



References on the Administration of Interferons
Using ALZET® Osmotic Pumps

Alpha

Q9444: E. H. Sanchez-Mendoza, *et al.* Compromised Hippocampal Neuroplasticity in the Interferon-alpha and Toll-like Receptor-3 Activation-Induced Mouse Depression Model. *Molecular Neurobiology* 2020;57(7):3171-3182

Agents: Interferon, alpha **Vehicle:** PBS; **Route:** CSF/CNS (left ventricle); **Species:** Mice; **Pump:** 1002; **Duration:** 14 days;
ALZET Comments: Dose (250 IU/day); Controls received mp w/ vehicle; animal info (male 8–12-week-old mice); post op. care (buprenorphine); Interferon, alpha aka IFN- α ; ALZET brain infusion kit 3 used; Brain coordinates (0.2 mm anterior and 0.9 mm lateral to bregma); dependence;

Q8912: C. Nocito, *et al.* Centrally Acting Angiotensin-Converting Enzyme Inhibitor Suppresses Type I Interferon Responses and Decreases Inflammation in the Periphery and the CNS in Lupus-Prone Mice. *Frontiers in Immunology* 2020;11(573677)

Agents: Interferon, alpha **Vehicle:** PBS; **Route:** SC; **Species:** Mice; **Pump:** Not Stated; **Duration:** 14 days;
ALZET Comments: Dose (0.25 μ l/h); Controls received mp w/ vehicle; animal info (NZB/W F1 female mice, 20 weeks old); behavioral testing (Forced Swim Test, Rotarod Test, Locomotor Activity Monitoring Test, Elevated Plus Maze Test); Interferon, alpha aka IFN α ; immunology;

Q1983: Y. Yuan, *et al.* Role of microRNA-15a in autoantibody production in interferon-augmented murine model of lupus. *MOLECULAR IMMUNOLOGY* 2012;52(2):61-70

Agents: Interferon, alpha; interferon, gamma **Vehicle:** PBS; BSA; **Route:** SC; **Species:** Mice; **Pump:** 2006; **Duration:** 16 weeks;
ALZET Comments: Animal info (13 wks old, female, B/W); pumps replaced after 8 weeks; long-term study; stability verified after 8 weeks; "residue IFNs from the pumps at the end of treatment were tested on IFN and IFN responsive cell lines and demonstrated that the in vivo conditions in the pump did not affect bioactivity of both IFNs (data not shown)" pg 63

P9300: A. Shinohara, *et al.* Dosing schedule-dependent change in the disruptive effects of interferon-alpha on the circadian clock function. *LIFE SCIENCES* 2008;83(15-16):574-580

Agents: Interferon-alpha, recomb. human **Vehicle:** Saline; **Route:** SC; **Species:** Mice; **Pump:** 2001; **Duration:** 6 days;
ALZET Comments: Controls received mp w/ vehicle; comparison of SC injections vs. mp; half-life (p. 579) "relatively short"; peptides; animal info (male, ICR, 5 wks old); behavioral testing (locomotor activity)

P6142: S. Koyanagi, *et al.* Alteration of intrinsic biological rhythms during interferon treatment and its possible mechanism. *Molecular Pharmacology* 2002;62(6):1393-1399

Agents: Interferon-alpha **Vehicle:** Saline, sterile; **Route:** SC; **Species:** Mice; **Pump:** 2001; **Duration:** 7 days;
ALZET Comments: Controls received mp w/ vehicle; immunology; peptides

Beta

P9580: S. Tzima, *et al.* Myeloid heme oxygenase-1 regulates innate immunity and autoimmunity by modulating IFN-beta production. *Journal of Experimental Medicine* 2009;206(5):1167-1179

Agents: Interferon-beta, recomb. human **Vehicle:** Not Stated; **Route:** Not Stated; **Species:** Mice; **Pump:** 2002; **Duration:** 14 days;
ALZET Comments: Animal info (Hmox1 KO)

P1845: M. Denis. Recombinant murine beta interferon enhances resistance of mice to systemic mycobacterium avium infection. *Infect. Immun* 1991;59(5):1857-1859

