



### References on the Administration of Thyroxine Using ALZET® Osmotic Pumps

- Q10672:** J. Santiago-Moreno, *et al.* Expression of Aquaglyceroporins in Spermatozoa from Wild Ruminants Is Influenced by Photoperiod and Thyroxine Concentrations. *International Journal of Molecular Sciences* 2022;23(6):  
**Agents:** Thyroxine **Vehicle:** Saline; **Route:** SC (lateral shoulder); **Species:** Ibex (Iberian); **Pump:** 2ML2; **Duration:** 56 days;  
**ALZET Comments:** Dose (164 µg/day); 0.9% normal saline used; T4 aka thyroxine; pumps replaced after 14 days; functionality of mp verified by plasma concentrations
- Q9129:** J. Zhou, *et al.* Thyroid Hormone Status Regulates Skeletal Muscle Response to Chronic Motor Nerve Stimulation. *Frontiers in Physiology* 2019;10(1363)  
**Agents:** Thyroxine **Vehicle:** NaCl, Sterile; **Route:** SC; **Species:** Rabbit; **Pump:** Not Stated; **Duration:** 14 days;  
**ALZET Comments:** Dose (50 ug/kg/day); animal info (Adult New Zealand white rabbits); dependence;
- Q10907:** J. Zhou, *et al.* Thyroid Hormone Status Regulates Skeletal Muscle Response to Chronic Motor Nerve Stimulation. *Frontiers in Physiology* 2019;10(1363)  
**Agents:** Thyroxine **Vehicle:** Saline, sterile; **Route:** SC; **Species:** Rabbit; **Pump:** Not Stated; **Duration:** 14 days;  
**ALZET Comments:** Dose: (50 mg/kg/day) Controls received mp w/ vehicle; animal info: Adult New Zealand white rabbits;
- Q7224:** F. S. Lucia, *et al.* Transient Hypothyroidism During Lactation Arrests Myelination in the Anterior Commissure of Rats. A Magnetic Resonance Image and Electron Microscope Study. *Front Neuroanat* 2018;12(31)  
**Agents:** Thyroxine. L- **Vehicle:** Not Stated; **Route:** SC; **Species:** Rat; **Pump:** 2001; **Duration:** 7 days;  
**ALZET Comments:** Dose (1 uL/hr/day); animal info (Wistar, adult, female, 250-300 g); dependence;
- Q7179:** Y. Henning, *et al.* Retinal S-opsin dominance in Ansell's mole-rats (*Fukomys ansellii*) is a consequence of naturally low serum thyroxine. *Sci Rep* 2018;8(1):4337  
**Agents:** Thyroxine, 3,5,3'-triiodothyronine **Vehicle:** NaOH, propylene glycol, PBS; **Route:** SC; **Species:** Rat (mole); **Pump:** 2006; **Duration:** 12 weeks;  
**ALZET Comments:** Dose (90 ng/g of T4, 2 ng/g of T3); 15 mM NaOH, 50% propylene glycol and PBS containing 5% BSA used; Controls received mp w/ vehicle; animal info (Ansell's mole rats, mean age 2.6 ± 0.92 years); post op. care (Carprofen, 5 mg/kg for at least 3 days; animals were isolated for 24–48 h for recovery then housed as family group); pumps replaced every 6 weeks; long-term study; "Osmotic pumps deliver the test agents with a constant flow rate, thus being well-suited for long-term hormone treatments" pg. 9 ;
- Q6523:** G. Vazquez-Anaya, *et al.* Exogenous thyroxine improves glucose intolerance in insulin-resistant rats. *J Endocrinol* 2017;232(3):501-511  
**Agents:** Thyroxine **Vehicle:** Saline; Propylene glycol; **Route:** SC; **Species:** Rat; **Pump:** 2006; **Duration:** Not Stated;  
**ALZET Comments:** 50% propylene glycol used; animal info (9 week old male lean (265 ± 7 g), strain-control Long Evans Tokushima Otsuka rats and obese (356 ± 4 g) Otsuka Long Evans Tokushima Fatty rats); Therapeutic indication (glucose intolerance);
- Q5829:** N. Martinez-Sanchez, *et al.* Thyroid hormones induce browning of white fat. *J Endocrinol* 2017;232(2):351-362  
**Agents:** Thyroxin, L-, Adenovirus vector; Gene, green fluorescent protein; Gene, AMP-activated protein kinase **Vehicle:** Saline; **Route:** CSF/CNS (hypothalamus); **Species:** Rat; **Pump:** 1007D; **Duration:** 7, 21 days;  
**ALZET Comments:** bilateral cannula used; animal info (200-250g); gene therapy; Therapeutic indication (Browning, thyroid hormones);



**Q1097:** C. Grijota-Martinez, *et al.* Lack of Action of Exogenously Administered T3 on the Fetal Rat Brain Despite Expression of the Monocarboxylate Transporter 8. *Endocrinology* 2011;152(4):1713-1721

**Agents:** Triiodothyronine ; Thyroxine **Vehicle:** Propylene glycol; **Route:** SC; **Species:** Rat (pregnant); **Pump:** 2ML2;  
**ALZET Comments:** Controls received mp w/ vehicle and sham surgery; animal info (250-300 g, female, Wistar); "(T3, T4 doses) were not corrected for increasing weight" pg 1714; "Instead of administering the hormones directly to the hypothyroid fetuses, they were given via subcutaneous infusion to pregnant dams." pg 1715

