



References on Myocardial Ischemia Using ALZET® Osmotic Pumps

Q12167: M. de la Fuente-Munoz, *et al.* Supplementation with Standardized Green/Black or White Tea Extracts Attenuates Hypertension and Ischemia-Reperfusion-Induced Myocardial Damage in Mice Infused with Angiotensin II. *Antioxidants (Basel)* 2025;14(1):

Agents: Angiotensin II **Vehicle:** Saline; **Route:** SC; **Species:** Mice; **Strain:** C57/BL6J; **Pump:** Not Stated; **Duration:** 28 days; **ALZET Comments:** Dose (1.44 mg/kg/day); controls received mp w/ vehicle; animal info (16-week-old male, isoflurane); blood pressure measured via tail cuff; Measurements Fig. 5 (pg.13); antihypertensive; cardiovascular;

Q12201: F. Zhang, *et al.* Rectifying METTL4-Mediated N(6)-Methyladenine Excess in Mitochondrial DNA Alleviates Heart Failure. *Circulation* 2024;150(18):1441-1458

Agents: Angiotensin II; Phenylephrine **Vehicle:** PBS; **Route:** SC; **Species:** Mice; **Strain:** C57BL/6J; **Pump:** Not Stated; **Duration:** 3 weeks;

ALZET Comments: Dose (1.5 ug/g/d, 30 ug/g/d); controls received mp w/ vehicle; animal info (12-week adult); heart failure;

Q12202: J. Song, *et al.* Bradykinin attenuates endothelial-mesenchymal transition following cardiac ischemia-reperfusion injury. *European Journal of Pharmacology* 2024;971(176556)

Agents: Bradykinin **Vehicle:** Not Stated; **Route:** SC; **Species:** Rat; **Strain:** Sprague-Dawley; **Pump:** 2002; **Duration:** 2 weeks;

ALZET Comments: Dose (0.5 µg/h); control animals were sham operated; animal info (male 8-week-old); ischemia (ischemia-reperfusion); cardiovascular; myocardial injury and fibrosis;

Q11459: J. Schmeckpeper, *et al.* RyR2 inhibition with dantrolene is antiarrhythmic, prevents further pathological remodeling, and improves cardiac function in chronic ischemic heart disease. *Journal of Molecular and Cellular Cardiology* 2023;181(67-78)

Agents: Dantrolene **Vehicle:** Saline; **Route:** SC; **Species:** Mice; **Strain:** C57BL/6J; **Pump:** 2006; **Duration:** 6 weeks;

ALZET Comments: Dose (20 mg/kg/day); 0.9% normal saline used; controls received mp w/ vehicle; animal info (10–12 week old male and female); cardiovascular; "These data show that chronic dantrolene treatment is as effective as an acute treatment for preventing VT in CIHD with minimal long-term adverse effects." pg. 7; (chronic ischemic heart disease)

Q11854: I. Marti-Pamies, *et al.* Brown Adipose Tissue and BMP3b Decrease Injury in Cardiac Ischemia-Reperfusion. *Circulation Research* 2023;133(4):353-365

Agents: Isoproterenol **Vehicle:** Saline; **Route:** Not Stated; **Species:** Mice; **Strain:** WT; Ucp1-/-; **Pump:** Not Stated **Duration:** 3d;

ALZET Comments: Dose: (60 mg/kg/d) controls received mp w/ vehicle; ischemia (cardiac ischemia-reperfusion);

Q11111: Y. Hu, *et al.* Stomatin-like protein 2 deficiency exacerbates adverse cardiac remodeling. *Cell Death Discovery* 2023;9(1):63

Agents: AngII **Vehicle:** Saline; **Route:** SC; **Species:** Mice; **Strain:** SLP-2-/-; WT (C57BL/6); **Pump:** 2004; **Duration:** 28 days;

ALZET Comments: Dose: (1000 ng/kg/min); Controls received mp w/ vehicle; animal info (Male mice; 6-24 weeks old; Weighed 22-25 g); peptides; cardiovascular;

Q10635: A. C. M. Omoto, *et al.* Central Nervous System Actions of Leptin Improve Cardiac Function After Ischemia-Reperfusion: Roles of Sympathetic Innervation and Sex Differences. *Journal of American Heart Association* 2022;11(21):e027081

Agents: Leptin **Vehicle:** Saline; **Route:** SC; **Species:** Rat; **Strain:** Wistar; **Pump:** 2002; **Duration:** 28 days;

ALZET Comments: Dose Leptin (0.62 µg/h); Controls received mp w/ vehicle; animal info (rats (12-to 14-weeks old)pumps replaced on day 14; catheter; See (p.3-4)ischemia (ischemia/reperfusion injury.);

