



References on the Administration of Prolactin Using ALZET® Osmotic Pumps

- Q7373:** K. S. Lynch, *et al.* Understanding the Loss of Maternal Care in Avian Brood Parasites Using Preoptic Area Transcriptome Comparisons in Brood Parasitic and Non-parasitic Blackbirds. *G3 (Bethesda)* 2019;9(4):1075-1084
Agents: Prolactin, ovine **Vehicle:** Sodium bicarbonate; **Route:** SC; **Species:** Bird (brown-headed cowbirds), bird (bronzed cowbirds), bird (red-winged); **Pump:** 1007D; **Duration:** 7 days;
ALZET Comments: Dose (80 ug/day); Controls received mp w/ vehicle;
- Q7367:** R. A. Augustine, *et al.* Impaired hypothalamic leptin sensitivity in pseudopregnant rats treated with chronic prolactin to mimic pregnancy. *J Neuroendocrinol* 2019:e12702
Agents: Ovine prolactin **Vehicle:** CSF, artificial; **Route:** IV; **Species:** Rat; **Pump:** 2001; **Duration:** 7 days;
ALZET Comments: Dose (2.5 ug/uL/hr); Controls received mp w/ vehicle; animal info (10 week old, female, Sprague-Dawley); bilateral cannula used; dependence;
- Q7798:** E. A. de Los Rios, *et al.* Impaired prolactin actions mediate altered offspring metabolism induced by maternal high-fat feeding during lactation. *FASEB J* 2018;32(6):3457-3470
Agents: prolactin, ovine **Vehicle:** Not Stated; **Route:** SC; **Species:** Rat (lactating); **Pump:** Not Stated; **Duration:** 17 days;
ALZET Comments: Dose (0.16 mg/kg/d); Controls received sham surgery; animal info (female, Sprague-Dawley, 300-350g); comparison of oral administration of PRL in pups vs mp; replacement therapy (prolactin); pump model not stated although listed as a 28-day rate. pumps implanted from d4 to d21 of lactation.;
- Q6762:** X. Ruiz-Herrera, *et al.* Prolactin Promotes Adipose Tissue Fitness and Insulin Sensitivity in Obese Males. *Endocrinology* 2017;158(1):56-68
Agents: Prolactin, ovine **Vehicle:** **Route:** SC; **Species:** Rat; **Pump:** **Duration:** 28 days;
ALZET Comments: 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 2minutes." (P.57)
- Q6204:** S. McIlvride, *et al.* A progesterone-brown fat axis is involved in regulating fetal growth. *Sci Rep* 2017;7(1):10671
Agents: Progesterone; Prolactin **Vehicle:** Cyclodextrin, 2-hydroxypropyl-b; **Route:** SC; **Species:** Mice; **Pump:** 2002; **Duration:** 14 days;
ALZET Comments: Dose (progesterone 250 µg/day; prolactin 7 µg/day); 20% (w/v) 2-hydroxypropyl-beta-cyclodextrin used; Controls received mp w/ vehicle; animal info (7–8 week old female mice with bilateral oophorectomy); replacement therapy (oophorectomy);
- Q6440:** M. G. Ledesma-Colunga, *et al.* Prolactin blocks the expression of receptor activator of nuclear factor kappaB ligand and reduces osteoclastogenesis and bone loss in murine inflammatory arthritis. *Arthritis Res Ther* 2017;19(1):93
Agents: Prolactin **Vehicle:** **Route:** SC; **Species:** Rat; **Pump:** **Duration:** 28 days;
ALZET Comments: animal info (Male Sprague-Dawley rats weighing 200–250 g);
- Q6249:** P. Gustafson, *et al.* The role of prolactin in the suppression of Crh mRNA expression during pregnancy and lactation in the mouse. *J Neuroendocrinol* 2017;29(9):
Agents: Prolactin **Vehicle:** **Route:** SC; **Species:** Mice; **Pump:** 1003D; **Duration:** 3 days;
ALZET Comments: Dose (1500 µg/day-); Controls received mp w/ vehicle; animal info (Adult female C57BL/6J mice aged 8-12 weeks);
- Q6388:** R. Dill, *et al.* Role of Prolactin in Promotion of Immune Cell Migration into the Mammary Gland. *J Mammary Gland Biol Neoplasia* 2017;22(1):13-26
Agents: Prolactin **Vehicle:** PBS, Dulbecco's; **Route:** SC; **Species:** Mice; **Pump:** **Duration:** 28 days;
ALZET Comments: Dose (2.4 µg/day); Controls received mp w/ vehicle; animal info (Eight week-old C57BL6/J female mice); immunology;