**Q0136:** L. Zhang, *et al.* Vasopressinergic Network Abnormalities Potentiate Conditioned Anxious State of Rats Subjected to Maternal Hyperthyroidism. *Neuroscience* 2010;168(2):416-428

**Agents:** Thyroxine, L- **Vehicle:** Not Stated; **Route:** SC; **Species:** Rat (pregnant); **Pump:** 2ML4; **Duration:** Not Stated;  
**ALZET Comments:** Controls received mp w/ vehicle; animal info (Wistar, P90)

**Q9016:** L. Sui, *et al.* Administration of thyroid hormone increases reelin and brain-derived neurotrophic factor expression in rat hippocampus in vivo. *Brain Research* 2010;1313(9-24)

**Agents:** Triiodothyronine; Thyroxine **Vehicle:** Ethanol; Saline; **Route:** CSF/CNS (hippocampus); **Species:** Rat; **Duration:** 24 hrs  
**ALZET Comments:** Dose (50 pmol/ul); 0.9% NaCl and 0.05% Ethanol used; Controls received mp w/ vehicle; animal info (Young adult male Sprague–Dawley rats weighting 180–200 g); Triiodothyronine aka T3, Thyroxine aka T4; Brain coordinates (bregma – 3.5 mm, lateral ± 2 mm, and depth – 2.0 mm); replacement therapy (Thyroid Hormones);

**Q0003:** P. Berbel, *et al.* Role of Late Maternal Thyroid Hormones in Cerebral Cortex Development: An Experimental Model for Human Prematurity. *Cerebral Cortex* 2010;20(6):1462-1475

**Agents:** Parathyroid hormone, rat (1-84); Calcitonin, rat; Thyroxine **Vehicle:** Acetate buffer; **Route:** SC; **Species:** Rat (pregnant); **Pump:** 2001; **Duration:** 4,8 days;  
**ALZET Comments:** Teratology; peptides; animal info (Female, Wistar, 250-300 g); replacement therapy (parathyroidectomy)

**Q1607:** A. Baysal, *et al.* Comparisons of the effects of systemic administration of L-thyroxine and doxycycline on orthodontically induced root resorption in rats. *European Journal of Orthodontics* 2010;32(5):496-504

**Agents:** Thyroxine, L-; doxycycline **Vehicle:** Not Stated; **Route:** SC; **Species:** Rat; **Pump:** 1002; **Duration:** 14 days;  
**ALZET Comments:** Controls received mp w/ physiological serum; animal info (Wistar, male, 50-60 days old, 132 g);

**Q0434:** L. P. Klieverik, *et al.* Thyroid Hormone Effects on Whole-Body Energy Homeostasis and Tissue-Specific Fatty Acid Uptake in Vivo. *Endocrinology* 2009;150(12):5639-5648

**Agents:** Thyroxine **Vehicle:** NaOH; Propylene glycol; **Route:** SC; **Species:** Rat; **Pump:** 2ML2; **Duration:** Not Stated;  
**ALZET Comments:** Controls received mp w/ vehicle; animal info (male, Wistar, 320-360 g); endocrinology

**P8764:** L. P. Klieverik, *et al.* Effects of thyrotoxicosis and selective hepatic autonomic denervation on hepatic glucose metabolism in rats. *American Journal of Physiology Endocrinology and Metabolism* 2008;294(3):E513-E520

**Agents:** Thyroxine, L- **Vehicle:** Propylene glycol; NaOH; **Route:** SC; **Species:** Rat; **Pump:** 2ML2; **Duration:** 10 days;  
**ALZET Comments:** Functionality of mp verified by T4 plasma concentrations; dose-response (Fig. 1); no stress (see pg. E515); post op. care (Temgesic); animal info (male, Wistar, 325-375g.); hepatic sympathetic or parasympathetic denervation

**P7879:** H. Lu, *et al.* Tissue distribution and thyroid hormone regulation of Pept1 and Pept2 mRNA in rodents. *Peptides* 2006;27(4):850-857

**Agents:** Triiodothyronine; thyroxine, L- **Vehicle:** Saline; NaOH; **Route:** SC; **Species:** Rat; **Pump:** 2002; **Duration:** 14 days;  
**ALZET Comments:** Controls received mp w/ vehicle, or no treatment; replacement therapy (thyroidectomy); animal info (Sprague–Dawley, 5 wk old, male)

**P7160:** P. Cettour-Rose, *et al.* Hypothyroidism in rats decreases peripheral glucose utilisation, a defect partially corrected by central leptin infusion. *Diabetologia* 2005;48(4):624-633

**Agents:** Thyroxine; Leptin, human analog; Triiodothyronine, reverse **Vehicle:** Saline, isotonic; **Route:** SC; **Species:** Rat; **Pump:** 2001; **Duration:** 3, 6 days;  
**ALZET Comments:** Controls received mp w/ vehicle, functionality of mp verified by plasma levels, replacement therapy (hypothyroidism), enzyme inhibitor (deiodinase), peptides, multiple pumps per animal (2), agents are also known as T3 and T4



