



References on the Administration of Antibiotics Using ALZET® Osmotic Pumps

1. ActinomycinD

P1379: M. Kanje, *et al.* A new method for studies of the effects of locally applied drugs on peripheral nerve regeneration in vivo. *Brain Research* 1988;439(116-121)

ALZET Comments: Actinomycin D; Cycloheximide; Mitomycin C; Vinblastine; Ringer's solution; CSF/CNS (sciatic nerve); Rat; 2001; 2002; 3, 4, 6 days; mp connected to silicone cuff; functionality of mp verified in vivo with dye; tissue perfusion.

2. Amikacin

Q5309: M. M. Clancy, *et al.* Management of Osteomyelitis Caused by Salmonella Enterica Subsp. Houtenae in a Taylor's Cantil (*Agkistrodon Bilineatus Taylori*) Using Amikacin Delivered Via Osmotic Pump. *J Zoo Wildl Med* 2016;47(2):691-4

ALZET Comments: Amikacin; SC; snake; 2002; 10 months; animal info (adult female Taylor's cantil, 6 yr old); good methods; spinal cord injury; long-term study; "This study demonstrates that the infection can be suppressed and the animal's life extended by long-term continuous infusion of amikacin and that such treatment did not result in renal compromise in this individual." pg 694; Veterinary Application; temperature adjusted pumping rate for snake; Industry authored (American Association of Zoo Veterinarians); Interesting (Veterinary use presented for treating animal with antibiotics for extended duration; minimizing need for animal handling); Dose (26ug/kg/hr);

R0324: P. M. Gibbons. ADVANCES IN REPTILE CLINICAL THERAPEUTICS. *Journal of Exotic Pet Medicine* 2014;23(1):21-38

ALZET Comments: Amikacin; florfenicol; gonadotropin-releasing hormone; Snake; iguana; Animal info (Euttata corn snake, Cscutulaus Mojave rattlesnake, green iguana); stress/adverse reaction: (see pg. 23);

Q2846: A. A. Al Dayeh, *et al.* Real-time monitoring of the growth of the nasal septal cartilage and the nasofrontal suture. *American Journal of Orthodontics and Dentofacial Orthopedics* 2013;143(6):773-783

ALZET Comments: Amikacin; gentamicin; SC; Pig (mini); Animal info (female, 3.5-4.5 mo old, 12-27 kg); 2ML sized pumps used; pump implanted in the back of the neck.

P9856: M. J. Adkesson, *et al.* MEDICAL AND SURGICAL MANAGEMENT OF OTITIS IN CAPTIVE BONGO (TRAGELAPHUS EURYCERUS). *JOURNAL OF ZOO AND WILDLIFE MEDICINE* 2009;40(2):332-343

ALZET Comments: Amikacin; Ear; Antelope (bongo); 2ML4; 24 days; Functionality of mp verified by residual volume; animal info (10 years old, male, 326 kg); "An osmotic pump was beneficial for antibiotic delivery in case 2 and may be an effective therapy for low-grade infections or for continued therapy once a severe infection is under control." pg. 340.

P8496: Z. Y. Sun, *et al.* Masticatory mechanics of a mandibular distraction osteogenesis site: Interfragmentary micromovement. *Bone* 2007;41(2):188-196

ALZET Comments: Amikacin; Sub-masseteric tunnel; Pig; 2ML2; 14 days; Bone healing; x-ray image showing pump adjacent to mandible bone (p. 189); pump positioned near mandible bone to deliver antibiotics for infection control; tissue perfusion (sub-masseteric tunnel).

P8296: J. M. Sykes, *et al.* Evaluation of an implanted osmotic pump for delivery of amikacin to corn snakes (*Elaphe guttata guttata*). *JOURNAL OF ZOO AND WILDLIFE MEDICINE* 2006;37(3):373-380

ALZET Comments: Amikacin; Saline, sterile; Intracoelomic; Snake (corn); 1002; Functionality of mp verified by plasma levels; comparison of IM injections vs. mp; half-life (p. 376) 44-45 hours; animal info (male, female, 115-328 grams); "...pumps delivered the drug at a predictable rate and were efficacious in achieving a constant plasma concentration of amikacin at the predicted level. Osmotic pumps may offer a safer alternative to periodic intramuscular injections for drug delivery in venomous or aggressive snakes." (p. 373); temperatures between 27.2-27.7 C; surgical staples (wound clips) used.



R0259: J. M. Sykes. Techniques for drug delivery in reptiles and amphibians. *Journal of Exotic Pet Medicine* 2006;15(3):210-217

ALZET Comments: Amikacin; gonadotropin-releasing hormone; Snake; iguana; 1002; Peptides; animal info (corn snake); review, see p. 211; ref #9; "Alzet osmotic pumps can deliver medications continuously without the need for periodic injections. They hold promise for future delivery options in reptiles." (p. 211).

P4730: M. Duan, *et al.* Complementary roles of neurotrophin 3 and a *N*-methyl-D-aspartate antagonist in the protection of noise and aminoglycoside-induced ototoxicity. *PNAS* 2000;97(13):7597-7602

ALZET Comments: NT-3; Amikacin;; Perilymph, artificial;; Ear (cochlea);; Guinea pig;; 2ML2;; 15 days;; Antibiotic; Controls received mp w/ vehicle; tissue perfusion (scala tympani); Amikacin is an aminoglycoside antibiotic; Group 1 received amikacin, Group 2 received vehicle, Group 3 received amikacin and NT-3; All treatment groups received drug for 1 day, followed by 2 weeks perilymph;

P4403: P. Ernfors, *et al.* Protection of auditory neurons from aminoglycoside toxicity by neurotrophin-3. *Nature Medicine* 1996;2(4):463-467

ALZET Comments: Amikacin; NT-3;; Perilymph, artificial;; Ear (cochlea);; Guinea pig;; 2ML2;; 2 weeks;; Antibiotic; controls received mp with vehicle; tissue perfusion (scala tympani); peptides; Lynch coil used, agents or vehicle given in different sequential combinations;.

P0601: C. R. Perry, *et al.* Local administration of antibiotics with an implantable osmotic pump. *Clin. Orthop* 1985;192(284-290)

ALZET Comments: Amikacin; Gentamicin; bone; rabbit; 2001; 2ML1; 6 days; Antibiotic; comparison of im injection vs. mp infusion; no stress p. 289 - no tissue reaction; antibiotic; tissue perfusion.

3. Bleomycin

Q7149: K. Kamio, *et al.* Resolution of bleomycin-induced murine pulmonary fibrosis via a splenic lymphocyte subpopulation. *Respir Res* 2018;19(1):71

ALZET Comments: Bleomycin; Saline; SC; Mice; 2001; 7 days; Dose (100 mg/kg/day); Controls received mp w/ vehicle; animal info (C57BL/6); gene therapy; .

