**References on the Administration of Cytokines
Using ALZET® Osmotic Pumps**

1. Granulocyte-Macrophage Colony Stimulating Factor

Q3634: F. Zhu*, et al.* MINOCYCLINE ALLEVIATES BEHAVIORAL DEFICITS AND INHIBITS MICROGLIAL ACTIVATION INDUCED BY INTRAHIPPOCAMPAL ADMINISTRATION OF GRANULOCYTE-MACROPHAGE COLONY-STIMULATING FACTOR IN ADULT RATS. Neuroscience 2014;266(275-281
ALZET Comments: Colony stimulating factor, GM, recombinant rat; Saline; CSF/CNS (hippocampus); Rat; 1007D; 14 days; Controls received mp w/ vehicle; animal info (male, Sprague Dawley, 280-320g); ALZET brain infusion kit 3 used; Multiple pumps per animal (2); behavioral testing (locomotor activity; social interaction test; PPI); used dental acrylic resin; schizophrenia;.

Q0753: G. Driessens*, et al.* Development of a successful antitumor therapeutic model combining in vivo dendritic cell vaccination with tumor irradiation and intratumoral GM-CSF delivery. CANCER IMMUNOLOGY IMMUNOTHERAPY 2011;60(2):273-281
ALZET Comments: Colony-stimulating factor, GM; SC; Rat; 2004; 28 days; Animal info (male, inbred, Fischer 344, 10-12 wks old); comparison of "all in-vivo therapy" vs mp; cancer.

P8510: H. R. Djalilian*, et al.* Efficacy of an osmotic pump delivered, GM-CSF-based tumor vaccine in the treatment of upper aerodigestive squamous cell carcinoma in rats. CANCER IMMUNOLOGY IMMUNOTHERAPY 2007;56(8):1207-1214
ALZET Comments: Colony-stimulating factor, GM, murine; interleukin-12; PBS; SC; Rat; 28 days; Controls received mp w/ vehicle; dose-response (fig 1); no stress (see pg. 1209); cancer (upper aerodigestive tract carcinoma); peptides; animal info (Fisher 344, 125-150 g); good methods; "This latter method (mp) has several advantages. First, the use of minipumps obviates the cumbersome need to transfect tumor cells and completely characterize their cytokine repertoires. Second, it allows for independent and rigorous control over the kinetics of administration of cytokine and antigen dosages. Third, it may generate les controversy than those techniques requiring "gene therapy" IRB approval." (p. 1213).

P7935: J. C. Chen*, et al.* Effects of irradiated tumor vaccine and infusion of granulocyte-macrophage colony-stimulating factor and interleukin-12 on established gliomas in rats. CANCER IMMUNOLOGY IMMUNOTHERAPY 2006;55(7):873-883
ALZET Comments: Colony-stimulating factor, GM, recomb. mouse; interleukin-12, recomb. mouse; BSA; PBS; SC; Rat; 2002; 14 days; Controls received mp w/ vehicle or no treatment; cancer (RT-2 glioma); peptides; animal info (Fischer, 200-350 grams, SC and ICV tumors); "continuously infused cytokine using an osmotic mini pump to...avoid the side effects of a single large dose of cytokine and one with a concept similar to that of gene-therapy." (p. 874).

P6450: W. C. Jean*, et al.* Effects of combined granulocyte-macrophage colony-stimulating factor (GM-CSF), interleukin-2, and interleukin-12 based immunotherapy against intracranial glioma in the rat. Journal of Neuro-oncology 2004;66(1-2):39-49
ALZET Comments: Colony-stimulating factor, GM; interleukin-2; interleukin-12; SC; Rat; 2004; 4 weeks; Cancer (gliosarcoma); GM-CSF was infused alone or with cytokines.

P9201: G. Driessens*, et al.* Highly Successful Therapeutic Vaccinations Combining Dendritic Cells and Tumor Cells Secreting Granulocyte Macrophage Colony-stimulating Factor. Cancer Research 2004;64(8435-8442
ALZET Comments: Colony-stimulating factor, GM, recomb. mouse; SC; Rat; 2004; 4 weeks; Cancer; animal info (male, Fischer 344, 10-12 wks old).

P5531: Y. Chen*, et al.* Effects of irradiated tumor vaccine and continuous localized infusion of granulocyte-macrophage colony-stimulating factor on neuroblastomas in mice. Journal of Pediatric Surgery 2002;37(9):1298-1304
ALZET Comments: Colony-stimulating factor, GM; PBS; BSA; SC (tumor vaccine injection site); Mice; 1002; 14 days; Controls received mp w/ PBS; immunology; GM-CSF is recombinant murine; tissue perfusion.

P5093: S. K. Basak*, et al.* Increased dendritic cell number and function following continuous in vivo infusion of granulocyte macrophage-colony-stimulating factor and interleukin-4. Blood 2002;99(8):2869-2879
ALZET Comments: Interleukin-4; Colony-stimulating factor, GM; Saline; SC; mice; 1007D; 7 days; controls received mp w/ vehicle; functionality of mp verified by serum levels via ELISA; immunology; peptides; recombinant cytokines; agents administered singly or concomitantly.

P4649: M. A. Wallenfriedman*, et al.* Effects of continuous localized infusion of granulocyte-macrophage colony-stimulating factor and inoculations of irradiated glioma cells on tumor regression. J. Neurosurg 1999;90(1064-1071
ALZET Comments: Colony-stimulating factor, GM;; Saline; BSA; PBS;; SC;; Rat;; 2004;; 28 days;; Controls received mp w/ saline; does-response; cancer; immunology; peptides; recomb. murine colony-stimulating factor, GM used.

P4130: M. Roelofs*, et al.* Transforming growth factor b1 involvement in the conversion of fibroblasts to smooth muscle cells in the rabbit bladder serosa. Histochemical J 1998;30(393-404
ALZET Comments: Transforming growth factor-B1; Epidermal growth factor; Fibroblast growth factor, basic; Granulocyte-colony stimulating factor; Platelet-derived growth factor; Colony-stimulating factor, GM; PBS; bladder wall; rabbit; 2ML2; 2ML4; no duration posted; controls received mp w/PBS; no stress (see pg. 395); "a minipump filled with Evans Blue solution was used to determine area of growth factor delivery"; peptides; tissue perfusion (bladder wall).

P6717: G. Molineux*, et al.* An analysis of the Effects of Combined Treatment with rmGM-CSF and PEG-rHuMGDF in Murine Bone Marrow Transplant Recipients. Stem Cells 1997;15(43-49
ALZET Comments: MegaKaryocyte growth development factor, PEG-recomb. human; colony-stimulating factor, GM, recomb. murine; PBS; BSA; SC; Mice; 2002; 18 days; Controls received mp w/ vehicle; dose-response (fig.1); immunology; "To avoid potential scheduling problems in these experiments we have delivered rmGM-CSF by continuous s.c. infusion" (p.44).

P4525: P. O. Iversen*, et al.* Inhibition of granulocyte-macrophage colony-stimulating factor prevents dissemination and induces remission of juvenile myelomonocytic leukemia in engrafted immunodeficient mice. Blood 1997;90(12):4910-4917
ALZET Comments: Colony-stimulating factor, GM; Antibody, monoclonal anti-TNFa;; Saline, isotonic;; IP;; Mice (nude);; 4 weeks;; controls received mp w/vehicle; functionality of mp verified by plasma levels; immunology; peptides;.

P3434: R. M. Alisauskas*, et al.* Reduction in the duration of myelotoxicity associated with radioimmunotherapy with infusions of the hemoregulatory peptide, HP5b in mice. Int. J. Cancer 1997;70(323-329
ALZET Comments: HP5b; Interleukin-1; Colony-stimulating factor, GM; PBS; Mercaptoethanol, 2-; NaN3; SC; mice; 1007D; 3, 7, 14 days; cancer; immunology; peptides; HP5b is a hemoregulatory peptide.

P9500: G. Molineux. Megakaryocyte growth and development factor accelerates platelet recovery in peripheral blood progenitor cell transplant recipients. Blood 1996;88):366-376
ALZET Comments: Megakaryocyte growth development factor, PEG-recomb. human; colony-stimilating factor, G, recomb. human; colongy-stimulating factor, GM, recomb. mouse; PBS; BSA; SC; Mice; 1007D; 2002; 7, 9, 16-18 days; Controls received mp w/ vehicle; replacement therapy (splenectomy); no stress (see pg. 367); cardiovascular; immunology; animal info (female, BDNF1, 8-12 wks; male, C57BL x DBA2BDNF1, 12-20 wks old); transplantation; "mice were healthy and had pumps still in position and in good condiction at the end of the mobilization protocol." (p. 367).

P2507: R. D. Blumenthal*, et al.* Cytokine intervention permits dose escalation of radioantibody: an analysis of myelostimulation by bolus versus continuous infusion of IL-1/GM-CSF. Cancer Suppl 1994;73(3):1083-1092
ALZET Comments: Colony-stimulating factor, GM; Interleukin-1, alpha; PBS; SC; mice; no duration posted; comparison of injections vs. mp; cancer; immunology.

P2449: S. Vyalov*, et al.* GM-CSF-induced granulation tissue formation: relationships between macrophage and myofibroblast accumulation. Virchows Archiv B Cell Pathol 1993;63(231-239

ALZET Comments: Colony-stimulating factor, GM; Tumor necrosis factor; Platelet-derived growth factor; Saline; SC; Rat; 2001; 2-7 days; controls received mp w/ TNF, PDGF or carrier solution; functionality of mp verified upon removal; pump infused GM-CSF to study formation of granulation tissue at infusion site; recomb. murine TNF used.

P9099: S. Grabbe*, et al.* Deficient antigen presentation by Langerhans cells from athymic (nu/nu) mice. Restoration with thymic transplantation or administration of cytokines. J. Immunol 1993;151(7):3430-3439
ALZET Comments: Colony-stimulating factor, GM, murine; tumor necrosis factor-a, recomb. mouse; interleukin-1a, recomb. human; PBS; IP; Mice (nude); 2002; 10 days; Controls received mp w/ normal saline; immunology; peptides; animal info (BALB/c, athymic, nu/nu, euthymic, 2-4 wks old).

P3890: B. R. Blazar*, et al.* Promotion of murine marrow alloengraftment and hematopoietic recovery across the major histocompatibility barrier by administration of recombinant human interleukin-1a. Blood 1992;80(6):1614-1622
ALZET Comments: Interleukin-1, alpha; Colony-stimulating factor, GM; PBS; SC; mice; 2002; 14 days; controls received mp w/PBS; immunology; peptides; agents given singly, together, or sequentially; "...for a 14-day administration schedule, continuous subcutaneous administration is favorable." (pg. 1618).

P2523: T. Berney*, et al.* Murine autoimmune hemolytic anemia resulting from Fc-gamma receptor-mediated erythrophagocytosis: protection by erythropoietin but not by interleukin-3, and aggravation by granulocyte-macrophage colony-stimulating factor. Blood 1992;79(11):2960-2964
ALZET Comments: Erythropoietin; Interleukin-3; Colony-stimulating factor, GM; PBS; Glycerol; SC; mice; 2002; 14 days; immunology; peptides.

P2970: T. Shibata*, et al.* Interleukin 3 perfusion prevents death due to acute anemia induced by monoclonal antierythrocyte autoantibody. J. Exp. Med 1990;171(1809-1814
ALZET Comments: Interleukin-3; Colony-stimulating factor, GM; Erythropoietin; PBS; Glycerol; LPS, e. coli; SC; mice; 2002; no duration posted; controls received mp with vehicles +/- LPS; immunology; peptides; recomb. mouse GM-CSF & IL-3 used; recomb. human EPO used.

P1326: R. L. Monroy*, et al.* Recovery from severe hematopoietic suppression using recombinant human granulocyte-macrophage colony-stimulating factor. Exp. Hematol 1988;16(344-348
ALZET Comments: Colony-stimulating factor, GM; SC; monkey; 2001; 7 days; dose-response; cancer/immunology; no stress; peptides.

P7959: S. Kamel-Reid*, et al.* Engraftment of Immune-Defficient Mice with Human Hematopoietic Stem Cells. Science 1988;242(4886):1706-1709
ALZET Comments: Interleukin-3, human; colony-stimulating factor, GM, human; SC; Mice; mice (SCID); 4-5 weeks; 15 days; Controls received mp w/ saline; peptides; immunology.

P1250: N. Sakai*, et al.* Increase in macrophage progenitor cell number in femoral marrow of mice after continuous infusion or repeated injections of a macrophage colony-stimulating factor. J. Pharmaco. Biodyn 1987;10(8):404-407
ALZET Comments: Colony-stimulating factor, GM; Endotoxin, E. coli; Saline; IP; mice; 2001; 6 days; controls received mp w/ LPS free isotonic saline; 2 exp.; comparison of ip injections vs. mp infusion; functionality of mp verified.

P0853: R. E. Donahue*, et al.* Stimulation of haematopoiesis in primates by continuous infusion of recombinant human GM-CSF. Nature 1986;321(872-875
ALZET Comments: Colony-stimulating factor, GM; Dextrose; SC; monkey; 2ML1; 1 week; half-life; 1 of 3 experiments using mp.

2. Macrophage Colony Stimulating Factor

Q0623: S. A. Lloyd*, et al.* Administration of high-dose macrophage colony-stimulating factor increases bone turnover and trabecular volume fraction. JOURNAL OF BONE AND MINERAL METABOLISM 2009;27(5):546-554
ALZET Comments: Colony-stimulating factor, M; SC; Mice; 28 days; Animal info (male, C57BL/6 J, 7 wks old); comparison of SC injections vs mp; lack of cortical response in both daily injection and pump studies, pg 550.

P3103: D. A. Vallera*, et al.* Antitumor protection from the murine T-cell leukemia/lymphoma EL4 by the continuous subcutaneous coadministration of recombinant macrophage-colony stimulating factor and interleukin-2. Cancer Res 1993;53(4273-4280
ALZET Comments: Colony-stimulating factor, M; Interleukin-2; Granulocyte-colony stimulating factor; SC; mice; no duration posted; controls received mp with PBS; cancer; immunology; peptides; M-CSF + IL-2 given concomitantly provided best antitumor protection; recomb. IL-2 used; human G-CSF used.

3. Erythropoietin

Q4880: E. H. Sanchez-Mendoza*, et al.* Implantation of Miniosmotic Pumps and Delivery of Tract Tracers to Study Brain Reorganization in Pathophysiological Conditions. Journal of Visualized Experiments 2016;107(1-9
ALZET Comments: Erythropoietin, recombinant human; CSF/CNS; Mice; 30 days; Controls received mp w/ vehicle; animal info (C57BL6); good methods (Jove Video; picture of pump and implantation pg. 4); ischemia (cerebral); post op. care (Carprofen 4 mg/kg); behavioral testing (rotarod test; hand grip strength); cyanoacrylate adhesive; “In this work we have shown the method of implantation of minipumps with a cannula connected to the skull in order to deliver the plasticity promoting protein rhEpo directly into the ventricle, thus circumventing the BBB.” pg 8; Cannula placement verified via histologic analysis "The are no evident severe tissue alterations based on Nissl staining as compared to the corresponding contralateral area";.

Q6648: M. Rauner*, et al.* Increased EPO Levels Are Associated With Bone Loss in Mice Lacking PHD2 in EPO-Producing Cells. J Bone Miner Res 2016;31(10):1877-1887
ALZET Comments: Erythropoietin, recomb. human; SC; Mice (knockout); Mice (transgenic); 30 days; Dose (3 U EPO/day or 10 U EPO/day); Controls received mp w/ vehicle; animal info (8-12 week old WT and Osx:cre-PHD2f/f and Vav:cre-PHD2f/f mice);.

Q3130: G. B. Wang*, et al.* The AKT/mTOR pathway mediates neuronal protective effects of erythropoietin in sepsis. MOLECULAR AND CELLULAR BIOCHEMISTRY 2014;385(1-2):125-132
ALZET Comments: Erythropoietin, human recombinant; PBS; BSA; SC; Rat; 1 week; Controls received mp w/ vehicle or sham surgery; animal info (Sprague Dawley, 120 days old, 240-280g); behavioral testing (open field exploration, inhibitory avoidance, Morris water maze);.

Q3518: M. S. Jeffers*, et al.* Epidermal Growth Factor and Erythropoietin Infusion Accelerate Functional Recovery in Combination With Rehabilitation. Stroke 2014;45(185-+
ALZET Comments: Epidermal Growth Factor; erythropoietin; CSF, artificial; CSF/CNS; Rat; 2001; 14 days; Animal info (male, Sprague Dawley); pumps replaced every 7 days; ischemia (cerebral); behavioral testing (staircase test); pumps removed 7 days after serial implantation;.

Q3269: Y. F. Wang*, et al.* Bioengineered sequential growth factor delivery stimulates brain tissue regeneration after stroke. JOURNAL OF CONTROLLED RELEASE 2013;172(1):1-11
ALZET Comments: Epidermal growth factor; erythropoietin; CSF, artificial; CSF/CNS; Mice; 1007D; 14 days; Animal info (male, C57BL6, 9-11 weeks old); EGF-PGF pumps replaced after 7 days with pump filled with ETO; ALZET brain infusion kit 3 used; comparison of epicortical composite vs mp; stress/adverse reaction: "Unlike the ICV catheter/minipump,which causes significant tissue damage, the epicortical composite provides a minimal invasiveness and no tissue damage."(see pg.9); immunology; Pumps implanted 4 days after stroke; BIK implanted same day as stroke;.

Q2546: J. Unden*, et al.* Post-ischemic continuous infusion of erythropoeitin enhances recovery of lost memory function after global cerebral ischemia in the rat. BMC NEUROSCIENCE 2013;14(;):U1-U8
ALZET Comments: Erythropoietin; Saline; IV (jugular); Rat; 2001D; 1003D; 72 hours; Control animals received mp w/ vehicle; animal info (Wistar, male, 300-350 g); silastic tubing used.

Q2677: L. M. Yamaleyeva*, et al.* Cell Therapy with Human Renal Cell Cultures Containing Erythropoietin-Positive Cells Improves Chronic Kidney Injury. STEM CELLS TRANSLATIONAL MEDICINE 2012;1(5):373-383**Erythropoietin**
ALZET Comments: Erythropoietin, recomb. human; Saline; IP; Rat (nude); 2ML4; Animal info (athymic, male, 10-15 wks old); pump functionality measured via residual volume.