Q11164: Y. Kwon, *et al.* Effects of 3-methyladenine, an autophagy inhibitor, on the elevated blood pressure and arterial dysfunction of angiotensin II-induced hypertensive mice. *Biomedicine & Pharmacotherapy* 2022;154(113588)

Agents: Angiotensin II **Vehicle:** Saline; **Route:** Not Stated; **Species:** Mice; **Strain:** C57BL/6; **Pump:** 2004; **Duration:** 4 weeks;

ALZET Comments: Dose: (1000 ng/kg/min); Controls received mp w/ vehicle; animal info: Eight-week-old male; Blood pressure measured via: tail-cuff method with a photoplethysmography blood pressure monitoring system; bp measurements see (pg.4) Fig.1A; cardiovascular;



Q10463: T. Devarakonda, *et al.* Chronic treatment with serelaxin mitigates adverse remodeling in a murine model of ischemic heart failure and modulates bioactive sphingolipid signaling. *Scientific Reports* 2022;12(1):8897

Agents: Serelaxin **Vehicle:** Saline; **Route:** SC; **Species:** Mice; **Strain:** CD1; **Pump:** Not Stated; **Duration:** 28 days;
ALZET Comments: Dose: (10 µg/kg/day); Controls received mp w/ vehicle; animal info: adult male 6–8 weeks, post op. care: (buprenorphine SR LAB, 0.5 mg/kg, s.c) and antibiotic (gentamicin, 0.7 mg/kg); ischemia (ischemic heart failure.); cardiovascular;

Q10744: H. Chen, *et al.* The E3 Ubiquitin Ligase WWP2 Regulates Pro-Fibrogenic Monocyte Infiltration and Activity in Heart Fibrosis. *Nature Communications* 2022;13(1):7375

Agents: Angiotensin II **Vehicle:** Saline; **Route:** SC; **Species:** Mice; **Strain:** WWP2 flox/flox; **Pump:** 1004; **Duration:** Not Stated;
ALZET Comments: Dose (500 ng/kg/min); Controls received mp w/ vehicle; animal info (8 weeks); peptides; heart fibrosis;

Q10419: P. Canale, *et al.* Role of miR-133/Dio3 Axis in the T3-Dependent Modulation of Cardiac mitoK-ATP Expression. *International Journal of Molecular Sciences* 2022;23(12):

Agents: Triiodothyronine **Vehicle:** Saline; **Route:** SC; **Species:** Rat; **Strain:** Wistar; **Pump:** 2ML4; **Duration:** 48 hours;
ALZET Comments: Dose: (3 ug/kg/day) Controls received mp w/ vehicle; animal info: 12-15 week old adult male; T3 is a thyroid hormone; cardiovascular; ischemia (heart)

Q10860: A. E. Yuko, *et al.* LIN28a Induced Metabolic and Redox Regulation Promotes Cardiac Cell Survival in the Heart After Ischemic Injury. *Redox Biology* 2021;47(102162)

Agents: Uridine, 5-ethynyl-2'-deoxy- **Vehicle:** DMSO; Water, double distilled; **Route:** SC; **Species:** Mice; **Strain:** C57BL/6;
Pump: Not Stated; **Duration:** 1 week;
ALZET Comments: Dose: (39.0625 mg/mL); 50/50% DMSO/ddH₂O vehicle used; Controls received mp w/ vehicle; animal info: (8–12 weeks old male mice) ischemia (Myocardial);

Q10301: E. A. Polyakova, *et al.* Hyperleptinemia results in systemic inflammation and the exacerbation of ischemia-reperfusion myocardial injury. *Heliyon* 2021;7(11):e08491

Agents: Leptin **Vehicle:** Not Stated; **Route:** SC; **Species:** Rat; **Strain:** Wistar; **Pump:** 2ML1; **Duration:** Not Stated;
ALZET Comments: Dose: (0.33 ug/ul); Controls received mp w/ vehicle; animal info: male rats aged 11–12 weeks and weighing 250–300 g; ischemia (ischemia-reperfusion injury);

Q12121: A. Eguchi, *et al.* GRK5 is a regulator of fibroblast activation and cardiac fibrosis. *Medical Sciences, Biological Sciences* 2021;118(5):

Agents: Ang II **Vehicle:** PBS **Route:** SC **Species:** Mice **Strain:** Fibroblast-specific GRK5 knock out (KO) **Pump:** Not Stated
Duration: 4 weeks;
ALZET Comments: Dose: (1 ug/kg/min); controls received mp w/ vehicle; cardiovascular (myocardial infarction);

Q12056: W. Bi, *et al.* Neurotrophin-3 contributes to benefits of human embryonic stem cell-derived cardiovascular progenitor cells against reperfused myocardial infarction. *Stem Cells Translational medicine* 2021;10(5):756-772

