



### References on the Administration of Endothelins Using ALZET® Osmotic Pumps

**Q10822:** S. Li, *et al.* Fibroblast Growth Factor 21 Ameliorates Endothelin I-Induced Hypertension Partly Through PPAR  $\gamma$  Pathway. *International Journal of Peptide Research and Therapeutics* 2022;28(4):

**Agents:** Endothelin-1 **Vehicle:** Saline; **Route:** SC; **Species:** Rat; **Pump:** 2001; **Duration:** 14 days;

**ALZET Comments:** Dose: (200 ng/kg); Controls received mp w/ vehicle; animal info: Male Sprague–Dawley (SD) rats (200–220 g); Blood pressure measured via: tail-cuff; Blood pressure measurements (p.6) Endothelin-1 aka (ET-1) cardiovascular; (Hypertension)

**Q8238:** S. Lakhali-Littleton, *et al.* Intracellular iron deficiency in pulmonary arterial smooth muscle cells induces pulmonary arterial hypertension in mice. *Proc Natl Acad Sci U S A* 2019;116(26):13122-13130

**Agents:** Selective endothelin subtype-A receptor agonist **Vehicle:** Saline; **Route:** SC; **Species:** Mice; **Pump:** Not stated; **Duration:** Not stated;

**ALZET Comments:** Dose (200 nmol/kg/day); Selective endothelin subtype-A receptor agonist aka cyclic peptide BQ-123 ; peptides; cardiovascular;

**Q7255:** I. Prada, *et al.* Glia-to-neuron transfer of miRNAs via extracellular vesicles: a new mechanism underlying inflammation-induced synaptic alterations. *Acta Neuropathologica* 2018;135(4):529-550

**Agents:** Endothelin A antagonist aka BQ-123 and Endothelin B antagonist aka BQ-788; **Vehicle:** Saline; **Route:** CSF/CNS (Hippocampus CA1); **Species:** Mice; **Pump:** 1007D; **Duration:** 4 days;

**ALZET Comments:** Dose (M1-EV 1.5  $\mu\text{g}/\mu\text{l}$ , M2-EV 0.5  $\mu\text{l}/\text{h}$ ); Controls received mp w/ vehicle; animal info (4-month-old C57BL6 male mice); Brain coordinates (anteroposterior: 1.8 mm relative to bregma; mediolateral: +1 mm; dorsoventral: 1.5 mm relative to the dura); neurodegenerative (Multiple sclerosis);

**Q7254:** J. Polak, *et al.* Blockade of Endothelin-1 Receptor Type B Ameliorates Glucose Intolerance and Insulin Resistance in a Mouse Model of Obstructive Sleep Apnea. *Front Endocrinol (Lausanne)* 2018;9(280

**Agents:** Endothelin-1 antagonist **Vehicle:** Saline, PEG; **Route:** SC; **Species:** Mice; **Pump:** 1002; **Duration:** 14 days;

**ALZET Comments:** Dose (ETA antagonist; 200 nmol/kg/day, ETB antagonist; 200 nmol/kg/day); Controls received mp w/ vehicle; animal info (Adult male C57BL6/J mice aged 6–8 weeks); Endothelin A antagonist aka BQ-123 and Endothelin B antagonist aka BQ-788;

**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

**Agents:** Transforming growth factor-B1; endothelin-1 **Vehicle:** Saline; **Route:** Not Stated; **Species:** Mice; **Pump:** Not Stated; **Duration:** 3 weeks;

**ALZET Comments:** Controls received mp w/ vehicle; animal info (FVB/N, 4 weeks old); used 28 day model pump;

**Q3341:** T. R. Hammond, *et al.* Astrocyte-Derived Endothelin-1 Inhibits Remyelination through Notch Activation. *Neuron* 2014;81(3):588-602

