References on the Administration of Vitamins Using ALZET® Osmotic Pumps

RO-23-7553
ALZET Comments: RO-23-7553; PBS; IP; mice; 1007D; 7 days; controls received sham mp; cancer.

Vitamin A
Q8858: C. Huang, et al. Chronic retinoic acid treatment induces affective disorders by impairing the synaptic plasticity of the hippocampus. Journal of Affective Disorders 2020;274(678-689)
Agents: Retinoic acid Vehicle: Saline; DMSO; Route: CSF/CNS (lateral ventricle); Species: Rat; Duration: 21 days;
ALZET Comments: Dose (20 μg/day); Controls received mp w/ vehicle; animal info (Adult male Wistar rats, 220–240 g); behavioral testing (Sucrose Preference Test, Open Field Test, Elevated Plus Maze Test, Tail Suspension Test, Forced Swim Test); Retinoic acid aka RA; ALZET brain infusion kit used; Brain coordinates (AP: 0.8 mm, ML: 1.5 mm, DV: 4.0 mm);

Agents: retinoic acid Vehicle: Saline; Route: SC; Species: Rat; Pump: 2001; Duration: 7 days;
ALZET Comments: Dose (5 mg/kg/day); Controls received mp w/ vehicle; animal info (male, Sprague-Dawley, 160-180g); Retinoic acid is an agonist of N-acetylglucosamine transferase V; cardiovascular;

Agents: Retinoic acid, 13-cis- Vehicle: Ethanol; Route: SC; Species: Mice (transgenic); Pump: 1007D; Duration: 5 weeks;
ALZET Comments: Controls received mp w/ vehicle; dose-response (fig. 1); no stress (see pg. 312-13); cancer (neuroblastoma)

Agents: Retinoic acid; Uridine, bromodeoxy- Vehicle: Not Stated; Route: SC; Species: Mice; Duration: 1, 3, 6 days;
ALZET Comments: Controls received mp w/ vehicle; comparison of SC injections vs. mp; cancer (gastric); pumps per animal (2)

Agents: Transforming growth factor; Insulin-like growth factor I; retinoic acid; brain-derived neurotrophic factor; Vehicle: PBS; BSA; Route: Ear (vestibule); Species: Guinea pig; Pump: 2002; Duration: 4 weeks;
ALZET Comments: Controls received mp w/ vehicle; pumps replaced after 2 weeks; peptides; IntraEAR catheter used; GFI group pumps filled with TGF, IGF and Retinoic acid; GFII group pumps filled with TGF, IGF, BDNF and retinoic acid;

Agents: Dipyridamole; Lazaroids; Retinoic acid Vehicle: Not Stated; Route: Not Stated; Species: Not Stated;
ALZET Comments: Review of adhesion formation and prevention; used mp to evaluate new agents to reduce experimental pelvic adhesions (p. 125),

Agents: Retinoic acid; Quinacrine; Dipyridamole Vehicle: PBS; Ethanol; Route: Injury site; Species: Rabbit; Pump: 2ML1; Duration: 1, 2, 3, 7 days;
ALZET Comments: Controls received mp w/vehicle; tissue perfusion (surgical injury site); animals given morphine i.m. for post-operative pain; catheter stabilized in sidewall w/suture; in some studies, catheter tubing was disconnected to halt flow at specific times; immunology

**Agents:** Retinoic acid; Phorbol myristate acetate  
**Vehicle:** ETHANOL; Gibco BRL minimal essential medium; DMSO; Culture medium, serum-free;  
**Route:** CSF/CNS (cortex);  
**Species:** Rat;  
**Pump:** 2ML1;  
**Duration:** 21, 28 days;  

**ALZET Comments:** controls received mp w/ vehicle; functionality of mp verified by residual volume; pumps replaced weekly.