- P5986:** T. Yoshimura, *et al.* Light-induced hormone conversion of T(4) to T(3) regulates photoperiodic response of gonads in birds. *Nature* 2003;426(6963):178-181  
**Agents:** Thyroxine; Iopanoic Acid; Triiodothyronine **Vehicle:** NaCl; NaOH (sodium hydroxide); HCl; **Route:** CSF/CNS; **Species:** Bird (quail); **Pump:** 2002; **Duration:** 2 weeks;  
**ALZET Comments:** ALZET brain infusion kit used; placement & patency of canula verified by injecting Evans blue dye
- P5142:** I. S. Kim, *et al.* Changes in the testis interstitium of Brown Norway rats with aging and effects of luteinizing and thyroid hormones on the aged testes in enhancing the steroidogenic potential. *Biology of Reproduction* 2002;66(1359-1366)  
**Agents:** Luteinizing hormone; Thyroxine **Vehicle:** Saline; **Route:** SC; **Species:** Rat; **Pump:** 2ML4; **Duration:** 4 weeks;  
**ALZET Comments:** controls received mp w/ saline; functionality of mp verified by residual volume and plasma levels of LH & T4 via radioimmunoassay; dose-response (table, p. 1364); multiple pumps per animal (1-2): one for T4 and one for LH
- P5155:** V. Haberkorn, *et al.* Vitamin A modulates the effects of thyroid hormone on UDP-glucuronosyl transferase expression and activity in rat liver. *Molecular and Cellular Endocrinology* 2002;190(167-175)  
**Agents:** Thyroxine; Triiodothyronine **Vehicle:** Saline; NaOH; **Route:** SC; **Species:** Rat; **Pump:** 2002; **Duration:** 15 days;  
**ALZET Comments:** controls received mp w/ vehicle; replacement therapy (thyroidectomy, p. 168); functionality of mp verified by thyroxine plasma levels
- P6657:** E. F. Gevers, *et al.* Localization and regulation of the growth hormone receptor and growth hormone-binding protein in the rat growth plate. *Journal of Bone and Mineral Research* 2002;17(8):1408-1419  
**Agents:** Growth hormone, recomb. human; thyroxine; triiodothyronine; **Route:** SC; **Species:** Rat; **Duration:** 2 weeks;  
**ALZET Comments:** Controls received teflon rods; replacement therapy (hypophysectomy)
- P6209:** I. M. Evans, *et al.* Influence of maternal hyperthyroidism in the rat on the expression of neuronal and astrocytic cytoskeletal proteins in fetal brain. *Journal of Endocrinology* 2002;175(3):597-604  
**Agents:** Thyroxine **Vehicle:** PBS; BSA; NaOH; **Route:** SC; **Species:** Rat (pregnant); **Pump:** 2004; **Duration:** 23 days;  
**ALZET Comments:** Controls received mp w/ vehicle; functionality of mp verified by tail bleed for TH levels; replacement therapy (thyroidectomy); teratology
- P5553:** P. Cettour-Rose, *et al.* Central stimulatory effect of leptin on T-3 production is mediated by brown adipose tissue type II deiodinase. *American Journal of Physiology Endocrinology and Metabolism* 2002;283(5):E980-E987  
**Agents:** Leptin; thyroxine; triiodothyronine **Vehicle:** Saline; **Route:** SC; CSF/CNS; **Species:** Rat; **Pump:** 2001; **Duration:** 6 days;  
**ALZET Comments:** Controls received mp w/ vehicle; peptides
- Q7552:** N. Lameloise, *et al.* Differences between the effects of thyroxine and tetraiodothyroacetic acid on TSH suppression and cardiac hypertrophy. *European Journal of Endocrinology* 2001;144(2):145-54  
**Agents:** Thyroxine; tetraiodothyroacetic acid, 3,5,3',5'- **Vehicle:** BSA, NaOH buffered; **Route:** IP; **Species:** Rat; **Pump:** 2002; **Duration:** 13 days;  
**ALZET Comments:** Dose ((T4 0.5, 1.5, 4.5, 13.5 nmol/day/100g BW), (Tetrac 0, 1.5, 4.5, 13.5, 40.5 nmol /day/100g BW)); 0.05 M NaOH, 2% bovine serum albumin, 100,000 c.p.m. [125I]T4 or [125I]Tetrac used; Controls received mp w/ vehicle; animal info (male, SIVZ); enzyme inhibitor (monodeiodinase type 2); replacement therapy (); Therapeutic indication (inhibiting serum TSH concentrations); Resultant plasma level ((T4 43.1+/-2.8, 77.1+/-9.4, 129.7+/-9.5, 353.4+/-31.7 pmol/ml), (Tetrac 168+/-16, 332+/-19, 458+/-27, 406+/-57 pmol/ml)); 3,5,3',5'-tetraiodothyroacetic acid (Tetrac) is a thyroxine (T4) analogue;
- P5104:** H. Kobori, *et al.* Local Renin-angiotensin system contributes to hyperthyroidism-induced cardiac hypertrophy. *Journal of Endocrinology* 1999;160(43-47)  
**Agents:** Angiotensin II; Thyroxine **Vehicle:** Saline; **Route:** SC; **Species:** Rat; **Pump:** 2004; **Duration:** 28 days;  
**ALZET Comments:** controls received mp w/ vehicle; cardiovascular; peptides; one group received Ang II and T4 in same pump; functionality of mp verified by plasma Ang II levels



