



References on the Administration of Viral Vectors Using ALZET® Osmotic Pumps

Q9355: J. Liu, *et al.* Maternal Diabetes-Induced Suppression of Oxytocin Receptor Contributes to Social Deficits in Offspring. *Frontiers in Neuroscience* 2021;15(634781)

Agents: Estrogen receptor beta; Oxytocin; Lentivirus **Vehicle:** CSF, artificial; **Route:** CSF/CNS; **Species:** Mice; **Pump:** 2002; **Duration:** 2 weeks;

ALZET Comments: Animal info (Male mice, 6 weeks old); behavioral testing (Animal Behavior Test); Brain coordinates (anteroposterior (AP) = -1.4, mediolateral (ML) = ±3.5, dorsoventral (DV) = -5.1); neurodegenerative (Autism spectrum disorders);

Q9559: D. Xiang, *et al.* Berberine Ameliorates Prenatal Dihydrotestosterone Exposure-Induced Autism-Like Behavior by Suppression of Androgen Receptor. *Frontiers in Cellular Neuroscience* 2020;14(87)

Agents: Lentivirus **Vehicle:** CSF, artificial; **Route:** CSF/CNS (amygdala); **Species:** Rat; **Pump:** 2002; **Duration:** 1 week;

ALZET Comments: Controls received mp w/ vehicle; animal info (Sprague–Dawley 2-month female rats); dependence;

Q9343: S. Li, *et al.* FGF22 promotes generation of ribbon synapses through downregulating MEF2D. *Aging* 2020;

Agents: Adeno-associated virus **Vehicle:** Not Stated; **Route:** Ear (cochlea); **Species:** Mice; **Pump:** 1004; **Duration:** 4 days;

ALZET Comments: Animal info (male CBA/J mice, aged 6 weeks, weight around 18g);

Q8160: K. Arnaud, *et al.* Non-cell autonomous choroid plexus-derived sAPP α regulates adult hippocampus proliferation and plasticity. *Hyper Articles en Ligne* 2020;

Agents: Cre recombinase protein, Vected **Vehicle:** Saline, DMSO; **Route:** CSF/CNS (right lateral ventricle); **Species:** Mice; **Pump:** Not stated; **Duration:** 15 days;

ALZET Comments: Dose (3.5 μ g); 1.8% NaCl, 15% DMSO used; Controls received mp w/ vehicle; animal info (Janvier Mice); behavioral testing (water maze); Vected Cre recombinase protein aka Cre-Tat; Brain coordinates (x, -0.58 mm; y, +1.28 mm; z, -2 mm); neurodegenerative (Alzheimer disease);

Q7520: Y. Gong, *et al.* Intrathecal Adeno-Associated Viral Vector-Mediated Gene Delivery for Adrenomyeloneuropathy. *Hum Gene Ther* 2019;30(5):544-555

Agents: Adeno-associated viral vector serotype 9 **Route:** SC; **Species:** Mice; **Pump:** 2001D; **Duration:** 1 day;

ALZET Comments: Dose (2 μ l/min/day); animal info (12-20 weeks old, Male, C57BL/6); neurodegenerative (Adrenoleukodystrophy);

Q5606: W. Xie, *et al.* Resveratrol ameliorates prenatal progesterin exposure-induced autism-like behavior through ER β activation. *Mol Autism* 2018;9(43)

Agents: Lentivirus, ER β knockdown **Vehicle:** CSF, artificial; **Route:** CSF/CNS (amygdala); **Species:** Rat; **Pump:** 2002;

ALZET Comments: animal info (8 week old Sprague Dawley rat); behavioral testing (marble burying test and social interaction test); 26 Gauge Plastics One cannula used; Brain coordinates (- 2.0 mm posterior to the bregma, \pm 4.2 mm from the midline, and - 7.2 mm from the skull surface);

Q8775: D. Wang, *et al.* Slow Infusion of Recombinant Adeno-Associated Viruses into the Mouse Cerebrospinal Fluid Space. *Human Gene Therapy Methods* 2018;29(2):75-85

Agents: Virus, recombinant adeno-associated **Vehicle:** Saline; **Route:** CSF/CNS (subarachnoid space); CSF/CNS (lateral ventricle); **Species:** Mice; **Pump:** 2001D; **Duration:** 40, 42 hours;

