Recent References (2016-2019) on Diabetes Research
Using ALZET® Osmotic Pumps


ALZET Comments: Metformin; CSF, artificial; CSF/CNS (lateral ventricle); Rat; 2006; Dose (25 μg/day); animal info (Eight-week-old male Dahl salt-sensitive rats); Brain coordinates (0.5 mm posterior to bregma, 1.5 mm lateral to the midline, and 2.7 mm below the skull surface); diabetes;


ALZET Comments: Placenta Growth Factor; SC; Mice; 6 weeks; Controls received mp w/ vehicle; animal info (8-week old Diabetic db mice);


ALZET Comments: Apelin-13, F13A; Saline; IP; Mice; 1004; 4 weeks; Dose (Apelin-13 at 30 μg/kg/d and F13A at 25 μg/kg/d); Controls received mp w/ vehicle; animal info (8-week old Male kkAy mice and control C57BL/6J mice); F13A is an Apelin-13 antagonist; diabetes;

Q7157: S. Tauscher, et al. beta Cell-specific deletion of guanylyl cyclase A, the receptor for atrial natriuretic peptide, accelerates obesity-induced glucose intolerance in mice. Cardiovasc Diabetol 2018;17(1):103

ALZET Comments: B-type natriuretic peptide; Saline; SC; Mice; 1007D; 7 days; Dose (2 ng/h/g); Controls received mp w/ vehicle; diabetes;


ALZET Comments: Poloxamer 407; Saline; SC; IP; Mice; 2004; 1 month; Controls received mp w/ vehicle; animal info (C57BL/6Crl mice); IP delivery via a cannula connected to SC pump; functionality of mp verified by total cholesterol and true triglyceride plasma concentrations; “To more easily maintain a sustained atherogenic plasma lipid profile without the increased stress and risk of animal loss associated with repeated intraperitoneal injections, we employed implantable osmotic pumps to continuously deliver P-407 at a defined rate to mice for 1 month. “ pg. 1502; Therapeutic indication (Diabetic retinopathy));

Q7234: M. Mizuno, et al. Empagliflozin normalizes the size and number of mitochondria and prevents reduction in mitochondrial size after myocardial infarction in diabetic hearts. Physiol Rep 2018;6(12):e13741

ALZET Comments: Empagliflozin; DMSO, PEG; SC; Rat; 2 weeks; Dose (10 mg/kg per day); DMSO:PEG, 50:50 used; Controls received mp w/ vehicle; animal info (25–30 weeks); diabetes;


ALZET Comments: Resistin; CSF/CNS (lateral ventricle); Mice; 2002; 3 days; Dose (1.2 μg/12 μL/day); Controls received mp w/ vehicle; animal info (male C57BL6J mice (27–32 g) and TLR-4-knockout mice); Obesity and diabetes;

Q7021: H. Hvid, et al. Activation of insulin receptors and IGF-1 receptors in COLO-205 colon cancer xenografts by insulin and insulin analogue X10 does not enhance growth under normo- or hypoglycaemic conditions. Diabetologia 2018;61(11):2447-2457

ALZET Comments: Insulin, human; X10; SC; Mice (nude); Dose (insulin at 27 nmol/kg/d; X10 at 41 nmol/kg/d); Controls received mp w/ vehicle; animal info (male BALB/c nude mice); X10 is an insulin analog; cancer (colon); diabetes;

ALZET Comments: Fingolimod; Saline; IP; Mice; 1004; 8 weeks; Dose (1 mg/kg/day); Controls received mp w/ vehicle; animal info (CD86−/− non-obese diabetic (NOD) mice); pumps replaced every 4 weeks; long-term study; Fingolimod is a sphingosine-1-phosphate analogue; neurodegenerative (autoimmune polyneuropathy); stress/adverse reaction: (see pg. 2);.