Q1294: R. Reitmeir*, et al.* Post-acute delivery of erythropoietin induces stroke recovery by promoting perilesional tissue remodelling and contralesional pyramidal tract plasticity. Brain 2011;134(;):84-99
ALZET Comments: Erythropoietin; NaCl; CSF/CNS; Mice; 4 weeks; Controls received mp w/ vehicle; animal info (C57Bl6/j, male, 23-25 g, 8-10 wks); ALZET brain infusion kit 3 used; ischemia (focal cerebral).

Q1055: A. Erlandsson*, et al.* Immunosuppression promotes endogenous neural stem and progenitor cell migration and tissue regeneration after ischemic injury. Experimental Neurology 2011;230(1):48-57
ALZET Comments: Epidermal growth factor, recomb. human; erythropoietin; cyclosporine A; CSF/CNS; SC; Mice (NOD/SCID); 1007D; Animal info (male, C57/BL6, 8-10 wks old); pumps replaced after 7 days; ALZET brain infusion kit 3 used.

Q1286: C. D. Price*, et al.* Effect of continuous infusion of asialoerythropoietin on short-term changes in infarct volume, penumbra apoptosis and behaviour following middle cerebral artery occlusion in rats. Clinical and Experimental Pharmacology and Physiology 2010;37(2):185-192
ALZET Comments: Erythropoietin, asialo-; Saline, sterile; SC; Rat; 2001; 4 days; Controls received mp w/ vehicle; animal info (male, Sprague Dawley, 250-275 g).

Q0577: A. Kondo*, et al.* Erythropoietin exerts anti-epileptic effects with the suppression of aberrant new cell formation in the dentate gyrus and upregulation of neuropeptide Y in seizure model of rats. Brain Research 2009;1296(;):127-136
ALZET Comments: Erythropoietin, human, recomb.; antibody, anti-EPO; Saline; CSF/CNS; Rat; 6 days; 24 hours; Controls received mp w/ rat serum albumin, or control mouse IgG; animal info (male, Fischer 344, 10-12 wks old, 200-250 g, SLC).

P9496: T. Kadota*, et al.* Continuous intraventricular infusion of erythropoietin exerts neuroprotective/rescue effects upon Parkinson's disease model of rats with enhanced neurogenesis. Brain Research 2009;1254(;):120-127
ALZET Comments: Erythropoietin; Albumin, rat serum; saline; CSF/CNS; Rat; 2001; 1 week; Controls received mp w/ vehicle; animal info (Sprague Dawley, 220-250 g.).

Q0293: B. J. Jobst*, et al.* Endothelial Cell Seeding Fails to Prevent Intimal Hyperplasia Following Arterial Injury in the Rat Carotid Model. Cardiovascular Drugs and Therapy 2009;23(5):343-353
ALZET Comments: Granulocyte-colony stimulating factor, human, recomb.; erythropoietin, human, recomb.; IP; Rat; 2ML1; 48 hours; Controls received mp w/ saline; animal info (male, CD, 250 g, splenectomy).

Q0263: M. Jing*, et al.* The combined therapy of intrahippocampal transplantation of adult neural stem cells and intraventricular erythropoietin-infusion ameliorates spontaneous recurrent seizures by suppression of abnormal mossy fiber sprouting. Brain Research 2009;1295(;):203-217
ALZET Comments: Erythropoietin, human, recomb.; Saline; albumin, rat serum; CSF/CNS; Rat; 2001; 7 days; Controls received mp w/ vehicle; animal info (male, 190-210 g).

P9369: L. Belayev*, et al.* A novel neurotrophic therapeutic strategy for experimental stroke. Brain Research 2009;1280(;):117-123
ALZET Comments: Erythropoietin; Saline; IV (femoral); Rat; 2ML1; 3 days; Controls received mp w/ vehicle; animal info (male, Long-Evans, 280-330 g., MCAO).

P8932: S. Oya*, et al.* Region-specific proliferative response of neural progenitors to exogenous stimulation by growth factors following ischemia. NeuroReport 2008;19(8):805-810
ALZET Comments: Epidermal growth factor, recomb. human; fibroblast growth factor-2, recomb. human; insulin-like growth factor I, recomb. human; erythropoietin, recomb. rat; brain-derived neurotrophic factor, recomb. human; DDL4, recomb. mouse; CSF/CNS; Rat; 1003D; 3 days; Ischemia; animal info (male, Wistar, 8wks old, 280-300 g.); bilateral infusion.

P9049: M. Hack*, et al.* A systemic combination therapy with granulocyte-colony stimulating factor plus erythropoietin aggravates the healing process of balloon-injured rat carotid arteries. Cardiovascular Drugs and Therapy 2008;22(5):351-362
ALZET Comments: Granulocyte-colony stimulating factor-, recomb. human; erythropoietin; IP; Rat; 2ML1; 7 days; Controls received mp w/ saline; peptides; animal info (male, Sprague Dawley, 300-350 g., splenectomy); "We used implantable osmotic minipumps to guarantee continuous systemic delivery of the tested cytokines over the first even days upon intraperitoneal deposition." pg. 353.

P8660: J. Soliz*, et al.* Soluble erythropoietin receptor is present in the mouse brain and is required for the ventilatory acclimatization to hypoxia. JOURNAL OF PHYSIOLOGY-LONDON 2007;583(1):329-336
ALZET Comments: Erythropoietin receptor, soluble; Phosphate buffer; CSF/CNS; Mice; 1003D; 3 days; Controls received mp w/ vehicle; ALZET brain infusion kit used; animal info (male C57/BL6, 3 months old, hypoxia).

Q0248: B. Kolb*, et al.* Growth factor-stimulated generation of new cortical tissue and functional recovery after stroke damage to the motor cortex of rats. Journal of Cerebral Blood Flow and Metabolism 2007;27(983-997
ALZET Comments: Erythropoietin; epidermal growth factor; CSF, artificial; CSF/CNS; Rat; 2001; 7, 14 days; Controls received mp w/ vehicle; peptides; animal info (male, Long-Evans, 90-110 days old); ischemia (cerebral); behavioral testing (forelimb assymetry, forelimb inhibition (swimming), reaching); some animals received 7 days EGF.

P8429: B. L. Frederiksen*, et al.* Does erythropoietin augment noise induced hearing loss? Hearing Research 2007;223(1-2):129-137
ALZET Comments: Erythropoietin; Ear (round window); Guinea pig; 1007D; 1 week; Controls received mp w/ saline; replacement therapy (noise-induced hearing impairment); comparison of acute admin. vs. mp; peptides; animal info (male, Dunkin-Hartley); tissue perfusion (round window); mp primed 6 hours in 37 Celsius saline; correct catheter placement confirmed.

4. Interferon

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):
ALZET Comments: Interferon, gamma; SC; Mice; 1007D; 7 days; 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
ALZET Comments: Interferon, gamma; Saline; CSF/CNS (third ventricle); Mice; 1007D; 7 days; Controls received mp w/ vehicle; animal info (male, STAT2 KO or 129S6/SvEv); immunology;.

Q5030: C. Hoyo-Becerra*, et al.* Rapid Regulation of Depression-Associated Genes in a New Mouse Model Mimicking Interferon-alpha-Related Depression in Hepatitis C Virus Infection. Mol Neurobiol 2015;52(1):318-29
ALZET Comments: Interferon-a, murine; polyinosinic/polycytidylic acid; PBS; CSF/CNS; Mice; 1002; 14 days; Controls received mp w/ vehicle; animal info (C57BL6J); behavioral testing (open field test; tail suspension test; forced swimming test); polyinosinic/polycytidylic acid is a toll-like receptor-3 agonist; Dose (mIFN-a 250 IU/day; poly(I:C) 1 ug/day);.

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;.

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
ALZET Comments: Interferon, gamma; Saline; SC; Mice; 7 days; 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;.

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.

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).

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
ALZET Comments: Interferon, alpha; interferon, gamma; PBS; BSA; SC; Mice; 2006; 16 weeks; 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
ALZET Comments: Interferon, gamma; PBS; BSA; Rat; 1002; 2 weeks; 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
ALZET Comments: Interferon, gamma, recomb. mouse; SC; Mice; 1007D; 7 days; Animal info (BALB/c, male, 8-10 wks old).

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).

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
ALZET Comments: Interferon-gamma; PBS; BSA; Mice (transgenic); 4 weeks; 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
ALZET Comments: Interferon, gamma; SC; Mice; 2001; 7 days; Animal info (C57BL6/J).

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.

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
ALZET Comments: Interferon, gamma; SC; Mice; 12 days; 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
ALZET Comments: Antibody, anti IL-18; IL-18, recomb. rat; interferon, gamma, recomb. rat; antibody, anti interferon, gamma; IL-18 receptor antagonist; interferon, gamma, receptor antagonist; Saline; CSF/CNS; Rat; 1007D; 1 week; Controls received mp w/ vehicle; animal info (Sprague Dawley, 7 wks old); ALZET brain infusion kit 1 used.

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.

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
ALZET Comments: Interferon-beta, recomb. human; Mice; 2002; 14 days; Animal info (Hmox1 KO).

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
ALZET Comments: Interferon-alpha, recomb. human; Saline; SC; Mice; 2001; 6 days; 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).

P8835: A. B. Rogers*, et al.* Hepatocellular carcinoma associated with liver-gender disruption in male mice. Cancer Research 2007;67(24):11536-11546
ALZET Comments: Interferon-gamma, recomb. murine; SC; Mice; 7 days; 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
ALZET Comments: Interferon-gamma; PBS; BSA; IP; Mice (transgenic); 2, 8, 12 weeks; Controls received mp w/ vehicle; comparison of IP injections vs. mp; peptides; animal info (12.4 KVil-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
ALZET Comments: Interferon-gamma, mouse; PBS; SC; Mice; 1007D; 7 days; Controls received mp w/ vehicle; no stress (see pg. 4286); immunology; peptides; animal info (C57BL/6).

P7725: R. Z. Birk*, et al.* IFN-alpha induces apoptosis of adipose tissue cells. Biochemical and Biophysical Research Communications 2006;345(2):669-674
ALZET Comments: Interferon-a A/D, recomb. human; Saline; SC; Mice; 8 days; Controls received mp w/ vehicle; animal info (C57BL/6, diet-induced obese).

P7184: A. Mathian*, et al.* IFN-alpha induces early lethal lupus in preautoimmune (New Zealand black x New Zealand White)F_1 but not in BALB/c mice[1]. Journal of Immunology 2005;174(5):2499-2506
ALZET Comments: Interferon, mouse; PBS; BSA; SC; Mice; 1002; 8-10 weeks; Controls received mp w/ vehicle; pumps replaced every 2 weeks; immunology.

P7447: W. Q. Kang*, et al.* Interferon gamma induction of gastric mucous neck cell hypertrophy. LABORATORY INVESTIGATION 2005;85(5):702-715
ALZET Comments: Interferon-gamma, recomb. mouse; IP; Mice; 1002; 14 days; 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
ALZET Comments: Interferon-gamma, recomb. mouse; SC; Mice; 4-6 days; 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
ALZET Comments: Interferon-gamma, murine; PBS; SC; Mice; 1007D; 7 days; 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
ALZET Comments: Interleukin-1, beta recomb. rat; Interferon-gamma, recomb. rat; Saline, physiological; albumin, human serum; CSF/CNS (intratumoral); Rat; 1003D; 48 hours; 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
ALZET Comments: Interleukin-4; interferon-gamma; PBS; IP; Mice; 1007D; 7 days; 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
ALZET Comments: Interferon-gamma; Abdominal wall; mice; 2004; tissue perfusion (abdominal wall); immunology; peptides; pump implanted SC, catheter tube perfused matrigel plug in abdominal wall.

P6142: S. Koyanagi*, et al.* Alteration of intrinsic biological rhythms during interferon treatment and its possible mechanism. MOLECULAR PHARMACOLOGY 2002;62(6):1393-1399
ALZET Comments: Interferon-alpha; Saline, sterile; SC; Mice; 2001; 7 days; Controls received mp w/ vehicle; immunology; peptides.

Q3035: Interferon-alpha: an effective adjuvant for peptide-based cytotoxic T-cell vaccines. Kurume Med J. 2001;48(2):171-4
ALZET Comments: Influenza virus nucleoprotein-derived peptide; interferon, gamma; PBS; SC; Mice; 1003D; 3 days; 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);.

5. Interleukin-1

Q7035: Y. P. Zhang*, et al.* Mifepristone attenuates depression-like changes induced by chronic central administration of interleukin-1beta in rats. Behav Brain Res 2018;347(436-445
ALZET Comments: Interleukin-1 beta; Saline, pyrogen-free; CSF/CNS (lateral ventricle); Rat; 1002; 14 days; Dose (10 ng/7uL/rat/day); Controls received mp w/ vehicle; animal info (Male Sprague Dawley rats (220–260 g)); behavioral testing (open field, elevated plus maze and sucrose preferencet); ALZET brain infusion kit used; Brain coordinates (AP=–1 mm, ML=+1.4 mm, DV=–1 mm); Therapeutic indication (depression);.

Q6989: Y. P. Zhang*, et al.* Mifepristone attenuates depression-like changes induced by chronic central administration of interleukin-1beta in rats. Behav Brain Res 2018;347(436-445
ALZET Comments: Interleukin-1 beta; Saline; CSF/CNS (lateral ventricle); Rat; 1002; 14 days; Dose (10 ng/7uL/rat/day); animal info (Male Sprague Dawley rats (220–260 g)); behavioral testing (open field, elevated plus maze and sucrose preferencet); functionality of mp verified by residual volume; ALZET brain infusion kit used; Brain coordinates (AP=–1 mm, ML=+1.4 mm, DV=–1 mm.); Cannula placement verified via sectioning the brains coronally;.

Q6320: M. L. Bonnemaison*, et al.* Interleukin-1beta as a driver of renal NGAL production. Cytokine 2017;91(38-43
ALZET Comments: Interleukin-1 beta, mouse recomb.; PBS; SC; Mice; 1002; 14 days; Dose (10 ng/h); 0.1% bovine serum albumin used; animal info (12-week-old male C57Bl/6 mice);.

Q5171: S. Okizaki*, et al.* Vascular Endothelial Growth Factor Receptor Type 1 Signaling Prevents Delayed Wound Healing in Diabetes by Attenuating the Production of IL-1beta by Recruited Macrophages. Am J Pathol 2016;186(6):1481-98
ALZET Comments: Placenta growth factor, recombinant human; antibody, interleukin-1B; PBS; SC; Mice; 1007D; 7 days; Controls received mp w/ vehicle or control antibody; animal info (male, C57BL6, 8 weeks old, STZ); immunology; diabetes; Dose (PlGF 10 ug/mouse; anti-IL-1B 1 ug/day);.

Q6636: C. S. Nunemaker. Considerations for Defining Cytokine Dose, Duration, and Milieu That Are Appropriate for Modeling Chronic Low-Grade Inflammation in Type 2 Diabetes. J Diabetes Res 2016;2016(2846570
ALZET Comments: Interleukin-1beta; Interleukin-6; Saline; SC; Mice; 1007D; 7 days; Dose (32.

Q4038: K. Pajer*, et al.* Cytokine signaling by grafted neuroectodermal stem cells rescues motoneurons destined to die. Experimental Neurology 2014;261(180-189
ALZET Comments: Antibody, anti-interleukin-1a; antibody, anti-interleukin-6; antibody, tumor necrosis factor-alpha; antibody, macrophage inflammatory protein-1 alpha; CSF/CNS (intrathecal); Rat; 1002; 2 weeks; Controls received mp w/ control antibody; animal info (female, Sprague Dawley, adult); functionality of mp verified by decreased activity of targets; used silicone tubing 0.3 mm ID for catheter; catheter was fixed to surrounding muscle with 8-0 sutures; pumps removed after 2 weeks;.

Q4611: Q. Liu*, et al.* Interaction between interleukin-1 beta and angiotensin II receptor 1 in hypothalamic paraventricular nucleus contributes to progression of heart failure. J Interferon Cytokine Res 2014;34(11):870-5
ALZET Comments: Losartan; interleukin-1, beta; CSF, articifial; CSF, artificial; CSF/CNS; rats; 2004; 4 weeks; Controls: sham rats w/ no treatment; rats given artificial CSF; animal info (Male Sprague–Dawley rats, 200–250 g); functionality of mp verified by echocardiography and plasma levels; bilateral cannula used; Plastics One double cannula; cardiovascular; heart failure; brain tissue distribution; Cannula placement verified via brain coordinates; LOS aka losartan; IL-1B aka interleukin-1B; Dose: LOS 200ug/day, IL-1B 1ug/day; Resultant plasma level (pg 872-874); Brain coordinates; pg. 871 (2.0mm posterior to the bregma and 8.5mm ventral from the skull surface).

Q3976: W. Liang*, et al.* Metabolically induced liver inflammation leads to NASH and differs from LPS- or IL-1 beta-induced chronic inflammation. LABORATORY INVESTIGATION 2014;94(491-502
ALZET Comments: Endotoxin, LPS; interleukin-1B, recombinant murine; SC; Mice; 1004; 10 weeks; Controls received mp w/ PBS; animal info (male, APOE3L.CETP, 10-14 weeks old); immunology;.

Q3178: C. M. O'Neill*, et al.* Circulating Levels of IL-1B+IL-6 Cause ER Stress and Dysfunction in Islets From Prediabetic Male Mice. Endocrinology 2013;154(9):3077-3088
ALZET Comments: Interleukin-1, beta; Interleukin-6; Saline; SC; Mice; 1007D; 7 days; Controls received mp w/ vehicle or sham surgery; animal info (male, CD1 5 weeks old, C57BL6J 11 weeks old); functionality of mp verified by measurement of serum levels; no stress (see pg. 3084); immunology; diabetes, Pumps primed 18-22 h at 37C.

Q2635: G. S. Cho*, et al.* N-Methyl-D-aspartate receptor antagonists memantine and MK-801 attenuate the cerebral infarct accelerated by intracorpus callosum injection of lipopolysaccharides. Neuroscience Letters 2013;538(;):9-14
ALZET Comments: Antibody, interleukin-1 beta; CSF/CNS; Rat; 1003D; Animal info (Sprague Dawley, male, 260-270 g); ischemia.