ALZET Comments: Dose (1-10¹¹, 2-10¹² GC in 200 μ L); Controls received mp w/ vehicle; animal info (6 weeks, male and female, C57BL/6J, 20g); post op. care (200 μ L of 0.9% saline by i.p. injection); comparison of IT injection vs mp; recombinant adeno-associated viruses (rAAVs) packaged in several serotypes such as AAV9 and AAV.rh10 can cross the BBB and transduce neurons and glia in rodents and nonhuman primates; Brain coordinates ((-0.9,-0.2) for the left ventricle, or (+0.9, -0.2) for the right ventricle); Cannula placement verified via stereotaxic frame; cyanoacrylate adhesive for icv delivery (Loctite); gene therapy; good methods (detailed pump installation instructions for IT and ICV delivery of agent on p.77-83); "IT pump infusion resulted in more widespread and higher transduction of the spinal cord than a bolus IT injection" pg.83; recombinant adeno-associated virus serotype 9 (rAAV9) used for examples;



Q5940: Y. Zou, *et al.* Prenatal levonorgestrel exposure induces autism-like behavior in offspring through ERbeta suppression in the amygdala. *Mol Autism* 2017;8(46)

Agents: Lentivirus, ER beta **Vehicle:** CSF, artificial; **Route:** CSF/CNS (amygdala); **Species:** Rat; **Pump:** 2002; **Duration:** 2 weeks; **ALZET Comments:** Controls received mp w/ empty lentivirus; animal info (male, Sprague Dawley, 8 weeks old); functionality of mp verified by India ink injection; behavioral testing (marbles burying test, social interaction, elevated plus maze, open-field test); gene therapy; Used Plastics One cannula;

Q6706: Z. W. Ning, *et al.* MicroRNA-21 Mediates Angiotensin II-Induced Liver Fibrosis by Activating NLRP3 Inflammasome/IL-1beta Axis via Targeting Smad7 and Spry1. *Antioxidants & Redox Signaling* 2017;27(1):1-20

Agents: Angiotensin II; Mir-21 lentivirus **Vehicle:** Saline; **Route:** IP; **Species:** Rat; **Pump:** 2004; 2ML4; **Duration:** Not Stated; **ALZET Comments:** Dose (25 mg/kg/h); Controls received mp w/ vehicle; animal info (Male Wistar rats (200–300 g); Therapeutic indication (liver fibrosis);

Q5829: N. Martinez-Sanchez, *et al.* Thyroid hormones induce browning of white fat. *J Endocrinol* 2017;232(2):351-362

Agents: Thyroxin, L-, Adenovirus vector; Gene, green fluorescent protein; Gene, AMP-activated protein kinase **Vehicle:** Saline; **Route:** CSF/CNS (hypothalamus); **Species:** Rat; **Pump:** 1007D; **Duration:** 7, 21 days; **ALZET Comments:** bilateral cannula used; animal info (200-250g); gene therapy; Therapeutic indication (Browning, thyroid hormones);

Q5052: G. Murlidharan, *et al.* CNS-restricted Transduction and CRISPR/Cas9-mediated Gene Deletion with an Engineered AAV Vector. *Mol Ther Nucleic Acids* 2016;5(7):

Agents: Viral vector, adeno-associated (AAV9, AAV2g0); Gene, CBh-ScGFP **Vehicle:** Not Stated; **Route:** CSF/CNS (intrathecal); **Species:** Mice; **Pump:** 2001D; **Duration:** 24 hrs; **ALZET Comments:** animal info (8 weeks old C57/Bl6 male mice); comparison of IT bolus injections vs mp; ALZET mouse intrathecal catheter used (lumbar cannulation); gene therapy;

Q6685: J. Y. Lee, *et al.* Jmjd3 mediates blood-spinal cord barrier disruption after spinal cord injury by regulating MMP-3 and MMP-9 expressions. *Neurobiol Dis* 2016;95(66-81

Agents: Virus, adeno-associated shjmd3 **Route:** CSF/CNS (intrathecal); **Species:** Rat; **Pump:** 1003D; **ALZET Comments:** Controls received mp w/ control adeno-associated virus; animal info (adult male Sprague-Dawley rats weighing 250-270g); spinal cord injury;

Q5612: R. Rao Malla, *et al.* Knockdown of cathepsin B and uPAR inhibits CD151 and alpha3beta1 integrin-mediated cell adhesion and invasion in glioma. *Mol Carcinog* 2013;52(10):777-90