ALZET Comments: Melanotan II; Saline; CSF/CNS (left lateral ventricle); Mice; 1007D; 7 days; Dose (200 ug/kg/day); Controls received mp w/ vehicle; animal info (male, 20-24 week old); antagonist aka melanocortin 3/4; diabetes;

Q7119: S. Clotet-Freixas, et al. Sex dimorphism in ANGII-mediated crosstalk between ACE2 and ACE in diabetic nephropathy. Lab Invest 2018;98(9):1237-1249
ALZET Comments: Angiotensin II; Saline; SC; Mice; 1004; 28 days; Dose (1.44 ug/day/g); 0.9% sodium chloride used; animal info (10 week old, female and male, C57BL/6); diabetes;

ALZET Comments: Insulin (Humulin R); Saline; SC; Mice; 1002; 14 days; Dose (8.33 umol/ml); Controls received mp w/ vehicle; animal info (Uchl1-/-mice, 9-11-week-old, male); diabetes;

ALZET Comments: Silodosin; Hartmann’s solution; SC; Rat; 2ML4; 8 weeks; Controls received mp w/ vehicle; animal info (female, Sprague Dawley, 6 weeks old); long-term study; diabetes; Dose (0.3 or 1 mg/kg/day);

Q5904: A. Vinu, et al. The GLP-1 analogue lixisenatide decreases atherosclerosis in insulin-resistant mice by modulating macrophage phenotype. Diabetologia 2017;60(9):1801-1812
ALZET Comments: Lixisenatide; liraglutide; SC; Mice; 2004; 1 month; Controls received mp w/ vehicle; Controls received mp w/ vehicle; cardiovascular; immunology; peptides; diabetes; Bp measured using tail cuff; Dose (liraglutide 400 ug/kg/day; lixisenatide 10 ug/kg/day);

ALZET Comments: Insulin (Humulin R); SC; Mice; 9 weeks; Controls were untreated diabetic mice; animal info (12 weeks); functionality of mp verified by insulin serum levels using a mouse ultrasensitive insulin ELISA; Does not indicate replacement; diabetes; 145Therapeutic indication (Diabetes); Dose (0.125 units/day);

ALZET Comments: Vasopressin; IP; Rat; 2006; 4 weeks; Dose (500 ng/kg/day); animal info (Eight-week-old male Sprague-Dawley and lean Zucker rats); Vasopressin aka AVP; diabetes;

Q6184: M. Szokol, et al. Long Term Osmotic Mini Pump Treatment with Alpha-MSH Improves Myocardial Function in Zucker Diabetic Fatty Rats. Molecules 2017;22(10);
ALZET Comments: Melanocyte-stimulating hormone, alpha; Saline; SC; Rat; 2006; 6 weeks; Dose (0.72 ug /h); Controls received mp w/ vehicle; animal info (Zucker Diabetic Fatty rats); diabetes;

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Bibliography

ALZET Comments: Peptide YY (3-36); Disodium hydrogen phosphate, NaCl, Tween 80; SC; Mice; 2004; 21 days; animal info (diet-induced obese wild-type, Y5R knockout); stability verified by (Peptide YY “was stable and functional over the period of the experiment”); Obesity and diabetes.;

ALZET Comments: Prolactin, ovine; SC; Rat; 28 days; Dose (0.16 mg/kg /d); Controls received mp w/ vehicle; animal info (Male Wistar rats); diabetes; “…the pumps were implanted sc in less than 2 minutes.” (P.57).

ALZET Comments: Oxytocin; Saline; CSF/CNS (Third and forth ventricle); Rats, Mice; 2004; 28 days; Dose (16 nmol/day); Controls received mp w/ vehicle; animal info (Adult male Sprague-Dawley (CD IGS) rats, Long-Evans rats, C57BL/6J mice); post op. care (Mice were treated with analgesic ketoprofen and antibiotic Baytril; Rats treated with analgesic buprenorphine sustained release and the antibiotic enrofloxacin after cannulations); delayed delivery (implanted cannula and vinyl catheter were filled with sterile saline then a stainless steel 22-gauge pin plug was inserted at the end of the tubing during a 2-wk postoperative recovery period); Obesity and diabetes.;

ALZET Comments: MitoTEMPO, BQ-123; Saline; SC; Mice; 2002; MitoTEMPO, BQ-123 Controls received mp w/ vehicle; animal info (8 weeks old) diabetes; mitoTEMPO is a mitochondri-targeted potent antioxidant; BQ-123 is a peptide antagonist, which specifically inhibits the binding of Edn1 ligand to Ednra receptor; Therapeutic indication (Diabetes); Dose (1 mg/kg/day, BQ: 0.1 ng/kg/day);.