- P3936:** A. G. Schuur, *et al.* Modulating effects of thyroid state on the induction of biotransformation enzymes by 2,3,7,8-tetrachlorodibenzo-p-dioxin. *Environmental Toxicology and Pharmacology* 1998;5(7-16)  
**Agents:** Triiodothyronine, 3,3',5'-; Thyroxine **Vehicle:** NaOH; Saline; **Route:** IP; **Species:** Rat; **Pump:** 2002; **Duration:** 10 days;  
**ALZET Comments:** controls received mp w/vehicle or no surgery; replacement therapy (thyroidectomy); toxicology
- P3633:** A. G. Schuur, *et al.* Extrathyroidal effects of 2,3,7,8-tetrachlorodibenzo-p-dioxin on thyroid hormone turnover in male Sprague-Dawley rats. *Endocrinology* 1997;138(9):3727-3734  
**Agents:** Thyroxine; Triiodothyronine **Vehicle:** NaOH; saline; **Route:** IP; **Species:** Rat; **Pump:** 2002; **Duration:** 10 days;  
**ALZET Comments:** Triiodothyronine (T3) & thyroxine (T4) were dissolved in 0.1M NaOH & 0.9% NaCl
- P3689:** M. Rudling, *et al.* Regulation of rat hepatic low density lipoprotein receptors. *J. Clin. Invest* 1996;97(2):292-299  
**Agents:** Growth hormone, recomb. human; Insulin-like growth factor I; Dexamethasone; Thyroxine, L- **Species:** Rat; **Pump:** 2001; 2ML2; **Duration:** 6 days;  
**ALZET Comments:** controls received sham operation; replacement therapy (hypophysectomy); agent infusion rates given in ug/h;
- P3963:** N. A. Pampori, *et al.* Feminization of hepatic cytochrome P450s by nominal levels of growth hormone in the feminine plasma profile. *Mol. Pharmacol* 1996;50(1148-1156)  
**Agents:** Growth hormone, rat; Thyroxine **Vehicle:** Not Stated; **Route:** SC; IP; **Species:** Rat; **Pump:** Not Stated; **Duration:** 6 days;  
**ALZET Comments:** functionality of mp verified by residual volume; replacement therapy (hypophysectomy); peptides; multiple pumps per animal (2) (1 with each agent)
- P3088:** S.-Y. Wu, *et al.* Sulfation pathway of thyroid hormone metabolism in selenium-deficient male rats. *American Journal of Physiology Endocrinology and Metabolism* 1995;31(E572-E579)  
**Agents:** Thyroxine sulfate; Triiodothyronine sulfate, 3,3',5'-; Triiodothyronine sulfate, reverse **Vehicle:** NaOH; PBS; Serum, rat;  
**Route:** SC; **Species:** Rat; **Pump:** 2001; **Duration:** 48, 96 hours;  
**ALZET Comments:** Controls received mp with saline; functionality of mp verified by serum levels
- P4140:** W. R. Christenson, *et al.* Extrathyroidally mediated changes in circulating thyroid hormone concentrations in the male rat following administration of an experimental oxyacetamide (FOE 5043). *Toxicol. Appl. Pharmacol* 1995;132(253-262)  
**Agents:** Thyroxine; Triiodothyronine **Vehicle:** Saline; Serum, rat; NaOH; **Route:** SC; **Species:** Rat; **Pump:** 2ML4; **Duration:** 28 days;  
**ALZET Comments:** controls received sham surgery; functionality of mp verified by serum hormone levels; replacement therapy (thyroidectomy); toxicology
- P2688:** F. Chapa, *et al.* Adult-onset hypothyroidism and the cerebral metabolism of (1,2-<sup>13</sup>C) acetate as detected by <sup>13</sup>C nuclear magnetic resonance. *Endocrinology* 1995;136(1):296-305  
**Agents:** Thyroxine **Vehicle:** Not Stated; **Route:** SC; **Species:** Rat; **Pump:** Not Stated; **Duration:** 7, 13 days;  
**ALZET Comments:** controls received mp w/ saline; replacement therapy (thyroidectomy)
- P3063:** Y.-M. Yen, *et al.* Direct measurement of whole body thyroid hormone pool sizes and interconversion rates in fasted rats: hormone regulation implications. *Endocrinology* 1994;134(4):1700-1709  
**Agents:** Thyroxine; Triiodothyronine **Vehicle:** <sup>125</sup>I tracer; Radio-isotopes; Albumin, bovine serum; NaOH; Sodium carbonate;  
**Route:** SC; **Species:** Rat; **Pump:** 2001; **Duration:** 7 days;  
**ALZET Comments:** functionality of mp verified in pilot studies; topical and im antibiotics used
- P3138:** T. T. Nguyen, *et al.* Steady state organ distribution and metabolism of thyroxine and 3,5,3'-triiodothyronine in intestines, liver, kidneys, blood, and residual carcass of the rat in vivo. *Endocrinology* 1993;133(6):2973-2983  
**Agents:** Triiodothyronine; Thyroxine **Vehicle:** <sup>125</sup>I tracer; Radio-isotopes; Albumin, bovine serum; **Route:** SC; **Species:** Rat;  
**Pump:** 2001; **Duration:** 7 days;  
**ALZET Comments:** functionality of mp verified in pilot studies