Q4837: Colin M. Hyslop, *et al.* Prolactin as an Adjunct for Type 1 Diabetes Immunotherapy. *Endocrinology* 2016;157(1):150-165

Agents: Prolactin, recombinant mouse **Vehicle:** Albumin, mouse; **Route:** **Species:** Mice (NOD); **Pump:** 1004; **Duration:** 3 weeks;

ALZET Comments: 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;

Q4662: T. Yonezawa, *et al.* Anti-metastatic outcome of isoform-specific prolactin receptor targeting in breast cancer. *CANCER LETTERS* 2015;366(84-92

Agents: Prolactin, recombinant human; oligomer, splice-modulating **Vehicle:** **Route:** SC; **Species:** Mice (NOD/SCID); **Pump:** **Duration:** 5 days; 25 days; 40 days;

ALZET Comments: Controls received mp w/ vehicle; animal info (female, BALB/cJ or NOD SCID, 8-9 weeks old); functionality of mp verified by plasma levels; pumps replaced every 28 days; cancer (breast); dose-response (pg 87);

Q4484: N. G. Kondegowda, *et al.* Osteoprotegerin and Denosumab Stimulate Human Beta Cell Proliferation through Inhibition of the Receptor Activator of NF-kappaB Ligand Pathway. *Cell Metabolism* 2015;22(77-85

Agents: Prolactin, ovine **Vehicle:** PBS; BSA; **Route:** SC; **Species:** Mice; **Pump:** **Duration:** 7 days;

ALZET Comments: Controls received mp w/ saline; animal info (male, OPG-KO, 12-14 weeks old); diabetes;

Q4384: H. M. Crawford, *et al.* Evidence for a Role of Prolactin in Mediating Effects of Photoperiod during the Dry Period. *ANIMALS* 2015;5(803-820

Agents: Prolactin **Vehicle:** Saline; **Route:** SC; **Species:** Cattle (pregnant); **Pump:** **Duration:** 28 days;

ALZET Comments: Controls received no mp; animal info (female, Holstein, multiparous); functionality of mp verified by blood samples; pumps removed after 28 days;

Q4064: M. Ricke-Hoch, *et al.* Opposing roles of Akt and STAT3 in the protection of the maternal heart from peripartum stress. *Cardiovascular Research* 2014;101(587-596

Agents: Prolactin **Vehicle:** Saline; **Route:** **Species:** Mice (pregnant); **Pump:** **Duration:** 14 days;

ALZET Comments: Controls received mp w/ vehicle; animal info (female, CKO, pregnant); cardiovascular; peptides;

Q3424: J. D. Buntin, *et al.* Increased STAT5 signaling in the ring dove brain in response to prolactin administration and spontaneous elevations in prolactin during the breeding cycle. *General and Comparative Endocrinology* 2014;200(1-9

Agents: Prolactin, ovine **Vehicle:** Saline; sodium bicarbonate; **Route:** SC; **Species:** Bird (ring dove); **Pump:** 2001; **Duration:** 7 days;

ALZET Comments: Controls received mp w/ vehicle; animal info (female, ring doves, adult, non-breeding);

Q3124: D. B. Yang, *et al.* Limits to sustained energy intake. XIX. A test of the heat dissipation limitation hypothesis in Mongolian gerbils (*Meriones unguiculatus*). *Journal of Experimental Biology* 2013;216(17):3358-3368

