



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

### 1. Brain-derived Neurotrophic Factor

**Q7086:** J. C. Bague, *et al.* BDNF infusion into the MPN mag is sufficient to restore copulatory behavior in the castrated Syrian hamster. *Horm Behav* 2018;102(69-75)

**ALZET Comments:** Brain-derived neurotrophic factor, human recomb.; Albumin, bovine serum; CSF/CNS (magnocellular medial preoptic nucleus); Hamster; 2004; 9 days; Dose (6.25 ug/ml/day); Controls received mp w/ vehicle; animal info (Male, Mesocricetus auratus, 5–6 months old); behavioral testing (Sex behavior test); Brain coordinates (ML=+0.85mm, DV=-7.4); replacement therapy (testosterone);.

**Q6193:** M. T. Nuzzo, *et al.* Huntingtin polyQ Mutation Impairs the 17beta-Estradiol/Neuroglobin Pathway Devoted to Neuron Survival. *Mol Neurobiol* 2017;54(8):6634-6646

**ALZET Comments:** Brain-derived neurotrophic factor; PBS; BSA; SC; Mice; 9 weeks; Dose (4.0 µg/day); PBS with 0.1% BSA; Controls received mp w/ vehicle;.

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

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

**Q4857:** M. Wen-Chung Liu, *et al.* Hyperbaric Oxygen Therapy Alleviates Carbon Monoxide Poisoning–Induced Delayed Memory Impairment by Preserving Brain-Derived Neurotrophic Factor–Dependent Hippocampal Neurogenesis. *Crit. Care Med* 2016;44(1):

**ALZET Comments:** TrkB-Fc, recombinant human; brain-derived neurotrophic factor; CSF, artificial; CSF/CNS; Rat; 1007D; 7 days; Controls received mp w/ vehicle; animal info (male, Sprague Dawley, adult); animal info (male, Sprague Dawley, adult); behavioral testing (radial arm maze, memory talk); used dental cement; pumps primed in 37C saline prior to implantation; Dose (); brain coordinates;.

**Q5343:** Sophie Dutheil, *et al.* BDNF Signaling Promotes Vestibular Compensation by Increasing Neurogenesis and Remodeling the Expression of Potassium-Chloride Cotransporter KCC2 and GABAA Receptor in the Vestibular Nuclei. *Journal of Neuroscience* 2016;36(23):6199-6212

**ALZET Comments:** Brain-derived neurotrophic factor, K252a; Saline; CSF, artificial; CSF/CNS (ventricles); Cat; 2ML4; 30 days; Controls received mp w/ saline; animal info (adult, male cat, 4-5 kg); dose-response (pg 6205, 6206); behavioral testing (rotating beam experimental device test); peptides;.

**Q5395:** T. H. Lin, *et al.* NF-kappaB decoy oligodeoxynucleotide mitigates wear particle-associated bone loss in the murine continuous infusion model. *Acta Biomater* 2016;41(273-81)

**ALZET Comments:** Ultra-high molecular weight polyethylene particles; oligodeoxynucleotide, decoy; oligodeoxynucleotide, scrambled; Endotoxin, LPS; Brain-derived neurotrophic factor; Saline; In Vitro (cell culture); Bone (Femur); Mice (nude); 2006; 4 weeks; Controls received mp w/ vehicle; animal info (Male athymic nude mice, 10-15 weeks old); stability verified by (in vitro experiment); dose-response (pg. 277); good methods (pg. 276); tissue perfusion (bone); Dose (15 mg/ml UHMWPE, 50uM decoy, 1 ug/ml LPS); Therapeutic indication (Bone loss, chronic inflammation);.

**Q6165:** C. K. Kandathil, *et al.* Effects of brain-derived neurotrophic factor (BDNF) on the cochlear nucleus in cats deafened as neonates. *Hear Res* 2016;342(134-143)

**ALZET Comments:** Brain-derived neurotrophic factor, recomb. human; Perilymph, artificial; Ear (cochlea); Cat; 1002, 2004; 10 weeks; Dose (94 mg/ml; 0.25 ml/hr); pumps replaced after 2 and 4 weeks; BDNF stability verified by neuronal cell culture survival assay (28 days);.



**Q6044:** N. Himi, *et al.* Exercise in the Early Stage after Stroke Enhances Hippocampal Brain-Derived Neurotrophic Factor Expression and Memory Function Recovery. *J Stroke Cerebrovasc Dis* 2016;25(12):2987-2994

**ALZET Comments:** Millipore; Brain-derived neurotrophic factor, human recombinant; K252a; Saline; CSF/CNS (hippocampus); Rat; 2001; 7 days; Controls received mp w/ vehicle; animal info (9 weeks old; 270-290 g); dorsorostral area of the right hippocampus (-3.8 mm anterior, 2.2 mm lateral and 3.0 mm deep relative to the bregma ; Therapeutic indication (Stroke); Dose (20 ng/mL);.

**Q4809:** J. Chen, *et al.* proBDNF Attenuates Hippocampal Neurogenesis and Induces Learning and Memory Deficits in Aged Mice. *NEUROTOXICITY RESEARCH* 2016;29):47-53

**ALZET Comments:** Brain-derived neurotrophic factor, pro; antibody brain-derived neurotrophic factor, anti-pro;; BSA; CSF/CNS (hippocampus); Mice; 1002; 6 days; Controls received mp w/ vehicle; Controls received mp w/ vehicle; neurodegenerative (Alzheimer's Disease); behavioral testing (morris water maze); Cannula placement verified postmortem;.

