



Recent References (2012-2019) on the Administration of Vascular Endothelial Growth Factor Using ALZET® Osmotic Pumps

Q7573: R. Lin, *et al.* Systemic Factors Trigger Vasculature Cells to Drive Notch Signaling and Neurogenesis in Neural Stem Cells in the Adult Brain. *Stem Cells* 2019;37(3):395-406

Agents: Biotin, recombinant vascular endothelial growth factor 165 **Vehicle:** Saline; **Route:** IV (Femoral); **Species:** Mice; **Pump:** Not Stated; **Duration:** 3 days;

ALZET Comments: Dose (1 mg/kg); Controls received mp w/ vehicle; animal info (9-week old CD-1 mice);

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

Agents: Vascular endothelial growth factor, mouse recomb.; Vascular endothelial growth factor, synthetic peptide (Nano-VEGF) **Vehicle:** CSF, artificial; **Route:** CSF/CNS (right lateral ventricle); **Species:** Mice; **Pump:** 1002; **Duration:** 2 weeks;

ALZET Comments: animal info (8-10, and 24 week-old mice); behavioral testing (rotating rod assay); Brain coordinates (A/P -0.5mm, M/L -1.1mm, D/V -2.5mm);

Q7841: Z. H. Dailiana, *et al.* Vascular endothelial growth factor for the treatment of femoral head osteonecrosis: An experimental study in canines. *World J Orthop* 2018;9(9):120-129

Agents: Vascular Endothelial Growth Factor **Vehicle:** Saline; **Route:** SC; **Species:** Dog; **Pump:** Not Stated; **Duration:** Duration;

ALZET Comments: Dose (500 ng); 0.9% Saline used; Controls received mp w/ vehicle; animal info (Beagle); Vascular endothelial Growth Factor aka VEGF;

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

Agents: Vascular endothelial growth factor **Vehicle:** PBS; Rat serum albumin; **Route:** CSF/CNS; **Species:** Rat; **Pump:** 2001; 1007D; **Duration:** **ALZET Comments:** 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)

Agents: Vascular Endothelial Growth Factor **Vehicle:** Saline; **Route:** CSF/CNS (Left Lateral Ventricle); **Species:** Rat; **Pump:** 2001; **Duration:** 7 days;

ALZET Comments: Controls received mp w/ vehicle; animal info (17 weeks); behavioral testing (Morris water maze); Therapeutic indication (Hypoxia-inducible factor-1 α 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)

Agents: Raf-Transducer cells, conditioned media; leukemia inhibitory factor; fibroblast growth factor 2; vascular endothelial growth factor **Vehicle:** CSF, artificial; **Route:** CSF/CNS; **Species:** Mice; **Pump:** 1007D; **Duration:** 6 days;

ALZET Comments: 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)

Agents: Vascular endothelial growth factor, Fibroblast Growth Factor 2 **Vehicle:** Saline; **Route:** CSF/CNS (lateral ventricle); **Species:** Mice; **Pump:** **Duration:** 7 days;

ALZET Comments: 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)

Agents: Vascular endothelial growth factor (165) **Vehicle:** CSF, artificial; **Route:** CSF/CNS; **Species:** Mice; **Pump:** 2006; **Duration:** 8 weeks;

ALZET Comments: 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

Agents: Vascular Endothelial Growth Factor, Angiotensin II, Losartan, Cyclosporine **Vehicle:** Saline; **Route:** SC; **Species:** Mice; **Pump:** **Duration:** 21 days;

ALZET Comments: Controls received mp w/ vehicle; animal info (Calcineurin (CN) B1 (Cnb1^{-/-}) 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

Agents: Vascular endothelial growth factor, recombinant human **Vehicle:** Heparin; Saline; **Route:** Intrapericardial; **Species:** Pig; **Pump:** 2ML4; **Duration:** 4 weeks;

ALZET Comments: 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)

Agents: Vascular endothelial growth factor; platelet-derived growth factor-BB **Vehicle:** PBS; **Route:** CSF/CNS (intrathecal); **Species:** Rat; **Pump:** 2001; **Duration:** 7 days;

ALZET Comments: 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

Agents: Vascular endothelial growth factor **Vehicle:** Saline; **Route:** CSF/CNS; **Species:** Mice; **Pump:** 2004; **Duration:** 3, 10 days;

ALZET Comments: 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

Agents: Vascular endothelial growth factor, A **Vehicle:** **Route:** **Species:** Mice; **Pump:** 2004; **Duration:** **ALZET Comments:** 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

Agents: Vascular endothelial growth factor, 121 **Vehicle:** **Route:** **Species:** Mice (pregnant); **Pump:** **Duration:** 5 days; **ALZET Comments:** 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(1):703-709



Agents: Vascular endothelial growth factor-A165; Bevacizumab **Vehicle:** Saline; BSA; **Route:** CSF/CNS; **Species:** Rat; **Pump:** 2001D; **Duration:** 1 day;

ALZET Comments: 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

Agents: Vascular endothelial growth factor B **Vehicle:** CSF, artificial; **Route:** CSF/CNS; **Species:** Rat; **Pump:** 1007D; **Duration:**

ALZET Comments: 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

Agents: Vascular endothelial growth factor **Vehicle:** IP; **Species:** Rat; **Pump:** **Duration:** **ALZET Comments:** 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

Agents: Vascular endothelial growth factor **Vehicle:** Saline; **Route:** CSF/CNS; **Species:** Mice; **Pump:** **Duration:** 7 days;

ALZET Comments: 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

Agents: Vascular endothelial growth factor **Vehicle:** Saline; **Route:** CSF/CNS; **Species:** Mice; **Pump:** 1007D; **Duration:** 7 days;

ALZET Comments: 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

Agents: Vascular endothelial growth factor **Vehicle:** NaCl; **Route:** CSF/CNS; **Species:** Mice; **Pump:** 2002; 2004; **Duration:** 4 weeks;

ALZET Comments: 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

Agents: Vascular endothelial growth factor; platelet-derived growth factor **Vehicle:** Saline; **Route:** CSF/CNS (intrathecal); **Species:** Rat; **Pump:** 2001; **Duration:** 7 days;

ALZET Comments: 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

Agents: Vascular endothelial growth factor, recomb. human **Vehicle:** **Route:** CSF/CNS; **Species:** Mice; **Pump:** 2002; 2004; **Duration:** 4 weeks;

ALZET Comments: 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

Agents: Vascular endothelial growth factor; anti-VEGF **Vehicle:** PBS; **Route:** CSF/CNS (cortex); **Species:** Rat; **Pump:** 1007D;

Duration: **ALZET Comments:** Control animals received mp w/ vehicle; animal info (Long Evans, P18); ALZET brain infusion kit used; cyanoacrylate adhesive used