Q2617: T. Chiba*, et al.* Interleukin-1beta Accelerates the Onset of Stroke in Stroke-Prone Spontaneously Hypertensive Rats. Mediators of Inflammation 2012;;(;):U1-U11
ALZET Comments: Interleukin-1, beta, recomb. rat; PBS; SC; Rat; 2ML4; 4 weeks; Control animals received mp w/ vehicle; animal info (SHR, SHRSP. male, 10 wks old).

Q1003: T. P. Braun*, et al.* Central nervous system inflammation induces muscle atrophy via activation of the hypothalamic-pituitary-adrenal axis. Journal of Experimental Medicine 2011;208(12):2449-2463
ALZET Comments: Interleukin-1 beta; CSF, artificial; CSF/CNS; IP; Rat; 2001; 1003D; 3 days; Controls received mp w/ vehicle; animal info (Sprague Dawley, 250-350 g); ALZET brain infusion kit 2 used.

Q0621: H. Kimura*, et al.* The Chondroprotective Agent ITZ-1 Inhibits Interleukin-1 beta-Induced Matrix Metalloproteinase-13 Production and Suppresses Nitric Oxide-Induced Chondrocyte Death. JOURNAL OF PHARMACOLOGICAL SCIENCES 2009;110(2):201-211
ALZET Comments: Interleukin-1, beta; BSA; saline, sterile; Knee (articular cavity); Rat; 1007D; 7 days; Animal info (8 wks old, male, Sprague-Dawley, CRJ:IGS).

P9451: K. Temporin*, et al.* Interleukin-1 beta promotes sensory nerve regeneration after sciatic nerve injury. Neuroscience Letters 2008;440(2):130-133
ALZET Comments: Interleukin-1, beta; CSF/CNS (sciatic nerve); Rat; 2002; 2 weeks; Controls received mp w/ PBS; animal info (female, Wistar, 180-220 g., sciatic nerve injury); behavioral testing (motor function, toe spreading test, sensory function).

P9325: H. Anisman*, et al.* Influence of continuous infusion of interleukin-1-beta on depression-related processes in mice: corticosterone, circulating cytokines, brain monoamines, and cytokine mRNA expression. Psychopharmacology 2008;199(2):231-244
ALZET Comments: Interleukin-1, beta; Saline; BSA; SC; Mice; 3, 7 days; Controls received mp w/ vehicle; animal info (male, CD-1, 6-7 wks old); behavioral testing (motor activity).

P7971: I. R. S. Sosenko*, et al.* IL-1 alpha causes lung inflammation and maturation by direct effects on preterm fetal lamb lungs. PEDIATRIC RESEARCH 2006;60(3):294-298
ALZET Comments: Interleukin-1, alpha, recomb. ovine; Intratracheal; Sheep (fetus); 2001D; Controls received mp w/ saline; animal info (merino, ewes + fetuses); silicone tubing used to collect lung fluid; vinyl tubing for intratracheal infusion; tissue perfusion (trachea).

P7145: B. F. Mitchell*, et al.* Intraperitoneal infusion of proinflammatory cytokines does not cause activation of the rat uterus during late gestation. AMERICAN JOURNAL OF PHYSIOLOGY-ENDOCRINOLOGY AND METABOLISM 2005;289(4):E658-E664
ALZET Comments: Interleukin-1 beta; tumor necrosis factor-alpha; Saline; IP; Rat (pregnant); 2001D; Controls received mp w/ vehicle; functionality of mp verified by residual volume.

P7096: Y. G. Park*, et al.* Effects of TGF-beta, TNF-alpha-, IL-beta and IL-6 alone or in combination, and tyrosine kinase inhibitor on cyclooxygenase expression, prostaglandin E_2 production and bone resorption in mouse calvarial bone cells. INTERNATIONAL JOURNAL OF BIOCHEMISTRY & CELL BIOLOGY 2004;36(11):2270-2280
ALZET Comments: Interleukin-1, beta; PBS; SC; Mice; 1003D; 72 hours; Controls received mp w/ vehicle.

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
ALZET Comments: Interleukin-1, beta recomb. rat; Interferon-gamma, recomb. rat; Saline, physiological; albumin, human serum; CSF/CNS (intratumoral); Rat; 1003D; 48 hours; Controls received mp w/ vehicle; tissue perfusion (tumor); cancer (glioma).

P5803: H. Korekane*, et al.* Mechanisms mediating metabolic abnormalities in the livers of Ehrlich ascites tumor-bearing mice. Archives of Biochemistry and Biophysics 2003;412(2):216-222
ALZET Comments: Ornithine decarboxylase-inducing factor; Interleukin-1, alpha; tumor necrosis factor-µ; Interleukin-6; SC; IP; Mice; 1007D; 6 days; Controls received mp w/ PBS vehicle; cancer; IL-1µ (human recomb) & ornithine decarboxylase-inducing factor (ODC factor) were infused via IP route; IL-6 was infused (SC).

P6205: H. L. Guo*, et al.* Manganese superoxide dismutase-plasmid/liposome (MnSOD-PL) intratracheal gene therapy reduction of irradiation-induced inflammatory cytokines does not protect orthotopic Lewis Lung Carcinomas. In Vivo 2003;17(1):13-21
ALZET Comments: Tumor necrosis factor-alpha; transforming growth factor-beta; interleukin-1; Saline, normal; SC; Mice; 1007D; 7 days; Controls received mp w/ vehicle; no stress (see pg. 17); cancer (lung).

P5878: B. Schoning*, et al.* Differences in immune cell invasion into the cerebrospinal fluid and brain parenchyma during cerebral infusion of interleukin-1 beta. NEUROLOGICAL SCIENCES 2002;23(5):211-218
ALZET Comments: Interleukin-1, beta; Interleukin-6; Tumor necrosis factor-a; Albumin, human serum; CSF/CNS (hypothalamus, lateral ventricle); Rat; 1003D; 4,8,24,48 hours; Controls received mp w/ vehicle; functionality of mp verified by CSF cell infiltration; dose-response (p. 213); ALZET brain infusion kit used; IL-1ß was rat recomb; cannula position verified histologically; cytokine levels in CSF were assayed.

R0193: H. Anisman*, et al.* Cytokines as a stressor: implications for depressive illness. INTERNATIONAL JOURNAL OF NEUROPSYCHOPHARMACOLOGY 2002;5(4):357-373
ALZET Comments: Interleukin-1, beta; Rat; 1 week; Peptides; p. 360.

6. Interleukin-2

Q4522: P. T. Mantani*, et al.* IL-25 Inhibits Atherosclerosis Development in Apolipoprotein E Deficient Mice. PLoS One 2015;10(U1274-U1291
ALZET Comments: Interleukin-25, recombinant mouse; SC; Mice; 1004; 4 weeks; Controls received mp w/ control medium; animal info (Apoe -/-, 9-10 or 21 weeks old); cardiovascular; brain tissue distribution; pumps removed after 4 weeks in young mice;.

Q4140: A. Y. Tilahun*, et al.* Systemic Inflammatory Response Elicited by Superantigen Destabilizes T Regulatory Cells, Rendering Them Ineffective during Toxic Shock Syndrome. Journal of Immunology 2014;193(2919-2930
ALZET Comments: Interleukin-2, murine; antibody, anti-interleukin-2; PBS; SC; Mice (transgenic); 10 days; Controls received mp w/ vehicle; animal info (HLA-DR3); comparison of injection vs mp; immunology;.

Q5597: K. R. Mott*, et al.* Role of interleukin-2 and herpes simplex virus 1 in central nervous system demyelination in mice. J Virol 2013;87(22):12102-9
ALZET Comments: Interleukin-2; PBS; CSF/CNS; SC; Mice; 2 weeks; Controls received mp w/ Interleukin 2 without HSV-1 infection; animal info (6 weeks) ; ALZET brain infusion kit 1 used; neurodegenerative (demyelination); Therapeutic indication (CNS demyelination; Herpes simplex virus 1; HSV); Dose (1 ug/24 h);.

Q2613: S. C. Katz*, et al.* Anti-KIT designer T cells for the treatment of gastrointestinal stromal tumor. Journal of Translational Medicine 2013;11(;):U1-U10
ALZET Comments: Interleukin-2, human; SC; Mice (nude); Animal info (6 wks old, male, Nu/J); 7-day pumps used.

Q1289: J. Quiel*, et al.* Antigen-stimulated CD4 T-cell expansion is inversely and log-linearly related to precursor number. PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA 2011;108(8):3312-3317
ALZET Comments: Interleukin-2; interleukin-7; interleukin-15; SC; Mice; 2001; 7 days; Controls received mp w/ PBS; animal info (6-12 wks old, gender, age matched); immunology.

Q1189: A. S. Y. Lo*, et al.* Anti-GD3 Chimeric sFv-CD28/T-Cell Receptor zeta Designer T Cells for Treatment of Metastatic Melanoma and Other Neuroectodermal Tumors. Clinical Cancer Research 2010;16(10):2769-2780
ALZET Comments: Interleukin-2, recomb.; PBS; albumin, human; SC; Mice (nude); 7 days; Controls received mp w/ vehicle; animal info (8 wks old, female, Balb/C, nu/nu); cancer (melanoma); "These pumps are easily loaded and then placed s.c., minimizing discomfort and handling of the mice as needed for repeated IL2 administration by injection." pg 2777.

P9309: E. L. Lane*, et al.* Neuroinflammation in the generation of post-transplantation dyskinesia in Parkinson's disease. NEUROBIOLOGY OF DISEASE 2008;32(2):220-228
ALZET Comments: Interleukin-2; Saline; CSF/CNS (striatum); Rat; 2002; 12 days; Controls received mp w/ vehicle; animal info (female, Sprague Dawley); neurodegenerative (Parkinson's Disease); behavioral testing (rotational behavior and locomotor; axial, limb, and orolingual movements).

P8528: Z. C. Neal*, et al.* Flt3-L gene therapy enhances immunocytokine-mediated antitumor effects and induces long-term memory. CANCER IMMUNOLOGY IMMUNOTHERAPY 2007;56(11):1765-1774
ALZET Comments: Interleukin-2, recomb. human; SC; Mice; 2001; 4 days; Controls received mp w/ no treatment; cancer (neuroblastoma); peptides; animal info (female, A/J, ICR, 6-8 weeks old); gene therapy.

P7460: S. Roychowdhury*, et al.* IL-15 but not IL-2 rapidly induces lethal xenogeneic graft-versus-host disease. Blood 2005;106(7):2433-2435
ALZET Comments: Interleukin-15, recomb. human; interleukin-2, recomb. human; PBS; albumin, human; SC; Mice (SCID); 1007D; 10 days; Controls received mp w/ vehicle; immunology; animal info (female, CB17, hu-PBL-SCID, 8-12 weeks old).

P6765: Z. C. Neal*, et al.* Enhanced activity of Hu14.18-IL2 immunocytokine against murine NXS2 neuroblastoma when combined with interleukin 2 therapy. Clinical Cancer Research 2004;10(14):4839-4847
ALZET Comments: Interleukin-2, recomb. human; SC; Mice; 2001; 7 days; Controls received mp w/ PBS; no stress (see pg.4841); cancer (neuroblastoma); peptides.

P6450: W. C. Jean*, et al.* Effects of combined granulocyte-macrophage colony-stimulating factor (GM-CSF), interleukin-2, and interleukin-12 based immunotherapy against intracranial glioma in the rat. Journal of Neuro-oncology 2004;66(1-2):39-49
ALZET Comments: Colony-stimulating factor, GM; interleukin-2; interleukin-12; SC; Rat; 2004; 4 weeks; Cancer (gliosarcoma); GM-CSF was infused alone or with cytokines.

R0190: H. Anisman*, et al.* Further evidence for the depressive effects of cytokines: Anhedonia and neurochemical changes. BRAIN BEHAVIOR AND IMMUNITY 2002;16(5):544-556
ALZET Comments: Interleukin-2; Mice; 7 days; Controls received mp w/ saline; peptides; examined anhedonic effects of IL-2.

P4872: J. A. Margenthaler*, et al.* Immunogenicity of Ld+ transgenic mouse hearts. Surgery 2001;130(217-224
ALZET Comments: Interleukin-2; mice; 1007D; 7 days; controls received no IL-2 treatment; immunology; peptides.

P4815: S. Hautmann*, et al.* Treatment of metastatic hormone-refractory prostate adenocarcinoma (MatLyLu) in Copenhagen rats with micro-osmotic interleukin-2 pumps. Anticancer Research 2000;20(4495-4498
ALZET Comments: Interleukin-2;; Albumin, human;; SC; Peritumoral (orthotopic); Rat;; 2002;; Controls received mp w/ vehicle; functionality of mp verified by in vitro assay; no stress (see p. 4496); good methods pumps weighed p. 4496; cancer (prostate); immunology; peptides; rats had a prostatic adenocarcinoma tumor implanted; Albumin vehicle was 20% concentration; SC & peritumoral orthotopic implantation; Note: these pumps were left in for 28 days;.

P4630: M. Ueno. Lymphokine-activated killer cells induced in vivo in mice showing IL-2 toxicity have cytoplasmic granules containing perforin and its hemolytic activity. Immunopharmacology 1998;39(75-82
ALZET Comments: Interleukin-2;; SC;; mice;; 2001;; 8 days;; immunology; peptides; recomb. human IL-2 was used.

P4557: V. Schirrmacher*, et al.* Antagonistic effects of systemic interleukin 2 on immune Tcell-mediated graft-*versus*-leukemia reactivity. Clinical Cancer Research 1998;4(2635-2645
ALZET Comments: Interleukin-2, recomb. human;; PEG;; mice;; 2002;; 12 days;; controls received mp w/vehicle; comparison of IP injections of PEG-IL-2 vs. IL-2 infusion via mp; cancer; immunology; peptides;.

P4089: S. Johansson*, et al.* The response of Dunning R3327 prostatic adenocarcinoma to IL-2, histamine and radiation. Br. J. Cancer 1998;77(8):1213-1219
ALZET Comments: Interleukin-2; SC; Rat; 2002; 6 weeks; pumps replaced every 2 weeks; cancer; immunology; peptides.

P4112: S. Hautmann*, et al.* Treatment of metastatic hormone refractory adenocarcinoma of the prostate (mat ly ly) with micro-osmotic interleukin-2 pump in male copenhagen rats. Eur. Urol 1998;34(265-266
ALZET Comments: Interleukin-2; Albumin; intratumoral; Rat; no duration posted; controls received mp w/albumin; tissue perfusion (intratumoral); cancer (prostate); immunology; peptides.

P3731: F. Galbiati*, et al.* Regulation of the IL-12 receptor B2 subunit by soluble antigen and IL-12 in vivo. Eur. J. Immunol 1998;28(209-220
ALZET Comments: Interleukin-12; Interleukin-2; Lysozyme, hen egg white; Ovalbumin; Interferon-gamma; PBS; Albumin, mouse serum; SC; mice; 2001; 9 days; 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.

P6325: M. Isobe*, et al.* Regulation by Differential Development of Th1 and Th2 Cells in Peripheral Tolerance to Cardiac Allograft Induced by Blocking ICAM-1/LFA-1 Adhesion. Circulation 1997;96(2247-2253
ALZET Comments: Interleukin-2, recomb.; Culture medium, RPMI 1640; fetal calf serum; Mice; 1007D; 7 days; Cardiovascular.

P4466: T. A. Fehniger*, et al.* Stem cell factor enhances interleukin-2-mediated expansion of murine natural killer cells in vivo. Blood 1997;90(9):3647-3653
ALZET Comments: Interleukin-2; PBS; Serum, syngenic mouse; SC; Mice; 8 weeks; Controls received mp w/vehicle; functionality of mp verified by plasma levels; long-term study, pump replaced every 10 days; immunology; peptides.

P3594: K. Kuroda*, et al.* Implantation of IL-2-containing osmotic pump prolongs the survival of superantigen-reactive T cells expanded in mice injected with bacterial superantigen. J. Immunol 1996;157(1422-1431
ALZET Comments: Interleukin-2; SC; mice; 2001; no duration posted; immunology; peptides; penicillin g given prophylactically; recomb. human IL-2 used.

P4572: R. P. Junghans*, et al.* Metabolism of Tac (IL2Ra): Physiology of cell surface shedding and renal catabolism, and suppression of catabolism by antibody binding. J. Exp. Med 1996;183(1587-1602
ALZET Comments: Interleukin-2 receptor-alpha;; ^{131}I tracer;; SC;; mice;; 7 days;; functionality of mp verified by plasma levels; comparison of IP injections vs. mp; IL-2 receptor-alpha also called CD25 or Tac; pumps were used to infuse radiolabeled receptor;.

P4095: U.-K. Hanisch*, et al.* Neurotoxicity induced by interleukin-2: involvement of infiltrating immune cells. Synapse 1996;24(104-114
ALZET Comments: Interleukin-2; CSF/CNS; Rat; 1007D; 2002; 7,14 days; controls received mp w/heat-inactivated IL-2 or IL-3; functionality of mp verified by emptied drug reservoir; good methods (pp. 105-106); ALZET brain infusion kit used; no stress - "icv delivery of solutions at a rate of 0.5 ul/h was shown previously not to cause any tissue damage due to volume overload." (p. 106); recomb. human IL-2 used.

P2849: T. Patselas*, et al.* Role of natural killer and killer cells in concordant xenograft rejection. Transplant. Proc 1995;27(1):262-263
ALZET Comments: Interleukin-2; mice; 3 days; no comment posted.

P2942: G. B. Schneider*, et al.* Effects of interleukin-2 on bone resorption and natural immunity in osteopetrotic (ia) rats. Lymphokine Cytokine Res 1994;13(6):335-341
ALZET Comments: Interleukin-2; Rat; 2002; 14 days; controls received mp with vehicle; immunology; peptides; normal and incisors absent osteopetrotic rats used; recomb. human IL-2 used.

P2510: H. Ishizu*, et al.* Immune-mediated regression of 'metastatic' neuroblastoma in the liver. J. Pediatr. Surg 1994;29(2):155-160
ALZET Comments: Interleukin-2; Saline; Serum; intrasplenic; mice; 14 days; tissue perfusion (spleen); dose-response (graph, p.156); cancer; immunology; peptides.