Agents: Human neurotrophin-3 **Vehicle:** PBS; **Route:** SC; **Species:** Mice; **Strain:** C57BL/6; **Pump:** 1004; **Duration:** 1 week;
ALZET Comments: Dose: (0.5 ug/d); animal info (male 10-12 weeks-old); cardiovascular (myocardial infarction); Therapeutic Indication: myocardial I/R injury;

Q9852: P. Zhang, *et al.* Inhibition of Autophagy Signaling via 3-methyladenine Rescued Nicotine-Mediated Cardiac Pathological Effects and Heart Dysfunctions. *International Journal of Biological Sciences* 2020;16(8):1349-1362

Agents: Nicotine **Vehicle:** Saline; **Route:** SC; **Species:** Rat; **Strain:** Sprague Dawley; **Pump:** 2ML4; **Duration:** 30 days;
ALZET Comments: Dose (4 µg/kg/min); Controls received mp w/ vehicle; animal info (male 8-months-old); (cardiac injury);

Q9908: J. B. Yang, *et al.* Infusion of Melatonin Into the Paraventricular Nucleus Ameliorates Myocardial Ischemia-Reperfusion Injury by Regulating Oxidative Stress and Inflammatory Cytokines. *Journal of Cardiovascular Pharmacology* 2019;

Agents: Melatonin **Vehicle:** CSF, artificial; **Route:** CSF/CNS; **Species:** Rat; **Strain:** Sprague Dawley; **Pump:** 1004; **Duration:** 1 w;
ALZET Comments: Dose (0.025 ug/hr); Controls received mp w/ vehicle; animal info (Male 220-285 g); Melatonin aka Mel; Brain coordinates (1.8 mm caudal from bregma, 0.4 mm lateral to the midline, and 7.9 mm ventral to the dorsal surface); bilateral cannula used; ischemia (Myocardial);



Q7400: C. X. Qin, *et al.* Cardioprotective Actions of the Annexin-A1 N-Terminal Peptide, Ac2-26, Against Myocardial Infarction. *Front Pharmacol* 2019;10(269)

Agents: Annexin A1, N-terminal-derived peptide **Vehicle:** DMSO, Saline; **Route:** SC; **Species:** Mice; **Strain:** C57BL/6; **Pump:** 1002; **Duration:** 4 weeks;

ALZET Comments: Dose (1 mg/kg/day); 10% DMSO used; Controls received mp w/ vehicle; animal info mice (22–30 g)); (Adult male ischemia (Myocardial ischemia); cardiovascular;

Q8748: R. Li, *et al.* The Glp-1 Analog Liraglutide Protects Against Angiotensin II and Pressure Overload-Induced Cardiac Hypertrophy via PI3K/Akt1 and AMPKa Signaling. *Front Pharmacol* 2019;10(537)

Agents: Angiotensin II **Vehicle:** Saline; **Route:** SC; **Species:** Mice; **Strain:** C57BL/6J; **Pump:** 2004; **Duration:** 4 weeks;

ALZET Comments: Dose (1.4 mg/kg/day); 0.9% Saline used; Controls received mp w/ vehicle; animal info (8-10 weeks old, Male, 23.5-27.5 g); cardiovascular;

Q8003: X. M. Gao, *et al.* Relaxin mitigates microvascular damage and inflammation following cardiac ischemia-reperfusion. *Basic Res Cardiol* 2019;114(4):30

Agents: Angiotensin II **Vehicle:** Saline; **Route:** SC; **Species:** Mice; **Strain:** C57BL/6; **Pump:** 2004; **Duration:** 4 weeks;

ALZET Comments: Dose (1.44 mg/kg/day); Controls received mp w/ vehicle; animal info (8 week old, male,); cardiovascular;

Q6901: T. Vajen, *et al.* Blocking CCL5-CXCL4 heteromerization preserves heart function after myocardial infarction by attenuating leukocyte recruitment and NETosis. *Sci Rep* 2018;8(1):10647

Agents: MKEY; MKEY, scrambled **Vehicle:** Formic acid; **Route:** IV (jugular); **Species:** Mice; **Strain:** C57BL/6; **Pump:** 1007D; **Duration:** 7 days;

ALZET Comments: Dose (1.3 mg/kg/day); animal info (mice); cardiovascular;

Q7862: L. Sabatino, *et al.* Modification of gene expression profiling related to renin-angiotensin system in an ischemia/reperfusion rat model after T3 infusion. *Mol Cell Biochem* 2018;449(1-2):277-283

Agents: Triiodothyronine **Vehicle:** Saline; **Route:** SC; **Species:** Rat; **Strain:** Wistar; **Pump:** 2002; **Duration:** 3 days;