ALZET Comments: Streptozotocin; Saline, citrate buffered; SC; Rat; 2ML2; 14 days; Dose (2.4–6 mg/day); Controls received mp w/ vehicle; animal info (Male Sprague Dawley rats aged 14–16 weeks); diabetes;.

ALZET Comments: Leptin; Saline; SC; Mice; 1004; 2 weeks, 14 days; Controls received mp w/ vehicle; animal info (8 weeks old); diabetes; Therapeutic indication (diabetic ketoacidosis); Dose (0.624 ug/hr);.

ALZET Comments: Salbutamol; Rat; 12 weeks; 5 weeks; Dose (0.5 mg/kg/day); Controls received mp w/ vehicle; animal info (Male 8-week-old ZDF rats); long-term study; Salbutamol is a beta2AR agonist; diabetes;.

ALZET Comments: Chloroquine; SC; Mice; 1 week; Dose (10 mg/kg/day); animal info (Male LETO and OLETF at ages of 25–30 weeks); diabetes; Therapeutic indication (acute kidney injury);.

Q6199: E. P. Mottillo, et al. FGF21 does not require adipocyte AMP-activated protein kinase (AMPK) or the phosphorylation of acetyl-CoA carboxylase (ACC) to mediate improvements in whole-body glucose homeostasis. Mol Metab 2017;6(6):471-481
ALZET Comments: Fibroblast growth factor-21; Saline; SC; Mice (knockout); 1002; 2 weeks; Dose (0.35 mg/kg/day); Controls received mp w/ vehicle; animal info (Mice lacking adipocyte AMPK b1b2 (ib1b2AKO)); diabetes;.
**ALZET Comments:** Cysteine, S-(2-boronoethyl)-L-; PBS; SC; Mice (knockout); 12 weeks; Dose (2.3 mg•kg⁻¹•day⁻¹); Controls received mp w/ vehicle; animal info (6-wk-old male arginase-2-deficient (Arg2_/_) mice); enzyme inhibitor (arginase); Therapeutic indication (diabetes);

**ALZET Comments:** Insulin; SC; Mice; 2001; 7 days; animal info (Akita, 14 weeks); diabetes; Therapeutic indication (Diabetes, Nephrology);

**ALZET Comments:** Palmitoylcarnitine hydrochloride; Saline; Saline; Mice; 2004; 28 days; Dose (50 mg/kg/day,10 mg/kg/day); Controls received mp w/ vehicle; animal info (12 week old male CD-1 mice); diabetes;

**ALZET Comments:** Sul-121; DMSO; SC; Mice; 2004; 8 weeks; Dose (2.2 mg/kg/day); 50% DMSO used; Controls received mp w/ vehicle; animal info (male db/db and lean controls); pumps replaced every 4 weeks; Resultant plasma level (p.2); diabetes;

**ALZET Comments:** Orexin-A (hypocretin-1); Saline; IP; Rat; 2ML4; 4 weeks; Dose (47 pmol/h); 0.9% NaCl used; Controls received mp w/ vehicle; animal info (adult male Wistar rats); Orexin aka hypocretin-1; diabetes;

**ALZET Comments:** Mimotope 3; SC; Mice; 1002; 14 days; Dose (5 μg/day); animal info (9-week-old female NOD mice); post op. care (Carprofen, 5–10 mg/kg administered s.c); mimetope 3 is a modified insulin B chain core epitope 12-23; diabetes;

**ALZET Comments:** Leptin; PBS; CSF/CNS; Rat; Mice; 14 days; animal info (male Wistar rats; Eight-week-old male and female POMC-lKO and WT mice); Brain coordinates (0.8 mm posterior to bregma; 1.5 mm lateral to the sagittal suture, and 3.6 mm below the skull surface); diabetes;