Q5913: T. Watanabe, *et al.* Optimization of a murine and human tissue model to recapitulate dermal and pulmonary features of systemic sclerosis. *PLoS One* 2017;12(6):e0179917

ALZET Comments: Bleomycin; Saline; SC; Mice; 1007D; 7 days; Controls received mp w/ vehicle; dose-response pg 5); Pumps removed on day 10; Dose (1, 10, 60, 110 u/kg);.

Q6078: X. Liang, *et al.* Inhibition of FKBP10 Attenuates Hypertrophic Scarring through Suppressing Fibroblast Activity and Extracellular Matrix Deposition. *J Invest Dermatol* 2017;137(11):2326-2335

ALZET Comments: Bleomycin sulfate; SC; Mice; 1004; 56 days; Dose (2.8 mg/ml); animal info (12 week old C57/BL6 mice);.

Q5874: A. P. Grzegorzewska, *et al.* Dimethyl Fumarate ameliorates pulmonary arterial hypertension and lung fibrosis by targeting multiple pathways. *Sci Rep* 2017;7(41605)

ALZET Comments: Bleomycin; PBS; SC; Mice; 1007D; 7 days; animal info (6–8 week old male C57BL/6 mice); pulmonary fibrosis model wherein fibrosis was induced by osmotic pump-delivery of bleomycin; Dose (1.8 Unit/mouse);.

Q6151: K. Fujiwara, *et al.* Inhibition of Cell Apoptosis and Amelioration of Pulmonary Fibrosis by Thrombomodulin. *Am J Pathol* 2017;187(10):2312-2322

ALZET Comments: Bleomycin; Saline; SC; Mice; 10 days; Dose (100 mg/kg); Controls received mp w/ vehicle; animal info (Nine-week-old female WT mice weighing 19 to 21 g);.



Q5470: M. Urawa, *et al.* Protein S is protective in pulmonary fibrosis. *J Thromb Haemost* 2016;14(8):1588-99

ALZET Comments: Bleomycin; Saline; SC; Mice; 7 days; Controls received mp w/ vehicle; animal info (male, hPS-TG or C57Bl6, 18-22g, 8-12 weeks old); cardiovascular; Dose (100 mg/kg);

Q4851: R. Lemaire, *et al.* Resolution of Skin Fibrosis by Neutralization of the Antifibrinolytic Function of Plasminogen Activator Inhibitor. *ARTHRITIS & RHEUMATOLOGY* 2016;68(2):473-483

ALZET Comments: Bleomycin; SC; Mice; 1 week; animal info (C57Bl6, 6-10 weeks old); Dose (100 mg/kg);

Q4183: W. T. Wu, *et al.* Synergistic Effect of Bolus Exposure to Zinc Oxide Nanoparticles on Bleomycin-Induced Secretion of Pro-Fibrotic Cytokines without Lasting Fibrotic Changes in Murine Lungs. *International Journal of Molecular Sciences* 2015;16(660-676

ALZET Comments: Bleomycin sulfate; Saline; SC; Mice; 2001; 7 days; Controls received mp w/ vehicle; animal info (female, C57BL6J, 9 weeks old, 19-22g); cardiovascular;

Q3974: M. R. Liang, *et al.* A modified murine model of systemic sclerosis: bleomycin given by pump infusion induced skin and pulmonary inflammation and fibrosis. *LABORATORY INVESTIGATION* 2015;95(342-350

ALZET Comments: Bleomycin; Saline; SC; Mice; 2004; 1 week; 2 weeks; 3 weeks; 4 weeks; Controls received mp w/ vehicle; animal info (C57BL6, 6-8 weeks old); no stress (see pg. 344); immunology;

Q4062: C. Reese, *et al.* Fibrocytes in the fibrotic lung: altered phenotype detected by flow cytometry. *FRONTIERS IN PHARMACOLOGY* 2014;5(U1-U13

ALZET Comments: Bleomycin; caveolin-1 scaffolding domain peptide;; Saline; DMSO; water; SC; Mice; 1007D; 2002; 10 days; 12 days;; Controls received mp w/ vehicle; animal info (male, CD1, 10 weeks old); 10% DMSO used; immunology; bleomycin had saline vehicle; CSD had DMSO and water vehicle; caveolin-1 scaffolding domain peptide aka CSD; bleomycin pumps removed after days 10-12 and replaced with CSD pumps;

Q3964: R. Lee, *et al.* Bleomycin delivery by osmotic minipump: similarity to human scleroderma interstitial lung disease. *AMERICAN JOURNAL OF PHYSIOLOGY-LUNG CELLULAR AND MOLECULAR PHYSIOLOGY* 2014;306(L736-L748

ALZET Comments: Bleomycin; Saline; SC; Mice; 1007D; 10 days; Controls received mp w/ vehicle; animal info (male, CD1, 10 weeks old); comparison of injection vs mp; immunology; "the pump model provides additional major benefits compared with the direct model. Much less weight loss and mortality is observed in the pump model than in the direct model. Therefore, besides the fact that the pump model is more humane, it also benefits the researcher because it allows the number of surviving animals in treatment groups to be accurately predicted, thereby making analyses of biochemical and cell biological parameters at the end of an experiment more meaningful." pg L747; pumps removed after 10 days; human scleroderma interstitial lung disease model;

Q3961: R. Lee, *et al.* Caveolin-1 regulates chemokine receptor 5-mediated contribution of bone marrow-derived cells to dermal fibrosis. *FRONTIERS IN PHARMACOLOGY* 2014;5(U1-U14

ALZET Comments: Bleomycin; Saline; SC; Mice; 1007D; 10 days; Controls received mp w/ vehicle; animal info (male, CD1, 10 weeks old); comparison of injection vs mp; "Recently, we found that systemic bleomycin delivery using subcutaneously implanted osmotic minipumps can produce a very useful mouse model for SSc in which fibrosis is observed in the skin, lungs, and a variety of other internal organs" pg 2; "We recently compared two methods of delivering bleomycin [Direct Model (directly into the lungs) and Pump Model (systemic delivery using implanted osmotic minipumps)]and found that the lung disease induced in the Pump Model was distinct from the disease induced in the Direct Model and more similar to the lung disease observed in SSc patients" pg 4; pumps removed after 10 days;

Q3512: M. Inomata, *et al.* Pirfenidone inhibits fibrocyte accumulation in the lungs in bleomycin-induced murine pulmonary fibrosis. *RESPIRATORY RESEARCH* 2014;15(;):U1-U14

ALZET Comments: Bleomycin; Saline; SC; Mice; 2001; 7 days; Controls received mp w/ vehicle; animal info (female, C57BL6, 9 weeks old); "Although intratracheal, intravenous, and subcutaneous injections are associated with disadvantages including variable distribution of lesions, high mortality, and a requirement for multiple procedures, the osmotic pump



method of BLM treatment reportedly avoids these difficulties" pg 11-12; Bleomycin infusion used to model pulmonary fibrosis.

