References on the Administration of Liposomes Using ALZET® Osmotic Pumps

Q2301: K. Nishijima, *et al.* Interactions among pulmonary surfactant, vernix caseosa, and intestinal enterocytes: intra-amniotic administration of fluorescently liposomes to pregnant rabbits. American Journal of Physiology Lung Cellular and Molecular Physiology 2012;303(3):L208-L214
Agents: Liposomes, fluorescently labeled; coatasome EL-01-C, hydrated **Vehicle:** DMSO; water, distilled; **Route:** Intrauterine; **Species:** Rabbit (fetus); **Pump:** 2ML1; **Duration:** 1 week;
ALZET Comments: Control animals received mp w/ liposome alone; animal info (Japanese, White, 4.2-5.4 kg, teen); tissue perfusion (fetus); "5-cm sterile PE 60 silicone catheter with silicone flange was attached to each pump" pg L209; Fig 2, image of pump and catheter placement; multiple pumps used (2); teratology

Q1884: E. Jang, *et al.* Syndecan-4 proteoliposomes enhance fibroblast growth factor-2 (FGF-2)-induced proliferation, migration, and neovascularization of ischemic muscle. PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA 2012;109(5):1679-1684
Agents: Fibroblast growth factor-2; syndecan-4, proteoliposome **Vehicle:** Not Stated; **Route:** SC; **Species:** Rat; **Pump:** 1004; **Duration:** 7-16 days;
ALZET Comments: Controls received mp w/ PBS; animal info (Sprague Dawley); wound clips used; ischemia

R0266: E. E. L. Swan, *et al.* Inner ear drug delivery for auditory applications. Advanced Drug Delivery Reviews 2008;60(15):1583-1599
Agents: 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 **Vehicle:** Not Stated; **Route:** SC; Ear (round window membrane); Ear (cochlea); Ear (scala tympani); Ear; **Species:** Guinea pig; **Pump:** Not Stated; **Duration:** 3, 7, 14, 28 days;
ALZET Comments: 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

P7197: J. A. MacKay, *et al.* Distribution in brain of liposomes after convection enhanced delivery; modulation by particle charge, particle diameter, and presence of steric coating. Brain Research 2005;1035(2):139-153
Agents: Liposomes; FITC-dextran-lysine **Vehicle:** Saline; Tris buffer; **Route:** CSF/CNS (caudate putamen); CSF/CNS (intratumoral); **Species:** Rat; **Pump:** 2001D; **Duration:** 24 hours;
ALZET Comments: Tissue perfusion (intratumoral); comparison of acute CSF/CNS injection vs. mp; half-life (p. 151) 9.9 hours; cancer (glioblastoma); ALZET brian infusion kit 2 used; brain tissue distribution; post op. care (buprenophine)

R0213: M. L. Duan, *et al.* Protection and treatment of sensorineural hearing disorders caused by exogenous factors: experimental findings and potential clinical application. Hearing Research 2002;169(169-178
Agents: Liposomes, cationic **Vehicle:** Not Stated; **Route:** Ear (cochlea); **Species:** Guinea pig; **Pump:** Not Stated; **Duration:** Not Stated;
ALZET Comments: Gene therapy; tissue perfusion (cochlea)

P4436: M. Wareing, *et al.* Cationic liposome mediated transgene expression in the guinea cochlea. Hearing Research 1999;128(61-69
Agents: Liposomes, cationic; Gene, beta-galactosidase **Vehicle:** Dextrose solution;; **Route:** Ear; **Species:** Guinea pig; **Pump:** 1007D; **Duration:** Not Stated;
ALZET Comments: Tissue perfusion (cochlea); comparison of micro injections vs. mp; stress/adverse reaction: significant fibrosis and acute immune response localized at the site of cochleostomy; gene therapy; prophylactic antibiotics provided; PE50 tubing was connected to PE10;

P3745: D. Sanchis, *et al.* Short-term treatment with oleoyl-oestrone in liposomes (Merlin-2) strongly reduces the expression of the ob gene in young rats. Biochemical Journal 1997;326(357-360
Agents: Oestrone, oleoyl; Liposomes **Vehicle:** Not Stated; **Route:** IV (jugular); **Species:** Rat; **Pump:** 2ML2; **Duration:** 3, 6, 10, 14 days;
ALZET Comments: controls received mp w/ liposomes; functionality of mp verified by radioimmunoanalysis of 3H-oestrone; Merlin-2 is code name for oestrone, oleoyl in liposomes