**Vitamin B12**


**ALZET Comments:** Vitamin b12; Cobalamin, ethylphenyl-; saline; SC; mice; 2004; 4 weeks; controls received mp w saline; animal info: 7 wks old, female, strain 129.S6; mp used to infuse EtPhCbI in mice to see if it causes Cbl (cobalamin) deficiency; EtPhCbl (3.5 nmol/24 h), CNCbI.


**ALZET Comments:** Cobinamide; vitamin B12; Saline; SC; Mice; 2004; 27 days; Control animals received mp w/ vehicle; animal info (129.S6, 8 wks old, female); “To avoid wound biting between mice, the mice were housed in individual cages for 3 days after surgery.”; post op. care (buprenorphine in the water); cobinamide is a vitamin B12 analogue.


**ALZET Comments:** Vitamin B12; IP; Rat; 2002; 15 days; controls received mp w/saline.


**ALZET Comments:** Vitamin B12 analog; SC; Rat; 2002; controls received pumps with saline only; pumps replaced after 3 weeks; cobalamin analog.

**Vitamin B12 analog**


**ALZET Comments:** Vitamin B12 analog; SC; Rat; 2002; no duration posted; controls received pumps with saline only; pumps replaced after three weeks; cobalamin analog.

**Vitamin D**


**Agents:** Vitamin D3  
**Vehicle:** Propylene, glycol;  
**Route:** SC;  
**Species:** Mice;  
**Pump:** Not stated;  
**Duration:** 1 day;  

**ALZET Comments:** Dose (1000 IU/kg); Controls received mp w/ vehicle; animal info (Q8 Mice, 10 weeks old); immunology;  


**Agents:** 1a,25-dihydroxyvitamin D;  
**Vehicle:** Not Stated;  
**Route:** SC;  
**Species:** Mice;  
**Pump:** Not Stated;  
**Duration:** 3 weeks;  

**ALZET Comments:** animal info (137 day old, C57BL/6J ); 1a,25-dihydroxyvitamin D; aka 1, 25D ; dependence;  


**Agents:** Vitamin D3, 1,25-dihydroxy  
**Vehicle:** Cyclodextrin; hydroxypropyl-B-;  
**Route:** CSF/CNS (third ventricle);  
**Species:** Rat;  
**Pump:** 1004;  
**Duration:** 28 days;  

**ALZET Comments:** Controls received mp w/ vehicle; animal info (male, Long Evans, adult); dose-response (Supplementary Figure 3); obesity; Dose (-.264 ug/day); Brain coordinates (i3vt 2.2A/P, 7.8D/V);
Agents: Vitamin D, 1,25-Dihydroxy- Vehicle: Not Stated; Route: Not Stated; Species: Mice; Pump: Not Stated; Duration: 4 weeks;
ALZET Comments: animal info (Hyp mice); “In contrast, Alzet minipump infusion of 1,25D into Hyp mice for 4 weeks after weaning, along with a diet rich in phosphate, normalizes the growth plate and dramatically improves osteoid thickness” pg 936; Oral vs. minipump (pg. 936);

Agents: Hydroxyvitamin D3, 1α- Vehicle: Not Stated; Route: SC; Species: Sheep (ewe); Pump: 2002; Duration: 6 days;
ALZET Comments: Animal info (merino, mature); functionality of mp verified by plasma 1,125-dihydroxycholecalciferol levels;

Q3900: S. K. Halder, et al. Paricalcitol, a Vitamin D Receptor Activator, Inhibits Tumor Formation in a Murine Model of Uterine Fibroids. REPRODUCTIVE SCIENCES 2014;21(1108-1119
Agents: Vitamin D3, 1,25-dihydroxy Vehicle: PEG; ethanol; Route: SC; Species: Mice (nude); Pump: Not Stated; Duration: 28 days;
ALZET Comments: Controls received mp w/ vehicle; animal info (female, athymic, nude, 5-6 weeks old); 95% PEG used; 5% ethanol used; cancer (uterine fibroid tumor);