**Agents:** Endothelin-1; PD142,893; DAPT; Jagged1 Fc, recombinant rat **Vehicle:** Saline; **Route:** CSF/CNS; **Species:** Mice; **Pump:** 1007D; 1002; **Duration:** 2 days; 7 days; 8 days; 15 days;

**ALZET Comments:** Controls received mp w/ vehicle; animal info (TNR, C57BL6N, 8-12 weeks old); ALZET brain infusion kit 3 used; cyanoacrylate adhesive; DAPT aka N-[[3,5-Difluorophenyl]acetyl]-L-alanyl-2-phenyl]glycine-1,1-dimethylethyl ester; DAPT is a gamma secretase inhibitor

**Q2397:** M. A. Saleh, *et al.* Chronic endothelin-1 infusion elevates glomerular sieving coefficient and proximal tubular albumin reuptake in the rat. *LIFE SCIENCES* 2012;91(13-14):634-637

**Agents:** Endothelin-1 **Vehicle:** NaCl; **Route:** SC; **Species:** Rat; **Pump:** Not Stated; **Duration:** 2 weeks;

**ALZET Comments:** Control animals received mp w/ vehicle; animal info (Munich-Wistar, male, 200-250 g);



**Q1784:** F. Li, *et al.* eNOS Deficiency Acts through Endothelin to Aggravate sFlt-1-Induced Pre-Eclampsia-Like Phenotype. *Journal of the American Society of Nephrology* 2012;23(4):652-660

**Agents:** Preproendothelin-1 **Vehicle:** Not Stated; **Route:** SC; **Species:** Mice; **Pump:** 1002; **Duration:** Not Stated; **ALZET Comments:** Controls received mp w/ saline; animal info (wt, female, nonpregnant, 3-5 mo old)

**Q2547:** J. M. Kim, *et al.* Increased expression of oxyproteins in the optic nerve head of an in vivo model of optic nerve ischemia. *BMC Pharmacology* 2012;12(:):U1-U6

**Agents:** Endothelin-1 **Vehicle:** Not Stated; **Route:** CSF/CNS (optic nerve, perineural region); **Species:** Rabbit; **Pump:** Not Stated; **Duration:** 2, 4, 8 weeks;

**ALZET Comments:** Animal info (New Zealand, 2.5-3.5 kg); long-term study; PE tubing used

**Q1214:** F. Ljuca, *et al.* Contribution of Ras farnesyl transferase, MAP kinase and cytochrome P-450 metabolites to endothelin-1 induced hypertension. *BJBMS* 2011;11(2):84-86

**Agents:** Endothelin 1; FPT III; PD-98059; baicalein; ODAYA, 17- **Vehicle:** Not Stated; **Route:** IV (jugular); **Species:** Rat; **Pump:** Not Stated; **Duration:** 9 days;

**ALZET Comments:** Controls received no pump; animal info (male, Sprague Dawley); peptides; enzyme inhibitor (Ras farnesyl transferase, MAP kinase, COX); 17-ODYA is a CYP450 inhibitor; PE-60 tubing used

**Q0303:** C. J. Wang, *et al.* (-)-Epigallocatechin Gallate Inhibits Endothelin-1-Induced C-Reactive Protein Production in Vascular Smooth Muscle Cells. *Basic & Clinical Pharmacology & Toxicology* 2010;107(2):669-675

**Agents:** Endothelin-1 **Vehicle:** Not Stated; **Route:** SC; **Species:** Rat; **Pump:** 2001; **Duration:** 7 days;

**ALZET Comments:** Controls received mp w/ saline; animal info (Male, Sprague-Dawley, 250 g)

**Q0739:** M. A. Saleh, *et al.* Endothelin-1 Increases Glomerular Permeability and Inflammation Independent of Blood Pressure in the Rat. *Hypertension* 2010;56(5):942-U427

**Agents:** Endothelin-1 **Vehicle:** Saline; **Route:** IV (jugular); **Species:** Rat; **Pump:** 2ML2; **Duration:** 14 days;