P2749: U.-K. Hanisch*, et al.* Hypothalamic-pituitary-adrenal activity during chronic central administration of interleukin-2. Endocrinology 1994;135(6):2465-2472
ALZET Comments: Interleukin-2; Interleukin-2, inactivated; PBS; Albumin, bovine serum; CSF/CNS; Rat; 2002; 14 days; controls received mp w/ inactivated IL-2 or only cannula implantation; functionality of mp verified by opening pump body after infusion; no stress (see pg. 2466); stability verified for up to 7 days at 37C in cat CSF w/o any decrease in biological activity; peptides; ALZET brain infusion kit used; minimal tissue damage confined to cannula tract; recomb. human IL-2 used.

P2292: P. H. Basse*, et al.* Accumulation of adoptively transferred A-NK cells in murine metastases: kinetics and role of interleukin-2. In Vivo 1994;8(17-24
ALZET Comments: Interleukin-2-PEG; Interleukin-2; IP; mice; no duration posted; cancer; half-life prolonged by complexing IL-2 to polyethylene glycol.

7. Interleukin-3

Q5345: M. Feld*, et al.* The pruritus- and TH2-associated cytokine IL-31 promotes growth of sensory nerves. J Allergy Clin Immunol 2016;138(2):500-508 e24
ALZET Comments: Interleukin-31, recombinant mouse; SC; Mice; 14 days; animal info (6 – 8 week old, C57BL/6 and Trpv1 knockout mice); functionality of mp verified by observation of skin phenotype; dose-response (pg. 508.e5); Dose (20 mg/day);.

Q2996: K. N. Rao*, et al.* Ikaros limits basophil development by suppressing C/EBP-alpha expression. Blood 2013;122(15):2572-2581
ALZET Comments: Interleukin-3; SC; Mice; Animal info (C57BL/6:SV129 IK-/-).

P9822: T. Yoshimoto*, et al.* Basophils contribute to T_H2-IgE responses in vivo via IL-4 production and presentation of peptide-MHC class II complexes to $CD4^+$ T cells. NATURE IMMUNOLOGY 2009;10(7):706-U54
ALZET Comments: Interleukin-3; PBS; SC; Mice; Animal info (DO11.10, IL-4 deficient).

Q0809: S. Kim*, et al.* Basophils Can Directly Present or Cross-Present Antigen to CD8 Lymphocytes and Alter CD8 T Cell Differentiation into IL-10-Producing Phenotypes. Journal of Immunology 2009;183(5):3033-3039
ALZET Comments: Interleukin-3; Mice (transgenic); 7 days; Animal info (C57BL/6, OT-I TCR-transgenic, IL-4KO B6); immunology.

P9722: T. Shen*, et al.* T cell-derived IL-3 plays key role in parasite infection-induced basophil production but is dispensable for in vivo basophil survival. International Immunology 2008;20(9):1201-1209
ALZET Comments: Interleukin-3; Mice; Animal info (BALB/c, IL-3 deficient).

P8557: K. Oh*, et al.* Induction of Th2 type immunity in a mouse system reveals a novel immunoregulatory role of basophils. Blood 2007;109(7):2921-2927
ALZET Comments: Interleukin-3; SC; Mice; mice (transgenic); 7 days; Controls received mp w/ PBS or no treatment; immunology; peptides; animal info (C57BL/6, BIO.A Rag -/-); "Sought an alternative strategy to generate basophils in vivo by administering IL-3 into mice via a miniosmotic pump." (p. 2923).

P7009: S. R. Dillon*, et al.* Interleukin 31, a cytokine produced by activated T cells, induces dermatitis in mice. NATURE IMMUNOLOGY 2004;5(7):752-760
ALZET Comments: Interleukin-31, mouse; PBS; BSA; SC; Mice; 7-14 days; Controls received mp w/ vehicle; immunology.

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(447-451
ALZET Comments: Interferon-gamma; Interleukin-3; Albumin, mouse serum; PBS; SC; mice; 1007D; 7 days; controls received mp w/ vehicle; stability verified after 7 day storage; immunology; peptides; cytokines given singly and together.

P2523: T. Berney*, et al.* Murine autoimmune hemolytic anemia resulting from Fc-gamma receptor-mediated erythrophagocytosis: protection by erythropoietin but not by interleukin-3, and aggravation by granulocyte-macrophage colony-stimulating factor. Blood 1992;79(11):2960-2964
ALZET Comments: Erythropoietin; Interleukin-3; Colony-stimulating factor, GM; PBS; Glycerol; SC; mice; 2002; 14 days; immunology; peptides.

P2970: T. Shibata*, et al.* Interleukin 3 perfusion prevents death due to acute anemia induced by monoclonal antierythrocyte autoantibody. J. Exp. Med 1990;171(1809-1814
ALZET Comments: Interleukin-3; Colony-stimulating factor, GM; Erythropoietin; PBS; Glycerol; LPS, e. coli; SC; mice; 2002; no duration posted; controls received mp with vehicles +/- LPS; immunology; peptides; recomb. mouse GM-CSF & IL-3 used; recomb. human EPO used.

P1603: M. Kamegai*, et al.* Interleukin 3 as a trophic factor for central cholinergic neurons in vitro and in vivo. Neuron 1990;2(429-436
ALZET Comments: Interleukin-3; Nerve growth factor; Albumin, bovine serum; PBS; CSF/CNS; 2002; 14 days; two doses of hIL-3 infused; B-NGF used; human IL-3 used.

R0089: A. Amkraut*, et al.* Osmotic delivery of peptides and macromolecules. Adv. Drug Delivery Review 1990;4(255-276
ALZET Comments: Atrial natriuretic factor; cholecystokinin; Granulocyte-colony stimulating factor.; glucagon; insulin; interleukin-2; interleukin-3; melatonin; nerve growth factor; neurotensin; prolactin; theophylline; CSF/CNS; IA (femoral); intrasplenic; IP; SC; no duration posted; peptides; ALZA-authored, review of peptide delivery issues and applications; tissue perfusion (spleen).

P1263: M. Kimoto*, et al.* Recombinant murine IL-3 fails to stimulate T or B lymphopoiesis in vivo, but enhances immune responses to T cell-dependent antigens. J. Immunol 1988;140(6):1889-1894
ALZET Comments: Interleukin-3, recomb. mouse; Penicillin; Streptomycin; Glycerol; PBS; IP; SC; mice; 2001; 2002; 7 days, 2 weeks; controls received mp w/vehicle; 2002 mp infused IL-3 ip for 2 weeks, additional mps implanted sc; peptides; antibiotics; IL-3 infused simultaneously with penicillin and streptomycin.

P7959: S. Kamel-Reid*, et al.* Engraftment of Immune-Defficient Mice with Human Hematopoietic Stem Cells. Science 1988;242(4886):1706-1709
ALZET Comments: Interleukin-3, human; colony-stimulating factor, GM, human; SC; Mice; mice (SCID); 4-5 weeks; 15 days; Controls received mp w/ saline; peptides; immunology.

P1144: T. Kalland. Physiology of Natural Killer Cells. J. Immunol 1987;139(11):3671-3675
ALZET Comments: Interleukin-2; Interleukin-3; SC; mice; 2001; 8, 16 days; controls received mp w/ unspecified vehicle or sham op; 2 experiments using mp, IL-2 infused for 8 days, IL-3 infused for 16 days; comparison of agents effects; pump replaced after eight days; peptides.

P0804: V. Kindler*, et al.* Stimulation of hematopoiesis in vivo by recombinant bacterial murine interleukin 3. Proc. Natl. Acad. Sci 1986;83(1001-1005
ALZET Comments: Endotoxin, E. coli; Interleukin-3, recomb. mouse; Penicillin; Streptomycin; Glycerol; PBS; SC; mice; 3 and 7 days; infusion supplemented w/ip injections; interleukin activity in blood varible - aggregation in pump? (see p. 1004); mp infusion in normal and irradiated mice; half-life; peptides; antibiotic.

8. Interleukin-4

Q6977: Cottrell JN*, et al.* Interleukin-4 supplementation improves the pathophysiology of 4 hypertension in response to placental ischemia in RUPP rats. Am J Physiol Regul Integr Comp Physiol. 2019;316(2):R165-R171
ALZET Comments: Interleukin-4; IP; Rat (pregnant); 19 days; Dose (600 ng/day); animal info (pregnant Sprague-Dawley rats; pumps implanted on gestational day 14); ischemia (placental);.

Q5193: T. Sato*, et al.* The effect of local IL-4 delivery or CCL2 blockade on implant fixation and bone structural properties in a mouse model of wear particle induced osteolysis. J Biomed Mater Res A 2016;104(9):2255-62
ALZET Comments: Ultra-high molecular weight polyethylene particles; interleukin-4, mouse recombinant; BSA; PBS; Bone (femur); Mice; 2006; 4 weeks; Controls received mp w/ vehicle; animal info (male, BALB/cByJ, 10-12 weeks old); 1% BSA used; post op. care (buprenorphine injection SC); used vinyl tubing to connect pumps to titanium rods;.

Q5411: X. Liu*, et al.* Interleukin-4 Is Essential for Microglia/Macrophage M2 Polarization and Long-Term Recovery After Cerebral Ischemia. Stroke 2016;47(2):498-504
ALZET Comments: Interleukin-4; Saline; CSF/CNS (ventricle); Mice (knockout); 2001; 7 days; Controls received mp w/ vehicle; animal info (C57/BL6 mice; 8-10 weeks, 25-30 g); ischemia (cerebral; stroke model); behavioral testing (Rotarod, corner, foot fault, and Morris water maze tests); healing, recovery; learning, memory; Therapeutic indication (Cerebral ischemia); Dose (60 ng/day); Brain coordinates: −0.20 mm anterior and 1.00 mm lateral to bregma;.

Q4037: J. Pajarinen*, et al.* Modulation of mouse macrophage polarization in vitro using IL-4 delivery by osmotic pumps. JOURNAL OF BIOMEDICAL MATERIALS RESEARCH PART A 2015;103(1339-1345
ALZET Comments: Interleukin-4, mouse recombinant; BSA; PBS; In vitro (cell culture); Cell culture; 2006; 4 weeks; 1% BSA used; immunology; "Osmotic pumps delivered IL-4 at a rate that closely followed the expected delivery rate." pg 1343; used vinyl tubing; pumps lead into mouse bone marrow macrophage augmented media; incubated at 37C.

Q4370: J. D. Cherry*, et al.* Arginase 1+ microglia reduce Abeta plaque deposition during IL-1beta-dependent neuroinflammation. Journal of Neuroinflammation 2015;12(U14-U26
ALZET Comments: Antibody, interleukin-4Ra; CSF/CNS (hippocampus); Mice; 1004; 28 days; Controls received mp w/ control antibody; animal info (APPswe/SP1dE9, 7-5 months old); ALZET brain infusion kit 3 used; neurodegenerative (Alzheimer's disease); immunology; pumps primed 48 hours in 37C saline;.

Q0583: J. D. Milner*, et al.* Sustained IL-4 exposure leads to a novel pathway for hemophagocytosis, inflammation, and tissue macrophage accumulation. Blood 2010;116(14):2476-2483
ALZET Comments: Interleukin-4, recomb. mouse; interleukin-13 recomb. mouse; SC; Mice; 3 days; Controls received mp w/ PBS; animal info (C57BL6, b6 Rag2 -/-, b6 Stat6 -/-); 100 ul sized pump used; immunology.

P9263: L. Wang*, et al.* Blimp-1 induced by IL-4 plays a critical role in suppressing IL-2 production in activated CD4 T cells. Journal of Immunology 2008;181(8):5249-5256
ALZET Comments: Interleukin-4; ovalbumin; SC; Mice; 7 days; Immunology, animal info (CD45.1, C57BL/6).

P8350: A. Mizoguchi*, et al.* Dependence of intestinal granuloma formation on unique myeloid DC-like cells. Journal of Clinical Investigation 2007;117(3):605-615
ALZET Comments: Interleukin-4; IP; Mice; 3 weeks; Controls received mp w/ PBS; IL-4 knockout; animal info (C57BL/6, 9 weeks old).

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
ALZET Comments: Interleukin-4; interferon-gamma; PBS; IP; Mice; 1007D; 7 days; Controls received mp w/ vehicle; comparison of IP injections vs. IP mp.

P5093: S. K. Basak*, et al.* Increased dendritic cell number and function following continuous in vivo infusion of granulocyte macrophage-colony-stimulating factor and interleukin-4. Blood 2002;99(8):2869-2879
ALZET Comments: Interleukin-4; Colony-stimulating factor, GM; Saline; SC; mice; 1007D; 7 days; controls received mp w/ vehicle; functionality of mp verified by serum levels via ELISA; immunology; peptides; recombinant cytokines; agents administered singly or concomitantly.

P4362: T. T. Lee*, et al.* Neuroprotective effects of basic fibroblast growth factor following spinal cord contusion injury in the rat. Journal of Neurotrauma 1999;16(5):347-356
ALZET Comments: Interleukin-1; Interleukin-4; Interleukin-6; Fibroblast growth factor, basic; Nerve growth factor; Ciliary neurotrophic factor;; Water; PBS; BSA; CHAPS;; CSF/CNS (intrathecal);; Rat;; 2001;; 7 days;; controls received mp with vehicle; tissue perfusion (injury site); good methods; peptides; 1:10 dilutional effect of CSF confirmed by dye study; PE10/50 tubing used with pump and 30 gauge needle to deliver drugs through small dural plial opening;.

P4119: A. Mathur*, et al.* Effect of IL-7 or IL-4 on reconstitution of donor lymphoid cells in congenic murine bone marrow transplantation. Bone Marrow Transplantation 1995;16(119-124
ALZET Comments: Interleukin-7; Interleukin-4; PBS; IP; mice; 14 days; controls received mp w/vehicle; immunology; peptides; recomb. mouse IL-4 and IL-7 used.

P4096: A. E. Levy*, et al.* Administration of intragraft interleukin-4 prolongs cardiac allograft survival in rats treated with donor-specific transfusion/cyclosporine. Transplantation 1995;60(5):405-406
ALZET Comments: Interleukin-4; Interleukin-10; IA (brachiocephalic); Rat; 14 days; immunology; peptides; pump infused the brachiocephalic artery of a harvested heart, which was then implanted into a recipient; recomb. mouse IL-4 & IL-10 used.

P2803: J. M. Carballido*, et al.* IL-4 induces human B cell maturation and IgE synthesis in SCID-hu mice. J. Immunol 1995;155(4162-4170
ALZET Comments: Interleukin-4; PBS; SC; mice (SCID); 2002; no duration posted; long-term study, pumps replaced; immunology; human IL-4 used.

9. Interleukin-5

Q3803: L. M. Amaral*, et al.* Progesterone supplementation attenuates hypertension and the autoantibody to the angiotensin II type I receptor in response to elevated interleukin-6 during pregnancy. American Journal of Obstetrics and Gynecology 2014;211(U377-U382
ALZET Comments: Interleukin-5, recombinant rat; Rat (pregnant); 2002; 5 days; Controls received mp w/ vehicle; animal info (pregnant, 14-19 days gestation); cardiovascular; bp measured using catheter; preeclampsia;.

P5279: A. Mishra*, et al.* IL-5 promotes eosinophil trafficking to the esophagus. J Immunol 2002;168(5):2464-2469
ALZET Comments: Interleukin-5; PBS; BSA; IP; Mice (transgenic); 2001; 8 days; Controls received mp w/ vehicle; Immunology; peptides; human IL-5 used.

10. Interleukin-6

Q7205: L. Madaro*, et al.* Denervation-activated STAT3-IL-6 signalling in fibro-adipogenic progenitors promotes myofibres atrophy and fibrosis. Nat Cell Biol 2018;20(8):917-927
ALZET Comments: Interleukin-6; SC; Mice; 15 days; Dose (1.0 mg/ml); Dose (1.0 mg/ml); Interleukin-6 aka IL-6; spinal cord injury;.

Q5906: C. von Loeffelholz*, et al.* The human longevity gene homolog INDY and interleukin-6 interact in hepatic lipid metabolism. Hepatology 2017;66(2):616-630
ALZET Comments: Interleukin-6, human; NaCl; BSA; Mice; 14 days; animal info (male, mINDY KO); 0.1% BSA used; immunology;.

Q6604: D. Z. Milikovsky*, et al.* Electrocorticographic Dynamics as a Novel Biomarker in Five Models of Epileptogenesis. J Neurosci 2017;37(17):4450-4461
ALZET Comments: Transforming growth factor-β1; SJN2511; Interleukin-6; Bovine serum albumin; CSF; artificial; dextran; CSF/CNS; Mice; 7 days; Dose (0.4mM BSA, 100 ng/ml (TGF)- β1, 300µM SJN2511); Controls received mp w/ vehicle; animal info (2- to 3-month-old FVB/N and C57BL/6 mice); SJN2511 is a selective blocker of the TGF-B type I receptor/ALK5; Brain coordinates (0.5 mm posterior, 1 mm lateral to bregma);.

Q6218: A. K. Linnemann*, et al.* Interleukin 6 protects pancreatic beta cells from apoptosis by stimulation of autophagy. FASEB J 2017;31(9):4140-4152
ALZET Comments: Interleukin-6, recomb. mouse; Saline; SC; Mice; 1007D; 1 week; Dose (16 mg/ml); Controls received mp w/ vehicle; animal info (12- to 15-wk-old male C57BL/6J mice);.

Q5090: S. Wang*, et al.* MicroRNA 152 regulates hepatic glycogenesis by targeting PTEN. FEBS J 2016;283(10):1935-46
ALZET Comments: Interleukin-6; Mice; 7 days; animal info (male, C57Bl6J, 12 weeks old); diabetes;.

Q6636: C. S. Nunemaker. Considerations for Defining Cytokine Dose, Duration, and Milieu That Are Appropriate for Modeling Chronic Low-Grade Inflammation in Type 2 Diabetes. J Diabetes Res 2016;2016(2846570
ALZET Comments: Interleukin-1beta; Interleukin-6; Saline; SC; Mice; 1007D; 7 days; Dose (32.

Q4828: N. Gomez-Lopez*, et al.* Interleukin-6 controls uterine Th9 cells and CD8+ T regulatory cells to accelerate parturition in mice. immunology and Cell Biology 2016;94(79-89
ALZET Comments: Interleukin-6, recomb. human; PBS; BSA; SC; Mice (pregnant); 1007D; 7 days; Controls received mp w/ vehicle; animal info (female, pregnant, Il6 +/+ or Il6 -/-, 11.5 dpc, 8-12 weeks old); 0.1% BSA used; immunology; Dose (5 ng/h);.