Agents: Parathyroid hormone (1-34), human; vitamin D3, 1,25-dihydroxy Route: SC; Species: Rat; Duration: 3 days;
ALZET Comments: Controls received mp w/ vehicle; animal info (male, Sprague Dawley, 3 months old);

Agents: Vitamin D3, 1,25-dihydroxy Vehicle: Ethylene glycol; Route: SC; Species: Rat; Pump: Not Stated; Duration: 3 weeks;
ALZET Comments: Controls received mp w/ vehicle; animal info (female, Eker, 14-16 wks old); functionality of mp verified via serum drug levels; cancer (uterine leiomyomas)

Agents: Vitamin D3, 1,25-dihydroxy Vehicle: Not Stated; Route: IP; Species: Rat; Pump: Not Stated; Duration: 6 weeks;
ALZET Comments: Animal info (adult, SHR, WKY, 36 wk old); long-term study

Agents: Vitamin D, 1 alpha 25-dihydroxy; Vitamin D hybrid, 1 alpha 25-dihydroxy Vehicle: Not Stated; Route: Not Stated; Species: Mice; Pump: Not Stated; Duration: 6-7 days;
ALZET Comments: Animal info (female, virgin, FVB, 8 wks old); cancer; enzyme inhibitor (histone deacetylase, HDAC)

Agents: Vitamin D3 Vehicle: Not Stated; Route: IP; Species: Rat; Pump: Not Stated; Duration: 14 days;
ALZET Comments: No stress (see pg. 425, 432); animal info (male, Sprague-Dawley, 7 weeks old)

Agents: Vitamin D3, 1,25-dihydroxy Vehicle: Propylene glycol; Route: SC; Species: Mice; Pump: 2004; Duration: 1,4 months;
ALZET Comments: Controls received mp w/ vehicle; long-term study; pumps replaced every 4 weeks; stability verified by serum calcium levels; cancer (prostate); animal info (4-7 months old, male)

**Agents:** Vitamin D₃, 1, 25-dihydroxy-; vitamin D₃, 22-oxa-1a, 25-dihydroxy-  
**Vehicle:** Tween 20; Ethanol  
**Route:** SC  
**Species:** Mice  
**Pump:** 2ML4  
**Duration:** 3 weeks; 10, 18 days  
**ALZET Comments:** Controls received mp w/ vehicle; dose-response; cancer (lung carcinoma); 10% ethanol;


**Agents:** Vitamin D₃, 1, 25-dihydroxy-  
**Vehicle:** Not Stated  
**Route:** Not Stated  
**Species:** Mice  
**Pump:** 2004  
**Duration:** 6 weeks  
**ALZET Comments:** Controls received mp w/ vehicle; pumps replaced after 3 weeks


**Agents:** Vitamin D₃, 1,25-dihydroxy-; EB 1089  
**Vehicle:** Polypropylene glycol; sodium phosphate  
**Route:** SC  
**Species:** Rat  
**Duration:** 28 days  
**ALZET Comments:** Controls received mp w/ vehicle; functionality of mp verified by plasma 25(OH)-D and 1,25-D levels; stress/adverse reaction: (see pg. 137) 5 animals died due to anesthesia complications and to tail irritation and diarrhea


**Agents:** Vitamin D₃, 1,25-dihydroxy-  
**Vehicle:** Not Stated  
**Route:** Not Stated  
**Species:** Mice  
**Pump:** 2004  
**Duration:** 6 weeks  
**ALZET Comments:** Controls received mp w/ vehicle; pumps replaced after 3 weeks


**Agents:** Vitamin D₃, 125-dihydroxy-; vitamin D₃, 25-hydroxy-  
**Route:** IP  
**Species:** Rat  
**Duration:** 1,3,5,7 days  
**ALZET Comments:** Functionality of mp verified by serum levels (p. E140); dose-response (p. E140); pump model not stated


