1002; 10 days; Controls received mp w/ PBS; animal info (male, Wistar, 234-254 g); functionality of mp verified by residual volume; post op. care (buprenorphine); pump connected to a porous polyurethane construct, schematic on Figure 1A;

**P9814:** G. Santulli, *et al.* In vivo properties of the proangiogenic peptide QK. Journal of Translational Medicine 2009;7(:):U1-U10

**ALZET Comments:** Vascular endothelial growth factor-15; vascular endothelial growth factor-165; QK; IA (femoral); Rat; 2002; 14 days; Peptides; animal info (12 wks old, WKY, normosensitive); QK is a de novo engineered VEGF mimicking peptide.

**Q0514:** C. Lee, *et al.* Inhibition of VEGF receptor 2 increased cell death of dentate hilar neurons after traumatic brain injury. Experimental Neurology 2009;220(2):400-403

**ALZET Comments:** Vascular endothelial growth factor (164); SU5416; CSF, artificial; DMSO; CSF/CNS; Rat; 1002; 13 days; Controls received mp w/ vehicle; animal info (young, male, Sprague Dawley, 270-330 g.); cannula placement verified by histology; 1% DMSO used; artificial CSF recipe.

**P8799:** A. Tsuchiya, *et al.* Sca-1+ endothelial cells (SPECs) reside in the portal area of the liver and contribute to rapid recovery from acute liver disease. Biochemical and Biophysical Research Communications 2008;365(3):595-601

**ALZET Comments:** Vascular endothelial growth factor-inhibitor; DMSO; IP; Mice; 9, 11 days; Controls received mp w/ vehicle; animal info (C57BL/6; 4, 8, 12 wks old; anti-Fas Ab-induced liver damage); agent also known as CBO-P11.

**P9443:** E. Segi-Nishida, *et al.* Electroconvulsive seizure and VEGF increase the proliferation of neural stem-like cells in rat hippocampus. PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA 2008;105(32):11352-11357

**ALZET Comments:** Vascular endothelial growth factor 164, recomb. rat; PBS; CSF/CNS; Rat; 1003D; 3 days; 24 hours; Controls received mp w/ vehicle; brain tissue distribution; peptides; animal info (male, Sprague Dawley, 175-200 g.); delayed delivery (in the 48 hour infusion, PBS infused for 24 hours to "avoid the influence of cannulation and anesthesia." (p. 11354) then VEGF infused for 24 hours).



**P9198:** E. S. Rennel, *et al.* Recombinant human VEGF<sub>165</sub>b protein is an effective anti-cancer agent in mice. *European Journal of Cancer* 2008;44(13):1883-1894

**ALZET Comments:** Vascular endothelial growth factor-165-b, recomb.; NaCl, sterile; SC; Mice; 28 days; No stress (see pg. 1888); half-life (p. 1893) 25 min in mice, 13.8-72 min in rats; cancer (colon); post op. care (Temgesic); animal info (C57/Bl6, 720 g.); silk sutures used; "no adverse effects were observed with this infusion of VEGF165b" pg. 1888; compound is an anti angiogenic isoform of VEGF.

**P9248:** K. Poesen, *et al.* Novel Role for Vascular Endothelial Growth Factor (VEGF) Receptor-1 and Its Ligand VEGF-B in Motor Neuron Degeneration. *Journal of Neuroscience* 2008;28(42):10451-10459

**ALZET Comments:** Vascular endothelial growth factor-B186, recomb. mouse; CSF, artificial; CSF/CNS; Rat; 2004; 100 days; Controls received mp w/ vehicle; long-term study; pumps replaced every 25 days; no stress (see pg. 10456); stability verified by 4 weeks in mp at 37 degrees Celsius; animal info (HAN-Wistar x Sprague Dawley-hSOD1G93A, 60 days old); behavioral testing (Rotarod test); "this delivery route was chosen because previous studies demonstrated that intracerebroventricularly delivered VEGF diffuses from the CSF into the neural parenchyma, where it reaches it's target motor neurons." (p. 10456).

**P9139:** J. N. Nicoletti, *et al.* Vascular endothelial growth factor is up-regulated after status epilepticus and protects against seizure-induced neuronal loss in hippocampus. *Neuroscience* 2008;151(1):232-241

**ALZET Comments:** Vascular endothelial growth factor, recomb. human; BowAng1; Flt-Fc; CSF/CNS (dorsal hippocampus); Rat; 5 days; Controls received mp w/ PBS; animal info (male, Sprague Dawley, adult, 250-350 g.); cannula, polyvinyl catheter from Plastics One used; BowAng1 is a fusion of four molecules of angiopoietin-1 with two molecules of hFC; Flt-Fc is an immunoadhesin.

**P8833:** M. Boodhwani, *et al.* Comparison of vascular endothelial growth factor and fibroblast growth factor-2 in a swine model of endothelial dysfunction. *European Journal of Cardio-thoracic Surgery* 2008;33(4):645-650

**ALZET Comments:** Vascular endothelial growth factor 165, recomb. human; Heparin; Intramyocardial; Pig (miniswine); 2ML4; 4 weeks; Tissue perfusion (myocardial); half-life (p. 649) "short"; cardiovascular; peptides; ischemia (cardiac); animal info (Yucatan mini-swine, 20-30 kg.).

**R0359:** A Review of the Foreign-body Response to Subcutaneously-implanted Devices: The Role of Macrophages and Cytokines in Biofouling and Fibrosis. *Journal of Diabetes Science and Technology* 2008;2(5):768-777

**ALZET Comments:** Antibody, TGF beta neutralizing; Vascular endothelial growth factor; SC; Pig (mini); 28 days; animal info (Yucatan mini pigs); enzyme inhibitor (pSmad2);