References on the Administration of Prostaglandins Using ALZET® Osmotic Pumps

Q10243: D. Liu, et al. Loss of diacylglycerol kinase epsilon causes thrombotic microangiopathy by impairing endothelial VEGFA signaling. JCI Insight 2021;6(9);
Agents: Prostaglandin E2 Vehicle: PBS; Route: SC; Species: Mice; Pump: 1004; Duration: 28 days;
ALZET Comments: Dose: (30 ug/kg); Controls received mp w/ vehicle; animal info: 8-week-old Tie2CreDgkefl/fl mice; Prostaglandin E2 aka (PGE2),

Agents: Prostaglandin F2a Vehicle: Saline; Route: SC; Species: Mice; Pump: 1007D; Duration: 3 days;
ALZET Comments: Dose (7.4 pg/hr/g); Controls received mp w/ vehicle; animal info (4-6 weeks old, C57BL/6);

Q9012: J. G. Soares de Carvalho, et al. Administration of PGF2alpha during the periovulatory period increased fertilization rate in superovulated buffaloes. Theriogenology 2020;145(138-143
Agents: Prostaglandin F2a Vehicle: Not stated; Route: SC; Species: Buffalo; Pump: 1003D; Duration: 2 days;
ALZET Comments: Dose (0.833 mg/h); animal info (Crossbred Murrah x Mediterranean buffalo, 8.5 ± 2.2  old); Prostaglandin F2a aka PGF2alpha; replacement therapy (Prostaglandin F2a Infusion);

Q7487: P. Sorensen, et al. A Blend of F Prostaglandins Functions as an Attractive Sex Pheromone in Silver Carp. Fishes 2019;4(2);
Agents: Prostaglandin F2-alpha Vehicle: Not Stated; Route: IP; Species: Fish (Carp); Pump: 2ML1; Duration: 8 days;
ALZET Comments: Dose (1ug/g body weight for 8 days); animal info (9 juvenile Silver, Bighead, and Common Carp (all approximately 50 g +/- 10 g);

Agents: Prostaglandin D2; Prostaglandin E2 Vehicle: Saline, sterile; Route: SC; Species: Mice (knockout); Pump: 1004; Duration: 7 days;
ALZET Comments: Controls received mp w/ vehicle; animal info (6-10 wks old, COX-1 -/-, COX-2 -/-, wt); 15% ethanol used

Agents: Prostaglandin F2-alpha Vehicle: Water, deionized, sterile; Route: IP; Species: Fish (carp); Pump: 2ML1; Duration: 2 weeks;
ALZET Comments: Animal info (juvenile, male, female, carp); "We suggest that the implant technique may be useful in future studies of how PGF pheromones function and could be further developed to attract invasive fish for use in control." pg 127

Agents: Prostaglandin E2; prostaglandin F2, alpha; iloprost Vehicle: Ethanol; saline, sterile; Route: Not Stated; Species: Mice; Pump: Not Stated; Duration: Not Stated;
ALZET Comments: Controls received mp w/ vehicle; animal info (6-10 wks old, COX-1 -/-, COX-2 -/-, wt); 15% ethanol used

Agents: Prostaglandin E2; prostaglandin E2, dimethyl- Vehicle: PBS; Route: SC; Species: Mice; Pump: 2002; Duration: 4, 7, 21 days;
ALZET Comments: Controls received mp w/ vehicle or no treatment; no stress (see pg. 51); animal info (male, CD, 25-35 g., bleomycin-induced lung injury); "This route of administration was preferred because of constant drug delivery... and in our pilot study was found to be both innocuous and efficacious." (p. 51)
Agents: Prostaglandin E1; Cyclodextrin Vehicle: Saline, isotonic; Route: SC; Species: Mice; Pump: Not Stated; Duration: 4 days;
ALZET Comments: Controls received mp w/ vehicle; animal info (C57/BL6, female, 6-8 weeks old)

Agents: Hydrogen Peroxide; Prostaglandin F2 alpha, 8-Iso-; CGS12970; U-46619; Urotensin II Vehicle: CSF, artificial; Route: CSF/CNS; Species: Rat; Pump: Not Stated; Duration: 1 week;
ALZET Comments: Controls received mp w/ vehicle; enzyme inhibitor (thromboxane A2 synthase); cardiovascular; peptides; U46619 is a thromboxane A2 synthase inhibitor; ischemia (cerebral)