**P2524:** H. Liang, *et al.* Effect of the antioxidant TK 12627 (Irganox) on monodeiodination and on the levels of messenger ribonucleic acid of 5'-deiodinase type I and spot 14. *European Journal of Endocrinology* 1993;128(451-458)

**Agents:** Thyroxine; Triiodothyronine **Vehicle:** 125I tracer; 131I tracer; Radio-isotopes; Albumin, bovine serum; Saline; Sodium hydroxide; **Route:** IP; **Species:** Rat; **Pump:** 1003D; 2002; **Duration:** 1 week; 24 hours;

**ALZET Comments:** replacement therapy (MMI-perchlorate induced hypothyroidism)

**P2335:** H. L. Katzeff, *et al.* Impaired peripheral thyroid hormone metabolism in genetic obesity. *Endocrinology* 1993;132(3):989-995

**Agents:** Thyroxine **Vehicle:** Not Stated; **Route:** SC; **Species:** Rat; **Pump:** 2002; **Duration:** 21, 24 days;

**ALZET Comments:** Replacement therapy (thyroidectomy)

**P2928:** M. Rudling, *et al.* Importance of growth hormone for the induction of hepatic low density lipoprotein receptors. *Proc. Natl. Acad. Sci. USA* 1992;89(6983-6987)

**Agents:** Growth hormone, human; Dexamethasone; Thyroxine, I-; **Route:** SC; **Species:** Rat; **Pump:** 2001; **Duration:** 5 days;

**ALZET Comments:** replacement therapy (hypophysectomy); peptides; GH given solely, or GH/Dex, GH/Dex/T4, or Dex/T4

**P2679:** R. Calvo, *et al.* The rat placenta and the transfer of thyroid hormones from the mother to the fetus. Effects of maternal thyroid status. *Endocrinology* 1992;131(1):357-365

**Agents:** Thyroxine; Triiodothyronine **Vehicle:** PBS; Serum, rat; Sodium hydroxide; **Route:** Not Stated; **Species:** Rat (pregnant); **Pump:** 2ML2; **Duration:** Not Stated;

**ALZET Comments:** controls received mp w/ saline; functionality of mp verified by plasma levels; dose-response

**P2176:** R. A. Barter, *et al.* UDP-glucuronosyltransferase inducers reduce thyroid hormone levels in rats by an extrathyroidal mechanism. *Toxicol. Appl. Pharmacol* 1992;113(36-42)

**Agents:** Thyroxine; Triiodothyronine **Vehicle:** Saline; Sodium hydroxide; **Route:** SC; **Species:** Rat; **Pump:** 2002; **Duration:** 10 days;

**ALZET Comments:** functionality of mp verified by serum levels (p. 38); replacement therapy (thyroidectomy); good methods

**P3097:** H. G. Wilcox, *et al.* Effects of thyroid status and fasting on hepatic metabolism of apolipoprotein A-1. *J. Lipid Res* 1991;32(395-405)

**Agents:** Triiodothyronine; Thyroxine, I- **Vehicle:** Butanol, n-; Propylene glycol; **Route:** IP; **Species:** Rat; **Pump:** 2001; 2002; **Duration:** 7,14 days;

**ALZET Comments:** controls received no treatment or mp with vehicle; functionality of mp verified by plasma levels; replacement therapy (thyroparathyroidectomy); comparison of SC T3 injections vs. mp

**P2693:** J. M. Connors, *et al.* Thyroid vascular conductance: differential effects of elevated plasma thyrotropin (TSH) induced by treatment with thioamides or TSH-releasing hormone. *Endocrinology* 1991;129(1):117-125

**Agents:** Triiodothyronine; Thyroxine; Thyrotropin-rel. factor **Vehicle:** Saline; Sodium hydroxide; Serum, rat; **Route:** SC; **Species:** Rat; **Pump:** Not Stated; **Duration:** 6 days;

**ALZET Comments:** controls received saline via injections or did not have drug-induced hypothyroidism; replacement therapy (propylthiouracil and methimazole-induced hypothyroidism); comparison of ip, iv & sc injections vs. mp; multiple pumps per animal (2) were used concurrently

**P1839:** G. Morreale de Escobar, *et al.* Contribution of maternal thyroxine to fetal thyroxine pools in normal rats near term. *Endocrinology* 1990;126(5):2765-2767

**Agents:** Thyroxine **Vehicle:** 125I tracer; Potassium iodide; Radio-isotopes; **Species:** Rat (pregnant);

**ALZET Comments:** no comment posted

**P1778:** H. L. Katzeff. Increasing age impairs the thyroid hormone response to overfeeding. *Experimental Biology and Medicine* 1990;194(198-203)

**Agents:** Thyroxine; Triiodothyronine **Vehicle:** Albumin, bovine serum; Radio-isotopes; Saline; **Route:** SC; **Species:** Rat; **Pump:** 2001; **Duration:** 7 days;