Agents: Interferon-beta **Vehicle:** Not Stated; **Route:** Not Stated; **Species:** Mice; **Pump:** 2002; **Duration:** Not Stated;
ALZET Comments: Controls received pumps with heat-inactivated cytokines; peptides



Gamma

Q8658: B. A. McLendon, *et al.* Pig conceptuses secrete interferon gamma to recruit T cells to the endometrium during the peri-implantation period. *Biology of Reproduction* 2020;103(5):1018-1029

Agents: Interferon, gamma; Albumin, porcine serum **Vehicle:** Not stated; **Route:** Intrauterine (uterine horn); **Species:** Pig; **Pump:** 2ML1; **Duration:** 5 days;

ALZET Comments: Dose (240 uL/day); animal info (Sexually mature gilts); Interferon, gamma aka IFNG; Porcine serum albumin aka PSA; dependence;

Q7344: R. Gutierrez Jauregui, *et al.* IL-1beta Promotes Staphylococcus aureus Biofilms on Implants in vivo. *Front Immunol* 2019;10(1082)

Agents: Interleukin-1 beta; Interleukin-6; Interleukin-10; Interleukin-12; Interleukin-17; Interleukin-23; Interferon, gamma; Tumor Necrosis Factor, alpha; Interleukin-1 beta, anti; Transforming Growth Factor-B1, anti **Vehicle:** PBS; **Route:** SC; **Species:** Mice; **Pump:** 1007D; **Duration:** 10 Days;

ALZET Comments: Dose (IL-1b (83µg/ml); IL-6 (83µg/ml); IL-10 (166µg/ml); IL-12 (83µg/ml); IL-17 (125µg/ml); IL-23 (166µg/ml); IFNg (83µg/ml); TNFa (166µg/ml); anti-TGF-b1 (166µg/ml); anti-IL-1b (150µg/ml)); Controls received mp w/ vehicle; animal info (Eight- to twelve-week-old female C57BL/6 mice); Immunology ("evaluate the suitability of osmotic pumps as a model for biofilms in implant associated infections, we implanted osmotic pumps pre-colonized with bioluminescent Staphylococcus aureus");

Q7192: A. Kimura, *et al.* Protective Roles of Interferon-gamma in Cardiac Hypertrophy Induced by Sustained Pressure Overload. *J Am Heart Assoc* 2018;7(6):

Agents: Interferon, gamma **Vehicle:** Not Stated; **Route:** SC; **Species:** Mice; **Pump:** 1007D; **Duration:** 7 days;

ALZET Comments: Dose (15 uM/d); animal info (8-10 week old, male, BALB/c); cardiovascular;

Q4560: L. Pereira, *et al.* IFN gamma regulates proliferation and neuronal differentiation by STAT1 in adult SVZ niche. *Frontiers in Cellular Neuroscience* 2015;9(U1-U10)

Agents: Interferon, gamma **Vehicle:** Saline; **Route:** CSF/CNS (third ventricle); **Species:** Mice; **Pump:** 1007D; **Duration:** 7 days;

ALZET Comments: Controls received mp w/ vehicle; animal info (male, STAT2 KO or 129S6/SvEv); immunology;

Q3523: T. S. Johnson, *et al.* Etoposide Selectively Ablates Activated T Cells To Control the Immunoregulatory Disorder Hemophagocytic Lymphohistiocytosis. *Journal of Immunology* 2014;192(1):84-91

Agents: Interferon, gamma **Vehicle:** Saline; **Route:** SC; **Species:** Mice; **Pump:** Not Stated; **Duration:** 7 days;

ALZET Comments: Controls received mp w/ vehicle; animal info (prf +/- or WT, lymphocytic choriomeningitis virus infected); functionality of mp verified by serum levels; immunology; murine model of hemophagocytic lymphohistiocytosis;

Q1983: Y. Yuan, *et al.* Role of microRNA-15a in autoantibody production in interferon-augmented murine model of lupus. *MOLECULAR IMMUNOLOGY* 2012;52(2):61-70

Agents: Interferon, alpha; interferon, gamma **Vehicle:** PBS; BSA; **Route:** SC; **Species:** Mice; **Pump:** 2006; **Duration:** 16 weeks;

