



References on the Intra-Arterial Administration of Agents Using ALZET® Osmotic Pumps

- Q9004:** Z. Zhao, *et al.* Antioxidant defense and protection against cardiac arrhythmias: lessons from a mammalian hibernator (the woodchuck). *FASEB Journal* 2018;32(8):4229-4240
Agents: KN-92; KN-93 **Vehicle:** Not Stated; **Route:** IA (femoral); **Species:** Woodchuck; **Pump:** 2ML1; **Duration:** 24 hours;
ALZET Comments: Dose ((KN-92 125 µg/kg/h), (KN-93 125 µg/kg/h)); Controls received mp w/ KN-92; animal info (1-2 years, male and female, wild-caught, 2-3kg); KN-92 is an inactive analog of KN-93. KN-93 is a membrane-permeable CaMKII inhibitor; KN-93 is an enzyme inhibitor (Ca²⁺/calmodulin-dependent protein kinase II); ischemia (coronary artery occlusion); cardiovascular; Therapeutic indication (inhibition of CaMKII activity by lessening its oxidized and/or phosphorylated levels may mediate its antiarrhythmic effects.);
- Q6251:** Y. Guan, *et al.* microRNA-352 regulates collateral vessel growth induced by elevated fluid shear stress in the rat hind limb. *Sci Rep* 2017;7(1):6643
Agents: Antagomir-352 **Vehicle:** Route: IA (femoral artery); **Species:** Rat; **Pump:** 1007; **Duration:** 1 week;
ALZET Comments: Dose (500 nmol/kg); animal info (Adult Sprague-Dawley rats weighing 250–300 g); cardiovascular;
- Q6575:** J. Y. Kim, *et al.* Activation of Protein Kinase G (PKG) Reduces Neointimal Hyperplasia, Inhibits Platelet Aggregation, and Facilitates Re-endothelialization. *Sci Rep* 2016;6(36979)
Agents: Exisulind **Vehicle:** DMSO; **Route:** IA (carotid); **Species:** Rat; **Pump:** Not Stated; **Duration:** 2 weeks;
ALZET Comments: Dose (0.5 mg/kg/day); Controls received mp w/ vehicle; animal info (12 week old female Sprague-Dawley rats weighing 280–310 g); Therapeutic indication (neointimal hyperplasia);
- Q4153:** M. H. M. Vries, *et al.* CXCL1 promotes arteriogenesis through enhanced monocyte recruitment into the peri-collateral space. *Anesthesiology* 2015;18(163-171)
Agents: SB225002; CXCL1 **Vehicle:** Not Stated; **Route:** IA (femoral); **Species:** Rat; **Pump:** 2ML1; **Duration:** 1 day; 3 days; 7 days; 10 days; 14 days; animal info (male, Sprague Dalwley, 300-350g); functionality of mp verified by staining for CXCL1; immunology; cardiovascular;;
ALZET Comments: Controls received mp w/ PBS;
- Q5257:** L. Rigassi, *et al.* 2-Methoxyestradiol blocks the RhoA/ROCK1 pathway in human aortic smooth muscle cells. *American Journal of Physiology Endocrinology and Metabolism* 2015;309(12):E995-1007
Agents: Estradiol, 2-methoxy **Vehicle:** DMSO; **Route:** IA (carotid artery); **Species:** Rat; **Pump:** Not Stated; **Duration:** 8 days, 14 days;
ALZET Comments: Controls received mp w/ vehicle; animal info (male Wistar Kyoto rats, 350 to 400 g); dose-response (E999); 0.1% DMSO; cardiovascular; cardiovascular; Balloon injury-induced neointima formation; Dose (350 ug/kg/day);
- Q3638:** Y. Zhao, *et al.* Complement anaphylatoxin C4a inhibits C5a-induced neointima formation following arterial injury. *Molecular Medicine Reports* 2014;10(45-52)
Agents: C5a, recombinant; C4a, recombinant **Vehicle:** PBS; BSA; **Route:** IA (femoral); **Species:** Mice; **Pump:** Not Stated; **Duration:** 2 weeks;
ALZET Comments: Dose (Recomb C5a 1 µg/25 g of body weight); recomb C4a (1 µg/25 g of body weight)); Animal info (C57BL6N, 16 week old); cardiovascular; immunology; arterial injury;
- Q5460:** S. Watada, *et al.* Evaluation of intragastric vs intraperitoneal glucose tolerance tests in the evaluation of insulin resistance in a rodent model of burn injury and glucagon-like polypeptide-1 treatment. *J Burn Care Res* 2014;35(1):e66-72
Agents: Glucagon-like peptide-1 peptide **Vehicle:** saline; **Route:** IA (carotid); iv (jugular); **Species:** Rat; **Pump:** 2001; **Duration:** 7 days;
ALZET Comments: Controls received mp w/ vehicle; animal info (male CD rats, ~400 g); Braintree Polyethylene Catheters used; Dose (40 ng/kg/min);



Q4992: X. F. Lei, *et al.* Identification of Hic-5 as a novel scaffold for the MKK4/p54 JNK pathway in the development of abdominal aortic aneurysms. *J Am Heart Assoc* 2014;3(3):e000747

Agents: Angiotensin II **Vehicle:** saline; **Route:** IA (aorta); **Species:** mice; **Pump:** 2004; **Duration:** 4 weeks;

ALZET Comments: Controls: tamoxifen-injected Apoe_{-/-} mice; mp w/ saline; Controls: tamoxifen-injected Apoe_{-/-} mice; mp w/ saline; cardiovascular, aorta; Dose: 1000ng/kg; Industry authored (American Heart Association);

R0361: J. T. Schnider, *et al.* Site-Specific Immunosuppression in Vascularized Composite Allotransplantation: Prospects and Potential. *Clinical and Developmental Immunology* 2013;2013(1-7

Agents: Prednisolone **Vehicle:** Not Stated; **Route:** IA (renal artery); **Species:** Rat; **Pump:** Not Stated; **Duration:** Not Stated;

ALZET Comments: Dose (4 mg/kg/day); "Local application was superior to systemic application at a dosage of 4mg/kg body weight per day, whereas i.p. or i.v. administration was ineffective at this dose." pg. 3;

Q2982: X. B. Liu, *et al.* Targeted Delivery of Carbaprostacyclin to Ischemic Hindlimbs Enhances Adaptive Remodeling of the Microvascular Network. *Hypertension* 2013;61(5):1036-U290

Agents: Carbaprostacyclin, cPGI2; **Vehicle:** Not Stated; **Route:** IA (femoral); **Species:** Mice; **Pump:** Not Stated; **Duration:** 3, 7, 14 days; 24 hours;

ALZET Comments: Controls received mp w/vehicle, or saline; animal info (C57 black mice (C57BL/6J), 8-12 wks old, acute ischemia model); multiple pumps per animal (2); two pumps with saline or cPGI2 for 24 hours); PE50 catheter

Q2155: J. Zhou, *et al.* Force-specific activation of Smad1/5 regulates vascular endothelial cell cycle progression in response to disturbed flow. *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA* 2012;109(20):7770-7775

Agents: Noggin **Vehicle:** Not Stated; **Route:** IA (abdominal aorta); **Species:** Mice; **Pump:** Not Stated; **Duration:** 2 weeks;

ALZET Comments: Controls received mp w/ saline; animal info (ApoE^{-/-}, C57BL/6)

Q2025: Y. R. Zhang, *et al.* Deficient Dopamine D₂ Receptor Function Causes Renal Inflammation Independently of High Blood Pressure. *PLoS One* 2012;7(6):U180-U190

Agents: Apocynin; RNA, small interfering, Drd2 **Vehicle:** Not Stated; **Route:** SC; IA (intrarenal); **Species:** Mice; **Pump:** 1007D; **Duration:** 7 days;

ALZET Comments: Controls received mp w/ vehicle; animal info (adult, male, D2 receptor deficient, uniphrectomy); enzyme inhibitor (NADPH oxidase); "Surgical glue was applied at the puncture site to hold the tubing in place and prevent extra-renal leakage. The osmotic pump was sutured to the abdominal wall to prevent excessive movement of the pump for the duration of the study." pg e38745; incorrectly listed ALZET Catheter 0007701 as PE tubing (polyurethane)

Q3005: R. Matyal, *et al.* Neuropeptide Y improves myocardial perfusion and function in a swine model of hypercholesterolemia and chronic myocardial ischemia. *Journal of Molecular and Cellular Cardiology* 2012;53(6):891-898

Agents: Neuropeptide Y **Vehicle:** Heparin; BSA; **Route:** IA; **Species:** Swine; **Pump:** 2ML4; **Duration:** 5 weeks;

ALZET Comments: Animal info (swine model of metabolic syndrome with chronic myocardial ischemia, six-week-old, male; Yorkshire miniswine); ischemia (arterial)

Q2047: I. De Meyer, *et al.* Toll-like receptor 7 stimulation by imiquimod induces macrophage autophagy and inflammation in atherosclerotic plaques. *Basic Research in Cardiology* 2012;107(3):U36-U48

Agents: Dexamethasone; imiquimod **Vehicle:** Not Stated; **Route:** IA (carotid); **Species:** Rabbit; **Pump:** 2ML1; **Duration:** 3, 7 days;

ALZET Comments: Animal info (male, New Zealand, white, 2.5-4.0 kg); one group contained mixture of dexamethasone and imiquimod

Q1319: W. Schierling, *et al.* Cerebral Arteriogenesis is Enhanced by Pharmacological as Well as Fluid-Shear-Stress Activation of the Trpv4 Calcium Channel. *European Journal of Vascular and Endovascular Surgery* 2011;41(5):589-596