ALZET Comments: Dose (6 µg/kg/day); Controls received sham surgery and mp w/ vehicle; animal info (12-15 weeks, male, 353 +/-11g); post op. care (hydrated with physiological saline and given buprenorphine 0.05 mg/kg s.c.); ischemia (myocardial ischemia/reperfusion); cardiovascular; Therapeutic indication (T3 stimulates the expression of protective genes related to renin-angiotensin system such as AT2R/MAS1-ACE2 mainly in BZ);

Q8125: E. Mendoza-Torres, *et al.* Protection of the myocardium against ischemia/reperfusion injury by angiotensin-(1-9) through an AT2R and Akt-dependent mechanism. *Pharmacol Res* 2018;135(112-121)

Agents: Angiotensin (1-9), Mas receptor antagonist, or AT2R antagonist **Vehicle:** Not stated; **Route:** SC; **Species:** Rat; **Strain:** Sprague Dawley; **Pump:** Not stated; **Duration:** 2 weeks;

ALZET Comments: Dose (Angiotensin (1-9)- 450 ng/kg/min, Mas receptor antagonist-100 ng/kg/min, or AT2R antagonist- 36 ng/kg/min); Controls received mp w/ vehicle; animal info (Male, Sprague Dawley, 250-300 g,); AT2R antagonist aka PD123319, Mas receptor antagonist aka A779; ischemia (Heart);

Q6934: F. Forini, *et al.* Integrative analysis of differentially expressed genes and miRNAs predicts complex T3-mediated protective circuits in a rat model of cardiac ischemia reperfusion. *Sci Rep* 2018;8(1):13870

Agents: Thyroid hormone **Vehicle:** Saline; **Route:** SC; **Species:** Rat; **Strain:** Not Stated; **Pump:** 2ML4; **Duration:** Not Stated;

ALZET Comments: Dose (3 µg/kg/day); Controls received mp w/ vehicle; cardiovascular;

Q5589: T. Beiert, *et al.* Chronic lower-dose relaxin administration protects from arrhythmia in experimental myocardial infarction due to anti-inflammatory and anti-fibrotic properties. *International Journal of Cardiology* 2018;250(21-28)

Agents: Relaxin-2 **Vehicle:** Sodium acetate; **Route:** SC; **Species:** Mice; **Strain:** CD1; **Pump:** 1002; **Duration:** 2 weeks;

ALZET Comments: Dose (75 µg/kg/d); Controls received mp w/ vehicle; animal info (12 wk old); ischemia (cardiac); cardiovascular; Therapeutic indication (myocardial infarction; arrhythmia)



Q7175: P. M. Becher, *et al.* Role of Toll-like receptors and interferon regulatory factors in different experimental heart failure models of diverse etiology: IRF7 as novel cardiovascular stress-inducible factor. *PLoS One* 2018;13(3):e0193844

Agents: Angiotensin II **Vehicle:** Not Stated; **Route:** SC; **Species:** Mice; **Strain:** Not Stated; **Pump:** 2004; **Duration:** 3 Weeks;

ALZET Comments: Dose (2.4 mg/kg); animal info (6-8 weeks of age); cardiovascular;

Q7791: R. Acin-Perez, *et al.* Ablation of the stress protease OMA1 protects against heart failure in mice. *Science Translational Medicine* 2018;10(434):

Agents: isoproterenol, angiotensin II, MitoQ **Vehicle:** Not Stated; **Route:** SC; **Species:** Mice; **Strain:** C57BL/6J0laHsd; CD1; **Pump:** 2004; **Duration:** 7, 28 days;

ALZET Comments: Dose ((ISO 10mg/kg/d), (AngII 1µg/kg/d), (MQ 0.15mg/d)); Controls were received mp w/ ISO and no MQ; animal info (C57BL/6J0laHsd or CD1); MQ is a specific mtROS scavenger; cardiovascular; ISO-infused mice compared to AngII model of heart failure; Therapeutic indication (cardioprotective effect of administered MQ (prior to TAC) through preserved cardiac mitochondrial performance);

Q5987: H. Song, *et al.* CREG protects from myocardial ischemia/reperfusion injury by regulating myocardial autophagy and apoptosis. *Biochimica et Biophysica Acta (BBA) - Molecular Basis of Disease* 2017;1863(8):1893-1903

Agents: CREG, recombinant **Vehicle:** Not Stated; **Route:** SC; **Species:** Mice; **Strain:** heterozygous; **Pump:** Not Stated;

Duration: 7 days;

ALZET Comments: animal info (8 weeks old); cardiovascular; Therapeutic indication (CREG, Ischemia/reperfusion injury); Dose (0.3 mg/kg/day);

Q6603: S. Menazza, *et al.* Non-nuclear estrogen receptor alpha activation in endothelium reduces cardiac ischemia-reperfusion injury in mice. *J Mol Cell Cardiol* 2017;107(41-51