ALZET Comments: Animal info (13 wks old, female, B/W); pumps replaced after 8 weeks; long-term study; stability verified after 8 weeks; "residue IFNs from the pumps at the end of treatment were tested on IFN and IFN responsive cell lines and demonstrated that the in vivo conditions in the pump did not affect bioactivity of both IFNs (data not shown)" pg 63

Q2040: T. X. Li, *et al.* Preproendothelin-1 expression is negatively regulated by IFNgamma during hepatic stellate cell activation. *American Journal of Physiology Gastrointestinal and Liver Physiology* 2012;302(9):G948-G957

Agents: Interferon, gamma **Vehicle:** PBS; BSA; **Route:** Not Stated; **Species:** Rat; **Pump:** 1002; **Duration:** 2 weeks;

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

Q2394: A. Kimura, *et al.* Interferon-gamma is protective in cisplatin-induced renal injury by enhancing autophagic flux. *Kidney International* 2012;82(10):1093-1104

Agents: Interferon, gamma, recomb. mouse **Vehicle:** Not Stated; **Route:** SC; **Species:** Mice; **Pump:** 1007D; **Duration:** 7 days;

ALZET Comments: Animal info (BALB/c, male, 8-10 wks old)



Q1724: S. P. Tu, *et al.* IFN-gamma Inhibits Gastric Carcinogenesis by Inducing Epithelial Cell Autophagy and T-Cell Apoptosis. *Cancer Research* 2011;71(12):4247-4259

Agents: Interferon-gamma **Vehicle:** PBS; BSA; **Route:** Not Stated; **Species:** Mice (transgenic); **Pump:** Not Stated; **Duration:** 4 weeks;

ALZET Comments: Controls received mp w/ vehicle; animal info (wt B6, IFN-gamma transgenic, 2 mo old)

Q1327: J. A. B. Strickertsson, *et al.* Interferon-gamma inhibits ghrelin expression and secretion via a somatostatin-mediated mechanism. *WORLD JOURNAL OF GASTROENTEROLOGY* 2011;17(26):3117-3125

Agents: Interferon, gamma **Vehicle:** Not Stated; **Route:** SC; **Species:** Mice; **Pump:** 2001; **Duration:** 7 days;

ALZET Comments: Animal info (C57BL6/J)

Q1352: Y. Tang, *et al.* The role of the Th1 transcription factor T-bet in a mouse model of immune-mediated bone-marrow failure. *Blood* 2010;115(3):541-548

Agents: Interferon, gamma **Vehicle:** Not Stated; **Route:** SC; **Species:** Mice; **Pump:** Not Stated; **Duration:** 12 days;

ALZET Comments: Animal info (F1, Tbet -/-)

Q0408: H. J. Ryu, *et al.* The Protective Effects of Interleukin-18 and Interferon-gamma on Neuronal Damages in the Rat Hippocampus Following Status Epilepticus. *Neuroscience* 2010;170(3):711-721

Agents: Antibody, anti IL-18; IL-18, recomb. rat; interferon, gamma, recomb. rat; antibody, anti interferon, gamma; IL-18 receptor antagonist; interferon, gamma, receptor antagonist **Vehicle:** Saline; **Route:** CSF/CNS; **Species:** Rat; **Pump:** 1007D; **Duration:** 1 week;

ALZET Comments: Controls received mp w/ vehicle; animal info (Sprague Dawley, 7 wks old); ALZET brain infusion kit 1 used

P8835: A. B. Rogers, *et al.* Hepatocellular carcinoma associated with liver-gender disruption in male mice. *Cancer Research* 2007;67(24):11536-11546

Agents: Interferon-gamma, recomb. murine **Vehicle:** Not Stated; **Route:** SC; **Species:** Mice; **Pump:** Not Stated; **Duration:** 7 days;

ALZET Comments: Controls received mp w/ vehicle; cancer (tumorigenic hepatitis, liver); peptides; animal info (male, female, A/JCr)

P8739: X. T. Qiao, *et al.* Prospective identification of a multilineage progenitor in murine stomach epithelium. *Gastroenterology* 2007;133(6):1989-1998