Agents: PDD, 4 alpha **Vehicle:** Not Stated; **Route:** IA (carotid); **Species:** Rat; **Pump:** 2001; **Duration:** 7 days;

ALZET Comments: Animal info (male, Sprague Dawley, 250-300 g); post op. care (buprenorphine); figure 4a, schematic diagram of the osmotic pump



Q1741: M. J. Frontini, *et al.* Fibroblast growth factor 9 delivery during angiogenesis produces durable, vasoresponsive microvessels wrapped by smooth muscle cells. *NATURE BIOTECHNOLOGY* 2011;29(5):421-U232

Agents: Fibroblast growth factor-9 **Vehicle:** PBS; **Route:** IA (femoral); **Species:** Mice; **Pump:** 1007D; **Duration:** Not Stated; **ALZET Comments:** Controls received mp w/ vehicle; animal info (male, C57BL/6J, 9-10 mo old); polyethylene tubing used; ischemia (hind limb)

Q1446: M. C. Chan, *et al.* The Amiloride Derivative Phenamil Attenuates Pulmonary Vascular Remodeling by Activating NFAT and the Bone Morphogenetic Protein Signaling Pathway. *MOLECULAR AND CELLULAR BIOLOGY* 2011;31(3):517-530

Agents: Phenamil **Vehicle:** Saline; DMSO; **Route:** IA (carotid); **Species:** Rat; **Pump:** 2004; **Duration:** 21 days; **ALZET Comments:** Controls received mp w/ vehicle; animal info (male, Sprague-Dawley, 6-7 wks old, 250-300 g); 50% DMSO used; hypobaric hypoxia; phenamil is an amiloride analog

Q1366: K. Troidl, *et al.* Effects of Endogenous Nitric Oxide and of DETA NONOate in Arteriogenesis. *Journal of Cardiovascular Pharmacology* 2010;55(2):153-160

Agents: Diethylenetriamine NONOate **Vehicle:** Alkaline solution; **Route:** IA; **Species:** Rabbit; **Pump:** Not Stated; **Duration:** Not Stated;

ALZET Comments: Animal info (white, New Zealand); "DETA NONOate in alkaline solution (pH 8) is stable but releases NO when in contact with blood during a continuous infusion from an implanted osmotic minipump connected to a catheter indwelling the proximal or distal stump of the occluded artery." pg 159

Q0190: C. Troidl, *et al.* Calcium-dependent signalling is essential during collateral growth in the pig hind limb-ischemia model. *Journal of Molecular and Cellular Cardiology* 2010;49(1):142-151

Agents: Phorbol didecanoate, 4-alpha- **Vehicle:** Not Stated; **Route:** IA (femoral); **Species:** Pig; **Pump:** 2ML1; **Duration:** 7 days; **ALZET Comments:** Controls received mp w/ saline or sham operation; cardiovascular; animal info (male, juvenile, crossbred, 38kg, femoral artery occlusion); post op. care (cefquinome, fentanyl); ischemia (hind limb); excellent color photograph of multiple mp placement (Fig. 1); multiple pumps per animal (2)

Q1546: D. H. Damon, *et al.* Eph/ephrin interactions modulate vascular sympathetic innervation. *Autonomic Neuroscience: Basic and Clinical* 2010;158(1-2):65-70

Agents: Ephrin-A4-Fc, ligand **Vehicle:** PBS; Evans blue; **Route:** IA (femoral); **Species:** Rat; **Pump:** 1002; **Duration:** Not Stated; **ALZET Comments:** Controls received mp w/ IgG-Fc; animal info (adult, male, 250-300 g, adult, post partum, females, neonatal, Sprague-Dawley)

Q0378: C. Troidl, *et al.* Trpv4 induces collateral vessel growth during regeneration of the arterial circulation. *Journal of Cellular and Molecular Medicine* 2009;13(8B):2613-2621

Agents: PDD, 4 alpha; ruthenium red **Vehicle:** Ethanol; NaCl; **Route:** IA (femoral); **Species:** Rabbit; Rat; **Pump:** Not Stated; **Duration:** 7 days;

ALZET Comments: Controls received mp w/vehicle or sham operated; animal info (New Zealand White, 3.0 kg, Sprague Dawley, 275 g); post op. care (buprenorphine); 4-alpha PDD also known as Phorbol-12,13-didecanoate; Fig 1, schematic of femoral artery ligation with ALZET pump

P9656: M. Snapyan, *et al.* Vasculature Guides Migrating Neuronal Precursors in the Adult Mammalian Forebrain via Brain-Derived Neurotrophic Factor Signaling. *Journal of Neuroscience* 2009;29(13):4172-4188

Agents: Brain-derived neurotrophic factor; immunoglobulin-G-Fe; RNA, small interfering; TrkB-Fr **Vehicle:** NaCl; **Route:** IA (carotid); CSF/CNS (rostral migratory, system); **Species:** Mice; **Pump:** 1007D; **Duration:** 7 days; **ALZET Comments:** Controls received mp w/control siRNA; animal info (2-3 mo old C57BL/J6); brain tissue distribution; ALZET mouse jugular catheter used; heparin added to BDNF

P9814: G. Santulli, *et al.* In vivo properties of the proangiogenic peptide QK. *Journal of Translational Medicine* 2009;7(1):U1-U10

Agents: Vascular endothelial growth factor-15; vascular endothelial growth factor-165; QK **Vehicle:** Not Stated; **Route:** IA (femoral); **Species:** Rat; **Pump:** 2002; **Duration:** 14 days; **ALZET Comments:** Peptides; animal info (12 wks old, WKY, normosensitive); QK is a de novo engineered VEGF mimicking peptide



Q1101: S. Grundmann, *et al.* Endothelial glycocalyx dimensions are reduced in growing collateral arteries and modulate leucocyte adhesion in arteriogenesis. *Journal of Cellular and Molecular Medicine* 2009;13(9B):3463-3474

Agents: Hyaluronidase, active; hyaluronidase, inactive **Vehicle:** Route: IA (femoral); **Species:** Rabbit; **Pump:** Not Stated; **Duration:** Not Stated;

ALZET Comments: Animal info (New Zealand, white, 3 kg)

P9738: V. Croons, *et al.* The Protein Synthesis Inhibitor Anisomycin Induces Macrophage Apoptosis in Rabbit Atherosclerotic Plaques through p38 Mitogen-Activated Protein Kinase. *The Journal of Pharmacology and Experimental Therapeutics* 2009;329(3):856-864

Agents: Anisomycin **Vehicle:** Not Stated; **Route:** IA (carotid); **Species:** Rabbit; **Pump:** 2ML1; **Duration:** 3 days;

ALZET Comments: Controls received mp w/saline; animal info (male, New Zealand, White, 3.3-3.9 kg)

P9229: M. Jiang, *et al.* Ang II-stimulated migration of vascular smooth muscle cells is dependent on LR11 in mice. *Journal of Clinical Investigation* 2008;118(8):2733-2746

Agents: Angiotensin II; Candesartan **Vehicle:** Saline; **Route:** IA (femoral); **Species:** Mice; **Pump:** Not Stated; **Duration:** 4 weeks;

ALZET Comments: Controls received mp w/ vehicle; cardiovascular; peptides; animal info (male, C57BL/6, 20 wks old, Lr11 -/-, wt)

P8306: K. Tiranathanagul, *et al.* Tissue engineering of an implantable bioartificial hemofilter. *ASAIO Journal* 2007;53(2):176-186

Agents: Platelet-derived growth factor-BB; Vascular endothelial growth factor 164 **Vehicle:** Saline, normal; Albumin, rat serum; Acetic acid; **Route:** IA (femoral); IV (femoral); **Species:** Rat; **Pump:** 2004; **Duration:** 28 days;

ALZET Comments: Artificial kidney; controls received mp w/ vehicle; peptides; animal info (male, Fisher 344); mp attached by cannula to bioartificial hemofilter device, which surrounded and delivered agent to the femoral vessels; nephrology

P8836: T. C. Nichols, *et al.* Protease-resistant insulin-like growth factor (IGF)-Binding protein-4 inhibits IGF-I actions and neointimal expansion in a porcine model of neointimal hyperplasia. *Endocrinology* 2007;148(10):5002-5010

Agents: Insulin-like growth factor-binding protein-4; Insulin-like growth factor-binding protein-4, mutated; Insulin-like growth factor-1, recomb. human **Vehicle:** PBS; **Route:** IA (carotid); IA (femoral); **Species:** Pig; **Pump:** Not Stated; **Duration:** 21 days;

ALZET Comments: Controls received mp w/ vehicle; cardiovascular; peptides; animal info (male, female, spotted Poland/China, 12 months old); protease resistant mutant form of IGFBP-4

P8728: G. Gradl, *et al.* Continuous intra-arterial application of substance P induces signs and symptoms of experimental complex regional pain syndrome (CRPS) such as edema, inflammation and mechanical pain but no thermal pain. *Neuroscience* 2007;148(3):757-765

Agents: Substance P **Vehicle:** Saline; Heparin; **Route:** IA (femoral); **Species:** Rat; **Pump:** 2001D; **Duration:** 24 hours;

ALZET Comments: Controls received mp w/ vehicle; good methods (p. 758); animal info (male, Sprague-Dawley, 225-250g); pain

P8299: C. A. Cruze, *et al.* The Y₂ receptor mediates increases in collateral-dependent blood flow in a model of peripheral arterial insufficiency. *Peptides* 2007;28(2):269-280

Agents: Peptide YY, recomb. human; peptide YY (3-36), recomb. human; Vascular endothelial growth factor 165 **Vehicle:** PBS; Glycerol; Sodium citrate; Tween 20; **Route:** IA (iliac); **Species:** Rat; **Pump:** Not Stated; **Duration:** 14 days;