Q3865: L. Dou*, et al.* MiR-301a Mediates the Effect of IL-6 on the AKT/GSK Pathway and Hepatic Glycogenesis by Regulating PTEN Expression. CELLULAR PHYSIOLOGY AND BIOCHEMISTRY 2015;35(1413-1424
ALZET Comments: Interleukin-6; NaCl; BSA; SC; Mice; 2001; 7 days; Animal info (male, C57BL6J, 12 weeks old); 0.1% BSA used; immunology; diabetes;.

Q4408: L. Dou*, et al.* MiR-19a regulates PTEN expression to mediate glycogen synthesis in hepatocytes. SCIENTIFIC REPORTS 2015;5(U1-U11
ALZET Comments: Interleukin-6; NaCl; BSA; SC; Mice; 2001; 7 days; Animal info (male, C57BL6J, 12 weeks old); 0.1% BSA used; immunology;.

Q4198: S. L. Yan*, et al.* Platelet Activation and Platelet-leukocyte Aggregation Elicited in Experimental Colitis Are Mediated by Interleukin-6. INFLAMMATORY BOWEL DISEASES 2014;20(353-362
ALZET Comments: Interleukin-6, murine recombinant; SC; Mice; 1007D; 7 days; Controls received mp w/ saline; animal info (male, IL-6 -/- or C57BL6J, 8-12 weeks old); functionality of mp verified by plasma levels; cardiovascular; immunology;.

Q3178: C. M. O'Neill*, et al.* Circulating Levels of IL-1B+IL-6 Cause ER Stress and Dysfunction in Islets From Prediabetic Male Mice. Endocrinology 2013;154(9):3077-3088
ALZET Comments: Interleukin-1, beta; Interleukin-6; Saline; SC; Mice; 1007D; 7 days; Controls received mp w/ vehicle or sham surgery; animal info (male, CD1 5 weeks old, C57BL6J 11 weeks old); functionality of mp verified by measurement of serum levels; no stress (see pg. 3084); immunology; diabetes, Pumps primed 18-22 h at 37C.

Q3210: L. Dou*, et al.* miR-200s Contribute to Interleukin-6 (IL-6)-induced Insulin Resistance in Hepatocytes. Journal of Biological Chemistry 2013;288(31):22596-22606
ALZET Comments: Interleukin-6; NaCl; BSA; SC; Mice; 2001; 7 days; Animal info (C57BL/6J).

Q2303: A. Bonetto*, et al.* JAK/STAT3 pathway inhibition blocks skeletal muscle wasting downstream of IL-6 and in experimental cancer cachexia. AMERICAN JOURNAL OF PHYSIOLOGY-ENDOCRINOLOGY AND METABOLISM 2012;303(3):E410-E421
ALZET Comments: Interleukin-6, recomb. murine; endotoxin, LPS; SC; Mice; 7 days; Animal info (C57BL/6J, male, IL-6 null); functionality of mp verified via blood IL-6 levels.

Q0597: X. L. Zhou*, et al.* Reversal of Cancer Cachexia and Muscle Wasting by ActRIIB Antagonism Leads to Prolonged Survival. Cell 2010;142(4):531-543
ALZET Comments: Interleukin-6, recomb.; Mice; 1, 3, 5 days; Controls received mp w/ saline; animal info (10 wks old, male, CDF1); pump infused at a rate of 1 ul/hr.

Q0175: G. C. Melendez*, et al.* Interleukin 6 Mediates Myocardial Fibrosis, Concentric Hypertrophy, and Diastolic Dysfunction in Rats. Hypertension 2010;56(2):225-231
ALZET Comments: Interleukin-6; Albumin, rat; IP; Rat; 2001; 7 days; Controls received mp w/ vehicle; cardiovascular; no stress (pg 227); animal info (male, Sprague-Dawley, 250-300 g); post op. care (buprenorphine HCl).

Q0616: X. L. Jin*, et al.* Interleukin-6 is an important in vivo inhibitor of intestinal epithelial cell death in mice. Gut 2010;59(2):186-196
ALZET Comments: Interleukin-6, recomb. murine; SC; IP; Mice; 7 days; Animal info (6-8 wks old, male, C57BL/6J).

P9453: A. A. Thomay*, et al.* Disruption of Interleukin-1 Signaling Improves the Quality of Wound Healing. American Journal of Pathology 2009;174(6):2129-2136
ALZET Comments: Interleukin-1 receptor antagonist, recomb. human; interleukin-6 recomb. mouse; Sodium citrate; sodium chloride; EDTA; Tween 80; PBS; SC; wound site; Mice; 1003D; 2002; 3, 14 days; Controls received mp w/ vehicle; animal info (male, B6D2F1, 8-12 wks, 27-30 g., IL-1R KO); mp was fitted with a polypropylene mesh collar containing a PVA sponge; agent also known as Anakinra; deep tissue wounds; 0.1% Tween 80 used; 0.5 mM EDTA;.

Q0523: A. Sultan*, et al.* T Cell-Mediated Inflammation in Adipose Tissue Does Not Cause Insulin Resistance in Hyperlipidemic Mice. Circulation Research 2009;104(8):961-U97
ALZET Comments: Interleukin-6, recomb. human; Saline; SC; Mice; 2001; 7 days; Controls received mp w/ saline; animal info (Apoe-/-, ob/ob, 11 wks old).

P9544: P. W. Bodell*, et al.* Skeletal muscle growth in young rats is inhibited by chronic exposure to IL-6 but preserved by concurrent voluntary endurance exercise. Journal of Applied Physiology 2009;106(2):443-453
ALZET Comments: Interleukin-6, recomb. rat; Intramuscular (gastrocnemius); Rat; 2002; 14 days; Controls received mp w/vehicle; functionality of mp verified by residual volume; animal info (Sprague Dawley, 5.5 wks old, 118g); fenestrated catheter used.

P9235: I. Sonderegger*, et al.* GM-CSF mediates autoimmunity by enhancing IL-6-dependent Th17 cell development and survival. Journal of Experimental Medicine 2008;205(10):2281-2294
ALZET Comments: Interleukin-6, recomb. human; SC; Mice (transgenic); mice; 2001; 7 days; Controls received sham surgery; immunology; peptides; animal info (BALB/c, wt, GM-CSF -/-, DO11.10 TG, 8-12 wks old); "To ensure a continuous supply, we implanted osmotic minipump containing IL-6 in mice." (p. 2289).

P9220: A. G. Holmes*, et al.* Prolonged interleukin-6 administration enhances glucose tolerance and increases skeletal muscle PPAR alpha and UCP2 expression in rats. Journal of Endocrinology 2008;198(2):367-374
ALZET Comments: Interleukin-6, recomb. human; Saline; BSA; SC; Rat; 2ML2; 14 days; Controls received mp w/ vehicle; comparison of IP injections vs. mp; no stress (see pg. 369); peptides; animal info (male, Wistar, 220 g.); endocrinology.

P9018: E. I. Boesen*, et al.* Interleukin-1 beta, but not interleukin-6, enhances renal and systemic endothelin production in vivo. American Journal of Physiology-Renal Physiology 2008;295(2):F446-F453
ALZET Comments: Interleukin-6, recomb. mouse; NaCl; PBS; SC; Mice; 1002; 14 days; Controls received mp w/ vehicle; peptides; animal info (C57BL/6).

P8583: E. I. Boesen*, et al.* Effect of chronic IL-6 infusion on acute pressor responses to vasoconstrictors in mice. Am J Physiol Heart Circ. Physiol 2007;293(3):H1745-H1749
ALZET Comments: Interleukin-6, recomb. mouse; PBS; BSA; SC; Mice; 1002; 14 days; Controls received mp w/ vehicle; functionality of mp verified by plasma IL-6 concentrations; peptides; cardiovascular; animal info (C57BL/6, male).

P7785: X. L. Jin*, et al.* Paradoxical effects of short- and long-term interleukin-6 exposure on liver injury and repair. Hepatology 2006;43(3):474-484
ALZET Comments: Interleukin-6, recomb. mouse; Saline, sterile; IP; Mice; 7 days; Controls received mp w/ vehicle; functionality of mp verified by serum IL-6 levels; peptides; animal info (male, C57BL6/J).

P7821: Z. X. Cao*, et al.* The cytokine interleukin-6 is sufficient but not necessary to mimic the peripheral conditioning lesion effect on axonal growth. Journal of Neuroscience 2006;26(20):5565-5573
ALZET Comments: Interleukin-6, recomb. rat; Saline; CSF/CNS (intrathecal); Rat; 1002; 2 weeks; 24 hours; Controls received mp w/ vehicle; functionality of mp verified by residual volume; dose-response (fig. 7); no stress (see pg. 5571); peptides; animal info (female, Long-Evans, pg. 21-pg. 23; bilateral dorsal column lesion, 8wk old); mp primed at least 4 hours at 37 celsius.

P7192: S. P. M. Janssen*, et al.* Interleukin-6 causes myocardial failure and skeletal muscle atrophy in rats. Circulation 2005;111(8):996-1005
ALZET Comments: Interleukin-6, recomb. human; PBS; serum, rat; SC; Rat; 2001; 7 days; Controls received mp w/ vehicle plus human albumin; functionality of mp verified by serum rh IL-6 levels; dose-response; cardiovascular; peptides.

P7226: F. Haddad*, et al.* IL-6-induced skeletal muscle atrophy. Journal of Applied Physiology 2005;98(3):911-917
ALZET Comments: Interleukin-6; Saline; Intramuscular (tibialis anterior); Rat; 2002; 3,14 days; Controls received mp w/ vehicle or had contralateral muscle w/ no treatment; functionality of mp verified by residual volume; no stress (see pg. 912,913); good methods p. 912; peptides; mp primed in sterile saline at 37 degrees celsius.

P7165: S. H. Gieng*, et al.* Accumulation of retinol in the liver after prolonged hyporetinolemia in the vitamin A-sufficient rat. Journal of Lipid Research 2005;46(4):641-649
ALZET Comments: Interleukin-6, recomb. human; SC; Rat; 1003D, 2001; 3, 7 days; Controls received mp w/ PBS, no stress (see pg. 646), peptides.

P6991: C. Woiciechowsky*, et al.* Brain-IL-1beta triggers astrogliosis through induction of IL-6: Inhibition by propranolol and IL-10. MEDICAL SCIENCE MONITOR 2004;10(9):BR325-BR330
ALZET Comments: Tumor necrosis factor-a, recomb. rat; interleukin-1 beta, recomb. rat; interleukin-10, recomb. rat; interleukin-6, recomb. rat; Albumin, human serum; CSF/CNS; Rat; 1003D; 48 hours; Controls received mp w/ vehicle; dose-response (fig 1); ALZET brain infusion kit used; correct localization of cannula confirmed histologically.

P6814: Q. C. Wang*, et al.* Interleukin-6 inhibits the growth of prostate cancer xenografts in mice by the process of neuroendocrine differentiation. International Journal of Cancer 2004;111(4):508-513
ALZET Comments: Interleukin-6; SC; Mice (nude); 3 weeks; Controls received SC saline injections; comparison of SC injections vs. mp; no stress (see pg. 511); cancer (prostate).

P7700: M. Murata*, et al.* Interleukin-6 Protects Skin Legion Caused by 7,12-Dimethylbenz[a]anthracene. Journal of Vet. Med. Sci 2003;65(4):511-513
ALZET Comments: Interleukin-6, recomb. human; PBS; serum, mouse; SC; Mice; 1007D; 6 days; Controls received mp w/ vehicle; functionality of mp verified by serum rhIL-6 levels; dose-response (table 1); toxicology; peptides; animal info (female, 20 wks old).

P5803: H. Korekane*, et al.* Mechanisms mediating metabolic abnormalities in the livers of Ehrlich ascites tumor-bearing mice. Archives of Biochemistry and Biophysics 2003;412(2):216-222
ALZET Comments: Ornithine decarboxylase-inducing factor; Interleukin-1, alpha; tumor necrosis factor-µ; Interleukin-6; SC; IP; Mice; 1007D; 6 days; Controls received mp w/ PBS vehicle; cancer; IL-1µ (human recomb) & ornithine decarboxylase-inducing factor (ODC factor) were infused via IP route; IL-6 was infused (SC).

P6074: P. J. Klover*, et al.* Chronic exposure to interleukin-6 causes hepatic insulin resistance in mice. Diabetes 2003;52(11):2784-2789
ALZET Comments: Interleukin-6; Saline; BSA; SC; Mice; 2001; 5 days; IL-6 plasma levels taken; 0.1% BSA used.

P5733: C. Barazzone-Argiroffo*, et al.* Glucocorticoids aggravate hyperoxia-induced lung injury through decreased nuclear factor-kappa B activity. AMERICAN JOURNAL OF PHYSIOLOGY-LUNG CELLULAR AND MOLECULAR PHYSIOLOGY 2003;284(1):L197-L204
ALZET Comments: Interleukin-6; SC; Mice; 1003D; 3 days; Controls received mp w/ mouse serum; functionalityof mp verified by IL-6 serum levels; peptides; IL-6 is human recombinant.

P5878: B. Schoning*, et al.* Differences in immune cell invasion into the cerebrospinal fluid and brain parenchyma during cerebral infusion of interleukin-1 beta. NEUROLOGICAL SCIENCES 2002;23(5):211-218
ALZET Comments: Interleukin-1, beta; Interleukin-6; Tumor necrosis factor-a; Albumin, human serum; CSF/CNS (hypothalamus, lateral ventricle); Rat; 1003D; 4,8,24,48 hours; Controls received mp w/ vehicle; functionality of mp verified by CSF cell infiltration; dose-response (p. 213); ALZET brain infusion kit used; IL-1ß was rat recomb; cannula position verified histologically; cytokine levels in CSF were assayed.

11. Interleukin-7

Q5839: H. K. Kim*, et al.* Distinct IL-7 signaling in recent thymic emigrants versus mature naive T cells controls T-cell homeostasis. Eur J Immunol 2016;46(7):1669-80
ALZET Comments: Interleukin-7; PBS; SC; Mice; 5 days; Controls received mp w/ vehicle; immunology; “we utilized osmotic pumps to administer recombinant IL-7 and increase IL-7 bioavailability in vivo... T-cell proliferation was dramatically increased in IL-7 pump installed mice compared to control PBS pump installed mice” pg 1671; Therapeutic indication (T-cell homeostasis); Dose (5 ug);.

Q1289: J. Quiel*, et al.* Antigen-stimulated CD4 T-cell expansion is inversely and log-linearly related to precursor number. PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA 2011;108(8):3312-3317
ALZET Comments: Interleukin-2; interleukin-7; interleukin-15; SC; Mice; 2001; 7 days; Controls received mp w/ PBS; animal info (6-12 wks old, gender, age matched); immunology.

Q1758: M. J. Palmer*, et al.* Signaling thresholds govern heterogeneity in IL-7-receptor-mediated responses of naive CD8(+) T cells. Immunology and Cell Biology 2011;89(5):581-594
ALZET Comments: Interleukin-7; SC; Mice; 1007D; 7 days; Controls received mp w/ PBS; animal info (C57BL/6, 6-16 wks old); wound clips used; post op. care (betadine).

P9932: J. H. Park*, et al.* Signaling by intrathymic cytokines, not T cell antigen receptors, specifies CD8 lineage choice and promotes the differentiation of cytotoxic-lineage T cells. NATURE IMMUNOLOGY 2010;11(3):257-U10
ALZET Comments: Interleukin-7, recomb, mouse; SC; Mice; 2 weeks; Animal info (79Z); immunology.

Q0940: J. H. Park*, et al.* 'Coreceptor tuning': cytokine signals transcriptionally
tailor CD8 coreceptor expression to the self-specificity
of the TCR. NATURE IMMUNOLOGY 2007;8(10):1049-1059
ALZET Comments: Interleukin-7, recomb. mouse; SC; Mice; 7 days; Controls received mp w/ PBS; animal info (C57BL/6).

P8210: P. J. Lucas*, et al.* Dysregulation of IL-15-mediated T-cell homeostasis in TGF-beta dominant-negative receptor transgenic mice. Blood 2006;108(8):2789-2795
ALZET Comments: Interleukin-7, recomb. mouse; SC; Mice (transgenic); 7-14 days; Controls received mp w/ PBS; animal info (C57BL/6, 8-10 wk old).

P7263: B. Min*, et al.* Spontaneous and homeostatic proliferation of CD4 T cells are regulated by different mechanisms. Journal of Immunology 2005;174(10):6039-6044
ALZET Comments: Interleukin-7, recomb. mouse; Mice; mice (transgenic); 7, 28 days; Controls received mp w/ PBS; immunology; peptides.

P6978: Y. W. Chu*, et al.* Exogenous IL-7 increases recent thymic emigrants in peripheral lymphoid tissue without enhanced thymic function. Blood 2004;104(4):1110-1119
ALZET Comments: Interleukin-7, recomb. mouse; PBS; sucrose; serum, normal mouse; SC; Mice; 1007D; 1002; 7,14 days; Controls received mp w/ vehicle; replacement therapy (thymectomy); immunology.

Q5527: S. Sharma*, et al.* Intratumoral Therapy with Cytokine Gene-Modified Dendritic Cells in Murine Lung Cancer Models. Lung Cancer 2003;75(711-722
ALZET Comments: Interleukin-7; SC; Mice; 1002; 14 days; animal info (8-12 weeks); cancer (Lung cancer); Immunology (dendritic cells); Therapeutic indication (Lung cancer);
Dose (5 ng/mL);.

Q6807: O. Alpdogan*, et al.* Administration of interleukin-7 after allogeneic bone marrow transplantation improves immune reconstitution without aggravating graft-versus-host disease. Blood 2001;98(7):2256-22656
ALZET Comments: Interleukin-7; PBS; SC; Mice (transgenic); 2002; 14 days; Dose (1 µg/d,); Controls received mp w/ vehicle; animal info (Female C57BL/6J (B6, H-2b), C3FeB6F1/J([B6 3 C3H]F1; H-2b/k), B10.BR (H-2k), and CBA/J (H-2k) mice), between 8 and 10 weeks of age or 9 months old; immunology;.