Agents: Interferon-gamma **Vehicle:** PBS; BSA; **Route:** IP; **Species:** Mice (transgenic); **Pump:** Not Stated; **Duration:** 2, 8, 12 weeks;

ALZET Comments: Controls received mp w/ vehicle; comparison of IP injections vs. mp; peptides; animal info (12.4 KViI-EGFP tg; C57BL/6J; 4 months old); long-term study

P8261: Y. Si, *et al.* Continuous in vivo infusion of interferon-gamma (IFN-gamma) enhances engraftment of syngeneic wild-type cells in Fanca^{-/-} and Fancg^{-/-} mice. *Blood* 2006;108(13):4283-4287

Agents: Interferon-gamma, mouse **Vehicle:** PBS; **Route:** SC; **Species:** Mice; **Pump:** 1007D; **Duration:** 7 days;

ALZET Comments: Controls received mp w/ vehicle; No stress (see pg. 4286); Immunology; Peptides; Animal info (C57BL/6)

P7447: W. Q. Kang, *et al.* Interferon gamma induction of gastric mucous neck cell hypertrophy. *Laboratory Investigation* 2005;85(5):702-715

Agents: Interferon-gamma, recomb. mouse **Vehicle:** Not Stated; **Route:** IP; **Species:** Mice; **Pump:** 1002; **Duration:** 14 days;

ALZET Comments: Controls received PBS; Animal info (c57BL/6)

P7132: J. T. Brooling, *et al.* Differential regulation of rodent hepatocyte and oval cell proliferation by interferon gamma. *Hepatology* 2005;41(4):906-915

Agents: Interferon-gamma, recomb. mouse **Vehicle:** Not Stated; **Route:** SC; **Species:** Mice; **Pump:** Not Stated; **Duration:** 4-6 days;

ALZET Comments: Controls received mp w/ saline; replacement therapy (hepatectomy)



P7042: X. X. Li, *et al.* Continuous in vivo infusion of interferon-gamma (IFN-gamma) preferentially reduces myeloid progenitor numbers and enhances engraftment of syngeneic wild-type cells in Fancc(-/-) mice. *Blood* 2004;104(4):1204-1209

Agents: Interferon-gamma, murine **Vehicle:** PBS; **Route:** SC; **Species:** Mice; **Pump:** 1007D; **Duration:** 7 days;

ALZET Comments: Controls received mp w/ vehicle; dose-response (fig. 7); no stress (pg. 1209); stress/adverse reaction: (see pg. 1205) "modest though not significant rise in peripheral white blood cell count" (pg. 1205); "IFN-gamma was overall well tolerated by both WT and Fancc -/- mice." (pg. 1208); hematology

P6764: S. Frewert, *et al.* Intratumoral infusion of interleukin-1 beta and interferon-gamma; induces tumor invasion with macrophages and lymphocytes in a rat glioma model. *Neuroscience Letters* 2004;364(3):145-148

Agents: Interleukin-1, beta recomb. rat; Interferon-gamma, recomb. rat **Vehicle:** Saline, physiological; albumin, human serum; **Route:** CSF/CNS (intratumoral); **Species:** Rat; **Pump:** 1003D; **Duration:** 48 hours;

ALZET Comments: Controls received mp w/ vehicle; tissue perfusion (tumor); cancer (glioma)

P6048: Y. Zavros, *et al.* Treatment of Helicobacter gastritis with IL-4 requires somatostatin. *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA* 2003;100(22):12944-12949

Agents: Interleukin-4; interferon-gamma **Vehicle:** PBS; **Route:** IP; **Species:** Mice; **Pump:** 1007D; **Duration:** 7 days;

ALZET Comments: Controls received mp w/ vehicle; comparison of IP injections vs. IP mp

P5102: D. K. Skovseth, *et al.* Vascular morphogenesis and differentiation after adoptive transfer of human endothelial cells to immunodeficient mice. *American Journal of Pathology* 2002;160(5):1629-1637

Agents: Interferon-gamma **Vehicle:** Not Stated; **Route:** Abdominal wall; **Species:** Mice; **Pump:** 2004; **Duration:** Not Stated;

ALZET Comments: Tissue perfusion (abdominal wall); immunology; peptides; pump implanted SC, catheter tube perfused matrigel plug in abdominal wall.