**Q4929:** D. Ramekers, *et al.* Temporary Neurotrophin Treatment Prevents Deafness-Induced Auditory Nerve Degeneration and Preserves Function. *J Neurosci* 2015;35(36):12331-45

**ALZET Comments:** Brain-derived neurotrophic factor; PBS; guinea pig serum; CSF/CNS; Guinea pig; 2004; 4 weeks; Controls received mp w/ vehicle; animal info (female, albino, 250-350g); functionality of mp verified by histological analysis; 1% guinea pig serum used; stress/adverse reaction: (see pg. 12336); Cannula placement verified via histological analysis; pumps removed after 4 weeks; pumps primed for 40 hours in 37C saline; Dose (17 ug/28 days);.

**Q5234:** P. Meschin, *et al.* p11 modulates calcium handling through 5-HT(4)R pathway in rat ventricular cardiomyocytes. *Cell Calcium* 2015;58(6):549-57

**ALZET Comments:** Brain-derived neurotrophic factor; saline; SC; Rat; 2ML2; 14 days; Controls received mp w/ vehicle; animal info (200-224 g male Wistar rats); functionality of mp verified by ECG (electrocardiograms); post op. care (lidocaine, heating pad); replacement therapy (neurotrophin); Dose (180 ng/day));.

**Q4425:** S. Garofalo, *et al.* Enriched environment reduces glioma growth through immune and non-immune mechanisms in mice. *Nature Communications* 2015;6(U26-U38

**ALZET Comments:** Interleukin-15; brain-derived neurotrophic factor; PBS; CSF/CNS (striatum); Mice; 1007D; 7 days; Controls received mp w/ vehicle; animal info (male, C57BL6, 3 weeks or 2 months old); ALZET brain infusion kit 3 used; cancer (glioma, U87MG human); tissue perfusion (right striatum); immunology; pumps primed in 37C saline overnight;.

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

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

**Q3598:** L. M. E. Pettersson, *et al.* Injury-Associated PACAP Expression in Rat Sensory and Motor Neurons Is Induced by Endogenous BDNF. *PLoS One* 2014;9(U629-U640

**ALZET Comments:** Antibody, brain-derived neurotrophic factor; CSF/CNS (intrathecal); Rat; 2001; 3 days; Controls received mp w/ control IgG; animal info (male, Wistar, 250-300tg); post op. care (buprenorphine 0.05-0.1 mg/kg SC); peripheral nerve injury;.

**Q6784:** L. Waaijer, *et al.* The Peripheral Processes of Spiral Ganglion Cells After Intracochlear Application of Brain-Derived Neurotrophic Factor in Deafened Guinea Pigs. *OTOLOGY & NEUROTOLOGY* 2013;34(570-578

**ALZET Comments:** Brain-derived neurotrophic factor; PBS; Ear (right cochlea); Guinea pig; 2004; 4 weeks; Dose (100 µg/ml); Controls received mp w/ vehicle; animal info (10 healthy albino female guinea pigs (strain: Dunkin Hartley; weighing 250-350 g);.



**Q3117:** C. B. Mantilla, *et al.* Motoneuron BDNF/TrkB signaling enhances functional recovery after cervical spinal cord injury. *Experimental Neurology* 2013;247(1):101-109

**ALZET Comments:** Brain-derived neurotrophic factor; CSF/CNS (intrathecal); Rat; 2002; 14 days; Animal info (male, Sprague Dawley, adult); spinal cord injury; post op. care (Acetaminophen orally and buprenorphine IM for 3 days); pulsed delivery (delayed delivery for 3 days - aCSF only in catheter); tissue perfusion (C4 segment of spine); peptides; "Mini-osmotic pumps were successfully implanted for intrathecal delivery at the C4 level and functioned properly throughout the 14 day duration of the experiment." pg 103 "Differences in survival rates across groups were likely unrelated to the possible additional morbidity associated with intrathecal catheter and miniosmotic pump implantation, as the survival rate was 70% (28 out of 40) compared to 84% (26 out of 31) in rats not implanted with an intrathecal pump (p = 0.17)." pg 103; PE-10 intrathecal cannula, 10 cm.

**Q6721:** P. A. Leake, *et al.* Effects of brain-derived neurotrophic factor (BDNF) and electrical stimulation on survival and function of cochlear spiral ganglion neurons in deafened, developing cats. *J Assoc Res Otolaryngol* 2013;14(2):187-211

**ALZET Comments:** Brain-derived neurotrophic factor, recomb. human; Perilymph, artificial; Ear (cochlea); Cat; 1002; 2004; 10 weeks; Dose (3.75 µg/day); animal info (deafened cats weighing 520-610g); pumps replaced every 2,4 weeks; long-term study; Because the animals were small at the time of implantation (mean body weight, 560 g; range, 520–610 g), a smaller osmotic pump (model #1002) that delivered 14 days of BDNF was implanted initially. Two weeks later, a brief surgical procedure was performed to replace the initial pump with a larger one containing a 28-day supply of BDNF; this was replaced 1 month later with a final 28-day pump.

**Q3105:** T. G. Landry, *et al.* Chronic neurotrophin delivery promotes ectopic neurite growth from the spiral ganglion of deafened cochleae without compromising the spatial selectivity of cochlear implants. *Journal of Comparative Neurology* 2013;521(12):2818-2832

**ALZET Comments:** Neurotrophin; Brain-derived neurotrophic factor; Ear (cochlea); Guinea pig; 2004; 28 days; Controls received mp w/ artificial perilymph; animal info (young adult, 300-600g); tissue perfusion (cochlea); peptides;.