**ALZET Comments:** Tempol; Water; SC; Rat; 4 weeks; Controls received mp w/ vehicle; animal info (Diabetic rats); diabetes; Therapeutic indication (Diabetes); Dose (1.5 mM/kg/day);

**ALZET Comments:** Exendin-4; FK506; PBS; saline; SC; Mice (NSG), mice (NOD); 1004; 1002; 4 weeks; 2 weeks; Dose (exendin-4: 24 nmol/kg/d; FK506: 0.25 mg/kg/d); Controls received mp w/ vehicle; animal info (NOD.Cg-PrkdcsidIl2rgtm1Wjl/Sz (NSG) mice); Multiple pumps per animal (2); some animals received a second pump containing FK506 after 2 weeks; diabetes;

ALZET Comments: Leptin, Hexamethonium; Saline; CSF/CNS (lateral ventricle); Rat; 2002; 12 days; Controls received mp w/ vehicle; animal info (360-420g); diabetes; Therapeutic indication (Diabetes); Dose (Hexamethonium: 15 mg/kg).

ALZET Comments: Exenatide; SC; Mice; 1004; 2 weeks; 18 weeks; Dose (1 nmol/kg/d); animal info (10 week old Male B6129SF1/J mice); diabetes.

ALZET Comments: Aliskiren; Water, deionized; SC; Rat; 2002; 14 days; Controls received mp w/ vehicle; animal info (200-230 g.); antihypertensive; diabetes; Therapeutic indication (Oxidative stress, metabolic syndrome); Dose (100 mg/kg body weight).

ALZET Comments: Pg-lipopolysaccharides; Saline; SC; Mice; 2004; 28 days; Dose (300mg/kg/day); 0.9% Saline used; Controls received mp w/ vehicle; animal info (5 week old C57Bl/6J wild-type female mice); diabetes.

ALZET Comments: R22E, B9:23; SC; Mice; 1002; 14 days; animal info (4-6 weeks old); diabetes; Therapeutic indication (Diabetes); Dose (5 ug/day).

ALZET Comments: Exendin-4; Saline; SC; Mice; 1004; 12 weeks; Dose (3.5 pmol/kg/min or 8.75 pmol/kg/min); 0.9% Saline used; Controls received mp w/ vehicle; animal info (PLP-SYN mice); pumps replaced every 4 weeks; Resultant plasma level (2197.6 + 317.7 pg/ml for 3.5 pmol/kg/min (n = 6) and 2796.3 + 284.9 pg/ml for those receiving 8.5 pmol/kg/min); diabetes.

ALZET Comments: SEr601; PBS; Saline; SC; Mice; 2001; 7 days; 0.9% saline used; animal info (C57Bl/6J mice); SEr601 is an insulin receptor antagonist; diabetes.

ALZET Comments: RGD Peptide, RAD hexapeptide; SC; Mice; 1004; 4 weeks; Controls received mp w/ RAD hexapeptide; animal info (C57Bl/6, 12 weeks old); diabetes; Arg-Gly-Asp is RGD peptide sequence; Therapeutic indication (Insulin sensitivity); Dose (10 mg/ML).

ALZET Comments: SEr601; SC; Mice; 2 weeks; 4 weeks; animal info (male, ICR, 4 weeks old); diabetes; Dose (20 ng/kg).

Q4918: M. Zhang, et al. Growth factors and medium hyperglycemia induce Sox9+ ductal cell differentiation into β cells in mice with reversal of diabetes. pnas 2016;113(3):650-655
ALZET Comments: Gastrin; epidermal growth factor, human recombinant; Acetic acid; PBS; IP; Mice; 1007D; 7 days; Controls received mp w/ vehicle; animal info (male, WT or Ins1 CreERT); diabetes; Dose (gastrin 3 ug/kg/hr; EGF 10 ug/kg/hr).
ALZET Comments: Adrenomedullin 2; Saline; SC; Mice; 4 weeks; Controls received mp w/ vehicle; animal info (male, C57BL6J, 8-10 weeks old); peptides; diabetes; Dose (300 ng/kg/hr); obesity.