Q3035: Interferon-alpha: an effective adjuvant for peptide-based cytotoxic T-cell vaccines. *Kurume Med J.* 2001;48(2):171-4

Agents: Influenza virus nucleoprotein-derived peptide; interferon, gamma **Vehicle:** PBS; **Route:** SC; **Species:** Mice; **Pump:** 1003D; **Duration:** 3 days;

ALZET Comments: animal info (C57BL/6 mice; 8-12 week old); comparison of SC injections vs mp; Flu peptide administered continuously by osmotic pump with IFN injection elicited CTL response, whereas Flu peptide administered by injection with IFN did not (Figs 3 and 4); Therapeutic indication (antigen immunization);

P4675: S. Jander, *et al.* Differential regulation of microglial keratan sulfate immunoreactivity by proinflammatory cytokines and colony-stimulating factors. *Glia* 2000;30(4):401-410

Agents: Interferon-gamma; Tumor necrosis factor- α **Vehicle:** PBS, sterile; **Route:** CSF/CNS; **Species:** Rat; **Pump:** 1007D; **Duration:** 6 days;

ALZET Comments: Controls received mp w/ vehicle; immunology; peptides; ALZET brain infusion kit used; proinflammatory cytokines

P3731: F. Galbiati, *et al.* Regulation of the IL-12 receptor B2 subunit by soluble antigen and IL-12 in vivo. *European Journal of Immunology* 1998;28(2):209-220

Agents: Interleukin-12; Interleukin-2; Lysozyme, hen egg white; Ovalbumin; Interferon-gamma **Vehicle:** PBS; Albumin, mouse serum; **Route:** SC; **Species:** Mice; **Pump:** 2001; **Duration:** 9 days;

ALZET Comments: Controls received mp w/ PBS; comparison of ip injections vs. mp; immunology; peptides; agents infused singly or in combination in the same pump; recomb. human IL-2 used; recomb. mouse IFN-gamma used

P3567: K. Tsuji-Takayama, *et al.* IFN-gamma in combination with IL-3 accelerates platelet recovery in mice with 5-fluorouracil-induced marrow aplasia. *J. Interferon and Cytokine Res* 1996;16(4):447-451

Agents: Interferon-gamma; Interleukin-3 **Vehicle:** Albumin, mouse serum; PBS; **Route:** SC; **Species:** Mice; **Pump:** 1007D; **Duration:** 7 days;

ALZET Comments: Controls received mp w/ vehicle; stability verified after 7 day storage; immunology; peptides; cytokines given singly and together



P3501: P. Siesjo, *et al.* Cure of established, intracerebral rat gliomas induced by therapeutic immunizations with tumor cells and purified APC or adjuvant IFN-gamma treatment. *J. Immunol* 1996;19(5):334-345

Agents: Interferon-gamma **Vehicle:** Not Stated; **Route:** SC; CSF/CNS; **Species:** Rat; **Pump:** Not Stated; **Duration:** 14 days;
ALZET Comments: cancer; immunology; peptides; ALZET brain infusion kit used

P4477: E. E. Voest, *et al.* Inhibition of angiogenesis in vivo by interleukin 12. *Journal of the National Cancer Institute* 1995;87(8):581-586

Agents: Interferon-gamma **Vehicle:** Saline; **Route:** IP; **Species:** Mice (scid); **Pump:** 2002; **Duration:** 5 days;
ALZET Comments: Controls received mp w/ saline; functionality of mp verified by checking residual volume; comparison of bolus injections vs. mp; cancer; immunology; angiogenesis inhibitor; recomb. murine interferon-gamma used; "... in comparison with bolus injections, continuous intraperitoneal infusion of IFN gamma achieved enhanced inhibition of angiogenesis ..." (p. 585)

P2625: M. Wiranowska, *et al.* Interferon entry through the blood-brain barrier in glioma and its effect on lipoxygenase activity. *Anticancer Research* 1994;14(11):1121-1126