**Q2946:** C. Giampa, *et al.* Systemic Delivery of Recombinant Brain Derived Neurotrophic Factor (BDNF) in the R6/2 Mouse Model of Huntington's Disease. *PLoS One* 2013;8(6):U444-U455

**ALZET Comments:** Brain-derived neurotrophic factor; PBS; BSA; SC; Mice; 1004; 28 days; Controls received mp w/ saline; animal info (F1, R6/2); pumps replaced every 28 days; behavioral testing (motor coordination); mp were used to infuse BDNF peripherally to examine its effect centrally;.

**Q2633:** B. Frias, *et al.* BRAIN-DERIVED NEUROTROPHIC FACTOR, ACTING AT THE SPINAL CORD LEVEL, PARTICIPATES IN BLADDER HYPERACTIVITY AND REFERRED PAIN DURING CHRONIC BLADDER INFLAMMATION. *Neuroscience* 2013;234(1):88-102

**ALZET Comments:** Brain-derived neurotrophic factor; CSF/CNS (intrathecal); Rat; 5 days; Control animals received mp w/ saline; animal info (Wistar, female); infusion rate of 1 µl/hr.

**Q1915:** D. J. Sly, *et al.* Brain-Derived Neurotrophic Factor Modulates Auditory Function in the Hearing Cochlea. *JARO-JOURNAL OF THE ASSOCIATION FOR RESEARCH IN OTOLARYNGOLOGY* 2012;13(1):1-16

**ALZET Comments:** Brain-derived neurotrophic factor; Ear (cochlea); Guinea pig; 2004; 4 weeks; Controls received mp w/ Ringers solution; animal info (adult, male, Dunkin-Hartley pigmented, 233-815 g); post op. care (buprenorphine); "Polymers, particularly hydrogels that may be applied directly to the round window, were considered... However, most have a release profile that varies over time, so instead we chose to place a cannula attached to a mini-osmotic pump directly onto the round window." pg 2; tissue perfusion (cochlea, round window niche).



**Q1822:** J. P. Shaffery, *et al.* Brain-derived neurotrophic factor (BDNF) reverses the effects of rapid eye movement sleep deprivation (REMSD) on developmentally regulated, long-term potentiation (LTP) in visual cortex slices. *Neuroscience Letters* 2012;513(1):84-88

**ALZET Comments:** Brain-derived neurotrophic factor; PBS; BSA; CSF/CNS (visual cortex); Rat; 2002; 1007D; Controls received mp w/ saline; animal info (Long-Evans Hooded, P28; immature, P22-P25); pulsatile delivery; polyethylene tubing contained saline with an air bubble separator for a 5-day drug delay and recovery period; delayed delivery.

**Q1989:** K. J. Griffioen, *et al.* Aberrant heart rate and brainstem brain-derived neurotrophic factor (BDNF) signaling in a mouse model of Huntington's disease. *NEUROBIOLOGY OF AGING* 2012;33(7):U377-U381

**ALZET Comments:** Brain-derived neurotrophic factor; CSF/CNS; Mice; 1002; 7 days; Controls received mp w/ artificial CSF; animal info (N17182Q, wt, male); ALZET brain infusion kit 3 used.

**Q1630:** W. M. Bauknight, *et al.* Convection enhanced drug delivery of BDNF through a microcannula in a rodent model to strengthen connectivity of a peripheral motor nerve bridge model to bypass spinal cord injury. *JOURNAL OF CLINICAL NEUROSCIENCE* 2012;19(4):563-569

**ALZET Comments:** Brain-derived neurotrophic factor; dye, fluorescein; Saline, sterile; CSF/CNS (intrathecal); Rat; 2006; 6 weeks; Controls received mp w/ vehicle; animal info (Sprague Dawley, female, adult, 200-300 g); good methods, pg 564; fig 2, diagram of convection enhanced delivery device, pump and microcannula tip; fig 1, schematic of peripheral nerve bridge model.

**Q0828:** S. Y. Wu, *et al.* Running exercise protects the substantia nigra dopaminergic neurons against inflammation-induced degeneration via the activation of BDNF signaling pathway. *BRAIN BEHAVIOR AND IMMUNITY* 2011;25(1):135-146

**ALZET Comments:** Brain-derived neurotrophic factor, recomb. human; CSF, artificial; CSF/CNS (striatum); Mice; 1002; 14 days; Controls received sham surgery; animal info (C57BL/6J, 8 wks old, 20-25 g).

**Q1336:** Y. Takeshima, *et al.* Neuroprotection With Intraventricular Brain-Derived Neurotrophic Factor in Rat Venous Occlusion Model. *Neurosurgery* 2011;68(5):1334-1341

**ALZET Comments:** Brain-derived neurotrophic factor; PBS; CSF/CNS; Rat; 2001; 2, 7 days; Controls received mp w/ vehicle; animal info (male, Wistar, 240-280 g); functionality of mp verified by residual volume; ALZET brain infusion kit 2 used.

**Q1195:** P. A. Leake, *et al.* Brain-Derived Neurotrophic Factor Promotes Cochlear Spiral Ganglion Cell Survival and Function in Deafened, Developing Cats. *Journal of Comparative Neurology* 2011;519(8):1526-1545

**ALZET Comments:** Brain-derived neurotrophic factor, human; Perilymph, artificial; Ear (cochlea); Cat; 1002; 2004; 10 weeks; Controls received mp w/ vehicle; long-term study; animal info (adult, 4 wks old, deafened); functionality of mp verified via residual volume; pumps replaced after two weeks then after 28 days; tissue perfusion (cochlea); "The drug-delivery cannula within the cochlear implant... was connected to vinyl tubing..., which was connected to the regulator of the osmotic pump, which was implanted behind the right pinna."; artificial perilymph recipe.