ALZET Comments: Controls received mp w/ vehicle; replacement therapy (femoral artery occlusion); dose-response (fig. 4); half-life (p. 276) <30 minutes; cardiovascular; peptides; ischemia (hindlimb); animal info (male, Sprague-Dawley, 325-350 grams)

P8353: V. Croons, *et al.* Selective clearance of macrophages in atherosclerotic plaques by the protein synthesis inhibitor cycloheximide. *The Journal of Pharmacology and Experimental Therapeutics* 2007;320(3):986-993

Agents: Cycloheximide **Vehicle:** Not Stated; **Route:** IA (carotid); **Species:** Rabbit; **Pump:** 2ML1; **Duration:** 3 days;

ALZET Comments: Controls received mp w/ saline; cardiovascular; animal info (male, New Zealand white, 3.1-3.8 kg); mp connected to a collar around atherosclerotic carotid arteries



P8461: E. C. Chan, *et al.* Adventitial application of the NADPH oxidase inhibitor apocynin in vivo reduces neointima formation and endothelial dysfunction in rabbits. *Cardiovascular Research* 2007;75(4):710-718

Agents: Apocynin **Vehicle:** DMSO; **Route:** IA (carotid); **Species:** Rabbit; **Pump:** 2001; **Duration:** Not Stated;

ALZET Comments: Controls received mp w/vehicle, or no treatment; enzyme inhibitor (NADPH oxidase); cardiovascular; animal info (male, New Zealand White, 3-4kg); 0.1% DMSO; mp attached to catheter to hollow, nonocclusive silastic collar around common carotid artery

P7731: A. N. Carr, *et al.* Efficacy of systemic administration of SDF-1 in a model of vascular insufficiency: Support for an endothelium-dependent mechanism. *Cardiovascular Research* 2006;69(4):925-935

Agents: Vascular endothelial growth factor; Stromal cell-derived factor-1a **Vehicle:** PBS; Glycerol; Sodium acetate; Sodium azide; **Route:** IA (iliac); **Species:** Rat; **Pump:** Not Stated; **Duration:** 2 weeks;

ALZET Comments: Controls received mp w/ vehicle; dose-response (table 1); cardiovascular; peptides; animal info (adult); bilateral femoral artery ligation; occlusive cardiovascular disease

P7937: M. A. Bartoli, *et al.* Localized administration of doxycycline suppresses aortic dilatation in an experimental mouse model of abdominal aortic aneurysm. *Annals of Vascular Surgery* 2006;20(2):228-236

Agents: Doxycycline hydrochloride **Vehicle:** Saline; **Route:** SC; IP; IA (aorta); **Species:** Mice; **Pump:** 1002; **Duration:** 14 days;

ALZET Comments: Controls received mp w/ vehicle; tissue perfusion (aorta); dose-response (table 1); comparison of oral vs. mp; half-life (p. 234), 26.5 hours; cardiovascular; animal info (C57BL/6J, male, 8-10 weeks old, 20-35 grams); catheter secured to a polyvinyl alcohol sponge positioned over the anterior surface of the aorta and secured to retroperitoneal tissues; (quote p. 233)

P7576: L. R. Zhao, *et al.* Synthetic fibronectin peptide exerts neuroprotective effects on transient focal brain ischemia in rats. *Brain Research* 2005;1054(1):1-8

Agents: Fibronectin-derived peptide, synthetic **Vehicle:** PBS; **Route:** IA (carotid); **Species:** Rat; **Pump:** Not Stated; **Duration:** 24 hours;

ALZET Comments: Controls received mp w/ vehicle or control peptide PRARI; peptides; ischemia (cerebral); animal info (male, Sprague-Dawley, 300-350 g); peptide: PRARIY; MCAO

P7495: M. Burchardt, *et al.* Application of angiogenic factors for therapy of erectile dysfunction: protein and DNA transfer of VEGF 165 into the rat penis. *Urology* 2005;66(3):665-670

Agents: Vascular endothelial growth factor, human 165 **Vehicle:** Saline, sterile; Heparin; **Route:** IA (renal); **Species:** Rat; **Pump:** 2004; **Duration:** 28 days;

ALZET Comments: Controls received mp w/ vehicle; functionality of mp verified by VEGF serum immunoassay; comparison of CDNA plasmid micro-injections vs. mp; gene therapy; peptides; animal info (male, Sprague-Dawley); urology; 2000 Units of heparin used

P7647: M. N. Barber, *et al.* Atrial natriuretic peptide preserves endothelial function during intimal hyperplasia. *Journal of Vascular Research* 2005;42(2):101-110

Agents: Atrial natriuretic peptide; Natriuretic peptide, C-type **Vehicle:** Saline, sterile; **Route:** IA (carotid); Perivascular (arterial collar); **Species:** Rabbit; **Pump:** 2001; **Duration:** 7 days;

ALZET Comments: Cardiovascular; animal info (New Zealand white, 3-4 kg); peptides

P6394: M. Sudoh, *et al.* A new animal model of continuous catheterization for investigating mechanisms of arteritis associated with chemotherapy. *LIFE SCIENCES* 2004;74(24):3025-3032

Agents: Fluorouracil, 5-FU; peplomycin **Vehicle:** Saline, heparinized; **Route:** IA (abdominal aorta); **Species:** Rat; **Pump:** 2ML1; **Duration:** 7 days;

ALZET Comments: Controls received mp w/ vehicle; cancer; chemotherapeutic agents; PE-10 and 60 used; tubing attached using a moment binding agent (alon-alfa); catheter schematic p. 3027; pump placed IP



P6784: S. H. Schirmer, *et al.* Differential effects of MCP-1 and leptin on collateral flow and arteriogenesis. *Cardiovascular Research* 2004;64(2):356-364

Agents: Monocyte chemoattractant protein-1, recomb. human; leptin, recomb. human **Vehicle:** Not Stated; **Route:** IA (femoral); **Species:** Rabbit; **Pump:** 2ML1; **Duration:** 7 days;

ALZET Comments: Controls received mp w/ PBS; no stress (see pg. 359); cardiovascular; peptides; right femoral artery occlusion

P6436: C. A. Porro, *et al.* Effects of ketamine anesthesia on central nociceptive processing in the rat: A 2-deoxyglucose study. *Neuroscience* 2004;125(2):485-494

Agents: Heparin **Vehicle:** Saline; **Route:** IA (carotid); IV (jugular); **Species:** Rat; **Pump:** 2001; **Duration:** 7 days;

ALZET Comments: Controls received mp w/ vehicle; post op. care (wounds treated with local anesthetics, lidocaine cream); PE-50 tubing was filled with rat serum and heparin and plugged with nylon fishing line until the pumps were attached; pumps were used only as a means of keeping vessel catheters patent.

P6370: P. S. Manoonkitiwongsa, *et al.* Neuroprotection of ischemic brain by vascular endothelial growth factor is critically dependent on proper dosage and may be compromised by angiogenesis. *Journal of Cerebral Blood Flow and Metabolism* 2004;24(6):693-702

Agents: Vascular endothelial growth factor **Vehicle:** Saline; **Route:** IA (carotid); **Species:** Rat; **Pump:** 2001; **Duration:** 7 days;

ALZET Comments: Controls received mp w/ vehicle; dose response (p. 697); stroke; ischemia (cerebral); biocompatible glue was used to secure catheter in artery

P6616: T. Ziegelhoeffer, *et al.* Inhibition of collateral artery growth by mibefradil: Possible role of volume-regulated chloride channels. *Endothelium: Journal of Endothelial Cell Research* 2003;10(4-5):237-246

Agents: Mibefradil **Vehicle:** PBS; **Route:** IA (femoral); **Species:** Mice; **Pump:** 1007D; **Duration:** 7 days;

ALZET Comments: Controls received mp w/ vehicle; antihypertensive; mibefradil is a tetralol calcium channel blocking agent; PE-50 heat stretched to an O.D of 0.22 mm

P5864: N. van Royen, *et al.* Effects of local MCP-1 protein therapy on the development of the collateral circulation and atherosclerosis in Watanabe hyperlipidemic rabbits. *Cardiovascular Research* 2003;57(1):178-185

Agents: Monocyte chemoattractant protein-1 **Vehicle:** PBS; **Route:** IA (femoral); **Species:** Rabbit; **Pump:** 2ML1; **Duration:** 1 week;

ALZET Comments: Controls received mp w/ vehicle; functionality of mp verified by residual volume; dose-response (p. 181, 183); cardiovascular; peptides; MCP-1

P7695: R. N. van, *et al.* Local monocyte chemoattractant protein-1 therapy increases collateral artery formation in apolipoprotein E-deficient mice but induces systemic monocytic CD11b expression, neointimal formation, and plaque progression. *Circulation Research* 2003;92(2):218-225

Agents: Monocyte chemotactic protein-1 **Vehicle:** Not Stated; **Route:** IA (femoral); **Species:** Mice; **Pump:** 1007D; **Duration:** 7 days;

ALZET Comments: Controls received mp w/ PBS; cardiovascular

P6009: S. Srivastava, *et al.* Basic fibroblast growth factor increases collateral blood flow in spontaneously hypertensive rats. *American Journal of Physiology Heart and Circulatory Physiology* 2003;285(3):H1190-H1197

Agents: Fibroblast growth factor, basic **Vehicle:** Sodium citrate; glycerol; PBS; **Route:** IA (iliac); **Species:** Rat; **Pump:** 2002; **Duration:** 14 days;

ALZET Comments: Controls received mp w/ vehicle; functionality of mp verified by residual volume p. H1192; antihypertensive; post op. care (topical antibiotic powder); "The pump was housed in a tunnel under the skin in the left groin area; this placement did not hamper hindlimb movement while rats were walking on the treadmill." p. H1191; behavioral study; "There were no signs of ischemia or necrosis and no presence of infection or complications from the osmotic pumps..." p. H1192