**Agents:** Vitamin D₃, 24,25-dihydroxy-; Vitamin D₃, 25-hydroxy-  
**Vehicle:** Propylene glycol; Ethanol  
**Route:** SC  
**Species:** Rat  
**Pump:** Not Stated  
**Duration:** Up to 28 days  
**ALZET Comments:** Controls received mp w/ vehicle; functionality of mp verified by plasma levels; vehicle was 95% PG with 5% ETOH


**Agents:** Vitamin D₃, 1,25-dihydroxy-  
**Vehicle:** Not Stated  
**Route:** SC  
**Species:** Guinea pig  
**Pump:** 2ML4  
**Duration:** 4 weeks  
**ALZET Comments:**


**Agents:** Vitamin D₃, 25-hydroxy-  
**Vehicle:** Not Stated  
**Route:** SC  
**Species:** Mice (SCID)  
**Duration:** 5.5 weeks  
**ALZET Comments:** Controls received mp w/ vehicle or agent with no tumor; functionality of mp verified by 25-OHD₃ plasma levels; no stress (see pg. 11 and fig.7); cancer (squamous carcinoma)


**Agents:** Vitamin D₃, 1, 25-dihydroxy-  
**Vehicle:** Not Stated  
**Route:** SC  
**Species:** Rat  
**Pump:** 2001  
**Duration:** 7 days  
**ALZET Comments:** controls received mp w/ vehicle; functionality of mp verified by serum Vitamin D₃ levels; streptozotocin induced diabetes, p. 1170

Agents: 1,25-Dihydroxyvitamin D3 Vehicle: Saline; Route: SC; Species: Rat; Pump: Not Stated; Duration: 14 days;
ALZET Comments: Dose (25 ng/100g wt/day); Controls received mp w/ vehicle; animal info (Female, 8 week old, Wistar, 160-200 g); 1,25-Dihydroxyvitamin D3 aka 1,25(OH)2D3; enzyme inhibitor (Monocyte-derived cytokine inhibitor); dependence;

P4614: I. V. Silva, et al. PTH regulates expression of ClC-5 chloride channel in the kidney. American Journal of Physiology Renal Physiology 2000;278(F238-F245

Agents: Vitamin D; Parathyroid hormone (1-34) Vehicle: Ringer’s solution; Route: SC; Species: Rat (pregnant); Pump: 1003D;; Duration: 3 days;
ALZET Comments: Controls received mp w/vehicle + sham operation; replacement therapy (thyroparathyroidectomy); peptides


Agents: Vitamin D Vehicle: Not Stated; Route: Not Stated; Species: Rat; Pump: Not Stated; Duration: 1 week;
ALZET Comments:


Agents: Vitamin D; uridine, bromodeoxy- Vehicle: Not Stated; Route: SC;; Species: Mice; Pump: 1003D; Duration: 3 days;
ALZET Comments: Cancer


Agents: Vitamin D Vehicle: Propylene glycol; Ethanol; Route: SC; Species: Rat; Pump: 2001; Duration: 5 days;
ALZET Comments: controls received mp w/vehicle


Agents: Parathyroid hormone; Calcitonin; Vitamin D, 1,25-dihydroxy- Vehicle: NaCl; HCl; Cysteine; Saline, isotonic; Route: SC; Species: Rat; Pump: 2002; Duration: 13 days;
ALZET Comments: controls received sham tubing; functionality of mp verified by hormone assays; replacement therapy (thyroidectomy, thyroparathyroidectomy); dose-response; stress/adverse reaction: high doses led to animal death; peptides; agents given singly and in combination


Agents: Vitamin D3, 1,25-dihydroxy- Vehicle: Propylene glycol; Route: SC; Species: Rat; Pump: Not Stated; Duration: 7 days;
ALZET Comments: controls received mp w/vehicle


Agents: Vitamin D3, 1,25-dihydroxy- Vehicle: Ethanol; Route: Not Stated; Species: Rat; Pump: 2ML4; Duration: Not Stated;
ALZET Comments: Controls received mp w/vehicle