**Q1178:** T. Kondo, *et al.* Wnt Signaling Promotes Neuronal Differentiation from Mesenchymal Stem Cells Through Activation of Tlx3. *Stem Cells* 2011;29(5):836-846

**ALZET Comments:** Wnt1; brain-derived neurotrophic factor; Ear (cochlea); Gerbil; 2004; 28 days; Controls received mp w/ saline or BDNF only; animal info (Mongolian, 4 mo old); pumps replaced after 72 hours; tissue perfusion (intracochlea).

**Q1392:** A. J. Weber, *et al.* Combined Application of BDNF to the Eye and Brain Enhances Ganglion Cell Survival and Function in the Cat after Optic Nerve Injury. *INVESTIGATIVE OPHTHALMOLOGY & VISUAL SCIENCE* 2010;51(1):327-334

**ALZET Comments:** Brain-derived neurotrophic factor; CSF/CNS (visual cortex); Cat; 1002; 1, 2 weeks; animal info (adult, male, female).

**Q0837:** J. L. Warner-Schmidt, *et al.* A Role for p11 in the Antidepressant Action of Brain-Derived Neurotrophic Factor. *Biological Psychiatry* 2010;68(6):528-535



**ALZET Comments:** Brain-derived neurotrophic factor, recomb.; CSF/CNS; Mice (transgenic); 1003D; 3 days; Animal info (8-10 wks old, C57BL/6, BDNF Tg); behavioral testing (tail suspension test, forced swim test, open field locomotor activity); Plastics One cannula used.

**Q1391:** A. Warnecke, *et al.* Artemin improves survival of spiral ganglion neurons in vivo and in vitro. *NeuroReport* 2010;21(7):517-521

**ALZET Comments:** Artemin; brain-derived neurotrophic factor; Ear (scala tympani); Guinea pig; 2002; 28 days; Negative controls received mp w/ artificial perilymph; animal info (deafened, pigmented, 250-450 g); pumps replaced after 14 days; tissue perfusion (scala tympani); pump connected to silicone-polyimide tubing.

**Q1581:** M. Toriya, *et al.* Long-term Infusion of Brain-Derived Neurotrophic Factor Reduces Food Intake and Body Weight via a Corticotrophin-Releasing Hormone Pathway in the Paraventricular Nucleus of the Hypothalamus. *Journal of Neuroendocrinology* 2010;22(9):987-995

**ALZET Comments:** Brain-derived neurotrophic factor; CSF, artificial; CSF/CNS; CSF/CNS (paraventricular nucleus); Rat; 1002; 12 days; Controls received mp w/ vehicle; animal info (Sprague Dawley, male, mature); artificial CSF recipe; ALZET brain infusion kit used.

**Q0409:** H. D. Schmidt, *et al.* Peripheral BDNF Produces Antidepressant-Like Effects in Cellular and Behavioral Models. *Neuropsychopharmacology* 2010;35(12):2378-2391

**ALZET Comments:** Brain-derived neurotrophic factor, recomb; PBS; BSA; Mice; 1002; 14 days; Controls received mp w/ vehicle; animal info (C57BL/6, BALB/c, 8-10 wks old); behavioral testing (forced swim test, novelty induced hypophagia, chronic unpredictable stress).

**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).

**Q0074:** N. M. Geremia, *et al.* Endogenous BDNF regulates induction of intrinsic neuronal growth programs in injured sensory neurons. *Experimental Neurology* 2010;223(1):128-142

**ALZET Comments:** Brain-derived neurotrophic factor, anti-, sheep; immunoglobulin G, sheep; CSF/CNS (intrathecal); Rat; 2001; 3 days; Controls received mp w/ control IgG; post op. care (buprenorphine); animal info (male, Wistar, adult, 300-500 g.); sciatic nerve transection.

**Q1542:** S. H. H. Chan, *et al.* Transcriptional Upregulation of Brain-Derived Neurotrophic Factor in Rostral Ventrolateral Medulla by Angiotensin II Significance in Superoxide Homeostasis and Neural Regulation of Arterial Pressure. *Circulation Research* 2010;107(9):1127-U180

**ALZET Comments:** Angiotensin II; brain-derived neurotrophic factor; CSF, artificial; CSF/CNS (intrathecal, cisterna magna); Rat; 1007D; 7 days; Controls received mp w/ vehicle; animal info (Wistar Kyoto, SHR, 12 wks old, adult); post op. care (penicillin).

## 2. Ciliary Neurotrophic Factor

**Q6945:** C. Andre, *et al.* mTORC1 pathway disruption abrogates the effects of the ciliary neurotrophic factor on energy balance and hypothalamic neuroinflammation. *Brain Behav Immun* 2018;70(325-334

**ALZET Comments:** Ciliary neurotrophic factor, recomb. human; CSF, artificial; CSF/CNS (lateral ventricle); Mice; 1002; Dose (63 ng/ul); Controls received mp w/ vehicle; animal info (16 week old mice); Brain coordinates (anteroposterior: -0.3mm from bregma, lateral: -1mm to bregma and dorsoventral: -2.5mm below skull); delayed delivery (2 days);.