Agents: Estradiol; Dendrimer; Estrogen-dendrimer conjugate; ICI182,780 **Vehicle:** Not Stated; **Route:** SC; **Species:** Mice;

Strain: Not Stated; **Pump:** Not Stated; **Duration:** 2 weeks;

ALZET Comments: Dose (Estradiol (6µg/day); (Dendrimer 6µg/day), Estrogen-dendrimer conjugate (6µg/day); ICI182,780 (2mg/kg/day0); Controls received mp w/ vehicle; animal info (11 week old female mice); Estrogen-dendrimer conjugate aka EDC; ischemia (Cardiac);

Q4908: M. Wu, *et al.* Placental growth factor 2 — A potential therapeutic strategy for chronic myocardial ischemia.

International Journal of Cardiology 2016;203(534-542

Agents: Placental growth factor-2, recombinant human **Vehicle:** PBS; **Route:** IV; **Species:** Pig; **Strain:** Sus Scrofa; **Pump:** 2ML2;

Duration: 14 days;

ALZET Comments: Controls received mp w/ vehicle; animal info (20-25kg); functionality of mp verified by plasma levels; ischemia (myocardial); cardiovascular; Dose (15 µg/kg/day);

Q6764: L. Sabatino, *et al.* T3 enhances Ang2 in rat aorta in myocardial I/R: comparison with left ventricle. *J Mol Endocrinol* 2016;57(3):139-49

Agents: Triiodothyronine **Vehicle:** Saline; **Route:** SC; **Species:** Rat; **Strain:** Wistar; **Pump:** 2ML4; **Duration:** 48 hours;

ALZET Comments: Dose (6 µg/kg/day); Controls received mp w/ vehicle; animal info (adult male rats 12-15 weeks old and weighing about 300 g); tri-iodothyronine aka T3; cardiovascular;

Q6037: Q. Duan. Deregulation of XBP1 expression contributes to myocardial vascular endothelial growth factor-A expression and angiogenesis during cardiac hypertrophy in vivo. *Aging Cell* 2016;

Agents: Isoproterenol hydrochloride **Vehicle:** Not Stated; **Route:** Not Stated; **Species:** Mice; **Strain:** C57BL/6; **Pump:** 1007D, 1002; **Duration:** 2 weeks;

ALZET Comments: Controls received sham surgery; animal info (8 weeks old); Therapeutic indication (ER stress, Heart failure); Dose (15 mg/kg/day);



R0338: M. Balestrino, *et al.* Potential of creatine or phosphocreatine supplementation in cerebrovascular disease and in ischemic heart disease. *Amino Acids* 2016;48(8):1955-67

Agents: Creatine **Vehicle:** Not Stated; **Route:** CSF/CNS (ventricle); **Species:** Rat; **Strain:** Not Stated; **Pump:** Not Stated;

Duration: 5 days;

ALZET Comments: functionality of mp verified by immunocytochemical staining of brain; ischemia (global brain ischemia); brain tissue distribution; Dose (50 mM);

Q4591: M. A. Song, *et al.* Chronic Losartan Treatment Up-Regulates AT(1)R and Increases the Heart Vulnerability to Acute Onset of Ischemia and Reperfusion Injury in Male Rats. *PLoS One* 2015;10(U1154-U1168)

Agents: Losartan **Vehicle:** Not Stated; **Route:** SC; **Species:** Rat; **Strain:** Sprague Dawley; **Pump:** 2ML4; **Duration:** 14 days;

ALZET Comments: Controls received mp w/ Saline; animal info (male, 6 months old); ischemia (cardiac); cardiovascular; antihypertensive; bp measured using femoral catheter;

Q4978: J. Phie, *et al.* Prolonged Subcutaneous Administration of Oxytocin Accelerates Angiotensin II-Induced Hypertension and Renal Damage in Male Rats. *PLoS One* 2015;10(9):e0138048

Agents: Angiotensin II; oxytocin **Vehicle:** PBS; **Route:** SC; **Species:** Rat; **Strain:** Sprague Dawley; **Pump:** 2004; **Duration:** 28 d;

ALZET Comments: Controls received mp w/ vehicle; animal info (male, 8-9 weeks old, 240-350g); post op. care (swabbed with 7.5% w/v iodine); cardiovascular; peptides; Dose (Ang II 40 ug/kg/h; OT 20 or 100 ng/kg/h);

Q5227: D. Luo, *et al.* Continuous angiotensin-(1-7) infusion improves myocardial calcium transient and calcium transient alternans in ischemia-induced cardiac dysfunction rats. *Biochemical and Biophysical Research Communications* 2015;467(4):645-50