Agents: Parathyroid hormone; Vitamin D3, 1,25-dihydroxy- Vehicle: Propylene glycol; Saline; Cysteine; Route: SC; Species: Mice; Pump: 2001; Duration: 3,14 days;
ALZET Comments: Controls received mp w/ vehicle; peptides
Agents: Vitamin D3, 1,25-dihydroxy- Vehicle: Not Stated; Route: SC; Species: Mice; Pump: Not Stated; Duration: Not Stated;
ALZET Comments: Functionality of mp verified by plasma levels; immunology

Agents: Vitamin D3, 1,25-dihydroxy- Vehicle: Not Stated; Route: SC; Species: Mice; Pump: Not Stated; Duration: 14 days;
ALZET Comments: Immunology

Agents: Calcium chloride; Vitamin D3, 1,25-dihydroxy- Vehicle: Propylene glycol; Ethanol; Route: SC; IV (inferior vena cava);
Species: Rat; Pump: 2001; Duration: 7 days;
ALZET Comments: no comment posted

Agents: Vitamin D3, 1,25-dihydroxy- Vehicle: Propanediol, 1,2; Route: SC; Species: Mice; Pump: 2001; Duration: 4 days;
ALZET Comments: Normal and Hyp mice used

Agents: Vitamin D3, 1,25-dihydroxy- Vehicle: Propanediol, 1,2; Route: SC; Species: Mice; Pump: 2001; Duration: 4 days;
ALZET Comments: Normal and Hyp mice used

Agents: Vitamin D3, 1,25-dihydroxy-; Vitamin D3, 24,25-dihydroxy- Vehicle: Propylene glycol; Route: SC; Species: Mice;
Pump: 2001; 2002; Duration: 17 days;
ALZET Comments: Pumps replaced at day 6; vitamins given singly and together

Agents: Vitamin D3, 1,25-dihydroxy- Vehicle: Not Stated; Route: SC; Species: Rat; Pump: 2001; Duration: 7 days;
ALZET Comments: controls received mp with vehicle; comparison of daily sc injections vs. mp

P3142: A. Uhland-Smith, et al. The necessity for calcium for increased renal vitamin D receptor in response to 1,25-dihydroxyvitamin D. Biochimica et Biophysica Acta (BBA) - Molecular Cell Research 1993;1176(321-326
Agents: Vitamin D3, 1,25-dihydroxy- Vehicle: Propylene glycol; Route: SC; Species: Rat; Pump: 2002; Duration: 4.8 weeks;
ALZET Comments: comparison of oral vitamin D-3 vs. mp; long-term study, pumps replaced after 2 weeks

Agents: Parathyroid hormone, bovine; Vitamin D3, 1,25-dihydroxy- Vehicle: Propylene glycol; Route: SC; Species: Rat; Pump: 2001, 2002; Duration: 1, 2 weeks;
ALZET Comments: replacement therapy (thyroparathyroidectomy)

Agents: Oxacalcitriol, 22--; Vitamin D3, 24,25-dihydroxy--; Vitamin D3, 1,25-dihydroxy- Vehicle: Propylene glycol; Route: SC;
Species: Rat; Pump: 2002; Duration: 14 days;
ALZET Comments: no comment posted

**Agents:** Vitamin D3, 1,25-dihydroxy - **Vehicle:** Propylene glycol - **Route:** SC - **Species:** Rat - **Pump:** 2001 - **Duration:** 6 days;

**ALZET Comments:** functionality of mp verified by residual volume, radioactive tracing and serum levels; comparison of i.p. injections vs. mp


**Agents:** Oxacalcitriol, 22-; Vitamin D3, 1,25-dihydroxy - **Vehicle:** Propylene glycol - **Route:** SC - **Species:** Rat - **Pump:** 2002 - **Duration:** 3 days;

**ALZET Comments:** controls received mp w/ vehicle; comparison of ip injections vs. mp; agent is 1,25-(OH)2D3


**Agents:** Vitamin D, 1,25-dihydroxy - **Vehicle:** Not Stated - **Route:** SC - **Species:** Rat - **Pump:** Not Stated - **Duration:** 3,7 days;