**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;

**Q3295:** M. R. Fang, *et al.* Antineuroinflammatory and neurotrophic effects of CNTF and C16 peptide in an acute experimental autoimmune encephalomyelitis rat model. *FRONTIERS IN NEUROANATOMY* 2013;7(;):U1-U17

**ALZET Comments:** Ciliary neurotrophic factor, recombinant rat; PBS; CSF/CNS (intrathecal); Rat; 2002; 2 weeks; Controls received mp w/ vehicle; animal info (male, Lewis, 250-300g, adult); ALZET brain infusion kit used; post op. care (temperature and humidity controlled chambers; penicillin injected IM 25000 IU); immunology; Ciliary neurotrophic factor aka CNTF; Ciliary neurotrophic factor is a cytokine; pumps primed overnight in room temp saline; cannulas sterilized overnight in 100% ethanol; used anchoring screws and dental cement;

**R0305:** S. Ramaswamy, *et al.* Gene therapy for Huntington's disease. *NEUROBIOLOGY OF DISEASE* 2012;48(2):243-254

**ALZET Comments:** Ciliary neurotrophic factor; Peptides; method of delivery with mp mentioned as efficiently reduces cell death in the AQ-treated striatum (pg.5); ALZET not mentioned often;

**Q1939:** M. Solymar, *et al.* A Fever-like Effect of Central Infusion of CNTF in Freely Moving Mice with Diet-Induced Obesity. *Journal of Molecular Neuroscience* 2011;45(2):212-215

**ALZET Comments:** Ciliary neurotrophic factor; NaCl; CSF/CNS; Mice; 2001; 7 days; Animal info (male, C57BL/6); incorrectly listed Model 2001D used.

**Q1062:** M. R. Fang, *et al.* The Neuroprotective Effects of Reg-2 Following Spinal Cord Transection Injury. *Anatomical Record-Advances in Integrative Anatomy and Evolutionary Biology* 2011;294(1):24-45

**ALZET Comments:** Regeneration gene protein 2; ciliary neurotrophic factor; Saline; CSF/CNS (intrathecal, subarachnoid space); Rat; 2001D; 2001; 7 days; 24 hours; Controls received mp w/ vehicle; animal info (adult, female, 200-250 g, Sprague Dawley); functionality of mp verified by residual volume; spinal cord injury.

**R0239:** R. T. Richardson, *et al.* Inner ear therapy for neural preservation. *AUDIOLOGY AND NEURO-OTOLOGY* 2006;11(6):343-356

**ALZET Comments:** Nerve growth factor; NT-3; adenovirus; brain-derived neurotrophic factor; perilymph, artificial; glial-derived neurotrophic factor; ciliary neurotrophic factor; fibroblast growth factor, acidic; fibroblast growth factor-1; fibroblast growth factor-2; fibroblast growth factor, basic; Ear (cochlea); ear (scala tympani); Guinea pig; 1,2,4,8 weeks; 15-60, 11-12, 26 days; Comparison of polymers, hydrogels, gene therapy, cell-based therapy, and injections vs. mp; long-term study; pumps replaced; no stress (see pg. 350); half-life (p. 344), short in blood; gene therapy; peptides; animal info (deafened); Table 2; "The mini-osmotic pump device is ideally suited to studying the effects of neurotrophic factors in the cochlea experimentally." (p. 350); tissue perfusion.

**P7860:** S. Pun, *et al.* Selective vulnerability and pruning of phasic motoneuron axons in motoneuron disease alleviated by CNTF. *Nature Neuroscience* 2006;9(3):408-419

**ALZET Comments:** Ciliary neurotrophic factor, recomb. rat; glial-derived neurotrophic factor, recomb. human; PBS; BSA; Intramuscular (triceps surae); Mice (transgenic); 1002; Controls received mp w/ vehicle; functionality of mp verified by residual volume; peptides; neurodegenerative (motoneuron disease); animal info (Tg G93A SoD1, G85R S0D1).

**P7558:** M. O. Kelleher, *et al.* The use of ciliary neurotrophic factor to promote recovery after peripheral nerve injury by delivering it at the site of the cell body. *Acta Neurochirurgica* 2006;148(1):55-61

**ALZET Comments:** Ciliary neurotrophic factor; CSF/CNS (intrathecal, subarachnoid space); Sheep; 2ML4; 28 days; Controls received mp w/ physiological saline; no stress (see pg. 57); half-life (pg. 59) 3 minutes in serum; peptides; post op. care (cefuroxime); median nerve transected and repaired; "The adverse cytokine-like side-effects associated with systemic administration of CNTF, namely cough, asthenia, nausea, anorexia and weight loss, aphthous stomatitis and fever were not observed in any of our animals". (pg. 57).



**P7339:** H. Yokota, *et al.* Expression of ciliary neurotrophic factor (CNTF), CNTF receptor alpha (CNTFR-alpha;) following experimental intracerebral hemorrhage in rats. *Neuroscience Letters* 2005;377(3):170-175

**ALZET Comments:** Ciliary neurotrophic factor; PBS; BSA; CSF/CNS; Rat; 2002; 14 days; Controls received mp w/ vehicle; good methods p. 171; ALZET brain infusion kit.

**P6458:** P. Olivius, *et al.* A model for implanting neuronal tissue into the cochlea. *BRAIN RESEARCH PROTOCOLS* 2004;12(3):152-156

**ALZET Comments:** Brain-derived neurotrophic factor; ciliary neurotrophic factor Ax1, human; Ear (scala tympani); Guinea pig; 2002; 21-22 days; Pump replaced on days 11-12; post op. care (cyclosporine, doxycycline); tissue perfusion (scala tympani).

**P6761:** W. V. McCallister, *et al.* Regeneration along intact nerves using nerve growth factor and ciliary neurotrophic factor. *Journal of Reconstructive Microsurgery* 2004;20(6):473-481

**ALZET Comments:** Nerve growth factor; ciliary neurotrophic factor; CSF/CNS (peroneal nerve); Rat; 2ML4; 28 days; Controls received mp w/ isotonic saline; peptides; mp primed 24 hours in 37 degrees Celsius saline.