Agents: Prostaglandin E2; DI-004; AE1-259; AE-248; AE1-329 Vehicle: Ethanol; Propylene glycol; Route: Bone (femur); Species: Mice; Pump: 1002; Duration: 6 weeks;
ALZET Comments: Controls received mp w/ vehicle; pumps replaced every 2 weeks; vehicle was 40% ethanol, 60% propylene glycol. DI-004, AE1-259, AE-248, and AE1-329 are agonists for Prostaglandin E receptor subtypes: EP1, EP2, EP3, and EP4, respectively

Agents: Prostaglandin E2 Vehicle: Not Stated; Route: IV (femoral); Species: Rat; Rat (pregnant); Pump: Not Stated; Duration: 24 hours;
ALZET Comments: Controls received mp w/ saline; catheter was filled with enough saline to provide a 3 hour recovery prior to onset of PGE2 delivery

Agents: Prostaglandin E2 Vehicle: Not Stated; Route: IP; Species: Mice; Pump: 1007D; Duration: 7 days;
ALZET Comments: Dose (1872 µg/100 µl or 321 µg/µl); Controls received mp w/ vehicle; animal info (Adult, female age-matched C57BL/6 mice (22–27 g))

P3029: D. K. Vanderwall, et al. Corpus luteal function in nonpregnant mares following intrauterine administration of prostaglandin E2 or estradiol-17B. Theriogenology 1994;42(1069-1083
Agents: Prostaglandin E2; Estradiol, 17B- Vehicle: Ethanol; PBS; Route: Intrauterine; Species: Horse; Pump: 2001; Duration: 7 days;
ALZET Comments: Controls received no treatment or mp with vehicle; tissue perfusion (uterine horn lumen); no stress (see pg. 1078); benzathine penicillin-G given prophylactically

Agents: Prostaglandin E1 Vehicle: Emulphor; Ethanol; Route: Bone (mandible); Species: Dog; Pump: Not Stated; Duration: 3 weeks;
ALZET Comments: Controls received undiluted vehicle which was 1:1 mixture of Emulphor:80% ETOH; tissue perfusion (bone); comparison of pellets vs. mp; pumps replaced weekly; authors state that subperiosteal bone formation was greater for comparable doses when PGE1 was delivered by minipumps as compared to pellets
Agents: Prostaglandin E1 Vehicle: Emulphor; Ethanol; Route: Bone (mandible); Species: Dog; Pump: Not Stated; Duration: 3 weeks;
ALZET Comments: Controls received mp w/vehicle; tissue perfusion (bone); comparison of pellets vs. mp; pumps replaced weekly; "we estimated that PGE delivered by minipump produces 25 to 30% more bone than the same amount of starting material delivered by pellet." (p.139)

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

Agents: Prostaglandin E1; Uridine, fluorodeoxy Vehicle: Not Stated; Route: IV (jugular); Species: Rat; Pump: 2ML1; Duration: 7 days;
ALZET Comments: stability confirmed for both agents in pumps for 7 days at ph 7.4

Agents: Prostaglandin A2; Prostaglandin E2; Prostaglandin D2; Prostaglandin I1, 6b-; Prostaglandin F2a THAM salt Vehicle: Albumin, bovine serum; Ethanol; Water, distilled; Route: Intraovarian (corpus luteum); Species: Monkey; Pump: 2ML1; Duration: 7 days;
ALZET Comments: Controls received mp with saline +/- BSA; tissue perfusion (corpus luteum); functionality of mp verified by residual volume; pumps replaced until onset of menses; stability verified by in vitro testing -- see pp. 509-510; good methods; ALZAI test kit used; agents infused singly and with PGF2a; degradation of PGE2 & PGD2 occurred

Agents: Prostaglandin E1 Vehicle: Emulphor; Ethanol; Route: Bone (mandible); Species: Dog; Duration: 5 weeks;
ALZET Comments: Control side of mandible received mp with vehicle; tissue perfusion (bone); long-term study, pumps replaced weekly; each dog served as its own control -- one mp with PGE1 to one side and one with vehicle to the other side of mandible; pump implanted in superficial neck tissues; dogs given penicillin orally (100,000 U/d) for first post-operative week

Agents: FPL-55712; Guaiaretic acid, nordihydro-; Leukotriene, C4; Prostaglandin E2 Vehicle: Ethanol; Propylene glycol; Saline; Water; Route: Intrauterine; Species: Rat; Pump: 2001; Duration: 1,4 days;
ALZET Comments: Tissue perfusion (uterus); FPL-55712 is a leukotriene antagonist