**ALZET Comments:** comparison of ip injections vs mp


**Agents:** Vitamin D3, 1,25-dihydroxy - **Vehicle:** Ethanol; Propylene glycol - **Route:** SC - **Species:** Rat - **Pump:** 2002 - **Duration:** 10 days;

**ALZET Comments:** dose-response graphs (pp. E127-E128); infusion of D3 represents a better approach over injections for determining the physiology of tissue D3 responsiveness


**Agents:** Vitamin D3, 1,25-dihydroxy - **Vehicle:** Radio-isotopes - **Route:** SC - **Species:** Rat - **Pump:** Not Stated - **Duration:** Not Stated;

**ALZET Comments:** no comment posted


**Agents:** Vitamin D3, 1,25-dihydroxy - **Vehicle:** Not Stated - **Route:** SC - **Species:** Mice - **Pump:** 2001 - **Duration:** Not Stated;

**ALZET Comments:** no comment posted


**Agents:** Vitamin D3, 1,25-dihydroxy - **Vehicle:** Not Stated - **Route:** SC - **Species:** Mice - **Pump:** 2001 - **Duration:** 48 hours;

**ALZET Comments:** no comment posted


**Agents:** Parathyroid hormone; Vitamin D3, 1,25-dihydroxy - **Vehicle:** Cysteine; Ethanol; HCl; Propylene glycol; Saline - **Route:** Not Stated - **Species:** Rat - **Pump:** Not Stated - **Duration:** 5 days;

**ALZET Comments:** controls received pumps with saline only; peptides; PTH and vit. D infused separately and concurrently


**Agents:** Vitamin D3, 1,25-dihydroxy - **Vehicle:** Propylene glycol - **Route:** SC - **Species:** Rat - **Pump:** 2002 - **Duration:** 7, 10 days;

**ALZET Comments:** dose-response (serum levels); half-life; functionality of mp verified by serum levels


**Agents:** Vitamin D3, 1,25-dihydroxy - **Vehicle:** Propanol - **Route:** IP - **Species:** Rat - **Pump:** Not Stated - **Duration:** Not Stated;

**ALZET Comments:** Comparison of IP injections vs. mp infusion
Agents: Calcitriol; Vitamin D3, 1,25-dihydroxy-
Vehicle: Ethanol; Propylene glycol; Route: SC; Species: Rat; Pump: 2001; Duration: 1 week;
ALZET Comments: functionality of mp verified by measuring residual volume

Agents: Vitamin D3, 1,25-dihydroxy-
Vehicle: Propylene glycol; Route: SC; Species: Cattle; Pump: 2ML1; Duration: 7 days;
ALZET Comments: functionality of mp verified by measuring plasma vit. D levels; discusses comparison of IM injections vs. mp; states pump effectively maintained plasma conc. throughout (p. 2939), states conc. achieved via pump may improve vit. D3 therapy for preventing p

Agents: Vitamin D3, 1,25-dihydroxy-
Vehicle: Ethanol; Propylene glycol; Route: Not Stated; Species: Rat; Pump: 2001; Duration: 6 days;
ALZET Comments: no comment posted

Agents: Vitamin D3, 1,25-dihydroxy-
Vehicle: Propanediol, 1,2-; Route: SC; Species: Mice; Pump: 2001; Duration: 3 days;
ALZET Comments: No comment posted

Agents: Vitamin D3, 1,25-dihydroxy-
Vehicle: Propanediol, 1,2-; Route: SC; Species: Mice; Pump: 2001; Duration: 3 days;
ALZET Comments: Dose-response; functionality of mp verified by plasma levels

Agents: Vitamin D3, 1,25-dihydroxy-
Vehicle: Ethanol; Propylene glycol; Saline; Route: IP; Species: Rat; Pump: 2001; Duration: 8 days;
ALZET Comments: controls received mp w/vehicle