Agents: Prolactin **Vehicle:** Saline; **Route:** SC; **Species:** Gerbil; **Pump:** 2002; **Duration:** 2 weeks;

ALZET Comments: Controls received mp w/ vehicle; animal info (female, Mongolian, 6-7 months old, 59-88g); functionality of mp verified by serum levels; behavioral testing (physical activity);

Q2469: W. B. Wang, *et al.* Extracellular Signal-regulated Kinase 5 (ERK5) Mediates Prolactin-stimulated Adult Neurogenesis in the Subventricular Zone and Olfactory Bulb. *Journal of Biological Chemistry* 2013;288(4):2623-2631

Agents: Prolactin, mouse, recomb. **Vehicle:** Albumin, mouse serum; saline; **Route:** SC; **Species:** Mice; **Pump:** 1007D; **Duration:** 7 days;

ALZET Comments: Control animals received mp w/ vehicle; animal info (male, female, Nestin CreER TM/ERK5 loxP/loxP, 8-10 wks old)

Q3045: N. Adan, *et al.* Prolactin promotes cartilage survival and attenuates inflammation in inflammatory arthritis. *Journal of Clinical Investigation* 2013;123(9):3902-3913

Agents: Prolactin, ovine **Vehicle:** **Route:** SC; **Species:** Rat; **Pump:** **Duration:** 6 days; 21 days;



ALZET Comments: Animal info (male, Sprague Dawley, 200-250g); functionality of mp verified by serum levels at 21 days; behavioral testing (hind paw pain); immunology;

Q2449: T. L. Walker, *et al.* Prolactin Stimulates Precursor Cells in the Adult Mouse Hippocampus. PLoS One 2012;7(9):U456-U466

Agents: Prolactin, mouse, recomb **Vehicle:** BSA; saline, sterile; **Route:** CSF/CNS (hippocampus); **Species:** Mice; **Pump:** 1007D; **Duration:** 7 days; 28 days;

ALZET Comments: Control animals received mp w/ vehicle; animal info (C57BL/6, adult); behavioral testing (Morris water maze test, Porsolt forced swim test, open field test, Y maze test)

Q2369: C. Sonigo, *et al.* Hyperprolactinemia-induced ovarian acyclicity is reversed by kisspeptin administration. Journal of Clinical Investigation 2012;122(10):3791-3795

Agents: Prolactin **Vehicle:** **Route:** SC; **Species:** Mice; **Pump:** 2004; **Duration:** 28 days;

ALZET Comments: Control animals received mp w/ PBS; animal info (6 wks old, adult, female)

Q2190: S. Park, *et al.* Central Prolactin Modulates Insulin Sensitivity and Insulin Secretion in Diabetic Rats. Neuroendocrinology 2012;95(4):332-343

Agents: Prolactin, rat **Vehicle:** NaHCO₃; NaCl; **Route:** CSF/CNS; **Species:** Rat; **Pump:** **Duration:** 4 weeks;

ALZET Comments: Controls received mp w/ vehicle; animal info (Sprague Dawley, male, 224 g)

Q0948: G. K. Mak, *et al.* Paternal recognition of adult offspring mediated by newly generated CNS neurons. Nature Neuroscience 2010;13(6):753-U134

Agents: Prolactin, mouse, recomb.; luteinizing hormone, mouse, recomb.; antibody, prolactin neutralizing **Vehicle:** Albumin, mouse serum; PBS;; **Route:** SC; CSF/CNS; **Species:** Mice; **Pump:** 1003D; 1007D; **Duration:** 2 days;

ALZET Comments: Controls received mp w/ vehicle or normal goat antibody; animal info (8 wks old, Prlr +/-, Prlr -/-, male)

Q0515: T. E. Ziegler, *et al.* Prolactin's mediative role in male parenting in parentally experienced marmosets (*Callithrix jacchus*). Hormones and Behavior 2009;56(4):436-443

Agents: Prolactin, human, recomb. **Vehicle:** Glycerol; NaHCO₃; NaCl; **Route:** SC; **Species:** Monkey (marmoset); **Pump:** 2004;