**ALZET Comments:** functionality of mp verified by serum hormone levels, measuring residual radioactivity



**P1468:** C. H. Emerson, *et al.* Serum thyrotropin concentrations are more highly correlated with serum triiodothyronine concentrations than with serum thyroxine concentrations in thyroid hormone-infused thyroidectomized rats. *Endocrinology* 1989;124(24):2415-2418

**Agents:** Thyroxine; Triiodothyronine **Vehicle:** Serum, rat; Sodium hydroxide; Water; **Route:** SC; **Species:** Rat; **Pump:** Not Stated; **Duration:** 14 days;

**ALZET Comments:** dose-response; functionality of mp verified by serum levels; replacement therapy (thyroidectomy)

**P1262:** C. A. Kaiser, *et al.* Increased plasma clearance rate of thyroxine despite decreased 5'-monodeiodination: study with a peroxisome proliferator in the rat. *Endocrinology* 1988;122(3):1087-1093

**Agents:** Radio-isotopes; Thyroxine **Vehicle:** 125I tracer; 131I tracer; **Route:** IP; **Species:** Rat; **Pump:** 2001; **Duration:** 7 days;

**ALZET Comments:** 4 exp., only 1 used mp; nafenopin pellets administered concomitantly in food; 2 doses of agent infused with different radio-isotopes

**P1173:** J. R. Goldberg, *et al.* Altered triiodothyronine metabolism in Zucker fatty rats. *Endocrinology* 1988;122(2):689-693

**Agents:** Radio-isotopes; Thyroxine; Triiodothyronine **Vehicle:** 125I tracer; **Route:** SC; **Species:** Rat; **Pump:** 2001; **Duration:** 7 days;

**ALZET Comments:** no comment posted

**P1331:** L. A. Gavin, *et al.* Carbohydrate feeding increases total body and specific tissue 3,5,3'-triiodothyronine neogenesis in the rat. *Endocrinology* 1988;123(2):1075-1081

**Agents:** Radio-isotopes; Thyroxine; Triiodothyronine **Vehicle:** 125I tracer; Albumin, human serum; Sodium hydroxide; Water; **Route:** SC; **Species:** Rat; **Pump:** 2001; **Duration:** 14 days;

**ALZET Comments:** dose-response (table); half-life; second and third pumps implanted at 7 days; third pump contained labelled T-4 to measure the MCR; functionality of mp verified by serum levels; pump replaced weekly; replacement therapy (thyroidectomy); stability determined

**P1306:** J. M. Dubuis, *et al.* Human recombinant interleukin-1B decreases plasma thyroid hormone and thyroid stimulating hormone levels in rats. *Endocrinology* 1988;123(5):2175-2181

**Agents:** Radio-isotopes; Thyroxine **Vehicle:** 125I tracer; **Route:** IP; **Species:** Rat; **Pump:** 2002; **Duration:** 7, 14 days;

**ALZET Comments:** measured plasma clearance of T4; functionality of mp verified by serum levels; stability verified at 14 days

**P1304:** J. J. DiStefano, *et al.* Rat enterohepatic circulation and intestinal distribution of enterally infused thyroid hormones. *Endocrinology* 1988;123(5):2526-2539

**Agents:** Radio-isotopes; Thyroxine; Triiodothyronine **Vehicle:** 125I tracer; Bile; Glycerol; Propanol; Propylene glycol; **Route:** Intestine (duodenum); **Species:** Rat; **Pump:** 2001; **Duration:** 7 days;

**ALZET Comments:** Catheter to duodenum; dose-response (text); functionality of mp verified by plasma levels

**P1223:** J. M. Conners, *et al.* Effects of thyrotropin on the vascular conductance of the thyroid gland. *Endocrinology* 1988;122(3):921-929

**Agents:** Thyroid-stimulating hormone, bovine; Thyrotropin-rel. factor; Thyroxine; Triiodothyronine **Vehicle:** Sodium hydroxide; Saline; **Route:** IV (jugular); SC; **Species:** Rat; **Pump:** Not Stated; **Duration:** 2, 6 days;

**ALZET Comments:** pump model not stated; mp connected to catheter; dose-response; separate and simultaneous infusion of T3 and T4; NaOH is vehicle for TRH, T3, and T4; replacement therapy (hypophysectomy); peptides

**P1013:** S. Smets, *et al.* Naturally occurring clones of cells with high intrinsic proliferation potential within the follicular epithelium of mouse thyroids. *Cancer Research* 1987;47(16):1646-1651

**Agents:** Thyroxine **Vehicle:** 3H tracer; **Route:** IP; **Species:** Mice; **Pump:** 2001; **Duration:** 22 days;

**ALZET Comments:** Pumps replaced; replacement therapy (hemithyroidectomy); cancer



**P1002:** M. O. Goumaz, *et al.* Brain cortex reverse triiodothyronine (rT3) and triiodothyronine concentrations under steady state infusions of thyroxine and rT3. *Endocrinology* 1987;120(1590-1596)