**P5983:** J. Zou, *et al.* Comparison of the protective efficacy of Neurotrophins and antioxidants for vibration-induced trauma. *ORL-JOURNAL FOR OTO-RHINO-LARYNGOLOGY AND ITS RELATED SPECIALTIES* 2003;65(3):155-161

**ALZET Comments:** Brain-derived neurotrophic factor; ciliary neurotrophic factor; Ear (scala tympani); Guinea pig; 2002; 14 days; tissue perfusion (cochlea); comparison of RWM injections vs. mp; peptides.

**P5990:** B. U. Ramirez, *et al.* Ciliary Neurotrophic Factor (CNTF) affects the excitable and contractile properties of innervated skeletal muscles. *Biological Research* 2003;36(3-4):303-312

**ALZET Comments:** Ciliary Neurotrophic Factor; Forskolin; PBS; BSA; SC; Rat; 2002; 14 days; Controls received mp w/ saline; control group pumps were implanted and contained saline; experimental groups had either CNTF or forskolin.

**P5009:** T. Shinohara, *et al.* Neurotrophic factor intervention restores auditory function in deafened animals. *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA* 2002;99(3):1657-1660

**ALZET Comments:** Brain-derived neurotrophic factor; Ciliary neurotrophic factor; Neomycin;; Perilymph, artificial; Ear (scala tympani); Guinea pig; 2002; 26 days; controls received mp w/ vehicle; tissue perfusion (cochlea, scala tympani); pumps replaced at day 15; peptides; catheter filled with perilymph and 10% neomycin; pump filled with vehicle or neurotrophic factor solution; 48-hr infusion of neomycin to cause deafness followed by 12 or 26 day infusion of neurotrophic factor pump reservoir.

### 3. Glial Derived Neurotrophic Factor

**Q0778:** M. H. Voutilainen, *et al.* Chronic infusion of CDNF prevents 6-OHDA-induced deficits in a rat model of Parkinson's disease. *Experimental Neurology* 2011;228(1):99-108

**ALZET Comments:** Central dopamine neurotrophic factor; mesencephalic astrocyte-derived neurotrophic factor; glial-derived neurotrophic factor; PBS; CSF/CNS (striatum); Rat; 2002; 3, 14 days; Controls received mp w/ vehicle; animal info (male, Wistar, 250-280 g); neuroprotection.

**Q1447:** S. B. Patil, *et al.* Neuropathic pain- and glial derived neurotrophic factor-associated regulation of cadherins in spinal circuits of the dorsal horn. *Pain* 2011;152(4):924-935

**ALZET Comments:** Glial-derived neurotrophic factor, recomb. human; Citrate buffer; CSF/CNS (intrathecal); Rat; 1007D; 2002; 7, 14 days; Controls received mp w/ vehicle; animal info (adult, male, Sprague-Dawley, > 60 days old, 200-250 g).



**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).

**Q0059:** K. Ubhi, *et al.* Neurodegeneration in a Transgenic Mouse Model of Multiple System Atrophy Is Associated with Altered Expression of Oligodendroglial-Derived Neurotrophic Factors. *Journal of Neuroscience* 2010;30(18):6236-6246

**ALZET Comments:** Glial-derived neurotrophic factor; CSF/CNS; Mice (transgenic); 1002; 14 days; Animal info (MBP-h alpha syn Tg, 8 months old).

**Q1685:** A. Fransson, *et al.* Post-Treatment Effects of Local GDNF Administration to the Inner Ears of Deafened Guinea Pigs. *Journal of Neurotrauma* 2010;27(9):1745-1751

**ALZET Comments:** Glial-derived neurotrophic factor; Ear (cochlea); Guinea pig; 2002; 4 weeks; Controls received mp w/ artificial perilymph; animal info (deafened); silicone tube used; tissue perfusion (cochlea); pump replaced after 2 weeks; post op. care (lidocaine).

**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).

**P9515:** V. Scheper, *et al.* Effects of Delayed Treatment With Combined GDNF and Continuous Electrical Stimulation on Spiral Ganglion Cell Survival in Deafened Guinea Pigs. *Journal of Neuroscience Research* 2009;87(6):1389-1399

**ALZET Comments:** Glial-derived neurotrophic factor; Ear (cochlea); Guinea pig; 2002; 48 days; Controls received mp w/artificial perilymph; tissue perfusion (cochlea); long-term study; pumps replaced after 13 days; good methods (pg. 1391); animal info (male, pigmented, 250-450 g.); pumps primed; image of pump and electrode cannula device used on fig. 1.

**Q0275:** J. H. Li, *et al.* Insect GDNF:TTC fusion protein improves delivery of GDNF to mouse CNS. *Biochemical and Biophysical Research Communications* 2009;390(3):947-951

**ALZET Comments:** Glial-derived neurotrophic factor, recombinant, rat; glial-derived neurotrophic factor, TTC; HEPES; NaCl; BSA; CSF/CNS; Mice; 1 week; Controls received mp w/ vehicle; animal info (normal, male, C57BL6, 8-10-wks-old, 25-30 g); GDNF:TTC also known as glial-derived neurotrophic factor: tetanus toxin C-fragment fusion protein.