Agents: Cathepsin B; Scrambled vector (pSV); Plasmid **Vehicle:** PBS (mock); **Species:** Mice (nude); **Pump:** 1002; **ALZET Comments:** Controls received mp w/ vehicle; cancer (Glioma); Therapeutic indication (Cancer, Glioma); Dose (1.5 mg/mL);

Q2986: D. Kesanakurti, *et al.* Essential role of cooperative NF-kappaB and Stat3 recruitment to ICAM-1 intronic consensus elements in the regulation of radiation-induced invasion and migration in glioma. *ONCOGENE* 2013;32(43):5144-5155

Agents: Oligonucleotide, antisense; plasmid, scrambled vector, pSV; PBS; **Route:** SC; **Species:** Mice (nude); **Pump:** 2004; **ALZET Comments:** Cancer (glioblastoma); animal info (nu/nu mice)

Q2638: D. Kesanakurti, *et al.* Role of MMP-2 in the regulation of IL-6/Stat3 survival signaling via interaction with alpha5beta1 integrin in glioma. *ONCOGENE* 2013;32(3):327-340

Agents: Plasmid, scrambled vector; RNA, small interfering **Species:** Mice (nude); **Pump:** 2004; **ALZET Comments:** Animal info (nu/nu, 4-6 wks old, athymic); MMP-2 siRNA

Q2563: D. Kesanakurti, *et al.* Functional cooperativity by direct interaction between PAK4 and MMP-2 in the regulation of anoikis resistance, migration and invasion in glioma. *Cell Death & Disease* 2012;3(;):U78-U90

Agents: Plasmid, scrambled vector; plasmid, PAK4si; **Species:** Mice (nude); **Pump:** 2004; **ALZET Comments:** Animal info (female, nu/nu)



Q2565: V. R. Gogineni, *et al.* uPAR and cathepsin B shRNA impedes TGF-beta1-driven proliferation and invasion of meningioma cells in a XIAP-dependent pathway. *Cell Death & Disease* 2012;3(;):U20-U29

Agents: Plasmid, scrambled vector, pSV; plasmid, pUC; **Species:** Mice (nude);

ALZET Comments: Control animals received mp w/ scrambled vector; animal info (nu/nu, athymic); pUC is a bicistronic shRNA constructs targeting uPAR and cathepsin B

Q1958: H. Raghu, *et al.* Specific knockdown of uPA/uPAR attenuates invasion in glioblastoma cells and xenografts by inhibition of cleavage and trafficking of Notch -1 receptor. *Molecular Cancer* 2011;10(;):U1-U15

Agents: Plasmid, puPA; plasmid, upAR; plasmid, pU2; plasmid, vector **Vehicle:** PBS; **Route:** CSF/CNS; **Species:** Mice (nude);

ALZET Comments: Cancer (glioblastoma)

Q1640: A. K. Nalla, *et al.* Suppression of uPA and uPAR blocks radiation-induced MCP-1 mediated recruitment of endothelial cells in meningioma. *Cellular Signalling* 2011;23(8):1299-1310

Agents: Plasmid, scrambled vector; plasmid, bi-cistronic, RNA, small interfering **Vehicle:** Not Stated; **Route:** Not Stated;

Species: Mice (nude); **Pump:** 2001; **Duration:** Not Stated;

ALZET Comments: Animal info (4-6 wks old)

Q1722: R. R. Malla, *et al.* Cathepsin B and uPAR knockdown inhibits tumor-induced angiogenesis by modulating VEGF expression in glioma. *Cancer Gene Therapy* 2011;18(6):419-434

Agents: Cathepsin B; vector, scrambled **Vehicle:** Not Stated; **Route:** Not Stated; **Species:** Mice (nude); **Pump:** 1002; **Duration:** Not Stated;

ALZET Comments: Animal info (athymic, nu/nu, 5-7 wks old)

Q5575: P. A. Lawlor, *et al.* A β Infusion and Related Models of Alzheimer Dementia. *Animal Reproduction* 2011;48(347-370)

Agents: Amyloid protein, beta; virus, adeno-associated **Vehicle:** DMSO, Hcl; **Route:** CSF/CNS (ventricle); **Species:** mice (transgenic); **Pump:** Not Stated; **Duration:** Not Stated;