Q5100: H. Z. Xu, et al. 12-Lipoxynasen Inhibition on Microalbuminuria in Type-1 and Type-2 Diabetes Is Associated with Changes of Glomerular Angiotensin II Type 1 Receptor Related to Insulin Resistance. Int J Mol Sci 2016;17(5):
ALZET Comments: Hydroxyeicosatetraenoic acid, 12(S)-; Saline, normal; SC; Rat; 1002; 7 days; Controls received mp w/ vehicle; animal info (male, Sprague Dawley, 180-200g); cardiovascular; diabetes; bp measured using tail cuff; Dose (1 mg/kg/day);

ALZET Comments: CL 316,243; SC; Rat; 2ML4; 3 weeks; Controls received mp w/ saline; animal info (male, Wistar); post op. care (analgesia 2 mg/kg); diabetes; “Minipump Infusion of CL has been shown to be comparable to daily CL injections” pg E902; Obesity; Therapeutic indication (obesity; diabetes); Dose (1 mg/kg/day); Industry authored (AstraZeneca);

ALZET Comments: Interleukin-6; Mice; 7 days; animal info (male, C57Bl6J, 12 weeks old); diabetes;

ALZET Comments: Leptin; Saline; SC; Mice (pregnant); 2004; Controls received mp w/ vehicle; animal info (female, WT); stress/adverse reaction: (see pg. 2645); teratology; diabetes; Dose (350 ng/h);

ALZET Comments: Insulin; SC; Rats; 2006; 1 week; 4 weeks; animal info (male, Wistar, 180-200g, STZ); immunology; diabetes; “The intensive subcutaneous insulin administration performed using a mini pump in our study led to an improvement in the metabolic control of diabetic rats, as confirmed by a decrease in fructosamine levels and an increase in body weight after four weeks of treatment. Moreover, blood insulin concentration was maintained at the same level throughout the study attesting to the efficiency of this therapy.” pg 189; Dose (2 UI/200g/day);

Q5110: Song-Yang Zhang, et al. Adrenomedullin 2 Improves Early Obesity-Induced Adipose Insulin Resistance by Inhibiting the Class II MHC in Adipocytes. Diabetes 2016;65(2342-2355
ALZET Comments: Adrenomedullin 2; Saline; SC; Mice (transgenic); 6 weeks; Controls received mp w/ vehicle; animal info (WT or oADM2-tg); peptides; diabetes; Dose (3000 ng/kg/hr); Resultant plasma level (see supplement pg 8, figure 7E);

ALZET Comments: RNA, NR1-short hairpin; CSF/CNS (Intrathecal); Mice; Intrathecal catheter; 10.1002/path.4764; animal info (Diabetes-induced C57BL/6 J mice, 8 weeks of age); diabetes; ALZET intrathecal catheter used with another product.

ALZET Comments: insulin; buffer solution; SC; Rat; 28 days; animal info (male, Lewis, STZ injection); comparison of injection of insulin vs mp; post op. care (Baytril 10 mg/kg QD for 7 days); diabetes; pumps primed for 24 hours in 37C saline; “...continuous insulin delivery by pumps restored normoglycaemia, which induced the reduction of both reactive oxygen species and macrophage infiltration into the liver and omentum. Injections controlled the glucose levels for only a short period of time and therefore tissue stress and inflammation were elevated.” pg 1; “pumps require no daily injection and
facilitate rat follow-up. Well-being of the animals and the homogeneity of the results permit researchers to limit the numbers of animals and experiments used to build solid and reproducible results.” pg 8; Dose (4 IU/day);

**ALZET Comments:** Exendin (9-39); Saline; SC; Mice; 1002; 8 weeks; Controls received mp w/ vehicle; animal info (8 weeks old); pumps replaced every 2 weeks; diabetes; Therapeutic indication (insulin resistance; diabetes);