**Agents:** Thyroxine; Triiodothyronine, reverse **Vehicle:** 125I tracer; Sodium hydroxide; Saline; Serum, rat; Sodium carbonate;  
**Route:** IP; **Species:** Rat; **Pump:** 2001; **Duration:** 3, 7 days;

**ALZET Comments:** Pumps primed overnight in saline; T4 of low & high specific activity (SA) infused sep; T4 of low (SA) obtained by add. of unlabeled T4; replacement ther. (thyroidectomy)

**P1009:** W. J. DeVito, *et al.* The pituitary TSH response to TRH is inversely related to the plasma TSH concentration and directly related to the pituitary TSH content during hypothyroidism in the rat. *European Journal of Endocrinology* 1987;114(27-36)

**Agents:** Thyroxine; Triiodothyronine **Vehicle:** Sodium hydroxide; Saline; Serum, rat; **Route:** SC; **Species:** Rat; **Pump:** 2002;  
**Duration:** 7, 14 days;

**ALZET Comments:** pumps replaced after 7 days; dose-response; intact euthyroid control rats were left untreated; replacement therapy (thyroparathyroidectomy)

**P0862:** C. A. Kaiser, *et al.* In vivo inhibition of the 5'-deiodinase type II in brain cortex and pituitary by reverse triiodothyronine. *Endocrinology* 1986;119(2):762-770

**Agents:** Thyroxine; Triiodothyronine, reverse **Vehicle:** Sodium hydroxide; Saline; Serum, hypothyroid rat; Sodium carbonate;  
**Route:** IP; **Species:** Rat; **Pump:** 2001; **Duration:** 7 days;

**ALZET Comments:** controls received mp w/vehicle; dose response data; pumps primed overnight in buffer; various doses of agents infused; functionality of mp verified by labelling agent (extensive serum level data); replacement therapy (thyroidectomy)

**P0638:** S. M. Simasko, *et al.* Treatment of rats with the TRH analog MK-771. *Neuropharmacology* 1985;24(2):157-165

**Agents:** MK-771; Thyroxine **Vehicle:** Sodium hydroxide; Saline; **Route:** CSF/CNS; SC; **Species:** Rat; **Pump:** Not Stated;  
**Duration:** 1 week;

**ALZET Comments:** 1 week; comparison of once daily each icv & ip injec vs. mp infusion vs. icv injec every 2 hr; T4 in saline & NaOH given sc, MK-771 in saline only given by icv route; stability of MK-771 verified; comparison of agent's effects; MK-771 is a TRH analog

**P0559:** Y. Shenker, *et al.* a-Melanocyte-stimulating hormone stimulation of aldosterone secretion in hypophysectomized rats. *Endocrinology* 1985;116(1):138-141

**Agents:** ACTH (1-24); Dexamethasone disodium phosphate; Melanocyte-stimulating hormone, a-; Thyroxine, I- **Vehicle:** Not Stated; **Route:** SC; **Species:** Rat; **Pump:** Not Stated; **Duration:** 6 days;

**ALZET Comments:** comparison of agents effects; replacement therapy (hypophysectomy); peptides

**P0531:** A. S. Jennings. Regulation of hepatic triiodothyronine production in the streptozotocin-induced diabetic rat. *American Journal of Physiology Endocrinology and Metabolism* 1984;247(E526-E533)

**Agents:** Thyroxine **Vehicle:** Sodium hydroxide; **Route:** SC; **Species:** Rat; **Pump:** Not Stated; **Duration:** 1 week;

**ALZET Comments:** comparison of sc injec vs. mp infusion

**P0448:** A. R. Glass, *et al.* Low serum thyroxine and high serum triiodothyronine in nephrotic rats: etiology and implications for bioavailability of protein-bound hormone. *Endocrinology* 1984;114(5):1745-1753

**Agents:** Thyroxine; Triiodothyronine **Vehicle:** Sodium hydroxide; Serum, rat; **Route:** SC; **Species:** Rat; **Pump:** 2002; **Duration:** 12 days;

**ALZET Comments:** Replacement therapy (thyroidectomy)

**P0392:** R. R. Cavalieri, *et al.* Effects of dexamethasone on kinetics and distribution of triiodothyronine in the rat. *Endocrinology* 1984;114(1):215-221

**Agents:** Dexamethasone; Radio-isotopes; Thyroxine, I-; Triiodothyronine **Vehicle:** 125I tracer; Albumin, human serum; Sodium hydroxide; Saline; **Route:** IP; SC; **Species:** Rat; **Pump:** 2001; 2002; **Duration:** 5, 6, 12 days;

**ALZET Comments:** Comparison of agents effects; replacement therapy (thyroidectomy); no stress - see p. 220; T3 and T4 used w/ and w/o 125I tracer; T4 used in 2002 pump sc, T3 in 2001 sc, Dex. in 2001 ip or sc; 3 pumps/animal



**P0312:** S. E. Taylor. Additional evidence against universal modulation of B-adrenoceptor responses by excessive thyroxine. *British Journal of Pharmacology* 1983;78(639-644

**Agents:** Thyroxine **Vehicle:** DMSO; **Route:** SC; **Species:** Guinea pig; **Pump:** 2002; **Duration:** 13 days;  
**ALZET Comments:** no comment posted