P4126: H. O. Valenzona*, et al.* Exogenous interleukin 7 as a proliferative stimulant of early precursor b cells in mouse bone marrow: efficacy of IL-7 injection, IL-7 infusion and IL-7-anti-IL-7 antibody complexes. Cytokine 1998;10(6):404-412
ALZET Comments: Interleukin-7; Water; Saline; Albumin, mouse serum; SC; mice; 1007D; no duration posted; controls received mp w/vehicle; functionality of mp verified by residual protein in reservoir; comparison of ip injections vs. mp; no stress (see p. 406); immunology; recomb. murine & human IL-7 used; peptides.

P4119: A. Mathur*, et al.* Effect of IL-7 or IL-4 on reconstitution of donor lymphoid cells in congenic murine bone marrow transplantation. Bone Marrow Transplantation 1995;16(119-124
ALZET Comments: Interleukin-7; Interleukin-4; PBS; IP; mice; 14 days; controls received mp w/vehicle; immunology; peptides; recomb. mouse IL-4 and IL-7 used.

12. Interluekin-8

P3730: E. H. Garin*, et al.* Effect of interleukin-8 on glomerular sulfated compounds and albuminuria. Pediatric Nephrology 1997;11(274-279
ALZET Comments: Interleukin-8; BSA; IA (renal); Rat; 2ML1; 5 days; controls received mp w/BSA; good methods (pg. 275); peptides; used PE-10 catheter stretched to further reduce its diameter.

P4097: C. R. Plata-Salaman*, et al.* Anorexia induced by chronic central administration of cytokines at estimated pathophysiological concentrations. Physiol. Behav 1996;60(3):867-875
ALZET Comments: Interleukin-1 receptor antagonist; Interleukin-6; Interleukin-1, beta heat inactivated; Interleukin-8; Interleukin-1, beta; Tumor necrosis factor-a; Saline, sterile physiological; BSA; CSF/CNS; Rat; 2001; 7 days; controls received mp w/vehicle; guide cannula was used, and a sterile 29 g stainless steel obturator was used to ensure cannula patency during at least a 10 day recovery period after surgery; BSA added as stabilizing agent and carrier protein for cytokines; recomb. human IL-6 & 8 used.

13. Interleukin-10

Q6788: M. F. Iulita*, et al.* CD4(+) Regulatory T Lymphocytes Prevent Impaired Cerebral Blood Flow in Angiotensin II-Induced Hypertension. J Am Heart Assoc 2019;8(1):e009372
ALZET Comments: Angiotensin II; Interleukin-10, recomb. human; PBS; SC; Mice; 1002; 14 days; Dose (Angiotensin II (1000 ng/kg/min); IL-10 (60ng/day)); Controls received mp w/ vehicle; animal info (Eight- to 10-week-old C57BL/6 male mice); cardiovascular;.

Q4854: V. V. Lima*, et al.* Interleukin-10 limits increased blood pressure and vascular RhoA/Rho-kinase signaling in angiotensin II-infused mice. Life Sci 2016;145(137-143
ALZET Comments: Angiotensin II; interleukin-10, recombinant mouse;; Saline; SC; Mice; 1002; 14 days; Controls received mp w/ vehicle; animal info (male, IL-10 -/- or WT, 10-12 weeks old); functionality of mp verified by plasma levels; immunology; bp measured using catheter; Dose (Ang II 90 ng/min; IL-10 0.5 ng/min);.

Q5388: A. Leung*, et al.* Regular physical activity prevents chronic pain by altering resident muscle macrophage phenotype and increasing interleukin-10 in mice. Pain 2016;157(1):70-9
ALZET Comments: Interleukin-10; PBS; SC; Mice; 2001; 9 days; Controls received mp w/ vehicle; animal info (male, female C57BL/6 mice, 8 – 12 weeks old); functionality of mp verified by hind limb muscle withdrawal; behavioral testing (running wheel); “Mice treated with systemic IL-10 had significantly less hyperalgesia compared with mice that received vehicle” pg. 75; analgesia produced by regular physical acitivity; Dose (2 ug/day);.

Q3357: F. J. Perez-Asensio*, et al.* Interleukin-10 regulates progenitor differentiation and modulates neurogenesis in adult brain. Journal of Cell Science 2013;126(18):4208-4219
ALZET Comments: Interleukin-10; U0126; Saline; SC; Mice; 1007D; 4 days; 7 days; Controls received mp w/ vehicle; animal info (IL-10 KO); immunology;.

Q2644: K. Gotoh*, et al.* Spleen-Derived Interleukin-10 Downregulates the Severity of High-Fat Diet-Induced Non-Alcoholic Fatty Pancreas Disease. PLoS One 2012;7(12):U1111-U1123
ALZET Comments: Albumin, mouse; interleukin-10, recomb.; SC; Mice; 4 weeks; Animal info (C57BL/6, 22-25 g, KBT, IL-10 KO).

Q1657: K. Gotoh*, et al.* A novel anti-inflammatory role for spleen-derived interleukin-10 in obesity-induced hypothalamic inflammation. Journal of Neurochemistry 2012;120(5):752-764
ALZET Comments: Interleukin-10, recomb.; SC; Rat; mice; 4 weeks; Controls received mp w/ mouse serum albumin; animal info (C57Bl/6J, IL-10KO; Sprague Dawley, male).

Q0445: E. G. Hong*, et al.* Interleukin-10 Prevents Diet-Induced Insulin Resistance by Attenuating Macrophage and Cytokine Response in Skeletal Muscle. Diabetes 2009;58(11):2525-2535
ALZET Comments: Interleukin-10; Mice; 3 days; Controls received mp w/saline; animal info (male, C57BL/6, 10 wks old); diabetes.

P8953: A. Knedla*, et al.* The therapeutic use of osmotic minipumps in the severe combined immunodeficiency (SCID) mouse model for rheumatoid arthritis. Annals of the Rheumatic Diseases 2008;68(1):124-129
ALZET Comments: Interleukin-10; interleukin-1 receptor antagonist; Saline; DMSO; SC; Mice (SCID); 2004; 40 days; Controls received mp w/ vehicle; functionality of mp verified by plasma levels; good methods (p.125); peptides; animal info (female, SCID, 4-5 wks old); Rheumatoid arthritis; pump and technique schematics p. 125; stability (with an excellent description of methods) was verified for 40 days @ 37C; 50% DMSO used; "... the application of proteins via osmotic pumps is an affective tool to evaluate the effects of cytokines and inhibitors in vitro." p. 128.

P7635: B. T. Ameredes*, et al.* Alterations in nitric oxide and cytokine production with airway inflammation in the absence of IL-10. Journal of Immunology 2005;175(2):1206-1213
ALZET Comments: Interleukin-10; Saline; SC; 3 days; Peptides; animal info (male, C57BL/6, 6 weeks old).

P7208: B. T. Ameredes*, et al.* Enhanced nitric oxide production associated with airway hyporesponsiveness in the absence of IL-10. AMERICAN JOURNAL OF PHYSIOLOGY-LUNG CELLULAR AND MOLECULAR PHYSIOLOGY 2005;288(5):L868-L873
ALZET Comments: Interleukin-10, recomb.mouse; Saline; SC; Mice; 72 hours; Controls received mp w/ vehicle; dose-response (Fig. 4); peptides.

P6991: C. Woiciechowsky*, et al.* Brain-IL-1beta triggers astrogliosis through induction of IL-6: Inhibition by propranolol and IL-10. MEDICAL SCIENCE MONITOR 2004;10(9):BR325-BR330
ALZET Comments: Tumor necrosis factor-a, recomb. rat; interleukin-1 beta, recomb. rat; interleukin-10, recomb. rat; interleukin-6, recomb. rat; Albumin, human serum; CSF/CNS; Rat; 1003D; 48 hours; Controls received mp w/ vehicle; dose-response (fig 1); ALZET brain infusion kit used; correct localization of cannula confirmed histologically.

P6136: S. Goodman*, et al.* Modulation of bone ingrowth and tissue differentiation by local infusi on of interleukin-10 in the presence of ultra-high molecular weight polyethylene (UHMWPE) wear particles. JOURNAL OF BIOMEDICAL MATERIALS RESEARCH PART A 2003;65A(1):43-50
ALZET Comments: Interleukin-10; PBS; BSA; Bone; Rabbit; 2004; 3 or 6 weeks; Controls received mp w/ vehicle; immunology; peptides; diagram of pump and bone chamber (p. 44).

P3931: A. Boehler*, et al.* Adenovirus-mediated interleukin-10 gene transfer inhibits post-transplant fibrous airway obliteration in an animal model of bronchiolitis obliterans. Human Gene Therapy 1998;9(541-551
ALZET Comments: Interleukin-10; Saline; IP; Rat; 2002; 14 days; functionality of mp verified by IL-10 plasma levels; immunology; peptides.

P3568: S. Persson*, et al.* Interleukin-10 suppresses the development of collagen type II-induced arthritis and ameliorates sustained arthritis in rats. Scand. J. Immunol 1996;44(607-614
ALZET Comments: Interleukin-10; PBS, sterile; SC; Rat; 2ML2; 14 days; controls received mp w/ PBS; comparison of footpad injections vs. mp; immunology; peptides.

P4096: A. E. Levy*, et al.* Administration of intragraft interleukin-4 prolongs cardiac allograft survival in rats treated with donor-specific transfusion/cyclosporine. Transplantation 1995;60(5):405-406
ALZET Comments: Interleukin-4; Interleukin-10; IA (brachiocephalic); Rat; 14 days; immunology; peptides; pump infused the brachiocephalic artery of a harvested heart, which was then implanted into a recipient; recomb. mouse IL-4 & IL-10 used.

14. Interleukin-11

Q4341: J. N. Buzzelli*, et al.* IL-1RT1 signaling antagonizes IL-11 induced STAT3 dependent cardiac and antral stomach tumor development through myeloid cell enrichment. ONCOTARGET 2015;6(679-695
ALZET Comments: Interleukin-11, recombinant human; SC; Mice; 1007D; 7 days; Controls received mp w/ saline; animal info (WT or IL-1RT1, 12-14 weeks old); immunology;.

P5900: K. A. Kuenzler*, et al.* IL-11 pretreatment reduces cell death after intestinal ischemia-reperfusion. Journal of Surgical Research 2002;108(2):268-272
ALZET Comments: Interleukin-11; Saline; IV (jugular); Rat; 1003D; 48 hours; Controls received mp w/ vehicle; peptides; IL-11 was human recomb; ischemia (intestinal).

P5148: K. A. Kuenzler*, et al.* Interleukin-11 enhances intestinal absorptive function after ischemia-reperfusion injury. Journal of Pediatric Surgery 2002;37(457-459
ALZET Comments: Interleukin-11; Saline; IV (jugular); Rat; 1003D; 3 days; controls received mp w/ vehicle; peptides; ischemia (bowel).

P4291: I. Roeder*, et al.* Interactions of erythropoietin, granulocyte colony-stimulating factor, stem cell factor, and interleukin-11 on murine hematopoiesis during simultaneous administration. Blood 1998;91(9):3222-3229
ALZET Comments: Interleukin-11; Stem cell factor; Granulocyte-colony stimulating factor, PEGylated; Erythropoietin;; SC;; mice;; 2002; 1007D;; 7 days;; controls received mp w/ saline; functionality of mp verified by pilot studies; no stress (see pg. 3223); peptides; recomb. human interleukin-11, EPO, & G-CSF used; recomb. rat stem cell factor used (pegylated);agents were given in every combination;.

P3407: J. P. Leonard*, et al.* Constant subcutaneous infusion of rhIL-11 in mice: efficient delivery enhances biological activity. Exp. Hematol 1996;24(270-276
ALZET Comments: Interleukin-11; Antibody, anti-interleukin-1 receptor; Serum, mouse; Saline, sterile; SC; mice; 3, 7, 10, 13 days; controls received mp w/vehicle; comparison of sc injections vs. mp; immunology; peptides; cardiovascular; "Compared to SC injection, both the magnitude and duration of the platelet increase were significantly enhanced following continuous SC infusion." (pg. 270).

15. Interleukin-12

Q3101: C. M. Krejsa*, et al.* Interleukin-21 Enhances Rituximab Activity in a Cynomolgus Monkey Model of B Cell Depletion and in Mouse B Cell Lymphoma Models. PLoS One 2013;8(6):U875-U888
ALZET Comments: Interleukin-12, recomb. human; Saline; SC; Mice (SCID; NOD/SCID); 2004; 28 days; Animal info (female, SCID and NOD/SCID, 8-10 weeks old); cancer (Lymphoma);.

Q3684: J. V. Berg*, et al.* Intratumoral IL-12 combined with CTLA-4 blockade elicits T cell-mediated glioma rejection. Journal of Experimental Medicine 2013;210(13):2803-2811
ALZET Comments: Interleukin-12, murine; PBS; CSF/CNS (intratumoral); Mice; 1004; 2004; 28 days; Controls received mp w/ vehicle; animal info (C57BL6); cancer (glioma); tissue perfusion (tumor; glioma); immunology; pumps primed at 37C; pumps explanted after 28 days;.

P8510: H. R. Djalilian*, et al.* Efficacy of an osmotic pump delivered, GM-CSF-based tumor vaccine in the treatment of upper aerodigestive squamous cell carcinoma in rats. CANCER IMMUNOLOGY IMMUNOTHERAPY 2007;56(8):1207-1214
ALZET Comments: Colony-stimulating factor, GM, murine; interleukin-12; PBS; SC; Rat; 28 days; Controls received mp w/ vehicle; dose-response (fig 1); no stress (see pg. 1209); cancer (upper aerodigestive tract carcinoma); peptides; animal info (Fisher 344, 125-150 g); good methods; "This latter method (mp) has several advantages. First, the use of minipumps obviates the cumbersome need to transfect tumor cells and completely characterize their cytokine repertoires. Second, it allows for independent and rigorous control over the kinetics of administration of cytokine and antigen dosages. Third, it may generate les controversy than those techniques requiring "gene therapy" IRB approval." (p. 1213).

P7935: J. C. Chen*, et al.* Effects of irradiated tumor vaccine and infusion of granulocyte-macrophage colony-stimulating factor and interleukin-12 on established gliomas in rats. CANCER IMMUNOLOGY IMMUNOTHERAPY 2006;55(7):873-883
ALZET Comments: Colony-stimulating factor, GM, recomb. mouse; interleukin-12, recomb. mouse; BSA; PBS; SC; Rat; 2002; 14 days; Controls received mp w/ vehicle or no treatment; cancer (RT-2 glioma); peptides; animal info (Fischer, 200-350 grams, SC and ICV tumors); "continuously infused cytokine using an osmotic mini pump to...avoid the side effects of a single large dose of cytokine and one with a concept similar to that of gene-therapy." (p. 874).

P6460: H. Sasaki*, et al.* Gamma interferon (IFN-gamma;) and IFN-gamma;-inducing cytokines interleukin-12 (IL-12) and IL-18 do not augment infection-stimulated bone resorption in vivo. Clinical and Diagnostic Laboratory Immunology 2004;11(1):106-110
ALZET Comments: Interleukin-12; recomb.; PBS; SC; Mice; 1007D; 21 days; Controls received mp w/ vehicle;pumps replaced at day 7 & day 14.

P6379: I. Mendel*, et al.* A novel protective model against experimental allergic encephalomyelitis in mice expressing a transgenic TCR-specific for myelin oligodendrocyte glycoprotein. Journal of Neuroimmunology 2004;149(1-2):10-21
ALZET Comments: Interleukin-12; PBS; SC; Mice; 2001; 7 days; Immunology.

P6450: W. C. Jean*, et al.* Effects of combined granulocyte-macrophage colony-stimulating factor (GM-CSF), interleukin-2, and interleukin-12 based immunotherapy against intracranial glioma in the rat. Journal of Neuro-oncology 2004;66(1-2):39-49
ALZET Comments: Colony-stimulating factor, GM; interleukin-2; interleukin-12; SC; Rat; 2004; 4 weeks; Cancer (gliosarcoma); GM-CSF was infused alone or with cytokines.

P6352: N. Akhtar*, et al.* Interleukin-12 inhibits tumor growth in a novel angiogenesis canine hemangiosarcoma xenograft model. NEOPLASIA 2004;6(2):106-116
ALZET Comments: Interleukin-12; PBS; SC; Mice (SCID); 2004; 1 week; Controls received mp w/ vehicle; functionality of mp verified by pump explantation, examination and tumor reduction; cancer (Hemangiosarcoma); peptides; pump model not listed; tumor cells from a canine.

P4117: W. C. Jean*, et al.* Interleukin-12-based immunotherapy against Rat 9L glioma. Neurosurgery 1998;42(4):850-857
ALZET Comments: Interleukin-12; PBS; Albumin, bovine serum; SC; Rat; 2004; 20 days; controls received mp w/vehicle; dose-response (p. 851); "an immunotherapeutic approach using cytokine-infusing minipumps and irradiated tumor cells can circumvent many of the problems associated with most popular methods..." (p. 854); cancer; immunology; peptides; recomb. mouse IL-12 used.

P3731: F. Galbiati*, et al.* Regulation of the IL-12 receptor B2 subunit by soluble antigen and IL-12 in vivo. Eur. J. Immunol 1998;28(209-220
ALZET Comments: Interleukin-12; Interleukin-2; Lysozyme, hen egg white; Ovalbumin; Interferon-gamma; PBS; Albumin, mouse serum; SC; mice; 2001; 9 days; 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.

16. Interleukin-13

R0378: B. Halle*, et al.* Convection-enhanced Drug Delivery for Glioblastoma: A Systematic Review Focused on Methodological Differences in the Use of the Convection-enhanced Delivery Method. Asian J Neurosurg 2019;14(1):5-14
ALZET Comments: Etoposide, Bevacizumab, IMCA12, Interleukin-13-PE38, Tetrakis Chlorin; CSF/CNS (intratumoral); Mice, Rat; 2001D, 1003D, 1007D, 1004, 2004; 24 hours, 3, 7, 21, 28 days; ALZET brain infusion kit 1,2, and 3 used; cancer (Glioblastoma);.

Q5433: A. Suzuki*, et al.* Analysis of biodistribution of intracranially infused radiolabeled interleukin-13 receptor-targeted immunotoxin IL-13PE by SPECT/CT in an orthotopic mouse model of human glioma. J Nucl Med 2014;55(8):1323-9
ALZET Comments: Interleukin-13 Pseudomonas exotoxin; PBS; HSA; CSF/CNS (intracranial); Mice; 1003D; 3 days; Controls received mp w/ vehicle; animal info (tumor-bearing mice); cancer (glioblastoma multiforme); brain tissue distribution; HSA aka human serum albumin; CED model, convection-enhanced delivery; orthotopic mouse model of human glioma; Dose (3,700 kBq);.