P6621: B. M. Prior, *et al.* Arteriogenesis: Role of nitric oxide. Endothelium: Journal of Endothelial Cell Research 2003;10(4-5):207-216

Agents: Fibroblast growth factor; heparinase I **Vehicle:** Not Stated; **Route:** IA (iliac); **Species:** Not Stated; **Pump:** Not Stated; **Duration:** 2 weeks;

ALZET Comments: Dose-response (p. 213); the heparinase I infusion group targeted the contralateral iliac vessel; pump or animal model not mentioned

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

Agents: Vascular endothelial growth factor; Vascular endothelial growth factor-E; Monocyte chemoattractant protein-1; Placental growth factor **Vehicle:** Phosphate buffer; albumin; **Route:** IA (femoral); **Species:** Mice; Rabbit; **Pump:** Not Stated; **Duration:** 1 week;

ALZET Comments: Controls received mp w/ vehicle; dose-response (p.381); peptides; placenta growth factor (PIGF) is a VEGF homologue; VEGF-E is a chimera containing the heparin-binding domain of VEGF; MCP-1

P5682: C. Heeschen, *et al.* Nicotine promotes arteriogenesis. Journal of the American College of Cardiology 2003;41(3):489-496

Agents: Nicotine; fibroblast growth factor, basic **Vehicle:** PBS; **Route:** IA (iliac); **Species:** Rabbit; **Pump:** 2ML2; **Duration:** 18 days;

ALZET Comments: Controls received mp w/ vehicle.

P5787: E. Deindl, *et al.* Involvement of the fibroblast growth factor system in adaptive and chemokine-induced arteriogenesis. Circulation Research 2003;92(5):561-568

Agents: Polyanetholesulfonic Acid; Monocyte chemoattractant protein-1 **Vehicle:** Not Stated; **Route:** IA (femoral); **Species:** Rabbit; **Pump:** Not Stated; **Duration:** 1 week;

ALZET Comments: Controls received mp w/ PBS; cardiovascular; MCP-1

P6123: R. H. Cao, *et al.* Angiogenic synergism, vascular stability and improvement of hind-limb ischemia by a combination of PDGF-BB and FGF-2. Nature Medicine 2003;9(5):604-613

Agents: Fibroblast growth factor; platelet-derived growth factor **Vehicle:** Not Stated; **Route:** IA (femoral); **Species:** Rabbit; **Pump:** Not Stated; **Duration:** 7 days;

ALZET Comments: ischemia (hind-limb)

P5730: J. B. Buckwalter, *et al.* Endogenous vascular remodeling in ischemic skeletal muscle: a role for nitric oxide. Journal of Applied Physiology 2003;94(3):935-940

Agents: L-NAME; D-NAME; Phenylephrine **Vehicle:** Saline; heparin; **Route:** IA (femoral); **Species:** Rabbit; **Pump:** 2ML2; **Duration:** 6 weeks;

ALZET Comments: Controls received mp w/ phenylephrine or D-NAME; enzyme inhibitor (Nitric oxide synthase); cardiovascular; peptides; L-NAME & D-NAME (no synthase inhibitors) were dissolved in heparinized saline (100 U/ml)

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

Agents: Monocyte chemoattractant protein-1; doxorubicin; transforming growth factor-B1 **Vehicle:** Not Stated; **Route:** IA (femoral); **Species:** Rabbit; **Pump:** 2ML1; **Duration:** 24 hours;

ALZET Comments: Cardiovascular

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

Agents: Monocyte chemoattractant protein-1; Transforming Growth Factor-B; Doxorubicin **Vehicle:** Not Stated; **Route:** IA (femoral); **Species:** Rabbit; **Pump:** 2ML1; **Duration:** 24 hours;

ALZET Comments: Cardiovascular; peptides; MCP-1 is monocyte chemoattractant protein 1



P5722: M. Arras, *et al.* Monocyte activation in angiogenesis and collateral growth in the rabbit hindlimb. *J Clin. Invest* 2003;101(1):40-50

Agents: Uridine, bromodeoxy- **Vehicle:** Not Stated; **Route:** IA (carotid); **Species:** Rabbit; **Pump:** 2ML2; **Duration:** 3,7 days;
ALZET Comments: Study proliferation of collateral arteries and capillaries

P6224: C. I. Seye, *et al.* Functional P2Y₂ nucleotide receptors mediate uridine 5'-triphosphate-induced intimal hyperplasia in collared rabbit carotid arteries. *Circulation* 2002;106(21):2720-2726

Agents: Uridine 5-triphosphate **Vehicle:** Not Stated; **Route:** IA (carotid); **Species:** Rabbit; **Pump:** 2ML2; **Duration:** 3,14 days;
ALZET Comments: Controls received mp w/ PBS; cardiovascular; post op. care (buprenorphine)

P5340: D. Scholz, *et al.* Contribution of arteriogenesis and angiogenesis to postocclusive Hindlimb perfusion in mice. *Journal of Molecular and Cellular Cardiology* 2002;34(7):775-787

Agents: Fibroblast growth factor 2 **Vehicle:** PBS; **Route:** IA (femoral); **Species:** Mice; **Pump:** 1007D; **Duration:** Not Stated;
ALZET Comments: Controls received mp w/ vehicle; peptides

R0188: C. Heilmann, *et al.* Collateral growth: cells arrive at the construction site. *Cardiovascular Surgery* 2002;10(6):570-578

Agents: Monocyte chemotactic protein-1 **Vehicle:** Not Stated; **Route:** IA; **Species:** Rabbit;
ALZET Comments: Cardiovascular; p. 574

P5542: R. Fernandez-Botran, *et al.* Targeting of glycosaminoglycan-cytokine interactions as a novel therapeutic approach in allotransplantation. *Transplantation* 2002;74(5):623-629

Agents: MC-2 **Vehicle:** Saline; **Route:** IA (profunda femoris artery); **Species:** Rat; **Pump:** 2ML2; **Duration:** Not Stated;
ALZET Comments: Controls received mp w/ vehicle; tissue perfusion (skin flap allograft); immunology; peptides; MC-2 is derived from mouse interferon gamma; transplant

P4782: H. T. Yang, *et al.* VEGF₁₂₁- and bFGF-induced increase in collateral blood flow requires normal nitric oxide production. *American Journal of Physiology Heart and Circulatory Physiology* 2001;280(H1097-H1104)

Agents: Vascular endothelial growth factor 121; Fibroblast growth factor, basic **Vehicle:** PBS; Sodium citrate; Glycerol; **Route:** IA (femoral); **Species:** Rat; **Pump:** 2002; **Duration:** 14 days;
ALZET Comments: Controls received mp w/ vehicle; cardiovascular; peptides; vehicle was PBS w/ 10% sodium citrate and 1.6% glycerol; sodium citrate used to prevent coagulation; glycerol used to enhance protein stability

P4988: K. M. Madsen, *et al.* Influence of ETB receptor antagonism on pregnancy outcome in rats. *Journal of the Society for Gynecologic Investigation* 2001;8(239-244)

Agents: A-192621 **Vehicle:** Ethanol; Propylene glycol; Sodium hydroxide; **Route:** IA (carotid); **Species:** Rat (pregnant); **Pump:** Not Stated; **Duration:** 7 days;
ALZET Comments: Controls received mp w/ vehicle; functionality of mp verified by plasma A-192621 levels; dose-response (fig 3. p. 242); peptides; A-192621 is an Endothelin-B receptor antagonist which blocks vasoconstriction; vehicle was 20% ethanol, 40% propylene glycol, 0.4 M sodium hydroxide.

Q6820: R. H. J. Bruijns, *et al.* Effects of local cytochalasin D delivery on smooth muscle cell migration and on collar-induced intimal hyperplasia in the rabbit carotid artery. *British Journal of Pharmacology* 2001;134(473-483)

Agents: Cytochalasin D **Vehicle:** Not Stated; **Route:** IA (left carotid artery); **Species:** Rabbit; **Duration:** 14 days;
ALZET Comments: Dose (10-4 M, 10-5 M, 10-6 M, 10-7 M, 10-8 M); animal info (Male New Zealand white rabbits (2.5 ± 3.5 kg)); cardiovascular;

P4491: H. T. Yang, *et al.* bFGF increases collateral blood flow in aged rats with femoral artery ligation. *American Journal of Physiology Heart and Circulatory Physiology* 2000;278(H85-H93)

Agents: Fibroblast growth factor, basic **Vehicle:** Sodium citrate; Glycerol; PBS; **Route:** IA (iliac); **Species:** Rat; **Pump:** 2002; **Duration:** 14 days;
ALZET Comments: Controls received mp w/ vehicle; dose response; peptides, cardiovascular; recomb. human FGF used; sodium citrate used to maintain catheter patency; glycerol used to stabilize protein.