**P9441:** A. Sakai, *et al.* Involvement of neural cell adhesion molecule signaling in glial cell line-derived neurotrophic factor-induced analgesia in a rat model of neuropathic pain. *Pain* 2008;137(2):378-388

**ALZET Comments:** Oligodeoxynucleotide, phosphorothioate antisense; glial-derived neurotrophic factor, recomb. human; neural cell adhesion molecule, mimetic peptide C3d; oligodeoxynucleotide, phosphorothioate missense; CSF/CNS (subarachnoid space); Rat; 4, 6, 7, 9 days; Controls received mp w/ saline; antisense (NCAM); peptides; multiple pumps per animal (2); animal info (male, Sprague Dawley, 5 wks old, 140-160 g., sciatic nerve injury); behavioral testing (mechanical allodynia, thermal hypersensitivity, paw withdrawal, plantar test).

**P9156:** Y. L. Du, *et al.* Multiple molecular pathways are involved in the neuroprotection of GDNF against proteasome inhibitor induced dopamine neuron degeneration in vivo. *EXPERIMENTAL BIOLOGY AND MEDICINE* 2008;233(7):881-890

**ALZET Comments:** Glial-derived neurotrophic factor, recomb.; CSF, artificial; CSF/CNS (striatum); Mice; 1002; 2 weeks; Controls received mp w/ vehicle; ALZET brain infusion kit used; animal info (male, C57BL/6, 8 wks old); neurodegenerative (Parkinson's disease).





**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.).

**R0239:** R. T. Richardson, *et al.* Inner ear therapy for neural preservation. *AUDIOLOGY AND NEURO-OTOLOGY* 2006;11(6):343-356

**ALZET Comments:** Nerve growth factor; NT-3; adenovirus; brain-derived neurotrophic factor; perilymph, artificial; glial-derived neurotrophic factor; ciliary neurotrophic factor; fibroblast growth factor, acidic; fibroblast growth factor-1; fibroblast growth factor-2; fibroblast growth factor, basic; Ear (cochlea); ear (scala tympani); Guinea pig; 1,2,4,8 weeks; 15-60, 11-12, 26 days; Comparison of polymers, hydrogels, gene therapy, cell-based therapy, and injections vs. mp; long-term study; pumps replaced; no stress (see pg. 350); half-life (p. 344), short in blood; gene therapy; peptides; animal info (deafened); Table 2; "The mini-osmotic pump device is ideally suited to studying the effects of neurotrophic factors in the cochlea experimentally." (p. 350); tissue perfusion.

**P7860:** S. Pun, *et al.* Selective vulnerability and pruning of phasic motoneuron axons in motoneuron disease alleviated by CNTF. *Nature Neuroscience* 2006;9(3):408-419

**ALZET Comments:** Ciliary neurotrophic factor, recomb. rat; glial-derived neurotrophic factor, recomb. human; PBS; BSA; Intramuscular (triceps surae); Mice (transgenic); 1002; Controls received mp w/ vehicle; functionality of mp verified by residual volume; peptides; neurodegenerative (motoneuron disease); animal info (Tg G93A SoD1, G85R S0D1).

**P7483:** Y. Chen, *et al.* Progenitor proliferation in the adult hippocampus and substantia nigra induced by glial cell line-derived neurotrophic factor. *Experimental Neurology* 2005;196(1):87-95

**ALZET Comments:** Glial-derived neurotrophic factor, recomb. human methionyl; CSF, artificial; CSF/CNS (striatum); Rat; 28 days; Controls received mp w/ vehicle; brain tissue distribution; animal info (male, Sprague-Dawley, 2 month old).

**P6801:** C. Iannotti, *et al.* A neuroprotective role of glial cell line-derived neurotrophic factor following moderate spinal cord contusion injury. *Experimental Neurology* 2004;189(2):317-332

**ALZET Comments:** Glial-derived neurotrophic factor, recomb. human; glial-derived neurotrophic factor, alexa S94 dye-conjugated; Saline; CSF/CNS (intrathecal); Rat; 2004; 3 weeks; 28 days; Controls received mp w/ vehicle; functionality of mp verified by residual volume and cannula patency; good methods p. 318; brain tissue distribution; spinal cord injury.

**P6644:** A. Bergerot, *et al.* Co-treatment with riluzole and GDNF is necessary for functional recovery after ventral root avulsion injury. *Experimental Neurology* 2004;187(2):359-366

**ALZET Comments:** Glial-derived neurotrophic factor, isr-met human; CSF/CNS (intrathecal); Rat; 2002; 2 weeks; Controls received no treatment to contralateral side.

**P6343:** R. Wang, *et al.* Glial cell line-derived neurotrophic factor normalized neurochemical chances in injured dorsal root ganglion neurons and prevents the expression of experimental neuropathic pain. *Neuroscience* 2003;121(3):815-824

**ALZET Comments:** Glial-derived neurotrophic factor, recomb. human; Saline; albumin, rat serum; CSF/CNS (intrathecal); Rat; 2002; 10 days; Controls received mp w/ vehicle; spinal nerve ligation injury.

**P6602:** D. L. Tolbert, *et al.* GDNF and IGF-I trophic factors delay hereditary Purkinje cell degeneration and the progression of gait ataxia. *Experimental Neurology* 2003;183(1):205-219

**ALZET Comments:** Glial-derived neurotrophic factor; insulin-like growth factor I; SC; Rat; 2004; 4,8 weeks; Controls received mp w/ saline; long-term study; pumps replaced at 4 weeks; peptides.

**P6506:** M. Nagano, *et al.* Decreased expression of glial cell line-derived neurotrophic factor signaling in rat models of neuropathic pain. *British Journal of Pharmacology* 2003;140(7):1252-1260

**ALZET Comments:** Glial-derived neurotrophic factor, recomb. human; Saline; CSF/CNS (intrathecal); Rat; 9 days; Controls received mp w/ vehicle; replacement therapy (spinal nerve ligation axotomy); post op. care (IP kanamycin sulfate).