**ALZET Comments:** Controls received mp w/ vehicle; animal info (male, Sprague Dawley, 225-250 g); peptides

**Q0217:** V. V. Lima, *et al.* O-GlcNAcylation Contributes to Augmented Vascular Reactivity Induced by Endothelin 1. *Hypertension* 2010;55(1):180-188

**Agents:** Endothelin-1 **Vehicle:** Sodium chloride; **Route:** IV (jugular); **Species:** Rat; **Pump:** Not Stated; **Duration:** 14 days;

**ALZET Comments:** Controls received mp w/ sodium chloride; animal info (male, Wistar, 8-10 wks old, 230-250 g.); 0.9% sodium chloride used

**Q0138:** Y. Koyama, *et al.* Decreases in rat brain aquaporin-4 expression following intracerebroventricular administration of an endothelin ET<sub>B</sub> receptor agonist. *Neuroscience Letters* 2010;469(3):343-347

**Agents:** Endothelin-1, ala-1, 3, 11, 15- **Vehicle:** CSF, artificial; **Route:** CSF/CNS; **Species:** Rat; **Pump:** 2002; **Duration:** 3, 7 days;

**ALZET Comments:** Controls received mp w/ vehicle; ALZET brain infusion kit used; animal info (male, Wistar, 250-300 g.)

**Q1439:** Y. Koyama, *et al.* Intracerebroventricular Administration of an Endothelin ET(B)-Receptor Agonist Increases Expression of Matrix Metalloproteinase-2 and -9 in Rat Brain. *JOURNAL OF PHARMACOLOGICAL SCIENCES* 2010;114(4):433-443

**Agents:** Endothelin-1, ala-1, 3, 11, 15- **Vehicle:** CSF, artificial; **Route:** CSF/CNS; **Species:** Rat; **Pump:** 2002; **Duration:** 7 days;

**ALZET Comments:** Controls received mp w/ vehicle; animal info (male, Wistar, 250-300 g); artificial CSF recipe listed; ALZET brain infusion kit used; ala-1, 3, 11, 15-ET-1 is an ETB-receptor agonist

**Q0959:** Z. Aktas, *et al.* Matrix metalloproteinase-9 expression in retinal ganglion cell layer and effect of topically applied brimonidine tartrate 0.2% therapy on this expression in an endothelin-1-induced optic nerve ischemia model. *International Ophthalmology* 2010;30(3):253-259

**Agents:** Endothelin-1, human, porcine **Vehicle:** Not Stated; **Route:** Eye (optic nerve); **Species:** Rabbit; **Pump:** 2002; **Duration:** 2 weeks;

**ALZET Comments:** Animal info (New Zealand, albino); vinyl tubing used; image of pump and tubing through the upper eyelid (Fig.1, Fig 2b);



**P9573:** X. Wang, *et al.* Increase in endothelin B receptor expression in optic nerve astrocytes in endothelin-1 induced chronic experimental optic neuropathy. *Experimental Eye Research* 2009;88(3):378-385

**Agents:** Endothelin-1 **Vehicle:** Not Stated; **Route:** CSF/CNS (optic nerve); **Species:** Rat; **Pump:** 2004; **Duration:** 28 days;  
**ALZET Comments:** Post op. care (buprenorphine); animal info (adult, male, Brown Norway, 250-300g); fellow eye served as untreated control; silastic tubing used; brain tissue distribution

**Q0277:** C. J. Wang, *et al.* Endothelin-1 induces the expression of C-reactive protein in rat vascular smooth muscle cells. *Biochemical and Biophysical Research Communications* 2009;389(3):537-542

**Agents:** Endothelin-1 **Vehicle:** Saline; **Route:** SC; **Species:** Rat; **Pump:** 2001; **Duration:** 7 days;  
**ALZET Comments:** Controls received mp w/ saline; animal info (male, Sprague-Dawley, 250 g)