P5238: K. M. Stevenson, *et al.* Angiotensin II infused intrarenally causes preglomerular vascular changes and hypertension. *Hypertension* 2000;36(5):839-844

Agents: Angiotensin II **Vehicle:** Saline; Heparin; **Route:** IP; IA (renal artery); **Species:** Rat; **Pump:** 2ML4; **Duration:** 14,25 days;
ALZET Comments: Controls received mp w/ vehicle; cardiovascular; vehicle contained 10 IU/ml of heparin

R0244: S. A. Gruber, *et al.* Local drug delivery to composite tissue allografts. *MICROSURGERY* 2000;20(8):407-411

Agents: Cyclosporin A; FK506 **Vehicle:** Not Stated; **Route:** IA (brachial); **Species:** Rabbit; **Pump:** Not Stated; **Duration:** 6 days;
ALZET Comments: Dose-response; review, see pg. 409

P4855: G. R. Y. De Meyer, *et al.* Periadventitial inducible nitric oxide synthase expression and intimal thickening. *Arteriosclerosis, Thrombosis, and Vascular Biology* 2000;20(1896-1902)

Agents: Lysine, L-N⁶-(1-imino-ethyl)- **Vehicle:** Saline; Polymyxin; **Route:** IA (left carotid); **Species:** Rabbit; **Pump:** 2ML2;
Duration: 14 days;

ALZET Comments: Controls received mp w/ vehicle; functionality of mp verified by immunostaining to verify iNOS activity; cardiovascular; enzyme inhibitor; Polymyxin B present in vehicle (2ug/ml) to bind all traces of lipopolysaccharides. L-NIL is a nitric oxide synthase inhibitor.

P4576: M. V. Shirbacheh, *et al.* Pharmacokinetic advantage of intra-arterial cyclosporin A delivery to vascularly isolated rabbit forelimb. I. Model development. *The Journal of Pharmacology and Experimental Therapeutics* 1999;289(3):1185-1190

Agents: Cyclosporin A **Vehicle:** Sandimmune IV solution; **Route:** IA (brachial); IV (jugular); **Species:** Rabbit; **Pump:** 2ML1;
Duration: 6 days;

ALZET Comments: Good surgical methods (p. 1186); immunology; diagram of pump/catheter system (p. 1186); PE-60 tubing was glued to PE-10 tubing; Sandimmune (CSA) solution used;

P5285: M. V. Shirbacheh, *et al.* Pharmacokinetics of intra-arterial delivery of tacrolimus to vascularly isolated rabbit forelimb. *J Pharmacol Exp. Ther* 1999;289(3):1196-1201

Agents: FK506 **Vehicle:** Not Stated; **Route:** IA (brachial); **Species:** Rabbit; **Pump:** 2ML1; **Duration:** 6 days;

ALZET Comments: Functionality of mp verified by FK-506 blood levels via ELISA; dose-response (p.1198); FK506 also known as tacrolimus; continuous systemic vs. local administration; immunology; transplantation

P4577: M. V. Shirbacheh, *et al.* Pharmacokinetic advantage of intra-arterial cyclosporin A delivery to vascularly isolated rabbit forelimb. II. Dose dependence. *The Journal of Pharmacology and Experimental Therapeutics* 1999;289(3):1191-1195

Agents: Cyclosporin A **Vehicle:** Cremophor; sandimmune IV solution; **Route:** IA (brachial); **Species:** Rabbit; **Pump:** 2ML1;
Duration: 6 days;

ALZET Comments: Dose-response (p. 1192-1194); immunology; sandimmune (CSA) solution used; intramedic PE-60/PE-10 infusion catheter used; to achieve highest dose; two pumps were implanted and catheters were joined via a Y-connector;

P5303: T. C. Nichols, *et al.* Reduction in atherosclerotic lesion size in pigs by alphaVbeta3 inhibitors is associated with inhibition of insulin-like growth factor- I-mediated signaling. *Circulation Research* 1999;85(11):1040-1045

Agents: SC-69000; SC-65811 **Vehicle:** Not Stated; **Route:** IA (carotid, femoral); **Species:** Pig; **Pump:** 2ML2; **Duration:** 14 days;
ALZET Comments: Controls received mp w/ vehicle; cardiovascular; peptides; agents are alphaVb3 receptor inhibitors; diagram of pump placement on p.1041

P4461: H. T. Yang, *et al.* Exercise training enhances basic fibroblast growth factor-induced collateral blood flow. *American Journal of Physiology Heart and Circulatory Physiology* 1998;274(H2053-H2061)

Agents: Fibroblast growth factor, basic **Vehicle:** PBS; Sodium azide; Glycerol; Heparin; **Route:** IA (iliac); **Species:** Rat; **Pump:** 2ML1;
Duration: 2 weeks;

ALZET Comments: Controls received mp w/vehicle; functionality of mp verified by residual volume; peptides; human. recomb fibroblast growth factor used



P4128: S. P. Hopkins, *et al.* Controlled delivery of vascular endothelial growth factor promotes neovascularization and maintains limb function in a rabbit model of ischemia. *J. Vasc. Surg* 1998;27(5):886-895

Agents: Vascular endothelial growth factor; Nitroglycerin **Vehicle:** Saline; Heparin; **Route:** IA (iliac); **Species:** Rabbit; **Pump:** 2ML4; **Duration:** 28 days;

ALZET Comments: Pump diagram (p. 888); 22 g intravenous catheter was inserted into tygon tubing; "implantable osmotic pumps offer an alternative simple delivery method, providing a constant release of soluble agents in a steady-state fashion." (p. 892); controls received mp w/vehicle; good methods (pp. 887-888); cardiovascular; peptides; ischemia

P4004: E. H. Garin, *et al.* Anti-interleukin 8 antibody abolishes effects of lipoid nephrosis cytokine. *Pediatric Nephrology* 1998;12(381-385)

Agents: Cell culture supernatant factor; Antibody, anti-human interleukin 8 **Vehicle:** PBS, sterile; Albumin, bovine serum; **Route:** IA (renal); **Species:** Rat; **Pump:** 2ML1; **Duration:** 5 days;

ALZET Comments: controls received mp w/vehicle; functionality of mp verified by residual volume; heat-stretched PE-10 tubing used; immunology

P4637: K. E. Matthys, *et al.* Local application of LDL promotes intimal thickening in the collared carotid artery of the rabbit. *Arteriosclerosis, Thrombosis, and Vascular Biology* 1997;17(2423-2429)

Agents: Lipoprotein, low density-; lipoprotein, oxidized low density- **Vehicle:** PBS; **Route:** IA (carotid); **Species:** Rabbit; **Pump:** Not Stated; **Duration:** 14 days;

ALZET Comments: Controls received mp w/vehicle; pumps connected to silicone collars around carotid arteries; human LDL used.

P3729: W. D. Ito, *et al.* Monocyte chemotactic protein-1 increases collateral and peripheral conductance after femoral artery occlusion. *Circulation Research* 1997;80(829-837)

Agents: Uridine, bromodeoxy-; Monocyte chemoattractant protein-1 **Vehicle:** PBS; **Route:** IA (femoral); **Species:** Rabbit; **Pump:** 2ML2; **Duration:** Not Stated;

ALZET Comments: Controls received mp w/ PBS; functionality of mp verified by BrdU staining and residual volume; peptides; cardiovascular; MCP-1

P3730: E. H. Garin, *et al.* Effect of interleukin-8 on glomerular sulfated compounds and albuminuria. *Pediatric Nephrology* 1997;11(274-279)

Agents: Interleukin-8 **Vehicle:** BSA; **Route:** IA (renal); **Species:** Rat; **Pump:** 2ML1; **Duration:** 5 days;

ALZET Comments: controls received mp w/BSA; good methods (pg. 275); peptides; used PE-10 catheter stretched to further reduce its diameter

P3740: C. Chen, *et al.* Boundary layer infusion of nitric oxide reduces early smooth muscle cell proliferation in the endarterectomized canine artery. *J. Surg. Res* 1997;67(26-32)

Agents: Proline, l-; Proline, nitric oxide- **Vehicle:** NaOH; **Route:** IA (femoral); **Species:** Dog; **Pump:** 2ML2; **Duration:** 7 days;

ALZET Comments: Controls received mp w/ proline to contralateral vessel; stability verified by in vitro assay; half-life (pg. 27); cardiovascular; constructed local infusion device and attached to mp via catheter

P3975: M. C. Cha, *et al.* Zinc deficiency inhibits the direct growth effect of growth hormone on the tibia of hypophysectomized rats. *Biological Trace Element Research* 1997;59(99-111)

Agents: Growth hormone, recomb. human **Route:** IA (femoral); **Species:** Rat; **Pump:** 2002; **Duration:** 13 days;

ALZET Comments: controls received mp w/vehicle; replacement therapy (hypophysectomy); no stress (see pg. 103); stress/adverse reaction (p. 103); PE10, PE50 and PE60 tubing used; PE10 tubing was stretched to fit into the vessel; peptides;

P4413: H. T. Yang, *et al.* Basic fibroblast growth factor increases collateral blood flow in rats with femoral arterial ligation. *Circulation Research* 1996;79(1):62-69

Agents: Fibroblast Growth Factor, basic; Heparin **Vehicle:** Saline; Glycerol; Sodium azide; **Route:** IA (Femoral); **Species:** Rat; **Pump:** 2002; **Duration:** 1,2,4 weeks;

ALZET Comments: Controls received mp w/ heparin; functionality of mp verified by residual volume; long-term study, pumps replaced at day 14; no stress (p. 63); good methods (p.63); peptides; cardiovascular



P4428: S. G. Mattar, *et al.* Local infusion of FGF-Saporin reduces intimal hyperplasia. *Journal of Surgical Research* 1996;60(339-344)

Agents: Fibroblast growth factor; saporin **Vehicle:** Sodium citrate; NaCl; EDTA; **Route:** IA (carotid); **Species:** Dog; **Pump:** 2002; **Duration:** 14 days;

ALZET Comments: Controls received mp w/vehicle; stability verified for 14 days by cellular assay; peptides; Saporin- FGF2 conjugate was infused; pump placed externally; Saporin is a potent ribosome-inactivating protein.