Q0801: T. Fujisawa*, et al.* Targeting IL-13Ralpha2 in human pancreatic ductal adenocarcinoma with combination therapy of IL-13-PE and gemcitabine. International Journal of Cancer 2011;128(5):1221-1231
ALZET Comments: Interleukin-13-Pseudomonas exotoxin, recomb.; IP; Mice (nude); 14 days; Animal info (nu/nu, 5-6 wks old); comparison of IP injections vs IP mp; IL-13-PE is a recombinant immunotoxin; "Mice receiving continuous IL-13-PE exhibited better tumor response compared to bolus administration" pg 1224.

Q1342: T. Shimamura*, et al.* Interleukin 13 Mediates Signal Transduction through Interleukin 13 Receptor alpha 2 in Pancreatic Ductal Adenocarcinoma: Role of IL-13 Pseudomonas Exotoxin in Pancreatic Cancer Therapy. Clinical Cancer Research 2010;16(2):577-586
ALZET Comments: Interleukin-13; PBS; albumin, human serum; IP; Mice (SCID); 1007D; 7 days; Controls received vehicle injections; animal info (5-6 wks old, male, SCID); comparison of ip injections vs ip mp; cancer (pancreatic); "Compared with (bolus IP) administration of 50 ug/kg IL-13 cytotoxin daily for 7 consecutive days, (ALZET pumps) (infused over 7 days) significantly suppressed tumor growth (P = 0.022) from the beginning of the treatment until the end of the experiment... Compared with the (bolus IP) 50 ug/kg group, a significant prolonged survival time was observed in the (ALZET pump) 50 ug/kg group", pg 581.

Q0583: J. D. Milner*, et al.* Sustained IL-4 exposure leads to a novel pathway for hemophagocytosis, inflammation, and tissue macrophage accumulation. Blood 2010;116(14):2476-2483
ALZET Comments: Interleukin-4, recomb. mouse; interleukin-13 recomb. mouse; SC; Mice; 3 days; Controls received mp w/ PBS; animal info (C57BL6, b6 Rag2 -/-, b6 Stat6 -/-); 100 ul sized pump used; immunology.

P7434: K. Kawakami*, et al.* Evidence that IL-13R alpha-2 chain in human glioma cells is responsible for the antitumor activity mediated by receptor-directed cytotoxin therapy. Journal of Immunotherapy 2005;28(3):193-202
ALZET Comments: Interleukin-13-PE38; interleukin-13Ra2, pME18S-; CSF/CNS (intratumoral); Mice (nude); 1003D; 1007D; 7 days; Controls received mp w/ vehicle or antisense IL-13Ra2 plasmid vector; pumps replaced after 3 days; cancer (glioblastoma); cyanoacrylate adhesive; convection enhanced delivery; IL-13Ra2 cDNA encoding plasmid vector; "the upregulated IL-13 Ra2 chain was successfully targeted with a continuous infusion of IL-13 cytotoxin." (p. 199).

P6373: M. M. Souweidane*, et al.* Interstitial infusion of IL13-PE38QQR in the rat brain stem. Journal of Neuro-oncology 2004;67(3):287-293
ALZET Comments: Interleukin-13,PE38QQR; Saline; serum albumin; CSF/CNS (brain stem); Rat; 2001D; 24 hours; Tissue perfusion (brain stem); stability verified (7 days at 37 degrees Celsius); good methods p. 288; cancer; pump incorrectly labeled as a 2001; IL13-PE38QQR is a tumor specific, chimeric cytotoxin; 30 g Plastics One Cannula used; vinyl catheter tubing from DURECT used.

P6923: K. Kawakami*, et al.* Distribution kinetics of targeted cytotoxin in glioma by bolus or convection-enhanced delivery in a murine model. Journal of Neurosurgery 2004;101(6):1004-1011
ALZET Comments: Interleukin-13, PE38; Albumin, human serum; PBS; CSF/CNS; Mice (nude); 1007D; 7 days; Comparison of CNS injections vs. mp; cancer (glioma); ALZET brain infusion kit; cyanoacrylate adhesive.

P5439: K. Kawakami*, et al.* Improved anti-tumor activity and safety of interleukin-13 receptor targeted cytotoxin by systemic continuous administration in head and neck cancer xenograft model. MOLECULAR MEDICINE 2002;8(8):487-494
ALZET Comments: Interleukin-13 endotoxin; PBS; IP; Mice (nude); 7 days; Comparison of IV injections vs mp; cancer (head and neck); IL-13 endotoxin, also called IL13-PE38QQR, is composed of IL-13 and a mutated form of a Pseudomonas endotoxin; compared to IV injections, continuous infusion decreased the toxicity and increased the efficacy of IL-13 cytotoxin.

P4522: Y. H. Lai*, et al.* Mouse IL-13 enhances antibody production in vivo and acts directly on B cells in vitro to increase survival and hence antibody production. The Journal of Immunology 1999;162(78-87
ALZET Comments: Interleukin-13;; PBS;; IP;; mice;; 7 days;; controls received mp w/vehicle; functionality of mp verified by plasma levels; Immunology; peptides; Recomb. mouse interleukin-13 used;.

P3409: Y. H. Lai*, et al.* Continuous administration of IL-13 to mice induces extramedullary hemopoiesis and monocytosis. J. Immunol 1996;156(3166-3173
ALZET Comments: Interleukin-13; IP; mice; 7 days; controls received phosphate buffered saline infusion; peptides.

17. Interleukin-15

Q4425: S. Garofalo*, et al.* Enriched environment reduces glioma growth through immune and non-immune mechanisms in mice. Nature Communications 2015;6(U26-U38
ALZET Comments: Interleukin-15; brain-derived neurotrophic factor; PBS; CSF/CNS (striatum); Mice; 1007D; 7 days; Controls received mp w/ vehicle; animal info (male, C57BL6, 3 weeks or 2 months old); ALZET brain infusion kit 3 used; cancer (glioma, U87MG human); tissue perfusion (right striatum); immunology; pumps primed in 37C saline overnight;.

Q1289: J. Quiel*, et al.* Antigen-stimulated CD4 T-cell expansion is inversely and log-linearly related to precursor number. PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA 2011;108(8):3312-3317
ALZET Comments: Interleukin-2; interleukin-7; interleukin-15; SC; Mice; 2001; 7 days; Controls received mp w/ PBS; animal info (6-12 wks old, gender, age matched); immunology.

P9700: J. S. Do*, et al.* IL-15 produced and trans-presented by DCs underlies homeostatic competition between CD8 and gamma-delta T cells in vivo. Blood 2009;113(25):6361-6371
ALZET Comments: Interleukin-15, murine; Mice; 14 days; Animal info (Thy 1.1 C57BL/6).

P8943: E. E. Pistilli*, et al.* Systemic elevation of interleukin-15 in vivo promotes apoptosis in skeletal muscles of young adult and aged rats. Biochemical and Biophysical Research Communications 2008;373(1):20-24
ALZET Comments: Interleukin-15, recomb. human; SC; Rat; 2002; 14 days; Peptides; animal info (Fischer Brown Norway).

P7460: S. Roychowdhury*, et al.* IL-15 but not IL-2 rapidly induces lethal xenogeneic graft-versus-host disease. Blood 2005;106(7):2433-2435
ALZET Comments: Interleukin-15, recomb. human; interleukin-2, recomb. human; PBS; albumin, human; SC; Mice (SCID); 1007D; 10 days; Controls received mp w/ vehicle; immunology; animal info (female, CB17, hu-PBL-SCID, 8-12 weeks old).

P6963: L. J. Harcourt*, et al.* Interleukin-15 administration improves diaphragm muscle pathology and function in dystrophic mdx mice. American Journal of Pathology 2005;166(4):1131-1141
ALZET Comments: Interleukin-15; Saline; SC; Mice; 1002; 4 weeks; Pump modified to a 4 week infusion by partially dipping the pump in paraffin wax to reduce infusion rate to ~0.125 ul/hr.

18. Interleukin-31

Q5345: M. Feld*, et al.* The pruritus- and TH2-associated cytokine IL-31 promotes growth of sensory nerves. J Allergy Clin Immunol 2016;138(2):500-508 e24
ALZET Comments: Interleukin-31, recombinant mouse; SC; Mice; 14 days; animal info (6 – 8 week old, C57BL/6 and Trpv1 knockout mice); functionality of mp verified by observation of skin phenotype; dose-response (pg. 508.e5); Dose (20 mg/day);.

P7009: S. R. Dillon*, et al.* Interleukin 31, a cytokine produced by activated T cells, induces dermatitis in mice. NATURE IMMUNOLOGY 2004;5(7):752-760
ALZET Comments: Interleukin-31, mouse; PBS; BSA; SC; Mice; 7-14 days; Controls received mp w/ vehicle; immunology.

19. Leukemia inhibitory factor

Q6323: M. Engelhardt*, et al.* Leukemia inhibitory factor impairs structural and neurochemical development of rat visual cortex in vivo. Mol Cell Neurosci 2017;79(81-92
ALZET Comments: Leukemia inhibitory factor; Cytochrome C; Saline; CSF/CNS (secondary visual cortex); Rat; 1007D; 7 days; Dose (0.083 µg/µl); Controls received mp w/ vehicle; To control for unspecific effects of the infusion protocol, 2 animals were infused with cytochrome C (cytC, 8.3 µg/µl).animal info (Pigmented Long Evans); Brain coordinates (1 mm lateral to lambda into medial area 18);.

Q5190: Y. H. Rhee*, et al.* Neural stem cells secrete factors facilitating brain regeneration upon constitutive Raf-Erk activation. Sci Rep 2016;6(32025
ALZET Comments: Raf-Transducer cells, conditioned media; leukemia inhibitory factor; fibroblast growth factor 2; vascular endothelial growth factor; CSF, artificial; CSF/CNS; Mice; 1007D; 6 days; Controls received mp w/ vehicle or control media; animal info (male, C57Bl6, 50-100g); ALZET brain infusion kit 2 used; immunology; cyanoacrylate adhesive; Brain coordinates;.

Q3111: Y. Liu*, et al.* Leukemia inhibitory factor promotes nestin-positive cells, and increases gp130 levels in the Parkinson disease mouse model of 6-hydroxydopamine. Neurosciences 2013;18(4):363-370
ALZET Comments: Leukemia inhibitory factor; Saline; CSF/CNS (intrathecal); Mice; 2002; 3 weeks; Controls received mp w/ vehicle or sham surgery; animal info (C57BL, 8 weeks old); neurodegenerative (Parkinson's disease); no stress (see pg. 368); behavioral testing (rotarod, bar grabbing, tremor analysis);.

Q6718: C. Laterza*, et al.* iPSC-derived neural precursors exert a neuroprotective role in immune-mediated demyelination via the secretion of LIF. Nat Commun 2013;4(2597
ALZET Comments: Antibody, leukemia inhibitory factor neutralizing; PBS; CSF/CNS (lateral ventricle); Mice; 1007D; 7 days; Dose (2 micrograms per day); Controls received mp w/ vehicle; animal info (E2.5 pseudo-pregnant CD1 females,); ALZET brain infusion kit 3 used; Brain coordinates ((from bregma, 0.3mm anterior, 0.8 lateral);.

Q2411: W. H. Huang*, et al.* Effects of leukemia inhibitory factor and basic fibroblast growth factor on free radicals and endogenous stem cell proliferation in a mouse model of cerebral infarction. Neural Regeneration Research 2012;7(19):1469-1474
ALZET Comments: Leukemia inhibitory factor; fibroblast growth factor, basic; Saline, normal; Mice; 21 days; Animal info (C57BL/6, male, 8 wks old).

P9324: S. Averill*, et al.* Reg-2 expression in dorsal root ganglion neurons after adjuvant-induced monoarthritis. Neuroscience 2008;155(4):1227-1236
ALZET Comments: Nerve growth factor, recomb. human; glial-derived neurotrophic factor, recomb. human; leukemia inhibitory factor, recomb. human; Saline; albumin, rat serum; CSF/CNS (intrathecal); Rat; 2002; 14 days; Controls received mp w/ vehicle; peptides, animal info (male, Wistar, 220-400 g.).

P8689: C. A. White*, et al.* Blocking LIF action in the uterus by using a PEGylated antagonist prevents implantation: A nonhormonal contraceptive strategy. PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA 2007;104(49):19357-19362
ALZET Comments: Leukemia inhibitory factor, antagonist; PBS; IP; Mice; Functionality of mp verified by plasma levels taken; comparison of SC/IP injections vs. mp; animal info (8-10 wk old, female, C57BL/6J).

P8153: S. Bauer*, et al.* Leukemia inhibitory factor promotes neural stem cell self-renewal in the adult brain. Journal of Neuroscience 2006;26(46):12089-12099
ALZET Comments: Ara-C; leukemia inhibitory factor, recomb. mouse; epidermal growth factor, recomb. human; Saline; PBS; BSA; CSF/CNS; Mice; 1003D; 1007D; 1, 3, 6, 7, days; Controls received mp w/ vehicle; ALZET brain infusion kit 2 or 3 used; peptides; animal info (adult, male, C57BL/6J, 2-6 months old).

P5632: P. Wahle*, et al.* Differential effects of cortical neurotrophic factors on development of lateral geniculate nucleus and superior colliculus neurons: anterograde and retrograde actions. Development 2003;130(3):611-622
ALZET Comments: Nerve growth factor; NT-4/5; brainderived neurotrophic factor; leukemia inhibitory factor; CSF/CNS (visual cortex); Rat; 1007D; 7 days; Controls received mp w/ cytochrome C; peptides.

P5692: B. E. Rolfe*, et al.* Leukaemia inhibitory factor retards the progression of atherosclerosis. Cardiovascular Research 2003;58(1):222-230
ALZET Comments: Leukemia inhibitory factor; Saline; IP; Rabbit; 2ML4; 4 weeks; Controls received mp w/ vehicle; peptides; atherosclerosis.

P6100: S. J. Feeney*, et al.* The effect of leukaemia inhibitory factor on SOD1 G93A murine amyotrophic lateral sclerosis. Cytokine 2003;23(4-5):108-118
ALZET Comments: Leukemia inhibitory factor; CSF/CNS (intrathecal); Mice (transgenic); 2004; 13 weeks; Comparison of SC injections vs. IT mp; long-term study; pumps replaced every 4 weeks; ALZET brain infusion kit 1 used (per Dr. Feeney); used the BIK for the IT infusion; glued and sutured the cannula in place; "All mice that entered the study recovered from the surgical procedure and appeared to have no adverse effects." (p. 111); neurodegenerative (Amyotrophic Lateral Sclerosis).

P4937: W. B. J. Cafferty*, et al.* Leukemia inhibitory factor determines the growth status of injured adult sensory neurons. Journal of Neuroscience 2001;21(18):7161-7170
ALZET Comments: Leukemia inhibitory factor; Saline; CSF/CNS (intrathecal, Dorsal Root Ganglia); Rat; 2002; 2 weeks; controls received mp w/ vehicle; peptides; brain tissue distribution; recombinant human LIF used; some animals had undergone nerve injury axotomy on either the tibial or sciatic nerves, other remained uninjured.

P4364: J. Leong*, et al.* Muscle protection following motor nerve repair in combination with leukemia inhibitory factor. J. Hand Surg. [Am] 1999;24A(37-45
ALZET Comments: Leukemia inhibitory factor;; Serum, rat; Saline; Radio-isotopes; ^{125}I tracer;; CSF/CNS (gastrocnemius nerve);; Rat;; 2004;; 28 days;; controls received mp with vehicle; tissue perfusion (nerve repair site); functionality of mp verified by cross-section; peptides; recomb. mouse LIF used; rat serum reduced binding to pump reservoir; bioavailabilitiy of LIF was 50%; diagram of experimental model (p. 40).

P4574: J. B. Kurek*, et al.* Leukaemia inhibitory factor and other cytokines as factors influencing regeneration of skeletal muscle. Basic Appl. Myol 1998;8(5):347-360
ALZET Comments: Leukemia inhibitory factor; Interleukin-6; Transforming growth factor-a;; PBS;; Intramuscular; mice;; 7 days;; controls received mp w/vehicle; tissue perfusion (vastus lateralis muscle); peptides; targeted delivery of growth factors to the site of muscle injury via a cannula; "drug delivery targeted to a discrete tissue or organ offers signicant advantages over systemic administration". (p. 355).

P3974: S. S. Cheema*, et al.* Leukemia inhibitory factor maintains choline acetyltransferase expression in vivo. NeuroReport 1998;9(3):363-366
ALZET Comments: Leukemia inhibitory factor; CSF/CNS; Rat; 2002; 14 days; controls received mp w/PBS; peptides; ALZET brain infusion kit used.

P3810: C. S. Moran*, et al.* Human leukemia inhibitory factor upregulates LDL receptors on liver cells and decreases serum cholesterol in the cholesterol-fed rabbit. Arterioscler. Thromb. Vasc. Biol 1997;17(1267-1273
ALZET Comments: Leukemia inhibitory factor; PBS; IP; rabbit; 2ML4; 4 weeks; controls received mp w/vehicle; functionality of mp verified by plasma levels and residual volume; peptides; recomb. human leukemia inhibitory factor used; wrong pump model number described in methods section as 4ML2; graph of pump functionality shown on page 1270; "The present study showed that the osmotic minipumps delivered the prescribed volume throughout the entire 4-week treatment." (p. 1271).

P3557: W. W. Tang*, et al.* Leukemia inhibitory factor ameliorates experimental anti-GBM Ab glomerulonephritis. Kidney Int 1996;50(1922-1927
ALZET Comments: Leukemia inhibitory factor; Saline; IP; Rat; 1003D; 24 hours; controls received mp w/ saline; peptides; "Continuous infusion of rhLIF was chosen due to the short half-life of this peptide" (p.1926); recomb. human LIF used.

P3592: J. Kurek*, et al.* Leukemia inhibitory factor treatment stimulates muscle regeneration in the mdx mouse. Neuroscience Letters 1996;212(167-170
ALZET Comments: Leukemia inhibitory factor; Saline; Serum, mouse; Intramuscular; mice; 2001; 7 days; controls received mp w/ vehicle; tissue perfusion (muscle); peptides; recomb. murine LIF used.