Duration: **ALZET Comments:** Controls received mp w/ saline; animal info (2.5-9 yrs old, male, parentally experienced); "... these pellets (from Innovative Research of America) did not raise the level of prolactin in the blood over the level of our control parentally experienced fathers... Therefore, we chose to use the osmotic minipump (Alzet, CA) for our test males." pg 439; "The position of the pumps on the lower area of a male's back precluded any interference with infant carrying since infant carrying occurs nearer the neck" pg 439; comparison of pellets vs mp

R0263: J. E. Merrill. In Vitro and In Vivo Pharmacological Models to Assess Demyelination and Remyelination. Neuropsychopharmacology 2009;34(1):55-73

Agents: LINGO-1, antibody; Prolactin **Vehicle:** **Route:** CSF/CNS; **Species:** Mice; Rat; **Pump:** **Duration:** 2, 3 weeks;

ALZET Comments: Animal info (MOG-induced Experimental Autoimmune Encephalomyelitis)

P8839: R. A. Augustine, *et al.* Induction of central leptin resistance in hyperphagic pseudopregnant rats by chronic prolactin infusion. Endocrinology 2008;149(3):1049-1055

Agents: Prolactin, ovine **Vehicle:** CSF, artificial; **Route:** CSF/CNS; **Species:** Rat; **Pump:** 2001; **Duration:** 7 days;

ALZET Comments: Controls received mp w/ vehicle; peptides; animal info (female, Sprague Dawley, 10 wks old, 200-300g., pseudopregnant); endocrinology

P8503: V. L. Williams, *et al.* Common and specific effects of the two major forms of prolactin in the rat testis. AMERICAN JOURNAL OF PHYSIOLOGY-ENDOCRINOLOGY AND METABOLISM 2007;293(6):E1795-E1803

Agents: Prolactin **Vehicle:** Saline; **Route:** SC; **Species:** Rat; **Pump:** **Duration:** 4 weeks;

ALZET Comments: Controls received mp w/ vehicle; plasma levels taken; peptides; animal info (male)



P8809: L. Naef, *et al.* Prolactin/Leptin interactions in the control of food intake in rats. *Endocrinology* 2007;148(12):5977-5983

Agents: Prolactin, ovine **Vehicle:** NaHCO₃; HCl; **Route:** CSF/CNS; **Species:** Rat; **Pump:** 2001; 2002; **Duration:** 7, 10 days;
ALZET Comments: Controls received mp w/ vehicle; dose-response (Fig. 1); peptides; animal info (female, Wistar, 220-240g.)

P8083: D. Hilfiker-Kleiner, *et al.* A cathepsin D-cleaved 16 kDa form of prolactin mediates postpartum cardiomyopathy. *Cell* 2007;128(3):589-600

Agents: Prolactin, recomb **Vehicle:** **Route:** **Species:** Mice; **Pump:** **Duration:** 3 weeks;
ALZET Comments: Controls received mp w/ saline; cardiovascular; peptides; animal info (female)

P8425: C. Gregg, *et al.* White matter plasticity and enhanced remyelination in the maternal CNS. *Journal of Neuroscience* 2007;27(8):1812-1823

Agents: Prolactin, recomb. mouse **Vehicle:** Saline; albumin mouse serum; **Route:** SC; **Species:** Mice; **Pump:** 1007D;
Duration: 2.5 days;
ALZET Comments: Controls received mp w/ vehicle; peptides; animal info (female, CD-1, 6-8 wks old)

P8681: D. R. Grattan, *et al.* Prolactin regulation of gonadotropin-releasing hormone neurons to suppress luteinizing hormone secretion in mice. *Endocrinology* 2007;148(9):4344-4351

Agents: Prolactin, ovine **Vehicle:** **Route:** CSF/CNS; **Species:** Mice; **Pump:** 1002; **Duration:** 7 days;
ALZET Comments: Serum levels taken, peptides, animal info (adult, female, C57BL6/J, 6-8 weeks, 24-28g, OVX)