Q3427: A. M. Cameron, *et al.* A Novel Murine Model of Hypertrophic Scarring Using Subcutaneous Infusion of Bleomycin. *PLASTIC AND RECONSTRUCTIVE SURGERY* 2014;133(1):69-78

ALZET Comments: Bleomycin; SC; Mice; 1004; 28 days; Controls received mp w/ PBS; animal info (BALB/c); good methods (picture of pump and pump implantation pg.71); no stress (see pg. 72); "The osmotic pump and infusion were well tolerated by the mice (Fig. 2). There were no obvious systemic differences in the bleomycin cohort compared with the control cohort. As the model did not involve a gross epidermal breach and the pump was positioned away from the insertion site (fig. 2), no macroscopic scarring was observed. The appearance of the murine skin was assessed for gross changes in appearance, but none was observed between the treatment groups." pg 72;.

Q3807: Y. Aono, *et al.* Role of Platelet-Derived Growth Factor/Platelet-Derived Growth Factor Receptor Axis in the Trafficking of Circulating Fibrocytes in Pulmonary Fibrosis. *American Journal of Respiratory Cell and Molecular Biology* 2014;51(7):93-801

ALZET Comments: Bleomycin; Saline; SC; Mice; 2001; Controls received mp w/ vehicle; animal info (female, C57BL/6, 7 weeks old); cardiovascular; immunology; "colleagues performed intratracheal injection in rats, but we used systemic infusion with a minipump in mice, which induces more chronic and mild model of pulmonary fibrosis in mice" pg 799;.

Q2641: A. N. Stefanov, *et al.* Positional Cloning Reveals Strain-Dependent Expression of Trim16 to Alter Susceptibility to Bleomycin-Induced Pulmonary Fibrosis in Mice. *PLoS Genetics* 2013;9(1):U684-U691

ALZET Comments: Bleomycin sulfate; Sodium chloride; SC; Mice; 2001; 7 days; Animal info (C57BL/6, C3H/HeJ, 8-10 wks old).

Q3096: K. Kinoshita, *et al.* Antifibrotic Effects of Focal Adhesion Kinase Inhibitor in Bleomycin-Induced Pulmonary Fibrosis in Mice. *American Journal of Respiratory Cell and Molecular Biology* 2013;49(4):536-543

ALZET Comments: Bleomycin; Saline; Mice; 2001; 7 days; Controls received mp w/ vehicle; animal info (female, C57BL/6, 8 weeks old); Pumps used to induce pulmonary fibrosis.

Q5517: D. Boveda-Ruiz, *et al.* Differential role of regulatory T cells in early and late stages of pulmonary fibrosis. *Immunobiology* 2013;218(2):245-54

ALZET Comments: Bleomycin; Immunoglobulin G; Saline; IP; Mice (transgenic); 2001; 7 days; Controls received mp w/ saline; animal info (8- to 10-wk-old, female, C57BL/6 mice, weighing 20–23 g); Therapeutic indication (Pulmonary fibrosis); Dose (60 mg/kg);.

4. Doxycycline

Q6660: J. H. Seo, *et al.* In Situ Pluripotency Factor Expression Promotes Functional Recovery From Cerebral Ischemia. *Mol Ther* 2016;24(9):1538-49

ALZET Comments: Doxycycline; PBS; CSF/CNS (right lateral ventricle); Mice (transgenic); 1007D; 7 days; Dose ((12 ng/day or 1,200 ng/day); Controls received mp w/ vehicle; animal info (transgenic mice expressing Pou5f1 (Oct4), Sox2, Myc, and Klf4); Doxycycline aka DOX; ALZET brain infusion kit 3 used; Brain coordinates ((AP +0.3 mm from Bregma; ML –0.7 mm from Bregma; DV –2.0 mm from Dura); ischemia (cerebral); Therapeutic indication (Cerebral ischemia);.

Q4941: P. Rai, *et al.* Renin angiotensin system modulates mTOR pathway through AT2R in HIVAN. *Exp Mol Pathol* 2014;96(3):431-7

ALZET Comments: Telmisartan; PD123319; Doxycycline; aliskiren; Saline; water; SC; mice; 2004; 2, 6 weeks; Controls received mp w/ vehicle; animal info : Tg26 mice; FVBN mice, Tg26 mice; Vpr transgenic mice (4 week old); immunology; Dose: Telmisartan (AT1R blocker, 300 µg/day), PD123319 (AT2R blocker, 3 µg/day); Doxycycline + aliskiren (50 mg/kg).



Q1540: L. Clarke, *et al.* The Adult Mouse Dentate Gyrus Contains Populations of Committed Progenitor Cells that are Distinct from Subependymal Zone Neural Stem Cells. *Stem Cells* 2011;29(9):1448-1458

ALZET Comments: Doxycycline; Saline; CSF/CNS; Mice (transgenic); 1007D; 4 days; Controls received mp w/ vehicle; animal info (GFP/M2, 2-3 mo old).

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

ALZET Comments: Thyroxine, L-; doxycycline; SC; Rat; 1002; 14 days; Controls received mp w/ physiological serum; animal info (Wistar, male, 50-60 days old, 132 g);.

P9224: J. H. Reyes, *et al.* Glutamatergic Neuronal Differentiation of Mouse Embryonic Stem Cells after Transient Expression of Neurogenin 1 and Treatment with BDNF and GDNF: In Vitro and In Vivo Studies. *Journal of Neuroscience* 2008;28(48):12622-12631

ALZET Comments: Doxycycline; brain-derived neurotrophic factor; glial cell line-derived neurotrophic factor; Ear (scala tympani); Guinea pig; 2002; 27 days; Controls received no treatment to contralateral ear; pumps replaced; peptides; tissue perfusion (scala tympani); animal info (NIH strain, 275-315 g., deafened); cannula and catheter contained doxycycline, mp contained BDNF/GDNF (delayed delivery) to follow, thus providing 2 days Dox, 25 days BDNF/GDNF.

P8811: S. Nagano, *et al.* Cancer cell death enhances the penetration and efficacy of oncolytic herpes simplex virus in tumors. *Cancer Research* 2008;68(10):3795-3802

ALZET Comments: Doxycycline; SC; Mice (SCID); 3 days; Controls received mp w/ saline; cancer (mammary carcinoma); animal info (SCID).

P8002: C. H. Tsai, *et al.* Tetracycline-regulated intratumoral expression of interleukin-3 enhances the efficacy of radiation therapy for murine prostate cancer. *Cancer Gene Therapy* 2006;13(12):1082-1092

ALZET Comments: Doxycycline; PBS; SC; Mice; 2001; 7 days; Controls received mp w/ vehicle; cancer (prostate); animal info (C57BL/6J, 7-8 weeks old); paper states incorrect pump model.