P4146: F. Balada, *et al.* Effect of the slimming agent oleoyl-estrone in liposomes on the body weight of rats fed a cafeteria diet. Archives of Physiology and Biochemistry 1997;105(5):487-495
Agents: Estrone, oleoyl-; Liposomes **Vehicle:** Not Stated; **Route:** IV (jugular); **Species:** Rat; **Pump:** 2ML2; **Duration:** 28 days;
ALZET Comments: controls received mp w/liposome suspension; pumps replaced after 14 days; oleoyl-estrone in liposomes was named Merlin-2

P3831: F. Balada, *et al.* Effect of the slimming agent oleoyl-estrone in liposomes on the body weight of zucker obese rats. Int. J. Obes 1997;21(789-795
Agents: Estrone, oleoyl-; Liposomes **Vehicle:** Not Stated; **Route:** IV (left jugular); **Species:** Rat; **Pump:** 2ML2; **Duration:** 28 days;
ALZET Comments: controls received mp w/liposomes; pumps replaced after 2 weeks; stress/adverse reaction: transient weight loss after surgical implantation of mp (pg. 790); oleoyl-estrone in liposomes referred to as "merlin-2"

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)

P3526: D. Sanchis, *et al.* Oleoyl-estrone induces the loss of body fat in rats. Int. J. Obes 1996;20(588-594
Agents: Estrone, oleoyl-; Liposomes **Vehicle:** Not Stated; **Route:** IV (jugular); **Species:** Rat; **Pump:** 2ML2; **Duration:** 14 days;
ALZET Comments: no comment posted

P2677: D. B. Drath, *et al.* Activation of a distinct subpopulation of pulmonary macrophages following exposure to biological response modifiers. Immunol. Invest 1994;23(2):115-127
Agents: Interferon-gamma; S-MDP, free; S-MDP, liposome-encapsulated **Vehicle:** Not Stated; **Route:** SC; **Species:** Rat; **Pump:** Not Stated; **Duration:** 7 days;
ALZET Comments: comparison of bolus tracheal injections, iv administration and mp; immunology; peptides; IFN-gamma and S-MDP were most effective when delivered either intravenously or via osmotic minipump infusion; S-MDP is lipophilic N-acetylmuramyl-6-0-stearoyl-alanyl-D-isoglutamine; recomb. mouse IFN-gamma used

P1978: S. Lerman, *et al.* Miniosmotic pumps for liposomal drug delivery. Liposome Technol 1993;1(429-438
Agents: Liposomes **Vehicle:** Not Stated; **Route:** Eye (lens); **Species:** Rabbit; **Pump:** 2ML1; **Duration:** Not Stated;
ALZET Comments: Pulsed delivery described; detailed surgical methods

P2086: J. Joles, *et al.* Subcutaneous administration of HMG-CoA reductase inhibitors in hyperlipidaemic and normal rats. Lab. Anim 1992;26(269-280
Agents: Lovastatin; Pravastatin; Liposomes; Simvastatin **Vehicle:** Propylene glycol; **Route:** Not Stated; **Species:** Rat; **Pump:** 2ML4; **Duration:** Not Stated;
ALZET Comments: comparison of injections and oral administration vs. mp; stress/adverse reaction: local cystic reaction to simvastatin and lovastatin (p. 271, 275); enzyme inhibitor (HMG-CoA reductase), sc injections of simvastatin also caused subcutaneous toxicity

P2013: D. G. Stein*, et al.* Intracerebral administration of alpha-tocopherol-containing liposomes facilitates behavioral recovery in rats with bilateral lesions of the frontal cortex. J. Neurotrauma 1991;8(4):281-292
Agents: Phosphatidylcholine; vitamin E; Liposomes **Vehicle:** Not Stated; **Route:** CSF/CNS (cortex); **Species:** Rat; **Pump:** 2001; **Duration:** 7 days;
ALZET Comments: Multiple pumps per animal (2); agent also called D-alpha-tocopherol

P1722: S. Lerman. Test models to determine potential ocular drug induced side effects. Lens and Eye Toxicity Research 1989;6(1/2):1-36
Agents: 8-MOP; Chromophore; Sorbinil; Liposomes **Vehicle:** Radio-isotopes; **Route:** Eye (lens); **Species:** Rabbit; **Pump:** 2ML1; **Duration:** 7 days;
ALZET Comments: Tissue perfusion (ocular lens); liposome-encapsulated agents

P0957: D. B. Drath. Modulation of pulmonary macrophage superoxide release and tumoricidal activity following activation by biological response modifiers. Immunopharmacology 1986;12(2):117-126
Agents: Interferon-gamma; Liposomes **Vehicle:** Not Stated; **Route:** SC; **Species:** Rat; **Pump:** 2001; **Duration:** 7 days;
ALZET Comments: controls received mp w/empty liposomes; liposome encapsulated agent and free agent; comparison of iv injections vs. mp infusion; cancer/immunology; peptides