Agents: Angiotensin (1-7) **Vehicle:** saline; **Route:** IV (jugular); **Species:** Rat; **Strain:** Sprague Dawley; **Pump:** 2ML4; **Duration:** 28 days;

ALZET Comments: Controls received mp w/ vehicle and sham operation; animal info: adult male rats, 180-220 g; functionality of mp verified by measurements of hemodynamic parameters, the calcium transient, and the heart rate threshold of calcium transient alternans; ischemia (cardiac); post op. care (IP injection of buprenorphine); cardiovascular; peptides; "evaluate impact of Ang-(1e7) on calcium transient (CaT) in cardiomyocytes during the pathogenesis of heart failure" (pg 645); Dose: 24 mg/kg per hour

Q3817: J. O. Bouhidel, *et al.* Netrin-1 improves post-injury cardiac function in vivo via DCC/NO-dependent preservation of mitochondrial integrity, while attenuating autophagy. *Biochimica et Biophysica Acta (BBA) - Molecular Basis of Disease* 2015;1852(277-289)

Agents: Netrin **Vehicle:** Saline; **Route:** SC; **Species:** Mice; **Strain:** C57BL6; **Pump:** Not Stated; **Duration:** 14 days;

ALZET Comments: Controls received mp w/ vehicle; animal info (male, C57BL6, 8-10 weeks old); ischemia (cardiac);

Q8171: J. O. Bouhidel, *et al.* Netrin-1 improves post-injury cardiac function in vivo via DCC/NO-dependent preservation of mitochondrial integrity, while attenuating autophagy. *Biochim Biophys Acta* 2015;1852(2):277-89

Agents: Netrin-1 **Vehicle:** Saline; **Route:** SC; **Species:** Mice; **Strain:** C57BL/6; **Pump:** Not stated; **Duration:** 14 days;

ALZET Comments: Dose (15 ng/kg per day); Controls received mp w/ vehicle; animal info (Male C57BL/6 (8-10 weeks old));

Q4308: K. Aravindhan, *et al.* Cardioprotection Resulting from Glucagon-Like Peptide-1 Administration Involves Shifting Metabolic Substrate Utilization to Increase Energy Efficiency in the Rat Heart. *PLoS One* 2015;10(U1979-U1996)

Agents: Glucagon-like peptide-1 **Vehicle:** Saline; **Route:** SC; **Species:** Rat; **Strain:** Sprague Dawley; **Pump:** 2ML2; **Duration:** Not Stated;

ALZET Comments: Controls received mp w/ vehicle; animal info (male, Sprague Dawley, 250-300g); ischemia (cardiac); post op. care (Saline IP, 37C incubator until fully ambulatory); cardiovascular;

Q3191: S. M. Williams, *et al.* Class I HDACs regulate angiotensin II-dependent cardiac fibrosis via fibroblasts and circulating fibrocytes. *Journal of Molecular and Cellular Cardiology* 2014;67(:):112-125

Agents: Angiotensin II **Vehicle:** Not Stated; **Route:** Not Stated; **Species:** Mice; **Pump:** Not Stated; **Duration:** 3 days; 2 weeks;

ALZET Comments: Animal info (male, C57BL6J, 10 weeks old); cardiovascular; peptides; bp measured using catheter;