Agents: Vitamin D, 1,25-dihydroxy-
Vehicle: Not Stated; Route: SC; Species: Rat; Pump: Not Stated; Duration: Not Stated;
ALZET Comments: Animal info (male, Norwegian hooded)

P1058: M. E. Bruns, et al. Vitamin D-dependent calcium binding proteins in the kidney and intestine of the X-linked hypophosphatemic mouse: Changes with age and responses to 1,25-dihydroxycholecalciferol. Endocrine Society 1987;121(1-6
Agents: Vitamin D3, 1,25-dihydroxy-
Vehicle: Propylene glycol; Route: SC; Species: Mice; Pump: 2001; Duration: 3 days;
ALZET Comments: Controls received mp w/vehicle; mice were hypophosphatemic

Agents: Vitamin D3, 1,25-dihydroxy-
Vehicle: Ethanol; Propylene glycol; Route: SC; Species: Rat; Pump: 2002; Duration: 13 days;
ALZET Comments: controls received mp w/vehicle
Agents: Calcium chloride; Vitamin D3, 1,25-dihydroxy-
Vehicle: Propylene glycol; Saline; Route: CSF/CNS; Species: Rat; Pump: 2001; Duration: 7 days;
ALZET Comments: mp connected to cannula in 3rd ventricle and implanted sc; vitamin d3 administered ip in combination w/mp infusion; controls received mp w/appropriate vehicle; agents administered separately

Agents: Vitamin D3 metabolites
Vehicle: Propylene glycol; Route: SC; Species: Mice; Pump: 2002; Duration: Not Stated;
ALZET Comments: Not Stated

Agents: Parathyroid hormone, bovine; Vitamin D3, 1,25-dihydroxy-
Vehicle: Cysteine HCl; Propylene glycol; Saline; Route: SC; Species: Mice; Pump: 2001; Duration: 48 hours;
ALZET Comments: mp primed in saline 24 hrs prior to implant; controls received sham pumps; dose-response (plasma levels & kidney conc.); agents infused separately; advantages of mp infusion (see pg. 185); peptides

Agents: Parathyroid hormone, bovine; Vitamin D3, 1,25-dihydroxy-
Vehicle: Acetic acid; Albumin; Ethanol; Propylene glycol; Saline; Route: IP; Species: Rat; Pump: 2001; Duration: 3 days;
ALZET Comments: 4 doses of agents infused; replacement therapy (thyroparathyroidectomy); peptides

Agents: Vitamin D3, 1,25-dihydroxy-
Vehicle: Ethanol; Propylene glycol; Route: SC; Species: Rat; Pump: 2002; Duration: 2wks
ALZET Comments: dose-response (serum conc.)

Agents: Radio-isotopes; Vitamin D3, 1,25-dihydroxy-
Vehicle: 3H tracer; Ethanol; Propylene glycol; Route: SC; Species: Rat; Pump: 2002; Duration: 3, 7, 12 days;
ALZET Comments: metabolic clearance rate measured by mp infusion of labelled Vit. D3, see ref. 15 & 16

Agents: Vitamin D3, 1,25-dihydroxy-
Vehicle: Propylene glycol; Route: SC; Species: Mice (nude); Pump: 2001; Duration: 70 days;
ALZET Comments: mp replaced periodically; long-term study; comparison of various agents iv vs. mp infusion;

Agents: Vitamin D3, 1,25-dihydroxy-
Vehicle: Propylene glycol; Route: SC; Species: Mice; Duration: 1 week;
ALZET Comments: 3 doses of Vit D3 given; dose-response data

Agents: Vitamin D3, 1,25-dihydroxy-
Vehicle: Ethanol; Propylene glycol; Route: SC; Species: Rat; Pump: 2002; Duration: 17d
ALZET Comments: comparison of single ip injection vs. mp infusion; mp coated w/ Panalog ointment to reduce risk of infection
**Agents:** Vitamin D3, 1,25-dihydroxy-  
**Vehicle:** Propylene glycol;  
**Route:** SC;  
**Species:** Mice;  
**Duration:** 4 weeks;  
**ALZET Comments:** 4 dose levels tested: 0.05, 0.10, 0.175, and 0.25 ug/kg/day