Agents: Interferon-a/B, mouse; Interferon-gamma **Vehicle:** Not Stated; **Route:** SC; **Species:** Mice; **Pump:** Not Stated;
Duration: 3 days;
ALZET Comments: Cancer; peptides; recomb. mouse IFN-gamma used

P2533: D. C. Rockey, *et al.* Interferon gamma inhibits lipocyte activation and extracellular matrix mRNA expression during experimental liver injury: implications for treatment of hepatic fibrosis. *J. Invest. Med* 1994;42(4):660-670

Agents: Interferon-gamma **Vehicle:** PBS; Albumin, bovine serum; **Route:** IP; **Species:** Rat; **Pump:** 2ML4; **Duration:** Not Stated;
ALZET Comments: Controls received mp w/ vehicle; immunology; peptides; rat IFN-gamma used

P2935: J. Rapp, *et al.* Parenteral administration of cytokines and drugs in rodent filariasis via osmotic pumps. *Parasite* 1994;1(1S):35-37

Agents: Interferon-gamma **Vehicle:** Not Stated; **Route:** SC; **Species:** mice; **Pump:** 2002; **Duration:** 14 days;
ALZET Comments: controls received mp with PBS or were untreated; no stress (see pg. 37); immunology; "implantation of osmotic pumps is a suitable method for the application of short lived substances like IFN-gamma or other cytokines."; incision heals within three days and animals show no signs of discomfort, making pumps a useful alternative to repeated injections especially for rodents..."; recomb. mouse IFN-gamma used

P2677: D. B. Drath, *et al.* Activation of a distinct subpopulation of pulmonary macrophages following exposure to biological response modifiers. *Immunol. Invest* 1994;23(2):115-127

Agents: Interferon-gamma; S-MDP, free; S-MDP, liposome-encapsulated **Vehicle:** Not Stated; **Route:** SC; **Species:** Rat; **Pump:** Not Stated; **Duration:** 7 days;
ALZET Comments: comparison of bolus tracheal injections, iv administration and mp; immunology; peptides; IFN-gamma and S-MDP were most effective when delivered either intravenously or via osmotic minipump infusion; S-MDP is lipophilic N-acetylmuramyl-6-0-stearoyl-alanyl-D-isoglutamine; recomb. mouse IFN-gamma used

P3104: E. N. Unemori, *et al.* Human relaxin decreases collagen accumulation in vivo in two rodent models of fibrosis. *J. Invest. Dermatol* 1993;101(2):280-285

Agents: Relaxin; Interferon-gamma **Vehicle:** PBS; **Route:** SC; **Species:** Rat; Mice; **Pump:** 2002; **Duration:** Not Stated;
ALZET Comments: Controls received mp with vehicle; immunology; multiple pumps per animal (1-2) for relaxin delivery; polyvinyl alcohol sponges implanted subcutaneously in rats for fibrotic infiltration; intentional capsule formation in mice analyzed

P2494: R. A. Rosiello, *et al.* Radiation pneumonitis: bronchoalveolar lavage assessment and modulation by a recombinant cytokine. *American Review of Respiratory Disease* 1993;148(16):1671-1676

Agents: Interferon-gamma **Vehicle:** Not Stated; **Route:** SC; **Species:** Rat; **Pump:** Not Stated; **Duration:** 26 days;
ALZET Comments: peptides; oncology



P3004: J. L. Flynn, *et al.* An essential role for interferon gamma in resistance to Mycobacterium tuberculosis infection. *J. Exp. Med* 1993;178(2249-2254

Agents: Interferon-gamma **Vehicle:** PBS; **Route:** SC; **Species:** Mice; **Pump:** Not Stated; **Duration:** Not Stated;
ALZET Comments: Controls received mp w/ PBS or could endogenously produce IFN; replacement therapy (genetic inability to produce IFN-gamma); comparison of im injections vs. mp; circulating half-life of IFN-gamma in mice is about 1 hour; continuous delivery of IFN-gamma prolonged survival longer than did IFN injections (12 vs. 4 days longer than controls); mouse IFN-gamma used

P2948: J. H. A. J. Curfs, *et al.* Plasmodium berghei: recombinant interferon- γ and the development of parasitemia and cerebral lesions in malaria-infected mice. *Experimental Parasitology* 1993;77(212-223