- Q3348:** A. D. Lassaletta, *et al.* Microvascular Notch Signaling Is Upregulated in Response to Vascular Endothelial Growth Factor and Chronic Myocardial Ischemia. *Circulation Journal* 2014;78(3):743-751
Agents: Vascular endothelial growth factor, recombinant human **Vehicle:** Heparin; Saline; **Route:** Intrapericardial; **Species:** Pig; **Pump:** 2ML4; **Duration:** 4 weeks;
ALZET Comments: Animal info (male, Yorkshire miniswine, 13-22kg); ischemia (cardiac, chronic); stress/adverse reaction: (see pg. 746); post op. care (Enrofloxacin 68mg PO daily for 5 days; aspirin 325 mg/day for 5 days; buprenorphine HCL 0.3 mg/kg, transdermal fentanyl patch 4mcg/kg for 72h); cardiovascular;
- Q3881:** F. Forini, *et al.* Triiodothyronine Prevents Cardiac Ischemia/Reperfusion Mitochondrial Impairment and Cell Loss by Regulating miR30a/p53 Axis. *Endocrinology* 2014;155(4581-4590)
Agents: Triiodothyronine **Vehicle:** Saline; **Route:** SC; **Species:** Rat; **Pump:** 2ML4; **Duration:** 48 hours;
ALZET Comments: Controls received mp w/ vehicle; animal info (male, Wistar, 12-15 weeks old, 310g); ischemia (cardiac);
- Q2682:** N. I. Yang, *et al.* Direct Renin Inhibitor Attenuates Left Ventricular Remodeling in Post-Myocardial Infarction Heart Failure Mice. *Acta Cardiologica Sinica* 2013;29(2):160-167
Agents: Aliskiren **Vehicle:** Not Stated; **Route:** Not Stated; **Species:** Mice; **Pump:** 1004; **Duration:** 3 weeks;
ALZET Comments: Control animals received mp w/ vehicle; animal info (C57BL/6, male, 10 wks old); enzyme inhibitor (renin);
- Q6776:** D. L. Sonin, *et al.* Protease-activated receptor 1 inhibition by SCH79797 attenuates left ventricular remodeling and profibrotic activities of cardiac fibroblasts. *J Cardiovasc Pharmacol Ther* 2013;18(5):460-75
Agents: SCH79797 **Vehicle:** Saline; **Route:** IP; **Species:** Rat; **Pump:** Not Stated; **Duration:** 3 days; 28 days;
ALZET Comments: Dose (25 µg/kg/day); Controls received mp w/ vehicle; animal info (Male Sprague-Dawley (SD) rats at 8 weeks of age (250-300 g)); SCH79797 is a PAR1 inhibitor; cardiovascular;
- Q6742:** L. Perasso, *et al.* Therapeutic use of creatine in brain or heart ischemia: available data and future perspectives. *Med Res Rev* 2013;33(2):336-63
Agents: Creatine **Vehicle:** Not Stated; **Route:** Not Stated; **Species:** Rat; **Pump:** Not Stated; **Duration:** 7 days;
ALZET Comments: Dose (0.25 ml/hr of a 50mM Creatine solution); ischemia (cardiac); cardiovascular
- 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:** Pig; **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)
- Q1605:** M. P. Robich, *et al.* Effects of neuropeptide Y on collateral development in a swine model of chronic myocardial ischemia. *Journal of Molecular and Cellular Cardiology* 2010;49(6):1022-1030
Agents: Neuropeptide Y (3-36) **Vehicle:** Heparin; BSA; PBS; **Route:** Intramyocardial; **Species:** Pig (miniswine); **Pump:** Not Stated; **Duration:** 4 weeks;
ALZET Comments: Controls received mp w/ placebo; animal info (Intact, adult, male, Yorkshire, miniswine); 2ML sized pump used; tissue perfusion (myocardium)
- Q0116:** Z. D. Ge, *et al.* A3 adenosine receptor activation during reperfusion reduces infarct size through actions on bone marrow-derived cells. *Journal of Molecular and Cellular Cardiology* 2010;49(2):280-286
Agents: Methylcarboxamide, CI-IB- **Vehicle:** DMSO; PBS; **Route:** SC; **Species:** Mice; **Pump:** Not Stated; **Duration:** 24 h;
ALZET Comments: Controls received mp w/ vehicle; cardiovascular; animal info (male, C57BL/6, B6-CD45 congenic, A3KO, BM chimeric, 25-30 g, coronary occlusion); ischemia (cardiac); 50% DMSO; A3 adenosine receptor agonist; CI-IB-MECA
- Q5872:** S. S. Chan, *et al.* Genetic fate-mapping for studying adult cardiomyocyte replenishment after myocardial injury. *Methods Mol Biol* 2010;660(201-11)
Agents: Uridine, bromodeoxy **Vehicle:** Not Stated; **Route:** SC; **Species:** Mice; **Pump:** Not Stated; **Duration:** 7 days;
ALZET Comments: Dose (1 µg/h/g);



P8887: A. H. Hu, *et al.* Tonic beta-adrenergic drive provokes proinflammatory and proapoptotic changes in aging mouse heart. *Rejuvenation Research* 2008;11(1):215-226

Agents: 1400W **Vehicle:** Isoproterenol bitartrate; **Route:** SC; **Species:** Mice; **Pump:** 2002; **Duration:** 14 days;
ALZET Comments: Controls received mp w/ vehicle; enzyme inhibitor (iNOS); animal info (C57BL/6, 3, 20 months old); ischemia (myocardial)

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

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

P7979: V. D. G. Colonna, *et al.* Asymmetric dimethylarginine (ADMA) induces vascular endothelium impairment and aggravates post-ischemic ventricular dysfunction in rats. *European Journal of Pharmacology* 2007;557(2-3):178-185

Agents: Dimethylarginine, asymmetric **Vehicle:** Not Stated; **Route:** SC; **Species:** Rat; **Pump:** 2ML2; **Duration:** 14 days;
ALZET Comments: Blood pressure taken; plasma levels taken; ischemia (myocardial); animal info (male, Wistar, 280 grams)