**P8717:** D. E. Brooks, *et al.* Blood flow velocity response of the ophthalmic artery and anterior optic nerve head capillaries to carbogen gas in the rhesus monkey model of optic nerve head ischemia. *VETERINARY OPHTHALMOLOGY* 2007;10(;):20-27

**Agents:** Endothelin-1 **Route:** CSF/CNS (optic nerve); **Species:** Monkey (Rhesus); **Pump:** 2004; **Duration:** 8 months;  
**ALZET Comments:** Controls received mp w/ vehicle; long-term study; pumps replaced every 4 weeks; peptides; animal info (young, male, Rhesus); glaucoma

**P7183:** A. Migneault, *et al.* Chronically elevated endothelin levels reduce pulmonary vascular reactivity to nitric oxide. *American Journal of Respiratory and Critical Care Medicine* 2005;171(5):506-513

**Agents:** Endothelin-1 **Vehicle:** Water; **Route:** IV (jugular); **Species:** Rat; **Pump:** Not Stated; **Duration:** 7, 20 days;  
**ALZET Comments:** Controls received sham surgery; functionality of mp verified by plasma E7-1 levels; stability verified by 7 and 28 day incubation at 37 degrees Celsius and HPLC; cardiovascular; peptides

**P7257:** Y. Koyama, *et al.* Endothelin increases expression of exon III-and exon IV-containing brain-derived neurotrophic factor transcripts in cultured astrocytes and rat brain. *Journal of Neuroscience Research* 2005;80(6):809-816

**Agents:** Endothelin-1; Ala-1, 3, 11, 15- **Vehicle:** CSF, artificial; **Route:** CSF/CNS; **Species:** Rat; **Pump:** 2002; **Duration:** 7 days;  
**ALZET Comments:** Controls received mp w/ vehicle; ALZET brain infusion kit used; peptides; endothelin B receptor agonist

**P7506:** Y. Koyama, *et al.* Endothelins stimulate the expression of neurotrophin-3 in rat brain and rat cultured astrocytes. *Neuroscience* 2005;136(2):425-433

**Agents:** Endothelin-1, Ala-1, 3, 11, 15 - **Vehicle:** CSF, artificial; **Route:** CSF/CNS; **Species:** Rat; **Pump:** 2002; **Duration:** 3, 7 days;  
**ALZET Comments:** Controls received mp w/ vehicle; animal info (male, Wistar, 250-300 g)

**P6957:** P. Beaucage, *et al.* Position of Src tyrosine kinases in the interaction between angiotensin II and endothelin in in vivo vascular protein synthesis. *Journal of Hypertension* 2005;23(2):329-335

**Agents:** Angiotensin II; endothelin **Vehicle:** Not Stated; **Route:** SC; **Species:** Rat; **Pump:** 1003D; **Duration:** 26 hours;  
**ALZET Comments:** Cardiovascular; peptides

**P7010:** L. Yao, *et al.* Olmesartan improves endothelin-induced hypertension and oxidative stress in rats. *HYPERTENSION RESEARCH* 2004;27(7):493-500

**Agents:** Endothelin-1 **Vehicle:** Saline; **Route:** IV (jugular); **Species:** Rat; **Pump:** 2ML2; **Duration:** 14 days;  
**ALZET Comments:** Controls received mp w/ vehicle; cardiovascular; peptides

**P6995:** Y. P. Wang, *et al.* Prevention of endothelin-1-induced increases in blood pressure: role of endogenous CGRP. *American Journal of Physiology Heart and Circulatory Physiology* 2004;287(4):H1868-H1874

**Agents:** Endothelin-1 **Vehicle:** Saline, normal; **Route:** IV (external jugular); **Species:** Rat; **Pump:** 2001; **Duration:** 7 days;  
**ALZET Comments:** Controls received mp w/ vehicle; functionality of mp verified by confirming mp was empty and correct catheter position; cardiovascular; peptides