Agents: Interferon-gamma **Vehicle:** Saline, isotonic; **Route:** IP; **Species:** Mice; Mice (nude); **Pump:** 2002; **Duration:** Not Stated;
ALZET Comments: Controls were untreated, or treated but uninfected; ". . .daily injection of a bolus of 105 units of IFN-gamma is not lethal, whereas even a lower daily total dose of 2.5 x 10⁴ units of IFN-gamma administered by continuous release is lethally toxic."; only continuous delivery was able to prevent development of cerebral malaria; comparison of ip injections vs. mp; recomb. rat IFN-gamma

P2301: J. A. Kuhn, *et al.* Gamma-interferon enhancement of carcinoembryonic antigen expression in human colon carcinoma xenografts. *J. Immunother* 1992;11(257-266

Agents: Interferon-gamma **Vehicle:** Albumin, bovine serum; PBS; **Route:** SC; **Species:** Mice; **Pump:** 1007D; **Duration:** 3, 7 days;
ALZET Comments: Functionality of mp verified by residual amounts; dose-response (text p. 259, graph p. 260); comparison of ip injections vs. infusion; cancer; immunology; peptides; biological activity of residual in pump diminished 15% by day 4, 25% by day 6 (p. 262); recomb. human IFN-gamma used

P1999: M. Denis. Involvement of cytokines in determining resistance and acquired immunity in murine tuberculosis. *J. Leukoc. Biol* 1991;50(495-501

Agents: Interferon-gamma, inactivated; Tumor necrosis factor- α ; Interferon-gamma; Interleukin-2; Interleukin-2, inactivated; Tumor necrosis factor- α , inactivated **Vehicle:** Not Stated; **Route:** IP; **Species:** Mice; **Pump:** 2002; **Duration:** Not Stated;
ALZET Comments: Peptides

P1718: H. W. Murray. Effect of continuous administration of interferon- γ in experimental visceral leishmaniasis. *J. Infect. Dis* 1990;161(992-994

Agents: Stibogluconate, sodium; Interferon-gamma **Vehicle:** Albumin, bovine serum; Saline; **Route:** SC; **Species:** Mice; **Pump:** 2002; **Duration:** 1 week;
ALZET Comments: Comparison of ip injections vs. mp; immunology; some mice received 2 pumps

P1918: R. D. Granstein, *et al.* The systemic administration of gamma interferon inhibits collagen synthesis and acute inflammation in a murine skin wound model. *J. Invest. Dermatol* 1989;93(1):18-27

Agents: Interferon-gamma **Vehicle:** PBS; Serum, mouse; **Route:** IP; SC; **Species:** Mice; **Pump:** 2002; **Duration:** 14 days;
ALZET Comments: Peptides; wound healing

P0987: R. D. Granstein, *et al.* Gamma-interferon inhibits collagen synthesis in vivo in the mouse. *J. Clin. Invest* 1987;79(4):1254-1258

Agents: Interferon-gamma **Vehicle:** PBS; Serum, mouse; **Route:** SC; **Species:** Mice; **Pump:** 2002; **Duration:** 7, 14 days;
ALZET Comments: 2002, 7-14 days; controls received mp w/vehicle; peptides; immunology; stress/adverse reaction (fibrous tissue formation which was used to study effects of gamma-interferon)

P0957: D. B. Drath. Modulation of pulmonary macrophage superoxide release and tumoricidal activity following activation by biological response modifiers. *Immunopharmacology* 1986;12(2):117-126

Agents: Interferon-gamma; Liposomes **Vehicle:** Not Stated; **Route:** SC; **Species:** Rat; **Pump:** 2001; **Duration:** 7 days;
ALZET Comments: controls received mp w/empty liposomes; liposome encapsulated agent and free agent; comparison of iv injections vs. mp infusion; cancer/immunology; peptides



Tau

Q3963: J. Lee, *et al.* Intrauterine Coadministration of ERK1/2 Inhibitor U0126 Inhibits Interferon TAU Action in the Endometrium and Restores Luteolytic PGF(2alpha) Pulses in Sheep. *Biology of Reproduction* 2014;91(U177-U185)

ALZET Comments: U0126; serum protein, ovine; interferon tau, recombinant ovine; DMSO; Intrauterine (uterine horn); Sheep (ewe); 2ML1; 6 days; Controls received mp w/ vehicle; animal info (female, Suffolk Ovis aries); 3% DMSO used; tissue perfusion (uterine horn); cyanoacrylate adhesive; used cyanoacrylate glue to anchor pump; interferon tau aka IFNT;

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, ramboillet, 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.