P3530: L. E. Cardona-Sanclemente, *et al.* Increase by adrenaline or angiotensin II of the accumulation of low density lipoprotein and fibrinogen by aortic walls in unrestrained conscious rats. *British Journal of Pharmacology* 1996;117(1089-1094)

Agents: Epinephrine; Angiotensin II **Vehicle:** Ascorbic acid; **Route:** SC; IA (carotid); **Species:** Rat; **Pump:** 2ML4; 1007D; **Duration:** 6 days;

ALZET Comments: controls received saline infusion; functionality of mp verified by plasma levels; stability verified by analyzing residual solution

P3404: N. Yoshimura, *et al.* Local immunosuppressive therapy with monoclonal anti-T-cell antibody on renal allograft survival in the rat. II. Phenotypic and functional assessment of spleen cells. *Transplant. Proc* 1995;27(1):390-391

Agents: Antibody, monoclonal, OX-19 **Vehicle:** Saline; **Route:** IA (renal); IV (femoral); **Species:** Rat; **Pump:** Not Stated; **Duration:** 7 days;

ALZET Comments: immunology; arterial infusion proved more effective than venous infusion

P4096: A. E. Levy, *et al.* Administration of intragraft interleukin-4 prolongs cardiac allograft survival in rats treated with donor-specific transfusion/cyclosporine. *Transplantation* 1995;60(5):405-406

Agents: Interleukin-4; Interleukin-10 **Vehicle:** Not Stated; **Route:** IA (brachiocephalic); **Species:** Rat; **Pump:** Not Stated; **Duration:** 14 days;

ALZET Comments: immunology; peptides; pump infused the brachiocephalic artery of a harvested heart, which was then implanted into a recipient; recomb. mouse IL-4 & IL-10 used

P3381: T. C. Kirkham, *et al.* Meal pattern analysis in rats reveals partial agonist activity of the bombesin receptor antagonist BW2258U89. *Pharmacol. Biochem. Behav* 1995;52(1):101-106

Agents: BW2258U89 **Vehicle:** Saline; **Route:** IA (celiac); **Species:** Rat; **Pump:** 2001; **Duration:** 6 days;

ALZET Comments: controls received laparotomy & subsequent anesthesia; catheter tips passed through gauze before placement in arteries; catheters were anchored w/polypropylene microsuture; gauze was sutured to arterial wall

P4100: M. K. Hirko, *et al.* In vivo tissue distribution of fibroblast growth factor-1 after intraarterial delivery. *ASAIO Journal* 1995;41(M630-M633)

Agents: Fibroblast growth factor; Heparin **Vehicle:** ¹²⁵I tracer; Radio-isotopes; **Route:** IA (carotid); **Species:** Rabbit; **Pump:** 2001D; **Duration:** 24 hours;

ALZET Comments: Functionality of mp verified by residual radioactivity analysis; no stress (see pg. M631); good methods (p. M631); peptides; tissue distribution

P3296: E. H. Garin. Effect of lipid nephrosis cytokine on glomerular sulfated compounds and albuminuria. *Pediatric Nephrology* 1995;9(587-593)

Agents: Cell cultures, supernatant fraction of PBM **Vehicle:** Not Stated; **Route:** IA (renal); **Species:** Rat; **Pump:** 2ML1; **Duration:** 5 days;

ALZET Comments: controls received mp w/ BSA in Hank's solution; idiopathic minimal lesion nephrotic syndrome; patient mononuclear cells used; pumps sutured to abdominal wall; "...chronic infusion allowed us to avoid the sudden increase in intravascular volume observed during the acute infusion studies..." (p.590)



P2617: D. S. Baskin, *et al.* Development of a model for Parkinson's disease in sheep using unilateral intracarotid injection of MPTP via slow continuous infusion. *Life Sci* 1994;54(7):471-479

Agents: MPTP HCl **Vehicle:** Not Stated; **Route:** IA (carotid); **Species:** Sheep; **Pump:** 2ML1; **Duration:** 1,7 weeks;

ALZET Comments: Neurodegenerative (Parkinson's disease); comparison of acute injections vs. mp; no stress (see pg. 474); catheter placed in proximal occipital artery (w/ distal end of artery occluded); ". . .slow continuous infusion may be a useful alternative to repeated dosing in animal studies using MPTP. . ."

P2525: B. L. Moses, *et al.* Comparison of intra-arterial and intravenous infusion of cisplatin for head and neck squamous cell carcinoma in a modified rat model. *Arch Otolaryngol. Head Neck Surg* 1993;119(6):612-617

Agents: Cisplatin **Vehicle:** Not Stated; **Route:** IV (saphenous); IA (saphenous); **Species:** Rat (nude); **Pump:** 2ML1; **Duration:** 6 days;

ALZET Comments: tissue perfusion (tumor xenograft); cancer

P2511: C. J. Lee, *et al.* Local immunosuppressive therapy with monoclonal anti-T cell antibody on renal allograft survival in the rat. *Clinical & Experimental Immunology* 1993;91(3):362-367

Agents: Antibody, monoclonal **Vehicle:** Saline; **Route:** IA (renal); IV (femoral); **Species:** Rat; **Pump:** 2ML1; **Duration:** 7 days;

ALZET Comments: tissue perfusion (kidney allograft); dose-response (table, p.364); immunology; comparison of single IV bolus, systemic IV infusion, or regional IA infusion

P2982: M. Ferraresso, *et al.* Immunosuppressive effects of defibrotide. *Transplantation* 1993;56(4):928-933

Agents: Defibrotide; Cyclosporin A **Vehicle:** PBS; Cremophor; **Route:** IA (innominate); IV (lumbar); **Species:** Rat; **Pump:** 2002; 2ML1; **Duration:** Not Stated;

ALZET Comments: Controls were untreated; comparison of ip injections or oral gavage vs. mp; defibrotide infused into artery of graft or recipient vein; defibrotide is an immunosuppressant w/ antithrombotic and profibrinolytic activities

P2220: M. H. Chiang, *et al.* Human placental lactogen directly inhibits rat cartilage growth processes in vivo and in vitro. *Circulation Research* 1993;128(6):65-68

Agents: Human placental lactogen **Vehicle:** Not Stated; **Route:** IA (iliac); **Species:** Rat; **Pump:** 2001; **Duration:** 7 days;

ALZET Comments: controls received mp w/vehicle; stability verified in vitro for 6 days; peptides

P2526: E. T. Alarid, *et al.* Differential effects of an antiserum to epidermal growth factor on the development of transplanted rat embryos and fetal structures in vivo. *Growth Factors* 1993;8(2):235-243

Agents: Antibody, anti-epidermal growth factor; Epidermal growth factor **Vehicle:** Water; Glycerol; Sodium nitrate; Heparin; Albumin; **Route:** IA (renal); **Species:** Rat; **Pump:** 2002; **Duration:** 14 days;

ALZET Comments: tissue perfusion (fetal tissue transplants); peptides

P2089: T. Riemenschneider, *et al.* Arterial, portal or combined arterio-portal regional chemotherapy in experimental liver tumours? *J. Cancer Res. Clin. Oncol* 1992;118(5):596-600

Agents: Uridine, fluorodeoxy- **Vehicle:** Heparin; Saline; **Route:** IA (hepatic); IV (hepatic portal); **Species:** Rat; **Pump:** 2ML2; **Duration:** 7 days;

ALZET Comments: Cancer; 5000 IU/kg of heparin dissolved in saline; animal info (SD, F, 120-150 g); tissue perfusion (tumor); cancer; hepatic artery accessed via gastroduodenal artery; portal vein via ileocolic vein;

P2154: G. L. Matejka, *et al.* Local infusion of IGF-I into the kidney of pituitary intact rats induces renal growth. *Acta Physiologica Scandinavica* 1992;145(7):18

Agents: Insulin-like growth factor I **Vehicle:** Albumin, bovine serum; Saline; **Route:** IA (suprarenal); **Species:** Rat; **Pump:** 2ML1; **Duration:** 7 days;

ALZET Comments: Controls received mp with vehicle; tissue perfusion (kidney); dose-response; peptides; pumps infused into the artery and directly into renal parenchyma via a catheter sealed at the end and punctured along the sides; recomb. human IGF-1 used