Agents: Prostaglandin E1 Vehicle: Emulphor; Ethanol; Route: Bone (mandible); Species: Dog; Duration: 3 weeks;
ALZET Comments: Controls received mp with vehicle; tissue perfusion (bone); pumps replaced weekly; stability: 70% of original activity after 1 week at 37 degrees C; penicillin given for 1 week post-surgery
Agents: Tumor necrosis factor, human; Prostaglandin E1 Vehicle: Albumin, rat serum; Saline; Triacetin; Route: IP; Species: Rat; Pump: 2ML1; Duration: 5 days;
ALZET Comments: Multiple pumps per animal (2); PGE1 and TNF concomitantly infused; cancer/immunology; toxicology/teratology; peptides

Agents: Oxytocin, desamino-; Oxytocin; Prostaglandin F2a Vehicle: Saline; Route: IP; Species: Rat; Pump: 2001; Duration: 5 days;
ALZET Comments: peptides

Agents: Uridine, fluorodeoxy-; Prostaglandin E1 Vehicle: Saline; Route: IV (hepatic portal); Species: Rat; Pump: 2ML1; Duration: 7 days;
ALZET Comments: controls received mp w/ saline; mp connected to catheter in portal vein; concomitant and simultaneous infusion of agents; cancer; toxicology

Agents: Prostaglandin E1 Vehicle: Ethanol; Saline; Water; Route: Not Stated; Species: Not Stated; Pump: Not Stated; Duration: Not Stated;
ALZET Comments: mp not used, different vehicles were tested w/PGE1 to ascertain which was the best for use in mp; stability of PGE1 in various vehicles at 37 degrees C; peptides

Agents: Indomethacin; Prostaglandin F2a Vehicle: HCl; Sodium hydroxide; Saline; Route: Intrauterine; Species: Rabbit; Pump: 2002; Duration: 11 days;
ALZET Comments: controls received mp w/ vehicle; separate and simultaneous infusion of agents; comparison of agents effects; NaOH, HCl and saline were used in combination as the vehicle for indomethacin; many different exp.; tissue perfusion (cornua of uterus)

Agents: Prostaglandin E1 a-cyclodextrin Vehicle: Ethanol; Saline; Route: SC; Species: Rat; Pump: 2ML1; Duration: 3 weeks;
ALZET Comments: pumps replaced every week; controls received mp w/vehicle; immunology

P0773: M. D. Lifschitz. Prostaglandins may mediate chloride concentration gradient across domes formed by MDCK1 cells. American Journal of Physiology Renal Physiology 1986;250(F525-F531
Agents: Prostaglandin E2 Vehicle: Glycine; Route: In vitro (cell culture); Species: Not Stated; Pump: 2002; Duration: 5 hours;
ALZET Comments: Mp infusion in culture dish to continually add PGE2 to MDCK cell culture

Agents: Indomethacin; Prostaglandin E2; Prostaglandin F2a Vehicle: Ethanol; Gelatin; PBS; Route: intrauterine; Species: Rat; Pump: 2001; Duration: 5 days;
ALZET Comments: replacement therapy (ovariectomy); controls received mp w/ vehicle; estradiol and progesterone injected sc w/ mp PG infusion; vehicle contained indomethacin to reduce PG synthesis; tissue perfusion (uterus)
**Agents:** Indomethacin; Prostaglandin E1; Prostaglandin E2  
**Vehicle:** Ethanol; Gelatin; PBS  
**Route:** intrauterine  
**Species:** Rat  
**Pump:** 2001; **Duration:** 5 days;  
**ALZET Comments:** mp w/vehicle; dose-response; indomethacin infused with prostaglandin E1 in one group and with prostaglandin E2 in another group; tissue perfusion (uterus)

**Agents:** Prostaglandin E1; Prostaglandin E2  
**Vehicle:** Triacetin;  
**Route:** Bone (tibia);  
**Species:** Rabbit; **Pump:** Not Stated; **Duration:** 4 weeks;  
**ALZET Comments:** Replacement therapy (ovariectomy); pumps primed overnight in saline; sc adminis. of agents in comb. w/mp infusion; separate and simultaneous infusion of agents; tissue perfusion (uterus)