P7937: M. A. Bartoli, *et al.* Localized administration of doxycycline suppresses aortic dilatation in an experimental mouse model of abdominal aortic aneurysm. *Annals of Vascular Surgery* 2006;20(2):228-236

ALZET Comments: Doxycycline hydrochloride; Saline; SC; IP; IA (aorta); Mice; 1002; 14 days; Controls received mp w/ vehicle; tissue perfusion (aorta); dose-response (table 1); comparison of oral vs. mp; half-life (p. 234), 26.5 hours; cardiovascular; animal info (C57BL/6J, male, 8-10 weeks old, 20-35 grams); catheter secured to a polyvinyl alcohol sponge positioned over the anterior surface of the aorta and secured to retroperitoneal tissues; (quote p. 233).

P7374: M. Mavragani, *et al.* Orthodontically induced root and alveolar bone resorption: inhibitory effect of systemic doxycycline administration in rats. *European Journal of Orthodontics* 2005;27(3):215-225

ALZET Comments: Doxycycline; SC; Rat; 2002; 7, 10, 14 days; Controls received no treatment; no stress (see pg. 217); enzyme inhibitor (collagenase); orthodontic appliance; agent also known as Doxylin; "The animals tolerated the appliance and the implanted mini-osmotic pump well. The incision wound from the implantation of the mini-osmotic pump was adequately healed by the day following surgery!" (p. 217).

5. Gentamicin

Q2846: A. A. Al Dayeh, *et al.* Real-time monitoring of the growth of the nasal septal cartilage and the nasofrontal suture. *American Journal of Orthodontics and Dentofacial Orthopedics* 2013;143(6):773-783

ALZET Comments: Amikacin; gentamicin; SC; Pig (mini); Animal info (female, 3.5-4.5 mo old, 12-27 kg); 2ML sized pumps used; pump implanted in the back of the neck.

Q2064: E. Bas, *et al.* Efficacy of three drugs for protecting against gentamicin-induced hair cell and hearing losses. *British Journal of Pharmacology* 2012;166(6):1888-1904



ALZET Comments: Gentamicin; dexamethasone; melatonin; Ear (round window); Rat; 2001; 7 days; Controls received mp w/ saline; animal info (Wistar, male, 220-250 g); stability verified after 7 days (data not shown).

P9166: K. Guerin, *et al.* Systemic aminoglycoside treatment in rodent models of retinitis pigmentosa. *Experimental Eye Research* 2008;87(3):197-207

ALZET Comments: Gentamicin; SC; Rat (transgenic); 1007D; 5 days; Animal info (S3344ter-4, heterozygous, P15).

P8738: P. Roehm, *et al.* Gentamicin uptake in the chinchilla inner ear. *Hearing Research* 2007;230(1-2):43-52

ALZET Comments: Gentamicin; Ear (round window); Chinchilla; 2002; 1, 3, 6, 14 days; 4, 8 hours; Comparison of transtympanic injections vs. mp; tissue perfusion (round window); animal info (male, female, chinchilla langier).

P8198: A. I. Bakardjiev, *et al.* *Listeria monocytogenes* traffics from maternal organs to the placenta and back. *PLoS Pathog* 2006;2(6):e66

ALZET Comments: Gentamicin sulfate; SC; Guinea pig (pregnant); 2ML1; Functionality of mp verified by plasma levels taken; teratology; listeria; wound clips used.

P6392: T. Okuda, *et al.* Inner ear changes with intracochlear gentamicin administration in guinea pigs. *Laryngoscope* 2004;114(4):694-697

ALZET Comments: Gentamicin; Saline; Ear (cochlea); Guinea pig; 2002; 14 days; Controls received mp w/ vehicle; pumps replaced at day 7; pump contained saline only for the first seven days; PE-10 used; tissue perfusion (cochlea).

P6918: M. Li, *et al.* Vestibular destruction by slow infusion of gentamicin into semicircular canals. *Acta Oto-laryngologica* 2004;124(35-41)

ALZET Comments: Gentamicin; Hank's solution; Ear (semicircular canals); Chinchilla; 1007D; 7 days; Controls received mp w/ vehicle; Meniere's disease; microcatheter used; 27 gauge tubing used for cannulation; tissue perfusion (semicircular canals).

P6860: D. A. Drevets, *et al.* The Ly-6C^{high} monocyte subpopulation transports *Listeria monocytogenes* into the brain during systemic infection of mice. *Journal of Immunology* 2004;172(7):4418-4424

ALZET Comments: Gentamicin; PBS; Mice; 1-2 days;

P4869: W. J. Wu, *et al.* Aminoglycoside ototoxicity in adult CBA, C57BL and BALB mice and the Sprague-Dawley rat. *Hearing Research* 2001;158(165-178)

ALZET Comments: Kanamycin; Gentamicin; Saline; SC; Rat; mice; 15 days; preliminary experiments on drug tolerance were carried out in mice using gentamicin; kanamycin infusion done in rats.

P4856: M. E. Hoffer, *et al.* Transtympanic versus sustained-release administration of gentamicin: Kinetics, morphology, and function. *Laryngoscope* 2001;111(1343-1357)

ALZET Comments: Gentamicin sulfate; Water, sterile; Ear; Chinchilla; 2001; 7 days; Dose-response (graph, table p. 1349); comparison of transtympanic injections vs. mp; IntraEar catheter used; Meniere's Disease; Vertigo; tinnitus; tissue perfusion.

P4880: D. Drevets, *et al.* *Listeria Monocytogenes*-infected phagocytes can initiate central nervous system infection in mice. *Infection and Immunity* 2001;March 2001(1344-1350)

ALZET Comments: Gentamicin sulfate; PBS; SC; mice; 1007D; 4-6 days; controls received no gentamicin treatment; dose response (graph p. 1346); immunology.

6. Minocycline

Q6949: T. Zera, *et al.* Microglia and brain angiotensin type 1 receptors are involved in desensitising baroreflex by intracerebroventricular hypertonic saline in male Sprague-Dawley rats. *Auton Neurosci* 2019;217(49-57)



ALZET Comments: Minocycline, Losartan; Saline, iso-osmotic, Saline, hyperosmotic; CSF/CNS; Rat; 2ML2; 2 weeks; Dose (Minocycline-5 µg/h; Losartan- 12.5 µg/h); 0.9% isosmotic saline with minocycline, 5% Hyperosmotic saline with Losartan used; animal info (Normotensive adult male Sprague-Dawley rats); enzyme inhibitor (microglia); ALZET brain infusion kit 2 used; Brain coordinates (1.2mm posterior to bregma, -1.8mm laterolateral from sagittal suture, diameter 0.5 mm) bilateral cannula used; cyanoacrylate adhesive; cardiovascular;

Q7050: R. K. Sharma, *et al.* Involvement of Neuroinflammation in the Pathogenesis of Monocrotaline-Induced Pulmonary Hypertension. *Hypertension* 2018;71(6):1156-1163

ALZET Comments: Minocycline; CSF, artificial; CSF/CNS (left ventricle); Rat; 2004; Dose (5 µg/h); animal info (8 week old male Sprague-Dawley rats);