**Agents:** Vitamin D3, 1,25-dihydroxy-; Vitamin D3, 25-hydroxy-  
**Vehicle:** Propylene glycol;  
**Route:** SC;  
**Species:** Rat;  
**Pump:** 2002;  
**Duration:** 20 weeks;  
**ALZET Comments:** comparison of oral vs. sc infusion; mp replaced every 2 weeks; pumps coated w/ Panalog ointment; animals washed w/surg. scrub & not shaved; long-term study; no stress - p. E296

**Agents:** Vitamin D3, 1,25-dihydroxy-  
**Vehicle:** Propylene glycol;  
**Route:** IP;  
**Species:** Rat;  
**Pump:** 1701;  
**Duration:** 1 week;  
**ALZET Comments:** no comment posted

**Agents:** Vitamin D3, 1,25-dihydroxy-; Vitamin D3, 25-hydroxy-  
**Vehicle:** Propylene glycol;  
**Route:** SC;  
**Species:** Rat;  
**Pump:** 2002;  
**Duration:** Not Stated;  
**ALZET Comments:** Comparison of oral vs. sc infusion

**Agents:** Vitamin D3, 1,25-dihydroxy-  
**Vehicle:** Propylene glycol;  
**Route:** SC;  
**Species:** Mice;  
**Pump:** 2001;  
**Duration:** 10 days;  
**ALZET Comments:** Pumps replaced

**Agents:** Vitamin D3, 24,25-dihydroxy-; Vitamin D3, 25-dihydroxy-; Vitamin D3, 1,25-dihydroxy-  
**Vehicle:** Propylene glycol;  
**Route:** SC;  
**Species:** Mice;  
**Pump:** Not Stated;  
**Duration:** 18 days;  
**ALZET Comments:** Comparison of agents

**Agents:** Vitamin D3, 1,25-dihydroxy-  
**Vehicle:** Propylene glycol;  
**Route:** SC;  
**Species:** Mice;  
**Pump:** 2001;  
**Duration:** 10 days;  
**ALZET Comments:** Pumps replaced

**Vitamin E**

**Agents:** PMC; tocopherol, alpha  
**Vehicle:** Not Stated;  
**Route:** SC;  
**Species:** Rat;  
**Pump:** Not Stated;  
**Duration:** 14 days;  
**ALZET Comments:** Controls received mp w/ normal saline; animal info (Wistar, male, 350-400 g); PMC, also known as (2,2,5,7,8-pentamethyl-6-hydroxychromane, is a vitamin E derivative; tocopherol also known as vitamin E

**Agents:** Ascorbate; glutathione; tocopherol, alpha  
**Vehicle:** Not Stated;  
**Route:** SC;  
**Species:** Mice;  
**Pump:** 1007D;  
**ALZET Comments:** Controls received mp w/saline; animal info (male, C57BL/6J, 25-30g, 10-12 weeks old); compounds were mixed and infused together as an antioxodant cocktail
**Agents:** Vitamin E  
**Vehicle:** Not Stated  
**Route:** IP  
**Species:** Rat  
**Pump:** 2001  
**Duration:** 7 days  
**ALZET Comments:** functionality of mp verified by measuring EPC-K1 plasma levels; immunology; EPC-K1 is a diester of a-tocopherol and ascorbic acid; agent also called D-alpha-tocopherol

**Agents:** Phosphatidylcholine; vitamin E; Liposomes  
**Vehicle:** Not Stated  
**Route:** CSF/CNS (cortex)  
**Species:** Rat  
**Pump:** 2001  
**Duration:** 7 days  
**ALZET Comments:** Multiple pumps per animal (2); agent also called D-alpha-tocopherol