P0739: T. G. Kennedy. Evidence for the involvement of prostaglandins throughout the decidual cell reaction in the rat. Biology of Reproduction 1985;33(140-146
**Agents:** Indomethacin; Prostaglandin E2; Prostaglandin F2a  
**Vehicle:** Ethanol; PBS;  
**Route:** Intrauterine;  
**Species:** Rat; **Pump:** 2001; **Duration:** 5 days;  
**ALZET Comments:** Replacement therapy (ovariectomy); pumps primed overnight in saline; sc adminis. of agents in comb. w/mp infusion; separate and simultaneous infusion of agents; tissue perfusion (uterus)

**Agents:** Uridine, fluorodeoxy-; Prostaglandin E1  
**Vehicle:** Not Stated;  
**Route:** IV (hepatic portal);  
**Species:** Rat; **Pump:** 2ML1; **Duration:** 1 week;  
**ALZET Comments:** controls received mp w/ buffer; cancer; toxicology

**Agents:** Prostaglandin E1 a-cyclodextrin  
**Vehicle:** Saline;  
**Route:** SC;  
**Species:** Rat; **Pump:** 2ML1; **Duration:** 10 days;  
**ALZET Comments:** comparison of 2x daily sc injec vs. mp infusion

**Agents:** EP-459; EP-475; Prostaglandin E2, dimethyl-  
**Vehicle:** DMSO;  
**Route:** SC;  
**Species:** Hamster; **Pump:** 2001  
**ALZET Comments:** pumps replaced weekly; agents infused separately and simultaneously; peptides; EP-459 and EP-475 are thiol protease inhibitors

**Agents:** Prostaglandin F2a  
**Vehicle:** Not Stated;  
**Route:** Intraovarian (corpus luteum);  
**Species:** Monkey; **Pump:** Not Stated;  
**Duration:** Not Stated;  
**ALZET Comments:** Paper cites mp used in preliminary study; tissue perfusion

**Agents:** Prostaglandin F2a  
**Vehicle:** Saline; Tromethamine (THAM);  
**Route:** Intraovarian (corpus luteum); intraovarian (stroma);  
**Species:** Monkey; **Pump:** 1701; **Duration:** 17 days;  
**ALZET Comments:** Pumps replaced after 7 days; tissue perfusion (corpus luteum & ovarian stroma)

**Agents:** Carbachol chloride; Echothiophate iodide; Histamine dihydrochloride; Prostaglandin E2; Thyrotropin-rel. factor  
**Vehicle:** Saline;  
**Route:** CSF/CNS;  
**Species:** Rat; **Pump:** 1701; **Duration:** Not Stated;  
**ALZET Comments:** 2001 w/carbachol & echothiophate, 1701 w/histamine, PGE2, & TRH, 7 days; comparison of agents effects
Agents: Prostaglandin F2a tromethamine salt Vehicle: Not Stated; Route: SC; Species: Hamster; Pump: 1701; Duration: 1 day; ALZET Comments: Comparison of injec. vs. mp infusion

Agents: Prostaglandin E2; Prostaglandin F2a Vehicle: Ethanol; Gelatin; PBS; Route: Intrauterine; Species: Rat; Pump: 2001; Duration: 4 days; ALZET Comments: Comparison of agents effects; pumps filled eve prior to use, stored at 4 deg. C in saline; PGE2 and PGF2a used alone and in combination; tissue perfusion (uterus)

Agents: Prostaglandin analog (TPT) Vehicle: Ethanol; Sodium phosphate; Route: SC; Species: Dog; Pump: Not Stated; Duration: 1, 2 days; ALZET Comments: Comparison of injections sc vs. infusion

P0076: S. Christensen. Failure of infusion of prostaglandin A2 to restore the response to antidiuretic hormone in rats with polyuria induced by lithium. Journal of Endocrinology 1980;84(3):459-465
Agents: Prostaglandin A2; Vasopressin, arginine Vehicle: Methanol; Propylene glycol; Saline; Route: IV (atrium); Species: Rat; Pump: 1701; Duration: 7 days; ALZET Comments: comparison of bolus injection vs. infusion; separate & simultaneous infusion of agents; pumps replaced 1-2 times; peptides

Agents: Prostaglandin E2 Vehicle: Ethanol; Sodium phosphate; Route: Intrauterine; Species: Sheep; Pump: 1701; Duration: 6, 7 days; ALZET Comments: Replaced every 7 days until estrus or day 40; tissue perfusion (uterus)