



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

**Q7120:** D. F. Cobice, *et al.* Quantification of 11beta-hydroxysteroid dehydrogenase 1 kinetics and pharmacodynamic effects of inhibitors in brain using mass spectrometry imaging and stable-isotope tracers in mice. *Biochem Pharmacol* 2018;148(88-99)

**ALZET Comments:** Cortisol; radio-isotopes; DMSO; propylene glycol; 2H tracer; SC; Mice; 1003D; 2 days; Dose (1.75 mg/day); Controls received mp w/ vehicle; animal info (Male, C57Bl6, 12 weeks old); stable-isotope labelled [9,11,12,12-2H]4-cortisol; dependence;.

**Q6635:** M. Nixon, *et al.* ABCC1 confers tissue-specific sensitivity to cortisol versus corticosterone: A rationale for safer glucocorticoid replacement therapy. *Science Translational Medicine* 2016;8(352):352-352ra109

**ALZET Comments:** Corticosterone; Cortisol; DMSO; Propylene glycol; SC; Mice (knockout); 2001; 7 days; Dose (corticosterone (250 ug/day) and cortisol (250 ug/day); Controls received mp w/ vehicle; animal info (Male(Abcc1-/-) mice);.

**Q2977:** L. Kleppe, *et al.* Cortisol treatment of prespawning female cod affects cytogenesis related factors in eggs and embryos. *General and Comparative Endocrinology* 2013;189(8):84-95

**ALZET Comments:** Cortisol; propranolol; Hydrocortisone; IP; Fish; 27.3 days; Controls received mp w/ 80% 1,2-propranolol; animal info (cod, 1.8kg, female); 2ML pump used.

**Q3071:** X. D. Feng, *et al.* Cortisol stimulates proliferation and apoptosis in the late gestation fetal heart: differential effects of mineralocorticoid and glucocorticoid receptors. *American Journal of Physiology-Regulatory Integrative and Comparative Physiology* 2013;305(4):R343-R350

**ALZET Comments:** Cortisol; potassium canrenoate; mifepristone; Saline; SC; Sheep (ewe); 2ML2; 10 days; Controls received mp w/ vehicle; animal info (female, singleton pregnancies); teratology; cardiovascular; impact of maternal stress during late gestation.

**Q2583:** P. Dorniak, *et al.* Cortisol and Interferon Tau Regulation of Endometrial Function and Conceptus Development in Female Sheep. *Endocrinology* 2013;154(2):931-941

**ALZET Comments:** Cortisol; PF915275; meloxicam; interferon, tau, recomb. ovine; Ethanol; Intrauterine (uterine horn); Sheep (ewe); 2ML1; Control animals received mp w/ vehicle; animal info (mature, rambouillet, female, ewe); 2% ethanol used; vinyl catheter used (0007760); "Our previous studies found that infusion of that amount of IFNT in the uterine lumen each day mimics effects of the conceptus on endometrial expression of hormone receptors and IFNT-stimulated genes during early pregnancy in ewes" pg 932.

**Q5637:** C. P. Cutler, *et al.* Cortisol regulates eel (*Anguilla anguilla*) aquaporin 3 (AQP3) mRNA expression levels in gill. *Gen Comp Endocrinol* 2007;152(2-3):310-3

**ALZET Comments:** Cortisol; Cyclodextrin, 2-hydroxypropyl-b-; Fish (Eel); 1003D; 8 days; Controls received mp w/ vehicle; functionality of mp verified by plasma levels; 30% 2-hydroxypropyl-b-cyclodextrin used; "The infusion of cortisol into FW eels using osmotic mini-pumps led to a 2.8-fold increase in the level of plasma cortisol as measured 8-days after the onset of the experiment (Fig. 1)" pg 311; Dose (15 ug/hr);.

**P7143:** A. S. Martinez, *et al.* Cloning and expression of three aquaporin homologues from the European eel (*Anguilla anguilla*): effects of seawater acclimation and cortisol treatment on renal expression. *Biology of the Cell* 2005;97(8):615-627

**ALZET Comments:** Cortisol; Cyclodextrin, beta; IP; Fish (eel); 1003D; 8 days; Controls received mp w/ vehicle; functionality of mp verified by cortisol plasma levels; pumps implanted IP per contact with author; 30% cyclodextrin used.

**P7146:** A. S. Martinez, *et al.* Regulation of expression of two aquaporin homologs in the intestine of the European eel: effects of seawater acclimation and cortisol treatment. *American Journal of Physiology-Regulatory Integrative and Comparative Physiology* 2005;288(6):R1733-R1743



**ALZET Comments:** Cortisol; Cyclodextrin, beta; IP; Fish (eel); 1003D; 8 days; Controls received mp w/ vehicle; cortisol plasma levels; yellow/silver eels with an ambient temp. of 5-14 degrees celsius, 30 degrees celsius Cyclodextrin used; pumps implanted IP; per contact with author; 30% cyclodextrin used.