ALZET Comments: ALZET brain infusion kit used; behavioral testing (Morris water maze, passive avoidance, novel object recognition); gene therapy (viral vector); "Use of an osmotic mini-pump to deliver Ab has the advantage of providing the continuous release and presence of Ab in the brain throughout the experiment." Pg. 353; Therapeutic indication (Alzheimer's disease); Dose (Amyloid beta: 100 μ M, DMSO:);

Q2224: S. Gopinath, *et al.* Mechanism of p27 upregulation induced by downregulation of cathepsin B and uPAR in glioma. *Molecular Oncology* 2011;5(5):426-437

Agents: Plasmid, uPAR/cathepsin B; plasmid, scrambled vector **Route:** IP; **Species:** Mice (nude); **Duration:** 5 weeks;

ALZET Comments: Controls received mp w/ PBS; cancer (glioma)

R0239: R. T. Richardson, *et al.* Inner ear therapy for neural preservation. *Auditory Neuroscience* 2006;11(6):343-356

Agents: Nerve growth factor; NT-3; adenovirus; brain-derived neurotrophic factor; perilymph, artificial; glial-derived neurotrophic factor; ciliary neurotrophic factor; fibroblast growth factor, acidic; fibroblast growth factor-1; fibroblast growth factor-2; fibroblast growth factor, basic **Vehicle:** Not Stated; **Route:** Ear (cochlea); ear (scala tympani); **Species:** Guinea pig; **Pump:** Not Stated; **Duration:** 1,2,4,8 weeks; 15-60, 11-12, 26 days;

ALZET Comments: Comparison of polymers, hydrogels, gene therapy, cell-based therapy, and injections vs. mp; long-term study; pumps replaced; no stress (see pg. 350); half-life (p. 344), short in blood; gene therapy; peptides; animal info (deafened); Table 2; "The mini-osmotic pump device is ideally suited to studying the effects of neurotrophic factors in the cochlea experimentally." (p. 350); tissue perfusion

P7904: T. C. Harding, *et al.* AAV serotype 8-mediated gene delivery of a soluble VEGF receptor to the CNS for the treatment of glioblastoma. *MOLECULAR THERAPY* 2006;13(5):956-966

Agents: Adeno-associated virus serotype 8 vector, recomb. **Vehicle:** Not Stated; **Route:** CSF/CNS (intratumoral); **Species:** Rat; **Pump:** 2001D; **Duration:** 24 hours;

ALZET Comments: Controls received mp w/ AAV control; cancer (glioblastoma multiforme, u-251 MG); gene therapy; animal info (male, athymic, 6 wk. old); rAAV contains soluble VEGF inhibitor, sVEGFR1/R2; "Implantation of the mini pump allows the slow infusion of a rAAV vector...to transduce more effectively the intracranial tumor mass." (pg. 962); antiangiogenesis



R0238: S. Boeckle, *et al.* Optimizing targeted gene delivery: Chemical modification of viral vectors and synthesis of artificial virus vector systems. *AAPS Journal* 2006;8(4):E731-E742

Agents: Virus, synthetic RNA **Vehicle:** Not Stated; **Route:** Intratumoral; **Species:** Mice (nude);

ALZET Comments: Cancer (glioblastoma); "Control animals within 30 days after tumor implantation, all treated animals survived for >1 year and were completely cured." (p. E738); gene therapy

P6905: Y. Zhang, *et al.* Phospholipase D1-promoted release of tissue plasminogen activator facilitates neurite outgrowth. *Journal of Neuroscience* 2005;25(7):1797-1805

Agents: Virus, sinbis suspension **Vehicle:** Not Stated; **Route:** CSF/CNS (hippocampus); SC; **Species:** Mice; **Pump:** 1007D; **Duration:** 4,7 days;

ALZET Comments: Controls received mp w/ sin-EGFP

P7335: H. Yin, *et al.* Kallikrein/kinin protects against myocardial apoptosis after ischemia/reperfusion via Akt-glycogen synthase kinase-3 and Akt-Bad 14-3-3 signaling pathways*. *Journal of Biological Chemistry* 2005;280(9):8022-8030

Agents: Virus, adeno-associated; Cytomegalovirus promoter **Vehicle:** Not Stated; **Route:** IP; **Species:** Rat; **Pump:** Not Stated; **Duration:** Not Stated;

ALZET Comments: Cardiovascular; gene therapy; adenoviral vector harboring the human tissue kallikrein cDNA (ad. CMV-TK)