Q6332: J. Zhang, *et al.* Prevention and reversal of latent sensitization of dorsal horn neurons by glial blockers in a model of low back pain in male rats. *J Neurophysiol* 2017;118(4):2059-2069

ALZET Comments: Minocycline, fluorocitrate; PBS, artificial cerebrospinal fluid; CSF/CNS (intrathecal); Rat; 2002; 6 days, 3 days; Dose (200 µg/day); Controls received mp w/ vehicle; animal info (adult male Sprague-Dawley rats);

Q6036: D. Du, *et al.* Neuroinflammation contributes to autophagy flux blockage in the neurons of rostral ventrolateral medulla in stress-induced hypertension rats. *J Neuroinflammation* 2017;14(1):169

ALZET Comments: Minocycline; inhibitor; CSF, artificial; CSF/CNS (cistern magna); Rat; 1007D; 7 days; 1 week; Controls received mp w/ vehicle; animal info (8 weeks old; 250-300g); Therapeutic indication (Neuroinflammation); Dose (.3 µL/hr);

Q4910: R. L. T. Baojian Xue, Yang Yu, Fang Guo, Terry G. Beltz, Robert B. Felder, *et al.* Central Renin–Angiotensin System Activation and Inflammation Induced by High-Fat Diet Sensitize

Angiotensin II–Elicited Hypertension. *Hypertension* 2016;67(163-170)

ALZET Comments: Pentoxifylline; irbesartan; minocycline; angiotensin II; CSF, artificial; Na sodium bicarbonate; saline; CSF/CNS; Rat; 2004; 2002; 2001; 4 weeks; 2 weeks; 1 week; Controls received mp w/ vehicle; animal info (male, Sprague Dawley, 10-12 weeks old); cardiovascular; peptides; Dose (ICV - Pentoxifylline 10 µg/hr; irbesartan 125 µg/day; minocycline 5 µg/hr; SC AngII 120 ng/kg/min); brain coordinates;

Q4204: M. Yasui, *et al.* A Chronic Fatigue Syndrome Model Demonstrates Mechanical Allodynia and Muscular Hyperalgesia via Spinal Microglial Activation. *Glia* 2014;62(1407-1417)

ALZET Comments: Minocycline; Saline; CSF/CNS (intrathecal); Rat; 2002; 5 days; Controls received mp w/ vehicle; animal info (male, Sprague Dawley, 250g); behavioral testing (Randall-Selitto, Von Frey hairs); immunology;

Q3693: K. A. Won, *et al.* The Glial-Neuronal GRK2 Pathway Participates in the Development of Trigeminal Neuropathic Pain in Rats. *JOURNAL OF PAIN* 2014;15(3):250-261

ALZET Comments: Minocycline; amino adipic acid, L-a-; Interleukin-1 receptor antagonist;; DMSO; saline; CSF/CNS (occipital membrane, cistern); Rat; 2001; 7 days; Controls received mp w/ vehicle; animal info (male, Sprague Dawley, adult, 220-240g); 20% DMSO used; behavioral testing (air-puff pressure/behavioral response withdrawal, mechanical allodynia); L-a-amino adipic acid aka LAA; LAA is an astrocytic specific inhibitor;

Q3988: L. D. Mannelli, *et al.* Glial role in oxaliplatin-induced neuropathic pain. *Experimental Neurology* 2014;261(22-33)

ALZET Comments: Minocycline HCl; Sodium fluorocitrate; PBS; CSF/CNS (intrathecal); Rat; 2004; 21 days; Controls received mp w/ vehicle; animal info (male, Sprague Dawley, 200-250g); behavioral testing (paw pressure test; von frey test; rota-rod test); pumps primed overnight in 37C PBS;

Q3772: M. Dworak, *et al.* Attenuation of microglial and neuronal activation in the brain by ICV minocycline following myocardial infarction. *Autonomic Neuroscience-Basic & Clinical* 2014;185(43-50)

ALZET Comments: Minocycline; Saline; CSF/CNS; Rat; 12 weeks; Control animals received mp w/ saline; animal info (male, Sprague Dawley); pumps replaced every 4 weeks; 0.3 µL/h pump used; ischemia (cardiac); long-term study; cardiovascular;



Q3104: M. J. Kwon, *et al.* Contribution of Macrophages to Enhanced Regenerative Capacity of Dorsal Root Ganglia Sensory Neurons by Conditioning Injury. *Journal of Neuroscience* 2013;33(38):15095-15108

ALZET Comments: Minocycline; PBS; CSF/CNS (intrathecal); Rat; 7 days; Controls received mp w/ vehicle; animal info (female, Sprague Dawley, 250-300g); spinal cord injury; immunology; used PE-10 catheter. Pump sutured to paravertebral muscles.

8. Mitomycin

P1874: X. Lu, *et al.* Inflammation near the nerve cell body enhances axonal regeneration. *J. Neurosci* 1991;11(4):972-978

ALZET Comments: Mitomycin C; CSF/CNS (intrathecal); Rat; no duration posted; no comment posted.

P1993: K. K. Fu, *et al.* Early and late effects of mitomycin C and continuous low-dose-rate irradiation on the mouse skin and soft tissues of the leg. *Int. J. Radiat. Oncol. Biol. Phys* 1991;21(1523-1528)

ALZET Comments: Mitomycin C; Saline; IP; mice; no duration posted; cancer.

P1302: S. Kawano, *et al.* Effect of continuous intravesical infusion of low-concentrated mitomycin-C on bladder carcinogenesis in rats treated with N-butyl-N-4-hydroxybutyl-nitrosamine. *J. Urol* 1988;139(1343-1346)

ALZET Comments: Mitomycin C; bladder; Rat; 2ML2; 2 weeks; mp connected to catheter; dose-response (graph, text); comparison of twice weekly injections vs. mp infusion; functionality of mp verified by urine levels; cancer/immunology; tissue perfusion.

P1379: M. Kanje, *et al.* A new method for studies of the effects of locally applied drugs on peripheral nerve regeneration in vivo. *Brain Research* 1988;439(116-121)

ALZET Comments: Actinomycin D; Cycloheximide; Mitomycin C; Vinblastine; Ringer's solution; CSF/CNS (sciatic nerve); Rat; 2001; 2002; 3, 4, 6 days; mp connected to silicone cuff; functionality of mp verified in vivo with dye; tissue perfusion.

P0818: W. M. Murphy, *et al.* Carcinogenesis in mammalian urothelium: changes induced by non-carcinogenic substances and chronic indwelling catheters. *J. Urol* 1986;135(4):840-844

ALZET Comments: Mitomycin; Water; bladder; Rat; 1 year and 3 weeks; pump replaced periodically; mp connected to bladder via catheter; tumors induced by infusion of water or agent; lesions reversible over time; long-term study; cancer; controls received surgery only; mps cultured upon removal; tissue perfusion.