P7206: K. Kuzume, *et al.* Long-term infusion of Met5-enkephalin fails to protect murine hearts against ischemia-reperfusion injury. *American Journal of Physiology Heart and Circulatory Physiology* 2005;288(4):H1717-H1723

Agents: Enkephalin, Met 5- **Vehicle:** Saline; **Route:** SC; **Species:** Mice **Pump:** 2002; **Duration:** 2 weeks; 24 hours;
ALZET Comments: Controls received mp w/ vehicle; cardiovascular; peptides; ischemia (cardiac)

P6645: A. L. Hemdahl, *et al.* Thrombin inhibitor reduces myocardial infarction in apoE^{-/-} x LDLR^{-/-} mice. *American Journal of Physiology Heart and Circulatory Physiology* 2004;287(H872-H877)

Agents: Melagatran **Vehicle:** PBS; **Route:** SC; **Species:** Mice (knockout); **Pump:** 1003D; **Duration:** 3 days;
ALZET Comments: Controls received mp w/ vehicle; cardiovascular; drug is a thrombin inhibitor; peptide

P6396: I. F. Benter, *et al.* Inhibition of Ras-GTPase, but not tyrosine kinases or Ca²⁺/calmodulin-dependent protein kinase II, improves recovery of cardiac function in the globally ischemic heart. *Molecular and Cellular Biochemistry* 2004;259(1-2):35-42

Agents: FPT III; KN-93; Genistein **Vehicle:** Saline; **Route:** IP; **Species:** Rat; **Pump:** 2ML1; **Duration:** 6 days;
ALZET Comments: Controls received mp w/ vehicle; enzyme inhibitor (tyrosine kinase, CaMKII); cardiovascular; ischemia (cardiac)

P6099: S. Roy, *et al.* Morphine inhibits VEGF expression in myocardial ischemia. *Surgery* 2003;134(2):336-344

Agents: Morphine **Vehicle:** Saline; **Route:** IV (jugular); **Species:** Rat; **Pump:** 2001; **Duration:** 1 week;
ALZET Comments: Controls received mp w/ vehicle; ischemia (cardiac)

P6116: K. Kuzume, *et al.* Sustained exogenous administration of Met(5)-enkephalin protects against infarction in vivo. *American Journal of Physiology Heart and Circulatory Physiology* 2003;285(6):H2463-H2470

Agents: Enkephalin **Vehicle:** Saline; **Route:** SC; **Species:** Rabbit; **Pump:** 2ML1; **Duration:** 24 hours;
ALZET Comments: Controls received mp w/ vehicle; cardiovascular; peptides; enkephalin was met-⁵

P5892: H. K. Jin, *et al.* Early treatment with hepatocyte growth factor improves cardiac function in experimental heart failure induced by myocardial infarction. *The Journal of Pharmacology and Experimental Therapeutics* 2003;304(2):654-660

Agents: Hepatocyte growth factor **Vehicle:** Saline; heparin; **Route:** IV (jugular); **Species:** Rat; **Pump:** 2001; **Duration:** 6 days;
ALZET Comments: Controls received mp w/ vehicle; functionality of mp verified by blood pressure taken & plasma levels taken; cardiovascular; peptides; recomb human HGF used; 50 U/ml of heparin

P5974: L. Calvillo, *et al.* In vivo cardioprotection by N-acetylcysteine and isosorbide 5-mononitrate in a rat model of ischemia-reperfusion. *Cardiovascular Drugs and Therapy* 2003;17(3):199-208

Agents: Acetylcysteine, N- **Vehicle:** Not Stated; **Route:** SC; IV (jugular); **Species:** Rat; **Pump:** 2ML1; **Duration:** 7 days; 24 hours;
ALZET Comments: Ischemia (cardiac)



P3458: J. J. Lopez, *et al.* Local extravascular growth factor delivery in myocardial ischemia. *Drug Delivery* 1996;3(143-147)

Agents: Vascular endothelial growth factor **Vehicle:** Heparin; Saline, sterile; **Route:** Perivascular (circumflex artery adventitia);

Species: Pig; **Pump:** 2ML2; **Duration:** 4 weeks;

ALZET Comments: Tissue perfusion (adventitia); peptides; pumps placed inside chest wall; cardiovascular; ischemia (cardiac)

P3411: K. Harada, *et al.* Vascular endothelial growth factor administration in chronic myocardial ischemia. *American Journal of Physiology Heart and Circulatory Physiology* 1996;270(H1791-H1802)

Agents: Vascular endothelial growth factor **Vehicle:** Saline; Heparin; **Route:** perivascular (circumflex coronary artery); **Species:** Pig; **Pump:** 2ML4; **Duration:** 4 weeks;

ALZET Comments: Controls received vehicle infusion; tissue perfusion (adventitia of coronary artery); peptides; ischemia (cardiac); 250 U/ml of heparin