P6618: S. S. Lakka, *et al.* Inhibition of cathepsin B and MMP-9 gene expression in glioblastoma cell line via RNA interference reduces tumor cell invasion, tumor growth and angiogenesis. *ONCOGENE* 2004;23(27):4681-4689

Agents: RNA, small interfering; human cytomegalovirus promoter **Vehicle:** Empty vector; **Route:** CSF/CNS; **Species:** Mice; **Pump:** 2004; **Duration:** 5 weeks;

ALZET Comments: Cancer (glioblastoma); siRNA against mmp-9 and cathepsin; antiangiogenesis; gene therapy

P6720: C. S. Gondj, *et al.* RNAi-mediated inhibition of cathepsin B and uPAR leads to decreased cell invasion, angiogenesis and tumor growth in gliomas. *Oncogene* 2004;23(8):8486-8496

Agents: RNA, small interfering; Virus, EV/SV vector **Vehicle:** PBS; **Route:** CSF/CNS (intratumoral); **Species:** Mice (nude); **Pump:** Not Stated; **Duration:** Not Stated;

ALZET Comments: Controls received mp w/ vehicle; tissue perfusion (tumor); cancer (glioma); gene therapy; antiangiogenesis; siRNA (cathepsin B); pump model not stated (0.25 ul/hr); "...local intracranial delivery of pcu using mini-osmotic pumps effectively inhibited human malignant glioma growth."

R0164: A. K. Lalwani, *et al.* Current issues in cochlear gene transfer. *Audiology & Neurotology* 2002;7(3):146-151

Agents: Gene vectors, virus **Vehicle:** Not Stated; **Route:** Ear (cochlea); **Species:** Guinea pig; **Pump:** 1007D; **Duration:** Not Stated;

ALZET Comments: Gene therapy; review of various cochlear gene delivery methods; diagram of the various delivery methods (p. 147); tissue perfusion (cochlea)

P5540: A. K. Lalwani, *et al.* In vitro and in vivo assessment of the ability of adeno-associated virus-brain-derived neurotrophic factor to enhance spiral ganglion cell survival following ototoxic insult. *Laryngoscope* 2002;112(8):1325-1334

Agents: Virus, adeno-associated; Gene, green fluorescent protein; Gene, brain-derived neurotrophic factor **Vehicle:** PBS; **Route:** Ear (cochlea); **Species:** Guinea pig; **Pump:** 1007D; **Duration:** 1 week;

ALZET Comments: Gene therapy; cochlea cannulated with PE10 attached to PE50; virus contained gene for brain-derived neurotrophic factor and/or green fluorescent protein; tissue perfusion (cochlea)

P4821: A. E. Luebke, *et al.* A modified adenovirus can transfect cochlear hair cells in vivo without compromising cochlear function. *Gene Therapy* 2001;8(7):789-794

Agents: Adenovirus; Gene, beta-galactosidase; **Vehicle:** Perilymph, artificial;; **Route:** Ear (cochlea);; **Species:** Guinea pig;; **Pump:** 2001;; **Duration:** Not Stated;

ALZET Comments: Controls received mp w/ vehicle; tissue perfusion (scala tympani); functionality of mp verified by transgene expression of b-gal; gene therapy;



P7117: A. E. Luebke, *et al.* Cochlear function and transgene expression in the guinea pig cochlea, using adenovirus and adeno-associated virus-directed gene transfer. *Human Gene Therapy* 2001;12(773-781

Agents: Adenovirus vector; Virus, adeno-associated **Vehicle:** Perilymph, artificial; **Route:** Ear (scala tympani); **Species:** Guinea pig; **Pump:** 2001; **Duration:** 7 days;

ALZET Comments: Controls received mp w/ vehicle, and no treatment to contralateral ear; no stress (see pg. 778); good methods; gene therapy; cyanoacrylate adhesive; tissue perfusion (scala tympani)

P4781: D. T. Efron, *et al.* A novel method of studying wound healing. *Journal of Surgical Research* 2001;98(16-20

Agents: Methylisothiourea, S-; adenovirus vector; gene, mouse iNOS cDNA sequence **Vehicle:** Saline; Dye, methylene blue; Dye, India black ink; PBS; **Route:** SC (wound healing site); **Species:** Rat; **Pump:** 2001; 2ML1; **Duration:** 7 days;