P0422: H. Akaza, *et al.* Bladder cancer induced by noncarcinogenic substances. *J. Urol* 1984;131(153-155)

ALZET Comments: Formalin, neutral buffered; Water; Cisplatin; Mitomycin C; Saline; Saline; bladder; Rat; 2002; 1, 2, and 3 weeks; cancer; comparison of agents carcinogenic effects; empty mp used in one exp.; mp connected to catheter in bladder; confusion over length of pumping time-states 18-22 days for 14 day pump; tissue perfusion.

8. Neomycin

R0266: E. E. L. Swan, *et al.* Inner ear drug delivery for auditory applications. *Advanced Drug Delivery Reviews* 2008;60(15):1583-1599

ALZET Comments: Cisplatin; Sodium thiosulfate; Brain-derived neurotrophic factor; Fibroblast growth factor; D-JNKI-1; BN82270; Tetrodotoxin; Perilymph, artificial; Dexamethasone; Methylprednisone; Caroverine; Methionine, D-; Thiourea; Liposome, cationic; Neomycin; SC; Ear (round window membrane); Ear (cochlea); Ear (scala tympani); Ear; Guinea pig; 3, 7, 14, 28 days; Gene therapy; peptides; no stress; enzyme inhibitor (peroxidase); stress/adverse reaction (see pg 1593) "Ref #161 found local trauma and inflammatory responses"; tissue perfusion (scala tympani, cochlea, round window membrane); comparison of middle ear injections vs. mp; Review, see pgs. 1587 - 1589, 1591, 1593 - 1595, refs #49, 50, 60, 63, 72, 75, 102, 104,180, 181, 194-201.



P8402: J. Maruyama, *et al.* Effects of antioxidants on auditory nerve function and survival in deafened guinea pigs. *NEUROBIOLOGY OF DISEASE* 2007;25(2):309-318

ALZET Comments: Trolox; neomycin; ascorbic acid; Perilymph, artificial; sodium bicarbonate; Ear (cochlea); Guinea pig; 2002; 26 days; Controls received mp w/ vehicle; pumps replaced after 14 days; post op. care (doxycycline); animal info (male, pigmented, 250-400g., neomycin deafening); cannula primed with 10% neomycin solution followed by a small air bubble spacer to allow neomycin infusion for first 2 days; trolox, a vitamin F analogue, and ascorbic acid delivered together in 1 mp; tissue perfusion (cochlea).

P5009: T. Shinohara, *et al.* Neurotrophic factor intervention restores auditory function in deafened animals. *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA* 2002;99(3):1657-1660

ALZET Comments: Brain-derived neurotrophic factor; Ciliary neurotrophic factor; Neomycin;; Perilymph, artificial; Ear (scala tympani); Guinea pig; 2002; 26 days; controls received mp w/ vehicle; tissue perfusion (cochlea, scala tympani); pumps replaced at day 15; peptides; catheter filled with perilymph and 10% neomycin; pump filled with vehicle or neurotrophic factor solution; 48-hr infusion of neomycin to cause deafness followed by 12 or 26 day infusion of neurotrophic factor pump reservoir.

P5315: R. K. Shepherd, *et al.* A multichannel scala tympani electrode array incorporating a drug delivery system for chronic intracochlear infusion. *Hearing Research* 2002;172(1-2):92-98

ALZET Comments: Neomycin; Kanamycin; Furosenide; PBS; ear (scala tympani); Guinea pig; 2004; 28 days; Tissue perfusion (round window); functionality of mp verified by residual volume; diagram of pump and electrode assembly (p. 94); catheter patency assessed by passing fluid through the line at the end of the experiment; Neomycin infused in pilot study; Kanamycin and furosenide were co-infused in a second study.

P5489: P. Cuevas, *et al.* Inhibition of rat glioma growth by neomycin. Preliminary report. *NEUROLOGICAL RESEARCH* 2002;24(6):522-524

ALZET Comments: Neomycin; PBS; CSF/CNS (intratumoral); Rat; 2004; 26 days; Controls received mp w/ vehicle; tissue perfusion (tumor); cancer.

P4733: B. J. Conlon, *et al.* Topical aminoglycoside ototoxicity: Attempting to protect the cochlea. *Acta Otolaryngol* 2000;120(596-599)

ALZET Comments: Neomycin; lipoic acid, alpha; Saline; Ear (round window); Guinea pig; 2ML4; 7 days; Controls received mp w/ vehicle; tissue perfusion (round window); no stress (see pg. 597); Neomycin antibiotic solution was 5%; micro polyurethane tubing used; the authors state that ALZET delivery system more closely approximates the clinical situation of repeated otic application, with minimal middle ear trauma.

P4101: R. A. Schindler, *et al.* Enhanced preservation of the auditory nerve following cochlear perfusion with nerve growth factor. *Am. J. Otolaryngol* 1995;16(3):304-309

ALZET Comments: Nerve growth factor; Neomycin; Saline; ear (cochlea); Guinea pig; 2 weeks; controls received mp w/vehicle; tissue perfusion (scala tympani); pulsed delivery; cannula/catheter filled with neomycin which was infused for the first 24 h; pump was filled with NGF; peptides.

P2567: E. Davies, *et al.* A model for long-term intracochlear administration of pharmacologic agents. *Am. J. Otolaryngol* 1994;15(6):757-761

ALZET Comments: Neomycin; Horseradish peroxidase; Saline; Ear (cochlea); Guinea pig; 2002; 2-14 days; Tissue perfusion (cochlea).

9. Penicillin

P6354: A. W. Harrington, *et al.* Secreted proNGF is a pathophysiological death-inducing ligand after adult CNS injury. *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA* 2004;101(16):6226-6230



ALZET Comments: Antibody, anti-nerve growth factor, neutralizing mouse; serum; immunoglobulin-G; penicillin; streptomycin; PBS; CSF/CNS (cortex); Rat; 2001; 1 week; Controls received mp w/ vehicle.

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.

P1074: C. L. Astry, *et al.* Interactions of clindamycin with antibacterial defenses of the lung. *Am. Rev. Respir. Dis* 1987;135(10):15-1019

ALZET Comments: Clindamycin HCl; Penicillin G; Sodium hydroxide; Water; SC; mice; 72 hours; Pump model not stated; controls received mp w/water; dose-response; mp primed overnight in PSB; 2 doses of agent infused; agent infused separately; antibiotic.

P0804: V. Kindler, *et al.* Stimulation of hematopoiesis in vivo by recombinant bacterial murine interleukin 3. *Proc. Natl. Acad. Sci* 1986;83(10):1-1005

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 variable - aggregation in pump? (see p. 1004); mp infusion in normal and irradiated mice; half-life; peptides; antibiotic.