**P6670:** B. Luo, *et al.* ET-1 and TNF-alpha in HPS: analysis in prehepatic portal hypertension and biliary and nonbiliary cirrhosis in rats. *American Journal of Physiology Gastrointestinal and Liver Physiology* 2004;286(2):G294-G303

**Agents:** Endothelin-1 **Vehicle:** Saline; **Route:** IV (femoral); **Species:** Rat; **Pump:** 2002; **Duration:** 2 weeks;  
**ALZET Comments:** Controls received mp w/ vehicle; ET-1 plasma levels taken



**P6550:** B. C. Chauhan, *et al.* Model of endothelin-1 - Induced chronic optic neuropathy in rat. INVESTIGATIVE OPHTHALMOLOGY & VISUAL SCIENCE 2004;45(1):144-152

**Agents:** Endothelin-1 **Vehicle:** Balanced salt solution; **Route:** Eye (retrobulbar optic nerve); **Species:** Rat; **Pump:** 2004; **Duration:** 21,42,84 days;

**ALZET Comments:** Controls received mp w/ vehicle and fellow eye w/ no treatment; dose-response (fig.5); long-term study; pumps replaced every 28 days; peptides; post op. care (rentamicin, buprenex)

**P6541:** D. E. Brooks, *et al.* Functional and structural analysis of the visual system in the rhesus monkey model of optic nerve head ischemia. INVESTIGATIVE OPHTHALMOLOGY & VISUAL SCIENCE 2004;45(6):1830-1840

**Agents:** Endothelin **Vehicle:** Saline; acetic acid; **Route:** CSF/CNS (optic nerve); **Species:** Monkey; **Pump:** Not Stated; **Duration:** 18 months;

**ALZET Comments:** Controls received mp w/ vehicle; long-term study; pumps replaced every 6 weeks; no stress (see pg. 1833); peptides; "The osmotic minipumps were well tolerated by the monkeys for the length (1.5 years) of the experiment." The long exposure time was used to "mimic more closely the prolonged human glaucomatous condition." p. 1838; pump model not listed; ischemia

**P5771:** L. Smith, *et al.* Endothelin-induced increases in Ca<sup>2+</sup> entry mechanisms of vascular contraction are enhanced during high-salt diet. Hypertension 2003;41(3):787-793

**Agents:** Endothelin-1 **Vehicle:** Not Stated; **Route:** IV; **Species:** Rat; **Pump:** Not Stated; **Duration:** 5 days;

**ALZET Comments:** Controls received mp w/ saline

**P6059:** M. H. Sedeeq, *et al.* Role of reactive oxygen species in endothelin-induced hypertension. Hypertension 2003;42(4):806-810

**Agents:** Endothelin-1; tempol **Vehicle:** Not Stated; **Route:** IV (jugular); **Species:** Rat; **Pump:** 2002; **Duration:** 9 days;

**ALZET Comments:** Peptides

**P5747:** S. D. Rogers, *et al.* Endothelin B receptors are expressed by astrocytes and regulate astrocyte hypertrophy in the normal and injured CNS. Glia 2003;41(2):180-190

**Agents:** Endothelin-1; Bosentan; Dye, Evans blue **Vehicle:** CSF, artificial; **Route:** CSF/CNS (optic nerve); **Species:** Rabbit; **Pump:** 2ML2; **Duration:** 14 days;

**ALZET Comments:** Controls received mp w/ vehicle; functionality of mp verified by Evans Blue Dye; good methods p.182, 181; antihypertensive; Bosentan (commercial drug name is tracler) is an endothelin receptor antagonist (ERA); Vialon catheter with holes used; pump/catheter schematic (p.182); pump is described as advantageous for optic nerve infusion (p.182)