ALZET Comments: Controls received mp w/ saline; functionality of mp verified by dye infusion; gene therapy; enzyme inhibitor; methylisothiourea, S- is an inducible nitric oxide synthase inhibitor (iNOS inhibitor); wound healing; SC-implanted pumps infused 2 hydroxyproline sponges via catheter; initial studies used 2ML1 pumps to infuse dyes in order to assess the feasibility of direct infusion with pumps; iNOS inhibitor infusion was with 2001 pumps; pumps were designed to infuse directly into SC implanted polyvinyl sponges at the wound site; Adenovirus vector was dissolved in PBS; iNOS inhibitor was delivered in saline; diagram of pump-catheter assembly and location (p. 18); "Dye infusion demonstrated both grossly and microscopically excellent delivery of the infusate to wound sponges" (p. 18);

P4471: J. J. Han, *et al.* Transgene expression in the guinea pig cochlea mediated by a lentivirus-derived gene transfer vector. *Human Gene Therapy* 1999;10(1867-1873

Agents: Lentivirus; gene, green fluorescent protein **Vehicle:** Saline; PBS; **Route:** Ear (cochlea); **Species:** Guinea pig; **Pump:** 1007D; **Duration:** 8, 3 days;

ALZET Comments: Controls received mp w/vehicle; tissue perfusion (scala tympani); gene therapy

P4028: A. K. Lalwani, *et al.* Long-term in vivo cochlear transgene expression mediated by recombinant adeno-associated virus. *Gene Therapy* 1998;5(277-281

Agents: Virus, adeno-associated; Gene, lacZ; Gene, green fluorescent protein **Vehicle:** Saline; **Route:** Ear (cochlea); **Species:** Guinea pig; **Pump:** Not Stated; **Duration:** Not Stated;

ALZET Comments: Controls received mp w/vehicle; tissue perfusion (cochlea); functionality of mp verified by gene expression; gene therapy

P4027: A. K. Lalwani, *et al.* Expression of adeno-associated virus integrated transgene within the mammalian vestibular organs. *Am. J. Otolology* 1998;19(390-395

Agents: Virus, adeno-associated; Gene, green fluorescent protein; Gene, beta-galactosidase **Vehicle:** PBS; **Route:** Ear (cochlea); **Species:** Guinea pig; **Pump:** 1007D; **Duration:** 7 days;

ALZET Comments: Controls received mp w/vehicle, mp w/reporter gene, or no pump; tissue perfusion (scala tympani); gene therapy

P3859: A. K. Lalwani, *et al.* Green fluorescent protein as a reporter for gene transfer studies in the cochlea. *Hear. Res* 1997;114(139-147

Agents: Virus, adeno-associated; Gene, green fluorescent protein **Vehicle:** PBS; **Route:** Ear (cochlea); **Species:** Guinea pig; **Pump:** 1007D; **Duration:** 2, 7 days;

ALZET Comments: Controls received mp w/saline or mp w/AAV-Bgal; tissue perfusion (scala tympani); good methods (p.141); gene therapy



P3860: J. Zhu, *et al.* A continuous intracerebral gene delivery system for in vivo liposome-mediated gene therapy. *Gene Therapy* 1996;3(472-476)

Agents: Liposomes; Gene, herpes simplex virus thymidine kinase; Gene, lacZ **Vehicle:** Not Stated; **Route:** CSF/CNS (caudate nucleus); **Species:** Rat; **Pump:** 1003D; **Duration:** 3 days;

ALZET Comments: controls received mp w/LacZ gene; tissue perfusion (tumor); functionality of mp verified by gene expression; comparison of intracerebral injections vs. mp; no stress (see pg.473); stability verified by gene expression; ALZET brain infusion kit used; cancer; gene therapy; "DNA-liposome complexes were stable within minipumps at body temperature (37C) for 1-3 days." (pg.474); "continuous administration of DNA-liposome complexes did not result in significant in vivo toxicity." (pg.474)

P3410: A. K. Lalwani, *et al.* Development of in vivo gene therapy for hearing disorders: introduction of adeno-associated virus into the cochlea of the guinea pig. *Gene Therapy* 1996;3(588-592)

Agents: Virus, adeno-associated, with bacterial gene seq **Vehicle:** PBS; **Route:** ear (cochlea); **Species:** Guinea pig; **Pump:** 1007D; **Duration:** 2 weeks;

ALZET Comments: controls received saline infusion; tissue perfusion (cochlea); Gene therapy