**P6093:** J. R. Metz, *et al.* Regulation of branchial Na<sup>+</sup>/K<sup>+</sup>-ATPase in common carp *Cyprinus carpio* L. acclimated to different temperatures. *Journal of Experimental Biology* 2003;206(13):2273-2280

**ALZET Comments:** Cortisol; Cyclodextrin, beta; IP; Fish (carp); 1007D; Controls received mp w/ vehicle; functionality of mp verified by cortisol plasma levels taken; "this approach was used instead of cortisol injection, which evokes stress responses due to repetitive handling..." (p. 2275); 30% cyclodextrin used.

**P5333:** K. Pacak, *et al.* Chronic hypercortisolemia inhibits dopamine synthesis and turnover in the nucleus accumbens: An in vivo microdialysis study. *Neuroendocrinology* 2002;76(3):148-157

**ALZET Comments:** Cortisol; SC; Rat; 2001; 7 days; Controls received mp w/ saline.

**R0368:** B. A. Teicher. The Combination of Antiangiogenic Therapy with Cytotoxic Therapy. *Tumor Angiogenesis and Microcirculation* 2001;506-548

**ALZET Comments:** Tetrahydrocortisol; Cyclodextrin-beta tetradecasulfate; SC; Mice; 14 days; Dose: b-Cyclodextrin tetradecasulfate (1000 mg/kg) and tetrahydrocortisol (125 mg/kg); cancer (Lewis lung carcinoma);

**P3347:** E. Wolfowitz, *et al.* Effects of hypercortisolemia or hyperinsulinemia on neurochemical indices of catecholamine release and synthesis in conscious rats. *J. Auton. Nerv. Syst* 1995;54(104-112

**ALZET Comments:** Cortisol; Saline; SC; Rat; 1 week; controls received mp w/saline.

**P2851:** P. T. Sangild, *et al.* The prenatal development and glucocorticoid control of brush-border hydrolases in the pig small intestine. *Pediatr. Res* 1995;37(2):207-212

**ALZET Comments:** Cortisol; Saline; SC; pig (fetus); 2001; 6 days; controls received mp with saline; after surgery fetuses received 50 mg of ampicillin into the amniotic cavity; sows maintained on antibiotics 3-4 days after surgery.

**P2823:** N. K. Popnikolov, *et al.* In vivo growth stimulation of collagen gel embedded normal human and mouse primary mammary epithelial cells. *J. Cell. Physiology* 1995;163(51-60

**ALZET Comments:** Epidermal growth factor; Cortisol; Toxin, cholera; Uridine, bromodeoxy-; Medium 199; SC; gel; Mice (nude); 1003D; 3 days; peptides; "tissue perfusion" -- gel containing human mammary epithelial cells was infused; estradiol, progesterone, and cholesterol combinations administered via silastic capsules EGF cholera toxin and hydrocortisone stimulated DNA synthesis substantially with the greatest response seen in the gel proximal to the pump; local delivery appears to be superior to injection;

**P3326:** K. Pacak, *et al.* Catecholaminergic inhibition by hypercortisolemia in the paraventricular nucleus of conscious rats. *Endocrinology* 1995;136(11):4814-4819

**ALZET Comments:** Cortisol; SC; Rat; 2001; 7 days; controls received mp w/saline.

**P2997:** J. M. Shrimpton, *et al.* Downregulation of corticosteroid receptors in gills of coho salmon due to stress and cortisol treatment. *Am. J. Physiol* 1994;267(36):R432-R438

**ALZET Comments:** Cortisol, 21-hemisuccinate; Saline; Cyclodextrin; IP; fish; 18 days; controls received mp w/ vehicle or no surgery; functionality of mp verified by plasma levels; comparison of ip injections and daily handling vs. mp; no stress (see pg. R433); stability verified for 18 days at 7.5 degrees C; only chronic infusion resulted in reduction of corticosteroid receptor number and affinity; cyclodextrin was Molecusol HBP.

**P2955:** P. T. Sangild, *et al.* Developmental regulation of the porcine exocrine pancreas by glucocorticoids. *J. Pediatr. Gastroenterology and Nutrition* 1994;19(204-212

**ALZET Comments:** Cortisol; ACTH; Saline; SC; pig (fetus); 2001; 6 days; controls received mp with saline; peptides; no stress: mp was generally well tolerated; the cortisol used was hydrocortisone hemisuccinate.



**P2956:** P. T. Sangild, *et al.* Adrenocortical stimulation of stomach development in the prenatal pig. *Biol. Neonate* 1994;65(378-389)

**ALZET Comments:** Cortisol; ACTH(1-24); Saline; SC; pig (fetus); 2001; 6 days; controls received mp with saline; peptides.

**P2957:** P. T. Sangild, *et al.* Secretion of acid, gastrin, and cobalamin-binding proteins by the fetal pig stomach: developmental regulation by cortisol. *Exp. Physiology* 1994;79(135-146)

**ALZET Comments:** Cortisol; SC; pig (fetus); 2001; 6 days; controls received mp with saline or no operation; mp implanted just behind ribs; ampicillin given via amniotic fluid.