**P0358:** L. A. Gavin, *et al.* Glucagon does not modulate the alterations in T3 metabolism consequent to dietary manipulation and diabetes. *Diabetes* 1983;32(798-803

**Agents:** Glucagon; Somatostatin; Thyroxine **Vehicle:** Not Stated; **Route:** SC; **Species:** Rat; **Pump:** 2001; **Duration:** 2, 3 days;  
**ALZET Comments:** Separate pumps delivering glucagon and somatostatin were implanted simultaneously in same rat; peptides

**P0214:** O. Senga, *et al.* Comparison of peripheral thyroid hormone metabolism in normal rats and in rats receiving prolonged glucagon infusion. *Endocrinology* 1982;110(6):2011-2017

**Agents:** Glucagon; Radio-isotopes; Thyroxine; Triiodothyronine **Vehicle:** 125I tracer; Sodium hydroxide; Saline; **Route:** IP; IV (jugular); **Species:** Rat; **Pump:** Not Stated; **Duration:** 7, 9 days;  
**ALZET Comments:** Glucagon ip simultaneous infusion w/T3 & T4 in vehicles iv; 2 pumps/animal

**P0213:** L. Luciani, *et al.* Metabolic effects of 3,5-dimethyl-3'-isopropyl-L-thyronine (DIMIT) in constant infusion by osmotic minipump to hypothyroid rat. *Comptes Rendus Biologies* 1982;294(3):361-364

**Agents:** Triiodothyronine analog (DIMIT); Thyroxine; Triiodothyronine **Vehicle:** Not Stated; **Route:** SC; **Species:** Rat; **Pump:** Not Stated; **Duration:** 8 days;  
**ALZET Comments:** comparison of daily sc injection vs. infusion; organ replacement therapy (thyroidectomy)

**P1240:** P. R. Waggoner, *et al.* Method for long term delivery of soluble agents to the chick chorioallantoic membrane. *Cellular and Molecular Life Sciences* 1981;37(3):321-322

**Agents:** Thyroxine, I- **Vehicle:** Not Stated; **Route:** In vitro (egg); chorioallantoic membrane; **Species:** Bird (chicken embryo); **Pump:** 2001; **Duration:** 7 days;  
**ALZET Comments:** mp placed in small test tube filled w/ water and then sealed w/ parafilm; mp connected to catheter that bathed the chorioallantoic membrane

**P0150:** L. A. Gavin, *et al.* Carbohydrate in contrast to protein feeding increases the hepatic content of active thyroxine-5'-deiodinase in the rat. *Endocrinology* 1981;109(2):530-536

**Agents:** Thyroxine **Vehicle:** Sodium hydroxide; **Route:** SC; **Species:** Rat; **Pump:** Not Stated; **Duration:** 3 days;  
**ALZET Comments:** no comment posted

**P0154:** L. A. Gavin, *et al.* The mechanism of impaired T3 production from T4 in diabetes. *Diabetes* 1981;30(694-699

**Agents:** Insulin; Thyroxine **Vehicle:** Sodium hydroxide; **Route:** SC; **Species:** Rat; **Pump:** 2001; **Duration:** 2, 4 days;  
**ALZET Comments:** NaOH in T4 only; peptides

**P0135:** M. M. El-Zaheri, *et al.* Maternal thyroid function is the major determinant of amniotic fluid 3,3',5'-triiodothyronine in the rat. *Journal of Clinical Investigation* 1981;67(1126-1133

**Agents:** Triiodothyronine, 3,3',5'-; Thyroxine **Vehicle:** Not Stated; **Route:** SC; **Species:** Rat; **Pump:** Not Stated; **Duration:** Not Stated;  
**ALZET Comments:** 2 days T4, 5 days rT3; comparison of injections vs. infusion

**P0130:** J. M. Connors, *et al.* Effect of continuous thyroxine administration on thyrotropin secretion in thyroidectomized rats. *Endocrinology* 1981;108(6):2098-2102

**Agents:** Thyroxine; Triiodothyronine **Vehicle:** Sodium hydroxide; Propanediol, 1,2-; Serum, rat; **Route:** SC; **Species:** Rat; **Pump:** Not Stated; **Duration:** 4, 6 days;  
**ALZET Comments:** Organ replacement therapy (thyroidectomy)





**P0108:** J. M. Connors, *et al.* Feedback regulation of thyrotropin by thyroxine under physiological conditions. American Journal of Physiology Endocrinology and Metabolism 1981;240(3):E308-E313

**Agents:** Thyroxine **Vehicle:** Sodium hydroxide; Propanediol, 1,2-; **Route:** IP; SC; **Species:** Rat; **Pump:** Not Stated; **Duration:** 2 days;

**ALZET Comments:** Comparison of oral admin. vs. infusion; organ replacement therapy (thyroidectomy)

**P0051:** J.-P. Clot, *et al.* Rat thyroxine metabolism studied by osmotic minipump infusion. C. R. Acad. Sc. Paris (French, English abstract) 1980;290(3):235-237

**Agents:** Radio-isotopes; Thyroxine **Vehicle:** 125I tracer; Saline; **Route:** SC; **Species:** Rat; **Pump:** 1701; **Duration:** Not Stated;

**ALZET Comments:** organ replacement therapy (thyroidectomy)