Q4759: A. Q. Antoniazzi. Endocrine Delivery of Interferon Tau Protects the Corpus Luteum from Prostaglandin F2 Alpha-Induced Luteolysis in Ewes. *Biology of Reproduction* 2013;88(6):1-12

ALZET Comments: interferon-tau, recombinant ovine; BSA; IV (jugular, intrauterine); ewe; 2001D, 1003D; 1 day, 3 day; controls received mp w/ vehicle; functionality of mp verified by serum antiviral activity; pumps were anchored in the s.c. space with cyanoacrylate glue; 200 ug/day (uterine vein); 200 ug/day (jugular vein).

Q2056: P. Dorniak, *et al.* Endometrial HSD11B1 and Cortisol Regeneration in the Ovine Uterus: Effects of Pregnancy, Interferon Tau, and Prostaglandins. *Biology of Reproduction* 2012;86(4):U106-U115

ALZET Comments: Interferon, tau, recomb. ovine; meloxicam; PGE2, ovine serum; PGF2a, ovine serum; PGI2, ovine serum; Ethanol; saline; Intrauterine (uterine horn); Sheep (ewe); 2ML1; 7 days; Controls received mp w/ vehicle; animal info (Mature Rambouillet); good methods (pg 2); vinyl tubing used (0007760); 2% ethanol used; enzyme inhibitor (prostaglandin synthase two); tissue perfusion (intrauterine).

Q2057: P. Dorniak, *et al.* Conceptus-Derived Prostaglandins Regulate Endometrial Function in Sheep. *Biology of Reproduction* 2012;87(1):U80-U86

ALZET Comments: Interferon, tau, recomb. ovine; meloxicam; PGE2, ovine serum; PGF2a, ovine serum; PGI2, ovine serum; Ethanol; saline; Intrauterine (uterine horn); Sheep (ewe); 2ML1; 5 days; Controls received mp w/ vehicle; animal info (Mature Rambouillet); tissue perfusion (intrauterine); multiple pumps used (2); enzyme inhibitor (prostaglandin synthase two).

Q1040: P. Dorniak, *et al.* Prostaglandins Regulate Conceptus Elongation and Mediate Effects of Interferon Tau on the Ovine Uterine Endometrium. *Biology of Reproduction* 2011;84(6):1119-1127

ALZET Comments: Meloxicam; interferon, recomb. ovina, tau; Ethanol; saline; Intrauterine (uterine horn); Sheep (ewe); 2ML1; 7 days; Controls received mp w/ vehicle; animal info (ewe, mature, Rambouillet); cyanoacrylate adhesive; enzyme inhibitor (prostaglandin synthase (PTGS)); vinyl catheter used (0007760); "The Alzet pump was then affixed to the mesometrial ligament between the uterine horn and oviduct by using cyanoacrylate glue... and then secured by sewing the oviduct to the perimetrium of the uterine horn, using 0 coated polyglactin suture." pg 1120; 2% ethanol used; photo of pump and catheter placement, fig. 1; "Intrauterine infusion of that amount of IFNT mimics effects of the conceptus on endometrial expression of hormone receptors and IFNT-stimulated genes during early pregnancy in ewes." pg 1120.

P9920: R. C. Bott, *et al.* Uterine Vein Infusion of Interferon Tau (IFNT) Extends Luteal Life Span in Ewes. *Biology of Reproduction* 2010;82(4):725-735

ALZET Comments: Interferon-tau, recomb, ovine; IV (uterine vein); Sheep (ewe); 2001D; 2ML1; 7 days; 24 hours; Controls received mp w/BSA or sham surgeries; animal info (white-faced, western range ewe); cyanoacrylate adhesive.