**P5690:** B. Luo, *et al.* Increased pulmonary vascular endothelin B receptor expression and responsiveness to endothelin-1 in cirrhotic and portal hypertensive rats: a potential mechanism in experimental hepatopulmonary syndrome. Journal of Hepatology 2003;38(5):556-563

**Agents:** Endothelin-1 **Vehicle:** Not Stated; **Route:** IV (femoral); **Species:** Rat; **Pump:** 2002; **Duration:** 2 weeks;

**ALZET Comments:** Functionality of mp verified by pump assessment; 2-week stability verified by previous studies by other groups; ET-1 plasma levels measured

**P5147:** B. R. Brehm, *et al.* Modulation of the beta-adrenergic receptor system of vascular smooth muscle cells in vitro and in vivo by chronically elevated endothelin-1 levels. Biochemical Pharmacology 2002;63(1361-1369

**Agents:** Endothelin-1 **Vehicle:** Saline; **Route:** IV (superior vena cava); **Species:** Rat; **Pump:** 2ML4; **Duration:** 3 weeks;

**ALZET Comments:** controls received mp w/ vehicle; functionality of mp verified by ET-1 levels; cardiovascular; peptides

**P5051:** Y. M. Ahn, *et al.* Sustained arterial narrowing after prolonged exposure to perivascular endothelin. Neurosurgery 2002;50(843-848

**Agents:** Endothelin-1 **Vehicle:** Saline; **Route:** Perivascular (femoral artery adventitia); **Species:** Rat; **Pump:** Not Stated; **Duration:** 3 or 5 days;

**ALZET Comments:** controls received mp w/ vehicle; tissue perfusion (adventitia); cardiovascular; peptides; ET-1 is a vasoconstrictor peptide; Arteries perfused via a custom silastic artery cuff attached to catheter tube; pump placed sc



**P4878:** M. Iglarz, *et al.* Chronic blockade of endothelin receptors improves ischemia-induced angiogenesis in rat hindlimbs through activation of vascular endothelial growth factor-NO pathway. *Arteriosclerosis, Thrombosis, and Vascular Biology* 2001;21(1598-1603

**Agents:** Endothelin-1 **Vehicle:** Not Stated; **Route:** SC; IP; **Species:** Rat; **Pump:** 2002; **Duration:** 3 or 28 days;  
**ALZET Comments:** ET-1 infused at a subpressor dose of 2 pmol/kg/min; ischemia (hind-limb); cardiovascular

**P4669:** C. Ramirez, *et al.* Role of intrarenal endothelin 1, endothelin 3, and angiotensin II expression in chronic cyclosporin A nephrotoxicity in rats. *Experimental Nephrology* 2000;8(161-172

**Agents:** Cyclosporin A; Endothelin-1; Endothelin-3; **Vehicle:** Saline; propylene glycol; **Route:** SC;; **Species:** Rat;; **Pump:** 2ML4;; **Duration:** 56 days;;

**ALZET Comments:** Controls received mp w/ vehicle; functionality of mp verified by whole blood CsA levels; long-term study, pumps replaced after 28 days; antihypertensive; cardiovascular; secretion in nephrotoxicity, relationship with Angiotensin II in renal expression propylene glycol used as vehicle for CsA.

**P4492:** M. Zhang, *et al.* Endothelin-1 stimulation of endothelial nitric oxide synthase in the pathogenesis of hepatopulmonary syndrome. *American Journal of Physiology Gastrointestinal and Liver Physiology* 1999;277(G944-G952

**Agents:** Endothelin-1; **Vehicle:** Saline;; **Route:** IV (femoral);; **Species:** Rat;; **Pump:** 2002;; **Duration:** 2 weeks;;

**ALZET Comments:** controls received mp w/vehicle; functionality of mp verified by residual volume; stability verified by RIA after 2 weeks in vitro incubation in the pumps; peptides;

**P4526:** D. Henrion, *et al.* Chronic endothelin-1 improves nitric oxide-dependent flow-induced dilation in resistance arteries from normotensive and hypertensive rats. *Arteriosclerosis, Thrombosis, and Vascular Biology* 1999;19(2148-2153