**P6221:** B. H. Hess, *et al.* Olivocerebellar projections are necessary for exogenous trophic factors to delay heredo-Purkinje cell degeneration. *Brain Research* 2003;986(1-2):54-62

**ALZET Comments:** Glial-derived neurotrophic factor; insulin-like growth factor I; CSF/CNS; Rat; 2002; 2 weeks; Controls received mp w/ saline or no treatment; ALZET brain infusion kit used.

**R0227:** T. Gordon, *et al.* Experimental strategies to promote functional recovery after peripheral nerve injuries. *JOURNAL OF THE PERIPHERAL NERVOUS SYSTEM* 2003;8(4):236-250

**ALZET Comments:** Brain-derived neurotrophic factor; glial-derived neurotrophic factor; CSF/CNS (peripheral nerve); Mice; 1 month; dose-response.

**P6592:** R. J. Dempsey, *et al.* Stroke-induced progenitor cell proliferation in adult spontaneously hypertensive rat brain: effect of exogenous IGF-1 and GDNF. *Journal of Neurochemistry* 2003;87(3):586-597

**ALZET Comments:** Insulin-like growth factor I; glial-derived neurotrophic factor; CSF, artificial; CSF/CNS; Rat; 1 week; Controls received mp w/ vehicle; ALZET brain infusion kit used; peptides; ischemia (cerebral); MCAO.

**P5967:** J. G. Boyd, *et al.* Glial cell line-derived neurotrophic factor and brain-derived neurotrophic factor sustain the axonal regeneration of chronically axotomized motoneurons in vivo. *Experimental Neurology* 2003;183(2):610-619

**ALZET Comments:** Glial-derived neurotrophic factor; brain-derived neurotrophic factor; Saline; CSF/CNS (tibial nerve); Rat; 2001; 2ML4; 7,28 days; Controls received mp w/ vehicle; tissue perfusion (nerve repair site); good methods (p. 611,612); silastic cuff used; pumps used for a 1 week and 4 week study.

**P5837:** S. L. Li, *et al.* Glial cell line-derived neurotrophic factor modulates kindling and activation-induced sprouting in hippocampus of adult rats. *Experimental Neurology* 2002;178(1):49-58

**ALZET Comments:** Glial-derived neurotrophic factor; Cytochrome C; Citrate butter; CSF/CNS; Rat; 2002; 11 days; Peptides; 7 day recovery from surgery.

**P5588:** A. Leffler, *et al.* GDNF and NGF reverse changes in repriming of TTX-sensitive Na<sup>+</sup> currents following axotomy of dorsal root ganglion neurons. *Journal of Neurophysiology* 2002;88(2):650-658

**ALZET Comments:** Glial-derived neurotrophic factor; Nerve growth factor; Saline; CSF/CNS (intrathecal, lumbar); Rat; 7 days; controls received mp with vehicle; peptides; some animals received both agents infused simultaneously by the same pump; delivery was to the lumbar enlargement.

**R0198:** P. Brundin. GDNF treatment in Parkinson's disease: time for controlled clinical trials? *Brain* 2002;125(2149-2151)

**ALZET Comments:** Glial-derived neurotrophic factor; CSF/CNS (dorsal putamen); CSF/CNS; Monkey; Neurodegenerative (Parkinson's disease).

**P5858:** M. S. Ramer, *et al.* Nerve growth factor induces P2X(3) expression in sensory neurons. *J Neurochem* 2001;77(3):864-875

**ALZET Comments:** Nerve growth factor; Glial-derived neurotrophic factor; Saline; rat serum; CSF/CNS (intrathecal); Rat; 2001; 1 week; Peptides.

**P4798:** D. Kirik, *et al.* Delayed infusion of GDNF promotes recovery of motor function in the partial lesion model of Parkinson's disease. *European Journal of Neuroscience* 2001;13(1589-1599)

**ALZET Comments:** Glial-derived neurotrophic factor;; Saline; Serum, rat; Gentamycin;; CSF/CNS (striatum); CSF/CNS;; Rat;; 2002;; 4 weeks;; Controls received mp w/ vehicle; pumps replaced after 2 weeks; ALZET brain infusion kit used; peptides; neurodegenerative (Parkinson's disease); neuroprotection;



**P4887:** P. C. Issa, *et al.* Intrathecally delivered glial cell line-derived neurotrophic factor produces electrically evoked release of somatostatin in the dorsal horn of the spinal cord. *Journal of Neurochemistry* 2001;78(221-229)

**ALZET Comments:** Glial-derived neurotrophic factor, recombinant human; Saline; Albumin, rat serum; CSF/CNS (intrathecal); Rat; 2001; 11-13 days; controls received mp w/ vehicle; peptides; vehicle was saline w/ 0.1% rat serum albumin; neuroprotection; no mention of pump replacement for 11-13 day delivery; Dose (12 µg/d); animal info (Adult male Wistar rats (250 g));

**P5845:** S. K. Akkina, *et al.* GDNF rescues nonpeptidergic unmyelinated primary afferents in streptozotocin-treated diabetic mice. *Exp Neurol* 2001;167(1):173-182

**ALZET Comments:** Nerve growth factor; Glial-derived neurotrophic factor; CSF, artificial; CSF/CNS (intrathecal); Mice; 1002; 14 days; Controls received mp w/ vehicle; comparison of intrathecal injections vs. mp; stress/adverse reaction (see pg. 178, surgical complications); peptides; PE-10 attached to PE-60 tubing; catheter placement verified at sacrifice.

#### 4. 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 ± 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 lidocaine injection); spared nerve injury; Dose (12 ug/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 TERATOLOGY* 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(;):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(;):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).