**ALZET Comments:** Angiotensin (1-7); Saline; SC; Mice; 1002; 14 days; Dose (2.47 mg/kg/day); 0.9% saline used; Controls received mp w/ vehicle; animal info (11- to 14-week-old mice deficient in the receptor Mas and wild-type); Resultant plasma level (p.4687); diabetes;

**ALZET Comments:** P78-PEDF; PBS; SC; Mice; 2006; 6 weeks; Controls received mp w/ vehicle; animal info (6 weeks, 12 weeks old); diabetes; P78-PEDF is an active 44 amino acid fragment of pigment epithelium-derived factor (PEDF); Therapeutic indication (diabetes); Dose (.3 ug/g/day);

**ALZET Comments:** Atorvastatin calcium; SC; Mice; 2004; 12 weeks; Dose (10 mg/kg/day); Controls received mp w/ vehicle; animal info (Male C57BL/6 mice (8 wk old, 18±22 g)); cardiovascular; diabetes; Therapeutic indication (diabetic cardiomyopathy);

**ALZET Comments:** Insulin, glargine; Saline; SC; Mice; 8 weeks; Dose (0.6 U/day); animal info (C57BL/6 mice); pumps replaced every 4 weeks; diabetes;

**ALZET Comments:** Irbesartan; Thiorphan; Saline; DMSO; Rat; 2ML4; 3 weeks; Dose (Irbesaratan 15 mg/kg/day or irbesaranat/thiorphan combination 0.1 mg/kg/day); 0.2% DMSO used; Controls received mp w/ vehicle; animal info (10 week old male Ren2 rats weighing 300–500g); diabetes;

**ALZET Comments:** Intermedin; Saline; SC; Mice; 2004; 4 weeks; Controls received mp w/ vehicle; animal info (male, C57BL6J, 6 weeks old); immunology; peptides; diabetes; Dose (318 ng/kg/h);

Q4868: O. Otlivanchik, et al. Orexin signaling is necessary for hypoglycemia-induced prevention of conditioned place preference. am J Physiol Regul Integr Comp Physiol 2016;310(R66-R73
**ALZET Comments:** Sertraline; Ethanol; SC; Rat; 2001; 1 week; Controls received mp w/ vehicle; animal info (male, Sprague Dawley, 7-8 weeks old, 250-400g); 50% ethanol used; behavioral testing (open field); diabetes; Dose (7.5 mg/kg/day);

**ALZET Comments:** Placenta growth factor, recombinant human; antibody, interleukin-1B; PBS; SC; Mice; 1007D; 7 days; Controls received mp w/ vehicle or control antibody; animal info (male, C57BL6, 8 weeks old, STZ); immunology; diabetes; Dose (PILGF 10 ug/mouse; anti-IL-1B 1 ug/day);
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Bibliography

ALZET Comments: Endotoxin, LPS; Saline; SC; Mice; 2004; 28 days; Controls received mp w/ vehicle; animal info (male, C57BL/6N, 12 weeks old); immunology; diabetes; Dose (600 ug/kg/day);.

ALZET Comments: Angiotensin II acetate; Ringer's solution; SC; Rat; 2M14; 4 weeks; Controls received mp w/ vehicle; animal info (Ovariectomized female Sprague Dawley rats, 210-240 g); functionality of mp verified by blood pressure; cardiovascular; diabetes; Rat model of hypertension induced by Angiotensin II; pentobarbital used for anesthesia; blood pressure measured directly by cannulation of carotid artery; Dose (100 ng/kg/min); Resultant blood pressure: 96 mmHg (control), 130 mmHg (hypertensive group).

ALZET Comments: Leptin; SC; Mice; 28 days; Controls received mp w/ vehicle; animal info (C57Bl6/J, albino BalbC and ob/ob mice); diabetes;.

ALZET Comments: S961; Saline; SC; Mice; 2001; Controls received mp w/ vehicle; animal info (six week old C57BL/6 male mice); enzyme inhibitor (insulin receptor antagonist); diabetes;.