- P2099:** E. T. Alarid, *et al.* Evidence suggesting that insulin-like growth factor-I is necessary for the trophic effect of insulin on cartilage growth in vivo. *Endocrine Society* 1992;139(4):2305-2309
Agents: Antibody, anti-IGF I; Insulin **Vehicle:** 125I tracer; Heparin; Radio-isotopes; Serum, rabbit; **Route:** IA (iliac); **Species:** Rat; **Pump:** 2001; **Duration:** 7 days;
ALZET Comments: functionality of mp verified by RIA; dose-response; peptides
- P2015:** S. M. Stepkowski, *et al.* Rapamycin, a potent immunosuppressive drug for vascularized heart, kidney, and small bowel transplantation in the rat. *Transplantation* 1991;51(1):22-26
Agents: Rapamycin **Vehicle:** Dimethylacetamide; PEG 400; Tween 80; **Route:** IA (innominate); IV (lumbar); **Species:** Rat; **Pump:** 2002; **Duration:** 14 days;
ALZET Comments: tissue perfusion (allograft)
- P1946:** T. Kamei, *et al.* Intra-graft delivery of 16, 16-dimethyl PGE2 induces donor-specific tolerance in rat cardiac allograft recipients. *Transplantation* 1991;51(1):242-246
Agents: Prostaglandin E2 analogue **Vehicle:** Ethanol; Saline; **Route:** IA (innominate); IP; IV (lumbar); **Species:** Rat; **Pump:** 2ML1; 2ML2; **Duration:** 1, 2 weeks;
ALZET Comments: tissue perfusion (cardiac allograft); immunology; pumps implanted IP
- R0084:** M. J. A. P. Daemen, *et al.* Pharmacokinetic considerations in local drug delivery. *Advanced Drug Delivery Reviews* 1991;6(1-18)
Agents: Hippuric acid **Vehicle:** 125I tracer; Radio-isotopes; **Route:** IA (suprarenal); **Species:** Rat;
ALZET Comments: Tissue perfusion
- P2594:** D. E. Andersen, *et al.* Metabolic effects associated with chronically elevated cortisol in rainbow trout (*Oncorhynchus mykiss*). *Canadian Journal of Fisheries and Aquatic Sciences* 1991;48(9):1811-1817
Agents: Cortisol **Vehicle:** Cyclodextrin, B-; **Route:** IA (dorsal aorta); **Species:** Fish (rainbow trout); **Pump:** 2001; **Duration:** 10, 14 days;
ALZET Comments: controls received mp w/ vehicle or sham operation; functionality of mp verified by RIA of plasma levels; stress from surgery caused hyperglycemia (p.816) for 22 hours; "Mini-osmotic pumps. . . were an effective method for chronically elevating cortisol titers in trout."; Molecusol HBP is a beta-cyclodextrin
- P1890:** E. T. Alarid, *et al.* Evidence for an organ- and sex-specific role of basic fibroblast growth factor in the development of the fetal mammalian reproductive tract. *Endocrine Society* 1991;129(4):2148-2154
Agents: Antibody, anti-fibroblast growth factor **Vehicle:** Glycerol; Sodium azide; **Route:** IA (suprarenal); **Species:** Rat; **Pump:** 2002; **Duration:** 14 days;
ALZET Comments: tissue perfusion (graft); peptides
- P1690:** L. Liu, *et al.* Analysis of the role of basic fibroblast growth factor in growth and differentiation of transplanted fetal rat paws and intestines. *Endocrinology* 1990;126(3):1764-1770
Agents: Antibody, anti-fibroblast growth factor; Fibroblast growth factor **Vehicle:** Glycerol; Heparin; Saline; Sodium azide; Sodium citrate; **Route:** IA (renal); **Species:** Rat; **Pump:** 2001; 2002; **Duration:** 6, 11 days;
ALZET Comments: Tissue perfusion: tissue graft; good methods for FGF/pg. 1765; peptides; basic FGF used
- P3291:** N. J., *et al.* Epidermal growth factor accelerates functional recovery from ischaemic acute tubular necrosis in the rat: role of the epidermal growth factor receptor. *Clinical Science* 1990;78(445-450)
Agents: Epidermal growth factor **Vehicle:** Saline; **Route:** IA (renal); **Species:** Rat; **Pump:** 2001; **Duration:** 8 days;
ALZET Comments: controls received mp w/saline; peptides; medical category: renal; skc
- R0089:** A. Amkraut, *et al.* Osmotic delivery of peptides and macromolecules. *Advanced Drug Delivery Reviews* 1990;4(255-276)
Agents: Atrial natriuretic factor; cholecystokinin; Granulocyte-colony stimulating factor.; glucagon; insulin; interleukin-2; interleukin-3; melatonin; nerve growth factor; neurotensin; prolactin; theophylline **Vehicle:** Not Stated; **Route:** CSF/CNS; IA (femoral); intrasplenic; IP; SC; **Species:** Not Stated; **Pump:** Not Stated; **Duration:** Not Stated;
ALZET Comments: Peptides; ALZA-authored, review of peptide delivery issues and applications; tissue perfusion (spleen)



P1567: S. M. Stepkowski, *et al.* Prolongation of heterotropic heart allograft survival by local delivery of continuous low-dose cyclosporine therapy. *Transplantation* 1989;47(1):17-23

Agents: Cyclosporin **Vehicle:** Cremophor; **Route:** IA (innominate); IV; **Species:** Rat; **Pump:** 2002; **Duration:** 14 days;
ALZET Comments: dose-response; comparison of gavage vs. mp infusion; functionality of mp verified by blood levels; tissue perfusion (heart allograft)

P1651: E. M. Spencer, *et al.* Parathyroid hormone potentiates the effect of insulin-like growth factor-I on bone formation. *European Journal of Endocrinology* 1989;121(4):35-44

Agents: Insulin-like growth factor I; Parathyroid hormone **Vehicle:** Glycerol; Heparin; Sodium azide; Tris buffer; **Route:** IA (iliac); **Species:** Rat; **Pump:** 2001; **Duration:** 7 days;
ALZET Comments: functionality of mp verified by residual volume; peptides

P1646: P. Ruiz, *et al.* Association of chronic thromboxane inhibition with reduced in situ cytotoxic T cell activity in rejecting rat renal allografts. *Transplantation* 1989;48(4):660-666

Agents: OKY-046 **Vehicle:** Saline; **Route:** IA (renal); **Species:** Rat; **Pump:** Not Stated; **Duration:** 4 days;
ALZET Comments: tissue perfusion; OKY-046 is a thromboxane synthetase inhibitor

P1606: P. Li, *et al.* Enhanced slow-pressor response to angiotensin II in spontaneously hypertensive rats. *Journal of Pharmacology and Experimental Therapeutics* 1989;251(3):909-921

Agents: Angiotensin II; Norepinephrine **Vehicle:** Water; **Route:** IA (renal); IP; IV (jugular); **Species:** Rat; **Pump:** 2002; **Duration:** 1, 2 weeks;
ALZET Comments: dose-response (graph); tissue perfusion; peptides

P1480: G. B. Koelle, *et al.* Effect of glycyl-L-glutamine on the rate of regeneration of acetylcholinesterase in the rat gastrocnemius muscle after diisopropyl phosphorofluoridate administration. *Proceedings of the National Academy of Sciences* 1989;86(11):4331-4333

Agents: Glutamine, glycyl-L- **Vehicle:** Plasma, heat-inactivated cat; Water; **Route:** IA (abdominal aorta); **Species:** Rat; **Pump:** 2001; **Duration:** 2 days;
ALZET Comments: controls received IA catheter, w/ no pump; tissue perfusion

P1644: J. M. Gallo, *et al.* Pump delivery of azidothymidine: potential for constant concentrations and improved brain delivery. *J. Controlled Release* 1989;9(249-253)

Agents: Azidothymidine **Vehicle:** Not Stated; **Route:** IA (carotid); **Species:** Rat; **Pump:** 2001; **Duration:** 3, 7 days;
ALZET Comments: Dose-response; blood levels; comparison of IV injections vs. mp; good methods; antiviral; alkaline pH of 11 increased solubility and stability of AZT; antiretroviral drug

P1431: T. M. Coffman, *et al.* Chronic thromboxane inhibition preserves function of rejecting rat renal allografts. *Kidney International* 1989;35(24-30)

Agents: OKY-046 **Vehicle:** Saline; **Route:** IA (renal); **Species:** Rat; **Pump:** Not Stated; **Duration:** 4 days;
ALZET Comments: schematic of OP ligated to aortic cuff of allograft; tissue perfusion; cancer/immunology

P1454: T. J. Ruers, *et al.* Sensitivity of graft rejection in rats to local immunosuppressive therapy. *Transplantation* 1988;46(6):820-825

Agents: Budesonide **Vehicle:** Propanediol; Water; **Route:** IA (carotid); IV (jugular); **Species:** Rat; **Pump:** 2ML2; **Duration:** 14 days;
ALZET Comments: dose-response; schematic shows IA catheter w/ mp; functionality of mp verified by plasma levels; tissue perfusion (heart); cancer/immunology

P1352: T. Riemenschneider, *et al.* Continuous or bolus chemotherapy with 5-fluoro-2-deoxyuridine in transplanted experimental liver tumors. *Journal of Cancer Research and Clinical Oncology* 1988;114(482-486)

Agents: Uridine, fluorodeoxy- **Vehicle:** Heparin; Saline; **Route:** IA (hepatic); **Species:** Rat; **Pump:** 2ML2; **Duration:** 7 days;
ALZET Comments: regional chemotherapy; comparison of IA injections vs. mp infusion; cancer/immunology; tissue perfusion



P1384: L. Liu, *et al.* Evidence for a role of basic fibroblast growth factor in rat embryonic growth and differentiation. *Endocrinology* 1988;123(4):2027-2031

Agents: Antibody, fibroblast growth factor; Serum, rabbit; Fibroblast growth factor **Vehicle:** Glycerol; Heparin, porcine; Sodium azide; Sodium citrate; Water; **Route:** IA (renal); **Species:** Rat; **Pump:** 2001; 2002; **Duration:** 6, 10 days;

ALZET Comments: antibody, transplanted embryo in kidney was perfused using renal artery; peptides; tissue perfusion; basic FGF used

P1340: M. J. A. P. Daemen, *et al.* Pharmacokinetic evaluation of local drug delivery: the intratesticular and intrarenal administration of acenocoumarol in the rat. *Journal of Pharmacy and Pharmacology* 1988;40(283-285)

Agents: Acenocoumarol **Vehicle:** PBS; Water; **Route:** IA (renal); IA (suprarenal); IA (testicular); intratesticular; **Species:** Rat; **Pump:** 2001; **Duration:** 5 days;

ALZET Comments: mp connected to catheter; functionality of mp verified by plasma and tissue levels; tissue perfusion; dose-response (table)

P1356: M. J. A. P. Daemen, *et al.* Pharmacokinetic considerations in target-organ directed drug delivery. *Trends in Pharmacological Sciences* 1988;9(138-141)

Agents: Acenocoumarol; Edetic acid; Hippuric acid; Propranolol; Radio-isotopes **Vehicle:** 125I tracer; 51Cr tracer; **Route:** IA (renal); **Species:** Rat; **Pump:** Not Stated; **Duration:** Not Stated;

ALZET Comments: Targeted delivery; tissue perfusion; antihypertensive

P0982: T. J. M. Ruers, *et al.* Local inhibition of major histocompatibility complex class II induction within the graft: An effective way to induce immunosuppression. *Transplant. Proc.* XIX 1987;19(1):246-248