P3644: S. Akita*, et al.* Disrupted murine leukemia inhibitory factor (LIF) gene attenuates adrenocorticotropic hormone (ACTH) secretion. Endocrinology 1996;137(7):3140-3143
ALZET Comments: Leukemia inhibitory factor; SC; mice; 1007D; 5 days; controls received PBS infusion; peptides; mice had disrupted LIF gene; recomb. human LIF used.

P2532: C. S. Moran*, et al.* Human leukemia inhibitory factor inhibits development of experimental atherosclerosis. Arterioscler. Thromb 1994;14(8):1356-1363
ALZET Comments: Leukemia inhibitory factor; PBS; IP; rabbit; 2ML4; 28 days; controls received mp w/ saline; functionality of mp verified by checking residual termination volume; peptides.

P2918: W. Barnard*, et al.* Leukemia inhibitory factor (LIF) infusion stimulates skeletal muscle regeneration after injury: injured muscle expresses lif mRNA. J. Neurol. Sci 1994;123(108-113
ALZET Comments: Leukemia inhibitory factor; PBS; Serum, mouse; Radio-isotopes; ^{125}I tracer; Intramuscular (muscle crush); mice; 2001; 7 days; 24 hours; controls received mp with serum and PBS; peptides; tissue perfusion (muscle crush); mouse serum lessened adsorption to pump reservoir; narrowed catheter sutured to adjacent muscles; iodinated LIF used to confirm targeted delivery.

20. Tumor Necrosis Factor

Q5898: M. C. L. Tse*, et al.* Tumor Necrosis Factor-alpha Promotes Phosphoinositide 3-Kinase Enhancer A and AMP-Activated Protein Kinase Interaction to Suppress Lipid Oxidation in Skeletal Muscle. Diabetes 2017;66(7):1858-1870
ALZET Comments: Tumor necrosis factor, alpha human recombinant; PBS; SC; Mice; 1003D; 24 hours; Controls received mp w/ vehicle; animal info (female, C57BL6, 5-6 months old);Dose (1 ug/kg/day);.

Q5764: F. Charlton*, et al.* The protective effect of apolipoprotein in models of trophoblast invasion and preeclampsia. Am J Physiol Regul Integr Comp Physiol 2017;312(1):R40-R48
ALZET Comments: Tumor necrosis factor-a; Saline; SC; Mice; 1007D; Controls received mp w/ vehicle; animal info (C57BL/6JArc); MRI; Therapeutic indication (Hypertension, pre-eclampsia, pregnancy); Dose (500 ng/kg/day);.

Q6577: F. Klaus*, et al.* Differential effects of peripheral and brain tumor necrosis factor on inflammation, sickness, emotional behavior and memory in mice. Brain Behav Immun 2016;58(310-326
ALZET Comments: Tumor necrosis factor, murine; PBS; BSA; SC; Mice; 1007D; 7 days; Dose (20 ng/g/day); 0.5% BSA used; animal info (10-12 week old Male C57BL/6J mice weighing 25-30g); comparison of injection vs mp;.

Q5999: G. Brower. Gender Differences In Cardiomyocyte Adhesion Cause Heart Failure. FASEB J 2016;
ALZET Comments: Tumor necrosis factor-a; SC; Rat; 2002; 3 days; animal info (Sprague Dawley); cardiovascular; Dose (17 pg/mL);.

Q3776: T. Matsuda*, et al.* TLR9 signalling in microglia attenuates seizure-induced aberrant neurogenesis in the adult hippocampus. Nature Communications 2015;6(U26-U35
ALZET Comments: Tumor necrosis factor, alpha, recomb.; CSF/CNS; Mice; 5 days; animal info (TLR9-KO).

Q5036: M. Liguz-Lecznar*, et al.* Inhibition of Tnf-alpha R1 signaling can rescue functional cortical plasticity impaired in early post-stroke period. Neurobiol Aging 2015;36(10):2877-84
ALZET Comments: Tumor necrosis factor-a receptor 1, soluble; CSF/CNS; Mice; 1007D; 1 weeks; Controls received mp w/ saline; animal info (female, C57BL6J, 1 year old); ALZET brain infusion kit 3 used; ischemia (cerebral); Dose (1 ug/day); brain coordinates;.

Q4388: M. J. Cunningham*, et al.* Pregnant rats treated with a high-fat/prooxidant Western diet with ANG II and TNF-alpha are resistant to elevations in blood pressure and renal oxidative stress. AMERICAN JOURNAL OF PHYSIOLOGY-REGULATORY INTEGRATIVE AND COMPARATIVE PHYSIOLOGY 2015;308(R945-R956
ALZET Comments: Angiotensin II; tumor necrosis factor, alpha; SC; Rat (pregnant); 2ML2; 14 days; Controls received mp w/ saline; animal info (female, Sprague Dawley, 15-21 weeks, day 6 of pregnancy); cardiovascular; peptides;.

Q3740: T. Toyoizumi*, et al.* Modeling the Dynamic Interaction of Hebbian and Homeostatic Plasticity. Neuron 2014;84(497-510
ALZET Comments: Tumor necrosis factor receptor 1; CSF/CNS (cortex); Mice; 1002; Control animals received mp w/ vehicle; animal info (C57BL/6, male).

Q3560: C. A. Martel*, et al.* Continuous low-dose infusion of tumor necrosis factor alpha in adipose tissue elevates adipose tissue interleukin 10 abundance and fails to alter metabolism in lactating dairy cows. Journal of Dairy Science 2014;97(4897-4906
ALZET Comments: Tumor necrosis factor alpha; Saline; SC; Cattle (lactating); 2ML1; 7 days; Controls received mp w/ vehicle; animal info (female, Holstein, late lactation); Multiple pumps per animal (2); immunology;.

Q2665: J. J. Chu*, et al.* Apelin Ameliorates TNF-alpha-Induced Reduction of Glycogen Synthesis in the Hepatocytes through G Protein-Coupled Receptor APJ. PLoS One 2013;8(2):U968-U975
ALZET Comments: Tumor necrosis factor, alpha; NaCl; BSA; SC; Mice; 7 days; Animal info (C57BL/6J, male, 12 wks old); 1.0 ul/hr rate of infusion.

Q2898: G. Bobek*, et al.* Magnetic Resonance Imaging Detects Placental Hypoxia and Acidosis in Mouse Models of Perturbed Pregnancies. PLoS One 2013;8(3):U1167-U1172
ALZET Comments: Tumor necrosis factor, alpha; SC; Mice; 1007D; Controls received mp w/ saline; animal info (C57BL/6JArc, pregnant, gestation day 13.5); mp used to infuse TNF-a to induce hypertension in pregnant mice.

Q2333: W. Yi*, et al.* C1q/Tumor Necrosis Factor-Related Protein-3, a Newly Identified Adipokine, Is a Novel Antiapoptotic, Proangiogenic, and Cardioprotective Molecule in the Ischemic Mouse Heart. Circulation 2012;125(25):3159-+
ALZET Comments: Tumor necrosis factor related protein 3, C1q, recomb.; IP; Mice; 2 weeks; Control animals received mp w/ vehicle; animal info (C57BL/6, male, adult); functionality of mp verified via plasma drug levels.

Q2718: M. M. A. Worlitzer*, et al.* Anti-inflammatory treatment induced regenerative oligodendrogenesis in parkinsonian mice. STEM CELL RESEARCH & THERAPY 2012;3(;):U1-U12
ALZET Comments: Tumor necrosis factor, alpha; Saline; CSF/CNS; Mice; 1002; 14 days; Control animals received mp w/ vehicle; animal info (C57BL/6, 20 g); ALZET brain infusion kit 3 used.

Q1874: C. Hambly*, et al.* Repletion of TNF-alpha or leptin in calorically restricted mice suppresses post-restriction hyperphagia. Disease Models & Mechanisms 2012;5(1):83-94
ALZET Comments: Leptin; tumor necrosis factor, alpha, recomb. murine; Mice; 2002; Controls received mp w/ PBS; animal info (male, MF1).

Q1517: N. S. Sunderland*, et al.* Tumor necrosis factor alpha induces a model of preeclampsia in pregnant baboons (Papio hamadryas). Cytokine 2011;56(2):192-199
ALZET Comments: Tumor necrosis factor-alpha; PBS; IV (femoral); Monkey (pregnant, baboon); 2ML4; Controls received mp w/ vehicle; animal info (female, baboon, Papio hamadryas).

Q1471: H. J. Ryu*, et al.* p65/RelA-Ser529 NF-kappa-B Subunit Phosphorylation Induces Autophagic Astroglial Death (Clasmatodendrosis) Following Status Epilepticus. Cellular and Molecular Neurobiology 2011;31(7):1071-1078
ALZET Comments: Tumor necrosis factor, alpha, p55 receptor; Saline; CSF/CNS; Rat; 1007D; 2 weeks; Controls received mp w/ vehicle; animal info (Sprague-Dawley); ALZET brain infusion kit 1 used.

Q1381: E. C. Wahl*, et al.* Direct bone formation during distraction osteogenesis does not require TNF alpha receptors and elevated serum TNF alpha fails to inhibit bone formation in TNFR1 deficient mice. Bone 2010;46(2):410-417
ALZET Comments: Tumor necrosis factor-alpha, recomb. murine; PBS; BSA; SC; Mice; 1002; 14 days; Controls received mp w/ vehicle; animal info (male, C57BL/6, R1KO, R2KO).

Q0192: E. C. Wahl*, et al.* Restoration of Regenerative Osteoblastogenesis in Aged Mice: Modulation of TNF. Journal of Bone and Mineral Research 2010;25(1):114-123
ALZET Comments: Tumor necrosis factor, recomb. mouse; PBS; SC; Mice; 1002; 14 days; Controls received mp w/ vehicle; animal info (male, C57BL/6 wt, p21 KO, 3 months old, distraction osteogenesis); functionality of mp verified by TNF serum levels.

P9916: M. Takaoka*, et al.* Endovascular Injury Induces Rapid Phenotypic Changes in Perivascular Adipose Tissue. ARTERIOSCLEROSIS THROMBOSIS AND VASCULAR BIOLOGY 2010;30(8):1576-1582
ALZET Comments: Tumor necrosis factor-alpha, recomb; Periadventitial; Mice; 4 weeks; Controls received mp w/ PBS.

Q0768: R. A. Bobadilla*, et al.* Placental Effects of Systemic Tumour Necrosis Factor-alpha in an Animal Model of Gestational Diabetes Mellitus. PLACENTA 2010;31(12):1057-1063
ALZET Comments: Tumor necrosis factor, recomb. mouse; SC; Mice; 2001; 7 days; Controls received mp w/ saline; animal info (db/+, gd11.5).

Q0520: Q. Tian*, et al.* Inhibition of Tumor Necrosis Factor-alpha-Induced Interleukin-6 Expression by Telmisartan Through Cross-Talk of Peroxisome Proliferator-Activated Receptor-gamma With Nuclear Factor kappa B and CCAAT/Enhancer-Binding Protein-beta. Hypertension 2009;53(5):798-804
ALZET Comments: Angiotensin II; tumor necrosis factor-alpha; DMEM; water, sterile; SC; Mice; 1 week; Animal info (9 wks old, C57/BL6); peptides.

P9512: E. Hinojosa*, et al.* Age-Associated Inflammation and Toll-Like Receptor Dysfunction Prime the Lungs for Pneumococcal Pneumonia. Journal of Infectious Diseases 2009;200(5):546-554
ALZET Comments: Tumor necrosis factor-a; PBS; albumin, mouse serum; SC; Mice; 1007D; 5, 6 days; Controls received mp w/ vehicle; animal info (young Balb/cby, adult); immunology.

P9407: F. R. C. Giachini*, et al.* Interleukin-10 attenuates vascular responses to endothelin-1 via effects on ERK1/2-dependent pathway. American Journal of Physiology-Heart and Circulatory Physiology 2009;296(2):H489-H496
ALZET Comments: Tumor necrosis factor-a; Saline; SC; Mice; 1002; 14 days; Controls received mp w/ vehicle; functionality of mp verified by serum TNFa levels; cardiovascular; animal info (male, C57BL/6, wt, IL-1D -/-, 10 wks old).

P9164: R. Sud*, et al.* Antinociception occurs with a reversal in alpha$_2$-adrenoceptor regulation of TNF production by peripheral monocytes/macrophages from pro- to anti-inflammatory. European Journal of Pharmacology 2008;588(2-3):217-231
ALZET Comments: Tumor necrosis factor, recomb. rat; CSF, artificial; CSF/CNS; Rat; 2002; Controls received mp w/ vehicle; ALZET brain infusion kit used; animal info (male, Sprague Dawley, 200-300 g.); gentamycin was added to the aCSF to prevent bacterial growth; rat albumin was added to stabilize the infused compound.

P9437: K. Riazi*, et al.* Microglial activation and TNF alpha production mediate altered CNS excitability following peripheral inflammation. PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA 2008;105(44):17151-17156
ALZET Comments: Tumor necrosis factor-a; Saline; albumin, rat; chlorbutanol; CSF/CNS; Rat; 1007D; 4 days; Controls received mp w/ vehicle; peptides; animal info (male, Sprague Dawley, 175-200 g.).

P9211: B. LaMarca*, et al.* Autoantibodies to the Angiotensin Type I Receptor in Response to Placental Ischemia and Tumor Necrosis Factor-alpha in Pregnant Rats. Hypertension 2008;52(6):1168-1172
ALZET Comments: Tumor necrosis factor-a; Rat (pregnant); 2002; 5 days; Functionality of mp verified by serum TNFa levels; cardiovascular; peptides; ischemia (placental); animal info (female, Sprague Dawley, gd 14-19).

P9760: E. M. Keithley*, et al.* Tumor necrosis factor alpha can induce recruitment of inflammatory cells to the cochlea. OTOLOGY & NEUROTOLOGY 2008;29(6):854-859
ALZET Comments: Tumor necrosis factor-alpha; Ear (cochlea); Guinea pig; 2001; 2-4 days; Controls received mp w/vehicle; animal info (Hartley albino); tissue perfusion.

P8246: R. Sud*, et al.* Uncovering molecular elements of brain-body communication during development and treatment of neuropathic pain. BRAIN BEHAVIOR AND IMMUNITY 2007;21(1):112-124
ALZET Comments: Tumor necrosis Factor-a, recomb. rat: tumor necrosis factor-a, recomb. rat, heat-inactivated; amitriptyline; CSF, artificial; CSF/CNS; Rat; 8 days; Controls received mp w/ vehicle, or heat-inactivated rr-TNFa; comparison of ip injections vs. mp; peptides; animal info (male, Sprague-Dawley, 300-350g); chronic constriction injury to the right sciatic nerve; neuropathic pain.

P8521: B. D. LaMarca*, et al.* Role of sex steroids in modulating tumor necrosis factor alpha-induced changes in vascular function and blood pressure. American Journal of Hypertension 2007;20(11):1216-1221
ALZET Comments: Tumor necrosis factor; Saline; heparin; IV; Rat; 2001; 5 days; Controls received mp w/ vehicle; replacement therapy (ovariectomy); cardiovascular; animal info (female, Sprague-Dawley, 15 weeks old).

P9937: G. Cavadini*, et al.* TNF-alpha suppresses the expression of clock genes by interfering with E-box-mediated transcription. PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA 2007;104(31):12843-12848
ALZET Comments: Tumor necrosis factor-alpha; BSA; PBS; SC; Mice; 1007D; 7 days; Controls received mp w/ vehicle; animal info (7 wks old, C57BL/6).

P7788: Y. Suzuki*, et al.* A tumor necrosis factor-alpha antagonist inhibits inflammatory bone resorption induced by Porphyromonas gingivalis infection in mice. Journal of Periodontal Research 2006;41(2):81-91
ALZET Comments: Tumor necrosis factor receptor peptide WP9QY; PBS; DMSO; SC; Mice; 2001; 7 days; Controls received mp w/ vehicle; dose-response (fig. 4); no stress (see pg. 85, 89-90); peptides; animal info (Balb/c, male, 4 wk. old); 10% DMSO; "the WP9QY peptide degrades very fast, which is the reason why we use osmotic mini pump in this study" (pg. 90).

P9000: G. R. Steinberg*, et al.* Tumor necrosis factor alpha-induced skeletal muscle insulin resistance involves suppression of AMP-kinase signaling. Cell Metabolism 2006;4(6):465-474
ALZET Comments: Tumor necrosis factor-a; Saline; Mice; 1003D; 24 hours; Controls received mp w/ vehicle; no stress (see pg. 468); animal info (C57BL/6, wt, TNFR1 -/-).

P8369: J. M. Peterson*, et al.* Tumor necrosis factor-alpha promotes the accumulation of neutrophils and macrophages in skeletal muscle. Journal of Applied Physiology 2006;101(5):1394-1399
ALZET Comments: Tumor necrosis factor-a, recomb. mouse; Saline, physiological; albumin, mouse serum; SC; Mice; 2001; 7 days; Controls received mp w/ vehicle; functionality of mp verified by residual volume; no stress (see pg. 1396); peptides; animal info (male, C57BL/6J, 27-30g.).

P8942: S. Lambin*, et al.* Chronic tumor necrosis factor-alpha infusion in gravid C57BL6/J mice accelerates adipose tissue development in female offspring. JOURNAL OF THE SOCIETY FOR GYNECOLOGIC INVESTIGATION 2006;13(8):558-565
ALZET Comments: Tumor necrosis factor-alpha, recomb. mouse; SC; Mice (pregnant); 2001; 7 days; Controls received mp w/ saline; dose-response (fig. 1); no stress (see pg. 560); teratology; peptides; animal info (female, C57BL/6, gd 11.5-18.5); endocrinology.

P7787: K. Aoki*, et al.* A TNF receptor loop peptide mimic blocks RANK ligand-induced signaling, bone resorption, and bone loss. Journal of Clinical Investigation 2006;116(6):1525-1534
ALZET Comments: Tumor necrosis factor receptor peptide WP9QY; peptides, synthetic; PBS; DMSO; SC; Mice; 2002; 4 weeks; 3 days; Controls received mp w/ vehicle, or control peptide; dose-response (pg. 1530); pumps replaced after 2 weeks; no stress (see pg. 1529); peptides; animal info (female, C57BL/6J, 12 wk old); 10% DMSO; inhibits osteoclastogenesis and bone resorption.