Q6653: H. R. E. Y. Kim, et al. NMDA Receptors as Potential Therapeutic Targets in Diabetic Nephropathy: Increased Renal NMDA Receptor Subunit Expression in Akita Mice and Reduced Nephropathy Following Sustained Treatment With Memantine or MK-801. Diabetes 2016;65(3139–3150
ALZET Comments: Memantine HCl; MK-801; Saline; SC; Mice; 1004; 28 days; Dose (Memantine (2 mg/kg/day); dizocilpine (0.5 mg/kg/day)); 0.9% Saline used; Controls received mp w/ vehicle; animal info (10-week-old DBA/2J mice); Dizocilpine AKA (MK-801); diabetes.

ALZET Comments: S961; CL 316,243; Saline; SC; Rabbit; 2ML1; 3 days, 7 days; Controls received mp w/ vehicle; animal info (male New Zealand White rabbits, 2.2 – 2.6 kg); functionality of mp verified by plasma levels; Diabetes-induced vascular dysfunction; Hyperglycemia study; Dose (12 ug/kg/hr S961, 40 ug/kg/hr CL);.

ALZET Comments: AMD3100; PBS; IP; Mice (NSG); 1002, 1004; 14 days, 28 days; Controls received mp w/ vehicle; animal info (Immunodeficient, non-obese, diabetic);.

ALZET Comments: Leptin; Saline; SC; Mice; 1002; 14 days; Controls received mp w/ vehicle; animal info (Fat-specific IR, IGF1R, and IR/IGF1R knockout mice; 3 month old); functionality of mp verified by blood glucose levels; dose-response (pg 2204-2206); behavioral testing (cold-resistance testing); replacement therapy (leptin); Lipoatrophic diabetes; Dose (10 ug/mouse/d);.

**ALZET Comments:** PTUPB; IP; Rat; 8 weeks; Dose (10 mg/kg/d); Controls received mp w/ vehicle; animal info (Male obese Zucker Diabetic Fatty and Zucker Lean rats); PTUPB aka 4-(5-phenyl-3-[3-[4(trifluoromethyl)phenyl]-ureido]-propyl)-pyrazol-1-yl-benzenesulfonamide; enzyme inhibitor (COX-2/sEH); Therapeutic indication (kidney injury).


**ALZET Comments:** Docosahexaenoic acid; Docosahexaenoic acid, 17R/S hydroxy; Saline; BSA; Ethanol; Mice; 15 days; Dose (Docosahexaenoic acid: 4 ug/g; 17-HDHA 50 ng/g ); animal info (Male C57BL/6j wild-type mice. Male BKS.Cg-Dock7m+/+Leprdb/J (db/db) mice and Lean nondiabetic littermates (db/+)); comparison of injections vs mp; diabetes.


**ALZET Comments:** DNAzymes, Scrambled or TXNIP; Saline; SC; Rat; 2006; 12 weeks; Controls received mp w/ vehicle; animal info (6-week old, female heterozygous rats); functionality of mp verified by blood glucose levels (AMES glucometer); pumps replaced every 6 weeks; diabetes; Inhibition of TNXIP using DNA-zyme improves autophagy and mitophagy in diabetic nephropathy; Inhibition of TNXIP using DNA-zyme improves autophagy and mitophagy in diabetic nephropathy; Resultant plasma level (pg. 10).


**ALZET Comments:** Dutasteride; Sesame oil; SC; Rat; 2006; 8 weeks; Controls were sedentary or health, age-matched, non-diabetic; animal info (20 weeks old); long-term study; behavioral testing (Resistance training); diabetes; enzyme inhibitor (5α-reductase inhibitor); Therapeutic indication (Type-2 Diabetes); Dose (2 mg/kg).

Q5805: S. Eid, et al. mTORC2 Signaling Regulates Nox4-Induced Podocyte Depletion in Diabetes. Antioxid Redox Signal 2016;25(13):703-719

**ALZET Comments:** Oligonucleotide, phosphorothioate antisense (Rictor); Oligonucleotide, phosphorothioate sense (Rictor); Saline; SC; Mice; 2006; 5 weeks; Controls received mp w/ vehicle; animal info (17 weeks old)antisense (phosphorothioated Sense and Antisense for Rictor); diabetes; Therapeutic indication (Diabetes); Dose (90 ng*g body wt-1 * day-1).