Agents: Prednisolone **Vehicle:** Saline; Water; **Route:** IA (suprarenal); IP; **Species:** Rat; **Pump:** 2ML2; **Duration:** 14 days;

ALZET Comments: controls received mp w/saline; immunology; tissue perfusion

P1451: T. J. M. Ruers, *et al.* Immunohistological observations in rat kidney allografts after local steroid administration. *Journal of Experimental Medicine* 1987;166(1205-1220)

Agents: Prednisolone **Vehicle:** Water; **Route:** IA (suprarenal); **Species:** Rat; **Pump:** 2ML2; **Duration:** 14 days;

ALZET Comments: functionality of mp verified by serum levels; tissue perfusion (kidney)

R0077: N. Ray, *et al.* Implantable osmotically powered drug delivery systems. In 'Drug Delivery Systems: Fundamentals and Techniques,' P. Johnson and J. G. Lloyd-Jones (eds.), Ellis Horwood Ltd., Chichester, England and VCH Verlagsgesellschaft mbH, Weinheim, Federal Republic of Germany 1987;Ch. 7):120-138

Agents: Antipyrine; bleomycin; dopamine HCl; melatonin; methotrexate, sodium; nicotine; prednisolone; radio-isotopes; valproic acid **Vehicle:** ¹⁴C tracer; ³H tracer; **Route:** IA; IP; SC; **Species:** Mice; Rabbit; Rat; **Pump:** Not Stated; **Duration:** Not Stated;

ALZET Comments: ALZA-authored; synoptic review of mp; post op. care (antibiotic); comparison of sc injections vs. mp infusion; pulsed delivery

P0981: A. Nilsson, *et al.* Effects of unilateral arterial infusion of GH and IGF-I on tibial longitudinal bone growth in hypophysectomized rats. *Calcified Tissue International* 1987;40(2):91-96

Agents: Growth hormone, human; Insulin-like growth factor I; Prolactin, ovine **Vehicle:** Saline, heparinized; **Route:** IA (femoral); **Species:** Rat; **Pump:** 2002; **Duration:** 14 days;

ALZET Comments: controls were untreated; mp connected to catheter in femoral artery; replacement therapy (hypophysectomy); local IA infusion; peptides

P1083: T. D. Hexum, *et al.* Plasma enkephalin-like peptide response to chronic nicotine infusion in guinea pig. *Brain Research* 1987;406(1/2):370-372

Agents: Nicotine **Vehicle:** Saline; **Route:** IA (carotid); **Species:** Guinea pig; **Pump:** 2002; **Duration:** 10 days;

ALZET Comments: mp connected to indwelling catheter in carotid artery



P0707: J. F. Smits, *et al.* Lack of renal vasodilation during intrarenal infusion of synthetic Atriopeptin II in conscious intact SHR. *Life Sciences* 1986;38(1):81-87

Agents: Saline **Vehicle:** Not Stated; **Route:** IA (renal); **Species:** Rat; **Pump:** 2001; **Duration:** 2, 3 days;
ALZET Comments: mp attached to catheter in suprarenal artery; tissue perfusion

P2427: N. L. Schlechter, *et al.* Evidence suggesting that the direct growth-promoting effect of growth hormone on cartilage in vivo is mediated by local production of somatomedin. *Proc. Natl. Acad. Sci* 1986;83(7932-7934

Agents: Growth hormone, rat; Somatomedin C, human; Serum, rabbit; Antiserum, human somatomedin C, rabbit **Vehicle:** Glycerol; Sodium azide; Water, double-distilled; Sodium heparin; **Route:** IA (right superior vesicle); **Species:** Rat; **Pump:** 2001; **Duration:** 7 days;

ALZET Comments: replacement therapy (hypophysectomy); peptides; minipump and catheter were implanted in abdominal cavity; some rats received co-infusion of GH and rabbit serum or antiserum

P0771: N. L. Schlechter, *et al.* A direct growth effect of growth hormone in rat hindlimb shown by arterial infusion. *American Journal of Physiology Endocrinology and Metabolism* 1986;250(American Journal of Physiology Endocrinology and Metabolism):E231-E235

Agents: Growth hormone, rat; Prolactin, ovine **Vehicle:** Glycerol; Sodium azide; **Route:** IA (superior vesicle); **Species:** Rat; **Pump:** 2001; **Duration:** 7 days;

ALZET Comments: replacement therapy (hypophysectomy); mp connected to catheter in superior vesicle artery; detailed description and diagram of catheter apparatus; constant and pulsed delivery of GH; peptides

P0782: T. J. M. Ruers, *et al.* Local treatment of renal allografts, a promising way to reduce the dosage of immunosuppressive drugs. *Transplantation* 1986;41(2):156-161

Agents: Prednisolone **Vehicle:** Saline; Water; **Route:** IA (suprarenal); IA (testicular); IP; IV (jugular); **Species:** Rat; **Pump:** 2ML2; **Duration:** 13 days;

ALZET Comments: mp connected to catheter in suprarenal or testicular artery or jugular vein; states pump rate as 6 ul/hr; dose-response (serum urea levels); kidney transplant; immunosuppression; half-life; mp infusion prolonged graft survival; tissue perfusion

P0912: T. J. M. Ruers, *et al.* infusion on rat renal allograft rThe effect of intrarenal steroid ejection. *Transplant. Proc. XVIII* 1986;18(5):1106-1107

Agents: Prednisolone **Vehicle:** Water; **Route:** IA (suprarenal); IP; **Species:** Rat; **Pump:** Not Stated; **Duration:** Not Stated;
ALZET Comments: Immunology; tissue perfusion

P0937: P. S. Cooke, *et al.* Insulin but not GH directly stimulates growth of transplanted fetal rat paws. *American Journal of Physiology Endocrinology and Metabolism* 1986;251(E624-E629

Agents: Growth hormone; Insulin **Vehicle:** Glutamic acid; Glycerin; HCl; Sodium hydroxide; Phenol; Saline; Water; **Route:** IA (renal); **Species:** Rat; **Pump:** 2001; **Duration:** 7 days;

ALZET Comments: controls received mp w/saline; mp conn. to catheter in renal artery; comparison of sc inject. vs. mp infusion; repl. therapy (hypophysectomy); peptides; tissue perfusion

P0682: L. M. L. LeNoble, *et al.* Selective efferent chemical sympathectomy of rat kidneys. *American Journal of Physiology Regulatory, Integrative, and Comparable Physiology* 1985;249(4):R496-R501

Agents: Saline **Vehicle:** Not Stated; **Route:** IA (renal); **Species:** Rat; **Pump:** 2001; **Duration:** Not Stated;
ALZET Comments: Pump used only to flush catheter and keep it patent when not in use; tissue perfusion

P0543: J. F. M. Smits, *et al.* Activation of afferent renal nerves by intrarenal bradykinin in conscious rats. *American Journal of Physiology Regulatory, Integrative, and Comparable Physiology* 1984;247(6):R1003-R1008

Agents: Saline **Vehicle:** Not Stated; **Route:** IA (renal); **Species:** Rat; **Pump:** Not Stated; **Duration:** 3, 5 days;
ALZET Comments: mp used only to keep catheters open prior to second part of surgery & prior to drug infusion; tissue perfusion



P0537: J. C. S. Kleinjans, *et al.* Hemodynamic characterization of hypertension induced by chronic intrarenal or intravenous infusion of norepinephrine in conscious rats. *Hypertension* 1984;6(5):689-699

Agents: Norepinephrine **Vehicle:** Saline; **Route:** IA (renal); IV (jugular); **Species:** Rat; **Pump:** 2001; **Duration:** 5 days;

ALZET Comments: comparison of acute infusion by Percidor pump vs. iv or ia mp infusion; dose-response data; 2 doses NE - 4 and 36 ug/kg/hr; tissue perfusion

P0468: J. C. S. Kleinjans, *et al.* Evaluation of renal function during intrarenal norepinephrine infusion in conscious rats. *Renal Physiology* 1984;7(243-250)

Agents: Norepinephrine **Vehicle:** Ascorbic acid; Saline; **Route:** IA (renal); IV (jugular); **Species:** Rat; **Pump:** Not Stated; **Duration:** 5 days;

ALZET Comments: Comparison of iv vs. ia mp infusion; dose-response data; tissue perfusion

P0287: J. F. M. Smits, *et al.* Chronic local infusion into the renal artery of unrestrained rats. *American Journal of Physiology Heart and Circulatory Physiology* 1983;244(H304-H307)

Agents: Saline **Vehicle:** Not Stated; **Route:** IA (renal); **Species:** Rat; **Pump:** 2001; **Duration:** 2, 14 days;

ALZET Comments: Pumps replaced after days 2 and 7; tissue perfusion

P0348: J. C. S. Kleinjans, *et al.* Blood pressure response to chronic low-dose intrarenal noradrenaline infusion in conscious rats. *Clinical Science* 1983;65(111-116)

Agents: Norepinephrine **Vehicle:** Ascorbic acid; Saline; **Route:** IA (renal); IV (jugular); **Species:** Rat; **Pump:** 2001; **Duration:** 5 days;

ALZET Comments: comparison of i.v. vs. i.a. infusion; tissue perfusion

P0496: J. C. S. Kleinjans, *et al.* Body fluid and salt homeostasis during hypertension caused by chronic intrarenal norepinephrine infusion in conscious rats. *Journal of Hypertension* 1983;1(2):207-209

Agents: Norepinephrine **Vehicle:** Ascorbic acid; Saline; **Route:** IA (renal); **Species:** Rat; **Pump:** Not Stated; **Duration:** 5 days;

ALZET Comments: dose-response data; tissue perfusion