**Agents:** Endothelin-1; **Vehicle:** Saline;; **Route:** SC;; **Species:** Rat;; **Pump:** 2002;; **Duration:** 2 weeks;;

**ALZET Comments:** controls received mp w/vehicle; peptides;

**P4351:** G. A. Cioffi, *et al.* The effect of chronic ischemia on the primate optic nerve. *European Journal of Ophthalmology* 1999;9(Supp. 1):S34-S36

**Agents:** Endothelin-I **Vehicle:** Not Stated; **Route:** CSF/CNS (optic nerve);; **Species:** monkey; **Pump:** Not Stated; **Duration:** 2-6 months;;

**ALZET Comments:** long-term study, pumps replaced after 4 weeks; peptides; abstract states pump implanted in rabbits also but no mention of rabbits throughout paper; ischemia

**P3977:** E. Thorin, *et al.* Endothelin-1 regulates tone of isolated small arteries in the rat. *Hypertension* 1998;31(1035-1041

**Agents:** Endothelin-1 **Vehicle:** Saline; **Route:** IV (jugular); **Species:** Rat; **Pump:** 2001; **Duration:** 7 days;

**ALZET Comments:** functionality of mp verified by plasma levels; cardiovascular

**Q0938:** M. G. Neerhof, *et al.* Endothelin-1 Induced Placental and Fetal Growth Restriction in the Rat. *The Journal of Maternal-Fetal Medicine* 1997;6(125-128

**Agents:** Endothelin-1 **Vehicle:** BSA; **Route:** IV (jugular); **Species:** Rat; **Pump:** Not Stated; **Duration:** 7 days;

**ALZET Comments:** Controls received mp w/ normal saline; animal info (female, Sprague-Dawley, 250-300 g); functionality of mp verified by residual volume

**P3475:** S. Orgul, *et al.* An endothelin-1 induced model of optic nerve ischemia in the rabbit. *Invest. Ophthalmol. Vis. Sci* 1996;37(9):1860-1869

**Agents:** Endothelin-1 **Vehicle:** Not Stated; **Route:** CSF/CNS (optic nerve); **Species:** rabbit; **Pump:** Not Stated; **Duration:** 2, 8 weeks;

**ALZET Comments:** controls received mp w/ balanced salt solution; tissue perfusion (perineural region of optic nerve); long-term study, pumps replaced every 2 weeks; peptides; pump implanted above the eye; ischemia (optic nerve)

**P3477:** S. Orgul, *et al.* An endothelin-1-induced model of chronic optic nerve ischemia in rhesus monkeys. *J. Glaucoma* 1996;5(135-138

**Agents:** Endothelin-1 **Vehicle:** Not Stated; **Route:** CSF/CNS (optic nerve); **Species:** monkey; **Pump:** 2002; **Duration:** 7 days;

**ALZET Comments:** controls received saline infusion; good methods; peptides; ischemia (optic nerve)





**P3586:** F. Martinez, *et al.* Chronic effects of endothelin-3 on blood pressure and renal haemodynamics in rats. *Nephrol. Dial. Transplant* 1996;11(270-274

**Agents:** Endothelin-3 **Vehicle:** Water, distilled; **Route:** IV (jugular); **Species:** Rat; **Pump:** Not Stated; **Duration:** 3 days;  
**ALZET Comments:** controls received mp w/ vehicle; stability verified by injection of ET-3 from minipump; stable for 3 days - lost biological activity thereafter; peptides

**P3469:** G. A. Cioffi, *et al.* An in vivo model of chronic optic nerve ischemia: the dose-dependent effects of endothelin-1 on the optic nerve microvasculature. *Curr. Eye Res* 1995;14(1147-1153