10. Rapamycin

Q7037: J. Zhang, *et al.* Neuroinflammation and central PI3K/Akt/mTOR signal pathway contribute to bone cancer pain. *Mol Pain* 2019;15(17):44806919830240

ALZET Comments: Rapamycin, LY294002, Interleukin-1 Receptor antagonist, SC144, etanercept; CSF, artificial; CSF/CNS (midbrain periaqueductal gray); Rat; animal info (200-250 gr Wistar rats); rapamycin is an mTOR inhibitor; LY294002 is a PI3K inhibitor; IL-1Ra is an IL-1b receptor antagonist, SC144 is a gp130 antagonist, etanercept is a TNF- α receptor antagonist; ALZET brain infusion kit used; Brain coordinates (7.6 mm posterior to the bregma, 0.65mm lateral to the midline, and 4.2 mm ventral to the brain surface); Therapeutic indication (bone cancer pain);

Q5705: X. Wang, *et al.* Cerebral mTOR signal and pro-inflammatory cytokines in Alzheimer's disease rats. *Transl Neurosci* 2016;7(1):151-157

ALZET Comments: Rapamycin; amyloid protein, beta (1-42); CSF, artificial; CSF/CNS; Rat; 1002; 14 days; animal info (male, Sprague Dawley, 3-4 months old, 300-350g); Multiple pumps per animal (2); neurodegenerative (Alzheimer's); behavioral testing (Y-maze); immunology; Bilateral infusion; used jewelers' screw and dental zinc cement; Dose (10 mg/kg amyloid beta, rapamycin 500 ug/2 weeks); Brain coordinates;

Q5074: H. Z. Toklu, *et al.* Anorexic response to rapamycin does not appear to involve a central mechanism. *Clin Exp Pharmacol Physiol* 2016;43(9):802-7

ALZET Comments: Rapamycin; DMSO; PEG 400; CSF/CNS (third ventricle); Rat; 4 weeks; Controls received mp w/ vehicle; animal info (male, F344 Brown Norway, 23-25 months old); 10% DMSO and 90% PEG used; used PE-50 tubing; pumps initially filled with aCSF - after one week recovery, pumps replaced with rapamycin or vehicle pump; Dose (30 ug/day); Brain coordinates (1.1 mm posterior to Bregma and 1.6 mm ventral from the skull surface on the midline (medial - sure), with the nose bar set at 4 mm below the ear bars (below zero)) pg 805;

Q5195: P. J. Scarpace, *et al.* Rapamycin Normalizes Serum Leptin by Alleviating Obesity and Reducing Leptin Synthesis in Aged Rats. *J Gerontol A Biol Sci Med Sci* 2016;71(7):891-9

ALZET Comments: Rapamycin; DMSO; PEG 400; CSF/CNS; Rat; 28 days; Controls received mp w/ vehicle; animal info (male, F344 x Brown Norway, 24 months old); pumps replaced after 14 days; ALZET brain infusion kit used; 10% DMSO used; 90% PEG 400 used; post op. care (rats kept warm until recovered); used aCSF filled pump for 14 days, then replaced with



rapamycin or vehicle for 28 day infusion; obesity; Dose (30 ug/day); Brain coordinates (1.3 mm posterior to bregma, 1.9 mm lateral to the midsagittal suture and to a depth of 3.5mm);

Q6621: E. Moisseiev, *et al.* Intravitreal Administration of Human Bone Marrow CD34+ Stem Cells in a Murine Model of Retinal Degeneration. *Invest Ophthalmol Vis Sci* 2016;57(10):4125-35

ALZET Comments: FK506; Rapamycin; SC; Mice; 1004; 1 month; Dose (1 ug/g/day); animal info (3 week old mice); FK506 aka Tacrolimus;

Q4840: Z. Jiang, *et al.* Blocking mammalian target of rapamycin alleviates bone cancer pain and morphine tolerance via u-opioid receptor. *International Journal of Cancer* 2016;138(2013-2020)

ALZET Comments: Rapamycin; CTOP; LY297002; DMSO; saline; CSF/CNS (intrathecal); Rat; 14 days; Controls received mp w/ saline; animal info (Wistar, 200-250g); 50% DMSO used; cancer (breast; bone); dose-response (pg 2015); behavioral testing (hindpaw withdrawal latency); Rapamycin is an mTOR antagonist; CTOP is an MOR antagonist; LY297002 an a PI3K inhibitor;

Q5576: S. T. Haller, *et al.* Rapamycin Attenuates Cardiac Fibrosis in Experimental Uremic Cardiomyopathy by Reducing Marinobufagenin Levels and Inhibiting Downstream Pro-Fibrotic Signaling. *J Am Heart Assoc* 2016;5(10):

ALZET Comments: Rapamycin, marinobufagenin; SC; Rat; 2004; 4 weeks; animal info (Male Sprague-Dawley rats weighing 250–300 g); Multiple pumps per animal (2 minipumps were implanted for coadministration of rapamycin and MBG); Marinobufagenin is a cardiotonic steroid; Dose (MBG 10 ug/kg/day; rapamycin 0.2 mg/kg/d);

Q4415: J. Fields, *et al.* HIV-1 Tat Alters Neuronal Autophagy by Modulating Autophagosome Fusion to the Lysosome: Implications for HIV-Associated Neurocognitive Disorders. *JOURNAL OF NEUROSCIENCE* 2015;35(1921-1938)

ALZET Comments: Rapamycin; CSF/CNS; Mice; 1007D; 2 weeks; Animal info (GFAP-Tat tg, 7-8 months old); neurodegenerative (HIV-associated neurocognitive disorder); "Because Rapam poorly crosses into the CNS, it was infused intracerebrally into the lateral ventricle of 9-month-old mice at a concentration of 20 mg/kg." pg 1923; Rapamycin is an autophagy activator;

Q3222: H. L. Li, *et al.* Suppression of the mTORC1/STAT3/Notch1 pathway by activated AMPK prevents hepatic insulin resistance induced by excess amino acids. *AMERICAN JOURNAL OF PHYSIOLOGY-ENDOCRINOLOGY AND METABOLISM* 2014;306(2):E197-E209

ALZET Comments: Rapamycin; Mice; 2 months; Control animals received mp w/ vehicle; animal info (C57BL/6, 12 wks old, male).

Q1974: S. B. Yang, *et al.* Rapamycin Ameliorates Age-Dependent Obesity Associated with Increased mTOR Signaling in Hypothalamic POMC Neurons. *Neuron* 2012;75(3):425-436

ALZET Comments: Rapamycin; PEG 400; DMSO; cremophor; CSF/CNS; Mice; 1004; Animal info (C57BL/6, 2, 12 mo old); ALZET brain infusion kit used; 10% DMSO used; 60% PEG 400 used; 30% cremophor used.

Q2380: G. N. Paliouras, *et al.* Mammalian Target of Rapamycin Signaling Is a Key Regulator of the Transit-Amplifying Progenitor Pool in the Adult and Aging Forebrain. *Journal of Neuroscience* 2012;32(43):15012-15026

ALZET Comments: Rapamycin; epidermal growth factor; DMSO; CSF/CNS; Mice (pregnant); 1007D; 7 days; Control animals received mp w/ vehicle; animal info (C57BL/6, female, 2, 10, 18 mo old); ALZET brain infusion kit 3 used.