**ALZET Comments:** Exendin (9-39); SC; Mice; 2002; 2 weeks; animal info (10 weeks old); diabetes; Therapeutic indication (Obesity); Dose (0.5 uL/h).


**ALZET Comments:** Leptin, recombinant mouse; PBS; SC; Mice; 9 days; Controls received mp w/ vehicle; animal info (6 weeks old); functionality of mp verified by leptin and glucose levels: (After leptin release from the osmotic pumps had ceased (~9.2 days after pump implantation), hyperglycemia rapidly returned to pre-treatment levels in 6OHDA-leptin and sham-leptin groups, concomitant with the reduction of plasma leptin levels (Figure 3A,C)); diabetes; Temperature transponders (Implantable Programmable Temperature Transponder IPTT-300; Bio Medic Data Systems Inc, Seaford, USA) were implanted interscapularly at the same time as osmotic pumps. After leptin release from the osmotic pumps had ceased (w9.2 days after pump implantation), hyperglycemia rapidly returned to pre-treatment levels in 6OHDA-leptin and sham-leptingrouops, concomitant with the reduction of plasma leptin levels (Figure 3A,C) Therapeutic indication (Diabetes Type 1, Brown adipose tissue); Dose (10, 20 ug/day).
**ALZET Comments:** Leptin, recombinant mouse; SC; mice; 1007D, 1002; 15 days; Controls received mp w/ vehicle; animal info (Male Leprflox/flox and Leprflox/flox Syn-cre mice, 12-14 wks); functionality of mp verified by plasma levels; pumps replaced after day 10; dose-response (pg. 2679); diabetes; Dose (10 ug/d or 20 ug/d);

**ALZET Comments:** Metroleptin; SC; mice; 17 days; diabetes; “While we applaud the efforts of the insulin/glucagon pump infusion studies, the delivery space cannot simulate normal physiology (Figure 1B). p.663 ; Therapeutic indication (Diabetes, Glucagon, Glucagon receptor, insulin); Dose (400 mg/day);

**ALZET Comments:** LY2405319; Mice (knockout); 1004; 28 days; Controls received mp w/ vehicle; animal info (6 weeks old) ; diabetes; Therapeutic indication (Diabetes);Dose (1 mg/kg/day);

**ALZET Comments:** Prolactin, recombinant mouse; Albumin, mouse; Mice (NOD); 1004; 3 weeks; Controls received mp w/ vehicle; Controls received mp w/ vehicle; diabetes; Therapeutic indication (diabetes); Dose (2.7 ug/d); resulted in serum PRL level 300-500 ng/mL;

**ALZET Comments:** Insulin (Humulin R); PBS; SC; Mice; 1004; 4 weeks; Dose: (Humulin R 0.1 units/day); Controls received mp w/ vehicle; animal info (16-week-old male mice); Resultant plasma level (p. 3615); diabetes;.

**ALZET Comments:** C-peptide, human; insulin, human recombinant; SC; Mice; 2004; 4 weeks; Controls underwent sham operations; animal info (6 weeks old, diabetic (non-fasting blood glucose >16mM, polyuria, and glycosuria)); diabetes; Therapeutic indication (Vasculopathy, Hyperglycemic memory); Dose (35 pmol/min/kg);

**ALZET Comments:** Tolvaptan; DMSO; SC; Mice; 1003D; 2 days; Controls received mp w/ vehicle; animal info (8 weeks old); Therapeutic indication (nephrogenic diabetes insipidus (NDI)).

Q5778: Pancreatic β-Cells Express the Fetal Islet Hormone Gastrin in Rodent and Human Diabetes. Diabetes 2016;66(2):
**ALZET Comments:** S961, Insulin receptor antagonist; PBS; SC; Mice; 2001; 7 days; Controls received mp w/ vehicle; animal info (6 weeks old);diabetes; Average blood glucose level at sacrifice, 515 mg/dL Therapeutic indication (Glucose tolerance, Diabetes);Dose (12 nmol);.