**Agents:** Endothelin-1 **Vehicle:** Balanced salt solution; **Route:** CSF/CNS (optic nerve); **Species:** rabbit; **Pump:** Not Stated; **Duration:** 4 weeks, 3 days;  
**ALZET Comments:** controls received mp w/ vehicle; peptides; pumps implanted above the eye; ischemia (optic nerve)

**P2661:** G. A. Cioffi, *et al.* Microvasculature of the anterior optic nerve. *Survey of Ophthalmol* 1994;38(Suppl):S107-S117

**Agents:** Endothelin-1 **Vehicle:** Balanced salt solution; **Route:** CSF/CNS (optic nerve); **Species:** rabbit; **Pump:** Not Stated; **Duration:** no duration posted;  
**ALZET Comments:** controls received mp w/ vehicle; comparison of intravitreal injections vs. mp; peptides; pumps implanted above upper eyelid

**P3116:** J. D. Trachtenberg, *et al.* Effect of endothelin-1 infusion on the development of intimal hyperplasia after balloon catheter injury. *J. Cardiovasc. Pharmacol* 1993;22(Suppl8):S355-S359

**Agents:** Endothelin-1 **Vehicle:** Albumin, bovine serum; Saline; **Route:** IV (inferior vena cava); **Species:** Rat; **Pump:** 2ML2; **Duration:** 2 weeks;  
**ALZET Comments:** peptides; pump implanted in groin; transmitter catheters implanted in suprarenal aorta to measure blood pressure and heart rate continuously

**P3039:** M. Naruse, *et al.* Is chronic elevation of plasma endothelin levels a cause of hypertension? *Hypertension Res* 1993;16(247-251

**Agents:** Endothelin-1 **Vehicle:** Saline; **Route:** IV (jugular); **Species:** Rat; **Pump:** 2ML1; 2ML4; **Duration:** 4 weeks;  
**ALZET Comments:** controls received mp with vehicle; functionality of mp verified by plasma levels; stability verified by examining pressor activity after 4 weeks at 37 degrees; peptides

**P2451:** K. Yoshida, *et al.* Endothelin-I augments pressor response to angiotensin II infusion in rats. *Hypertension* 1992;20(3):292-297

**Agents:** Norepinephrine; Angiotensin II; Endothelin **Vehicle:** Acetic acid; Saline; **Route:** IP; IV (jugular); **Species:** Rat; **Pump:** Not Stated; **Duration:** 6 days;  
**ALZET Comments:** controls received mp w/ vehicle; functionality of mp verified upon removal; peptides

**P1940:** H. Kobayashi, *et al.* Cerebral vasospasm and vasoconstriction caused by endothelin. *Neurosurgery* 1991;28(5):673-679

**Agents:** Endothelin-1 **Vehicle:** Water; **Route:** CSF/CNS (intrathecal); **Species:** dog; **Pump:** 2001; **Duration:** 7 days;  
**ALZET Comments:** controls received sham op or mp w/ water; peptides

**P1803:** M. Yasujima, *et al.* Chronic effects of synthetic endothelin on blood pressure and sodium excretion in rats. *American Journal of Hypertension* 1990;3(635-637

**Agents:** Endothelin **Vehicle:** Saline; **Route:** IV (jugular); **Species:** Rat; **Pump:** Not Stated; **Duration:** 6 days;  
**ALZET Comments:** stability assessed by monitoring elevated blood pressure throughout infusion period; peptides

**P1810:** M. Yasujima, *et al.* Calcium channel blockers reverse the sustained elevation of blood pressure induced by chronic infusion of endothelin in conscious rats. *Tohoku J. Exp. Med* 1990;160(157-165

**Agents:** Endothelin **Vehicle:** Saline; **Route:** IV (jugular); **Species:** Rat; **Pump:** Not Stated; **Duration:** 6 days;  
**ALZET Comments:** stability assessed by comparing BP elevating activity of solution recovered from pump with fresh solution; peptides