Q2046: J. Klucken, *et al.* Alpha-synuclein aggregation involves a bafilomycin A1-sensitive autophagy pathway. *Autophagy* 2012;8(5):754-766

ALZET Comments: Bafilomycin, A1; rapamycin; CSF/CNS; Mice; 1007D; 2 weeks; Animal info (wt, alpha synuclein, 9 mo old); neurodegenerative (Parkinson's disease).

Q5955: S. Haller. Marinobufagenin induced uremic cardiomyopathy : the role of passive immunization, rapamycin, and CD40 signaling in the generation of renal fibrosis. *Theses and Dissertations* 2012;331(**ALZET Comments:** Rapamycin; Marinobufagenin; SC; Rat; 2004; 4 weeks; animal info (Male Sprague Dawley rats weighing between 250-300 gms);



marinobufagenin is a cardiotoxic steroid; Agents administered alone or in combination; Dose (rapamycin was administered at 0.2mg/kg/day and MBG at 10µg/kg/day);.

11. Streptomycin

P7559: C. C. M. Chan, *et al.* Dose-dependent beneficial and detrimental effects of ROCK inhibitor Y27632 on axonal sprouting and functional recovery after rat spinal cord injury. *Experimental Neurology* 2005;196(2):352-364

ALZET Comments: Y-27632; streptomycin; PBS, sterile; penicillin; CSF/CNS (intrathecal); Rat; 2002; 2 weeks; 2, 4 days; Controls received mp w/ vehicle; functionality of mp verified by ROCK inhibitory activity in CSF; dose-response (fig. 3); stability of Y27632 verified by ROCK inhibitory activity after 13 days in mp at 37 C; enzyme inhibitor (RHO Kinase); animal info (male, Sprague-Dawley); cervical 4/5 dorsal column transection; spinal cord injury.

P6354: A. W. Harrington, *et al.* Secreted proNGF is a pathophysiological death-inducing ligand after adult CNS injury. *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA* 2004;101(16):6226-6230

ALZET Comments: Antibody, anti-nerve growth factor, neutralizing mouse; serum; immunoglobulin-G; penicillin; streptomycin; PBS; CSF/CNS (cortex); Rat; 2001; 1 week; Controls received mp w/ vehicle.

P5659: O. Horiike, *et al.* Protective effect of edaravone against streptomycin-induced vestibulotoxicity in the guinea pig. *European Journal of Pharmacology* 2003;464(1):75-78

ALZET Comments: Streptomycin; Saline; Ear (cochlea); Guinea pig; 2002; 24 hours; tissue perfusion (round window).

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.

P0804: V. Kindler, *et al.* Stimulation of hematopoiesis in vivo by recombinant bacterial murine interleukin 3. *Proc. Natl. Acad. Sci* 1986;83(10):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 variable - aggregation in pump? (see p. 1004); mp infusion in normal and irradiated mice; half-life; peptides; antibiotic.

12. Tetracycline

Q7265: R. K. Sharma, *et al.* Microglial Cells Impact Gut Microbiota and Gut Pathology in Angiotensin II-Induced Hypertension. *Circ Res* 2019;124(5):727-736

ALZET Comments: Angiotensin II, Tetracycline-3, chemically modified; Saline; CSF, artificial; SC; CSF/CNS (left lateral ventricle); Rat; 2004; 4 weeks; Dose: Ang II (200 ng/kg/min), CMT-3 (3.5µg/h); Controls received mp w/ vehicle; animal info (Sprague-Dawley rats (250-280g) and six-week old male SHR and their normotensive controls); Brain coordinates (1.0mm caudal to bregma, 1.8mm lateral to midline and 4.4mm ventral to the skull surface); cardiovascular;

P2384: K. Freeman, *et al.* Continuously infused calcium hydroxide: its influence on hard tissue repair. *J. Endodontics* 1994;20(6):272-275

ALZET Comments: Calcium hydroxide; Barium hydroxide; Tetracycline; Glycerol; bone (femur); Rat; 4 weeks; no stress (see pg. 274); tissue perfusion; good methods.



13. Tobramycin

P0820: S. H. Powell, *et al.* Once-daily vs. continuous aminoglycoside dosing: efficacy and toxicity in animal and clinical studies of gentamicin, netilmicin, and tobramycin. *J. Infect. Dis* 1983;147(5):918-932

ALZET Comments: Tobramycin; IP; Guinea pig; Rat; 2ML1; 7 days, 72 hours; comparison of single injection vs. mp infusion; mps primed in saline for 4 hours; studies also used dogs and humans; one study used rabbits w/ infusaid pumps; antibiotics.

14. Tunicamycin

Q5674: J. Y. Kim, *et al.* PDI regulates seizure activity via NMDA receptor redox in rats. *Sci Rep* 2017;7(42491)

ALZET Comments: RNA, small interfering (PDI; DTNB); bacitracin; Immunoglobulin, anti-PDI; tunicamycin ;; CSF/CNS; Rat; 1007D; 7 days, 14 days; Controls received mp w/ vehicle or control siRNA or control IgG; animal info (male, Sprague Dawley, 7 weeks old); pumps replaced every week; ALZET brain infusion kit 1 used; behavioral testing (behavioral seizure severity); Brain coordinates;

Q3396: V. Legry, *et al.* Endoplasmic reticulum stress does not contribute to steatohepatitis in obese and insulin-resistant high-fat-diet-fed foz/foz mice. *Clinical Science* 2014;127(507-518)

ALZET Comments: Tunicamycin; DMSO; SC; Mice; 1004; 4 weeks; Control animals received mp w/ vehicle; animal info (HFD-fed foz/foz).

P4971: G. Orsini, *et al.* Localized infusion of tunicamycin in rat hemimandibles: Alteration of the basal lamina associated with maturation stage ameloblasts. *JOURNAL OF HISTOCHEMISTRY & CYTOCHEMISTRY* 2001;49(165-176)

ALZET Comments: Tunicamycin; Saline; bone (mandible); Rat; 2001; Controls received mp w/ vehicle; tissue perfusion (bony elevation over incisor); article incorrectly states use of 2001D pump, but states 7 day delivery period and pump; Tunicamycin is an antibiotic that interferes with N-glycosylation;

P1695: H. Kubota, *et al.* Mechanisms of the B-adrenoceptor down-regulation by the treatment with antidepressants in the rat cerebral cortex: effects of continuous administration of antidepressants by an osmotic pump. *Jpn. J. Psychiatry Neurol* 1990;44(1):135-136

ALZET Comments: Tunicamycin; Cycloheximide; Desipramine; Fluoxetine; Mianserin; Trazodone; CSF/CNS; SC; Rat; 2001; 2ML1; 4-7 days; comparison of sc injections vs. mp; cyclo. and tunica. delivered icv for 5 days.