**P2903:** K. Pacak, *et al.* Adrenalectomy augments in vivo release of norepinephrine in the paraventricular nucleus during immobilization stress. *Endocrinology* 1993;133(1404-1410)

**ALZET Comments:** Cortisol; Saline; SC; Rat; 2002; 14 days; controls received mp with vehicle or sham operation; replacement therapy (adrenalectomy).

**P3238:** M. J. Lobo, *et al.* Effect of chronic intravenous injection of steroid hormones on body weight and composition of female rats. *Biochem. Molec. Biol. Intl* 1993;29(2):349-358

**ALZET Comments:** Progesterone; Cortisol; Cortisone; Corticosterone; Dehydroepiandrosterone; Androstenedione, 4-; Androstendiol, 5-; Testosterone; Nortestosterone, 19-; Estradiol, B-; Estrone; Estriol; Deoxycorticosterone; PEG 400; IV (lower cava); Rat; 2002; 15 days; controls received mp with PEG; no stress (see pg. 351); pumps placed into peritoneal cavity and sutured to musculature; surgical wound sprinkled with sulphathiazol.

**P3216:** R. Kvetnansky, *et al.* Endogenous glucocorticoids restrain catecholamine synthesis and release at rest and during immobilization stress in rats. *Endocrinology* 1993;133(3):1411-1419

**ALZET Comments:** Cortisol; Saline; SC; Rat; 2001; 7 days; no comment posted.

**P2025:** B. A. Teicher, *et al.* Antiangiogenic agents potentiate cytotoxic cancer therapies against primary and metastatic disease. *Cancer Res* 1992;52(6702-6704)

**ALZET Comments:** Cyclodextrin-beta tetradecasulfate; Cortisol, tetrahydro-; SC; mice; 2002; 14 days; cancer.

**P2405:** K. Pacak, *et al.* Hypercortisolemia inhibits yohimbine-induced release of norepinephrine in the posterolateral hypothalamus of conscious rats. *Endocrinology* 1992;131(3):1369-1376

**ALZET Comments:** Cortisol; Saline; SC; Rat; 2001; 7 days; controls received mp w/ vehicle; microdialysis.

**P2682:** R. T. Chatterton, *et al.* Depletion of luteal phase serum progesterone during constant infusion of cortisol phosphate in the cynomolgus monkey. *Fertil. Steril* 1991;56(3):547-554

**ALZET Comments:** Cortisol 21-phosphate; Saline; SC; monkey; 2001; 2ML2; 8 weeks; controls received mp w/ saline; functionality of mp verified by plasma level assay; pumps replaced every 7 or 14 days; long-term study.

**P2594:** D. E. Andersen, *et al.* Metabolic effects associated with chronically elevated cortisol in rainbow trout (*Oncorhynchus mykiss*). *Can. J. Fish. Aquat. Sci* 1991;48(9):1811-1817

**ALZET Comments:** Cortisol; Cyclodextrin, B-; IA (dorsal aorta); fish (rainbow trout); 2001; 10-14 days; controls received mp w/ vehicle or sham operation; functionality of mp verified by RIA of plasma levels; stress from surgery caused hyperglycemia (p.816) for 22 hours; "Mini-osmotic pumps. . .were an effective method for chronically elevating cortisol titers in trout."; Molecusol HBP is a beta-cyclodextrin.

**P1548:** K. Szemeredi, *et al.* Opposite effects of chronic cortisol treatment on pre- and postsynaptic actions of clonidine in pithed rats. *J. Auton. Pharmac* 1989;9(35-43)

**ALZET Comments:** Cortisol; Saline; SC; Rat; 2001; 7 days; dose-response; functionality of mp verified by plasma levels.

**P1303:** K. Szemeredi, *et al.* Sympathoadrenomedullary inhibition by chronic glucocorticoid treatment in conscious rats. *Endocrinology* 1988;123(5):2585-2590

**ALZET Comments:** Cortisol; Saline; SC; Rat; 2001; 7 days; dose-response; functionality of mp verified by plasma levels.



**P1269:** M. B. Elam, *et al.* Stimulation of in vitro triglyceride synthesis in the rat hepatocyte by growth hormone treatment in vivo. *Endocrinology* 1988;122(4):1397-1402

**ALZET Comments:** Cortisol; Growth hormone, human; Triiodothyronine; Sodium hydroxide; Saline; SC; Rat; 7, 14 days; pump model not stated; male rats infused for 7 days, females for 14; agents infused separately; replacement therapy (hypophysectomy); peptides.

**P0612:** R. Phillips, *et al.* Effect of mineralocorticoids and glucocorticoids on compensatory adrenal growth in rats. *Am. J. Physiol* 1985;248(4):E450-E456

**ALZET Comments:** Aldosterone; Fluorocortisol acetate, 9a-; Corticosterone; Deoxycorticosterone; Dexamethasone; Ethanol; Propylene glycol; Water; SC; Rat; 3 days; replacement therapy (unilateral adrenalectomy); each mp used twice, 3 days in one animal, then 3 days in another; cannot tell if stability/concentration of ald. determined by RIA before or after exp.