Recent References (2014-2020) on the Administration of Cyclosporine Using ALZET® Osmotic Pumps


**Agents:** Cyclosporine A  
**Vehicle:** Not stated  
**Route:** SC  
**Species:** Rat  
**Pump:** 2ML4  
**Duration:** 4 months;

**ALZET Comments:** Dose (2.5 mg/kg/d); animal info (LW (RT-1l) and BN (RT-1n) rats); pumps replaced every month; Cyclosporine A aka CsA; immunology;


**Agents:** Cyclosporine A  
**Vehicle:** Ethanol, Cremophor  
**Route:** SC  
**Species:** Rat  
**Pump:** 2ML4  
**Duration:** 56 days;

**ALZET Comments:** Dose (15 mg/kg/day); animal info (male Sprague-Dawley rats, 350 g); post op. care (3 mg/kg-ketoprofen); behavioral testing (Montoya staircase and tapered beam test); long-term study; ischemia (stroke);


**Agents:** Cyclosporin A  
**Vehicle:** Not Stated  
**Route:** SC  
**Species:** Mice  
**Pump:** Not Stated  
**Duration:** 4 weeks;

**ALZET Comments:** Dose (20 mg/kg/day); animal info (C57Bl6 and ldlr_/_ mice);


**Agents:** U0126; SP600125; Okadaic acid; Cyclosporin A  
**Vehicle:** Not stated  
**Route:** CSF/CNS (right lateral ventricle)  
**Species:** Rat  
**Pump:** 1007D  
**Duration:** 7 days;

**ALZET Comments:** Dose (25 uM U0126; 10 uM SP600125; 10 uM Okadaic acid; 250 uM Cyclosporin A); Controls received mp w/ vehicle; animal info (Male Sprague-Dawley rats, 7 weeks old ); U0126 aka ERK1/2 inhibitor, SP600125 aka JNK inhibitor, Okadaic acid aka PP1/PP2A inhibitor, Cyclosporin A aka CsA; ALZET brain infusion kit 1 used; Brain coordinates (1 mm posterior; 1.5 mm lateral; −3.5 mm depth to the bregma); dependence;


**Agents:** Bisindolylmaleimide; KN-93; H-89; U0126; SP600125; okadaic acid; cyclosporin A  
**Vehicle:** Not Stated  
**Route:** CSF/CNS (right lateral ventricle)  
**Species:** Rat  
**Pump:** 1003D  
**Duration:** 3 days;

**ALZET Comments:** Dose (BIM 25uM, KN-93 25uM, H-89 10uM, U0126 25uM, okadaic acid 10uM, cyclosporine A 250uM); animal info (male Sprague-Dawley (SD) rats (7 weeks old)); behavioral testing (Morris Water maze test); enzyme inhibitor (BIM is a PKC inhibitor, KN-93 is a CAMKII inhibitor, H-78 is a PKA inhibitor, U0126 is an ERK 1/2 inhibitor, SPO600126 is a JNK inhibitor, cyclosporin A is a PP2B inhibitor, okadaic acid is a PP1/PP2A inhibitor); ALZET brain infusion kit 1 used; Brain coordinates (1 mm posterior; 1.5 mm lateral; 3.5 mm depth to the bregma); neurodegenerative (Epilepsy);


**Agents:** Cyclosporin A  
**Vehicle:** Ethanol, Cremophor buffered  
**Route:** SC  
**Species:** Mice  
**Pump:** 1002  
**Duration:** 1, 2 weeks;

**ALZET Comments:** Dose (10 mg/kg/day); 65% ethanol: 35% Cremaphor used; Controls received mp w/ vehicle; animal info (8 weeks, Shi(−/−)); mp with CsA used to induce immunosuppression in Shiverer mice;


**Agents:** Cyclosporine A  
**Vehicle:** Saline  
**Route:** SC  
**Species:** Rat  
**Pump:** 2ML4  
**Duration:** 7 days;

**ALZET Comments:** Dose (15 mg/kg/day); Controls received mp w/ vehicle; animal info (10 weeks old, Male, Sprague Dawley); post op. care (ketoprofen); Cyclosporine A aka CsA ; neurodegenerative (Stroke);

Agents: Cyclosporin A Vehicle: Ethanol, Cremaphor; Route: SC; Species: Mice; Pump: Not Stated; Duration: 4-49 days;
ALZET Comments: Dose (15 mg/kg/day); animal info (adult male C57BL/6 mice 6–8 weeks of age; 20–25 g); pumps replaced; ischemia (cerebral); 65% ethanol and 35% cremaphor used

Agents: Cyclosporine A, Phenelzine Vehicle: Saline; Cremophor; Ethanol; Route: SC; Species: Rat; Pump: 2ML1; Duration: 3 days;
ALZET Comments: Dose (10 mg/kg/day); Controls received mp w/ vehicle; animal info (3 months old, Sprague Dawley); neurodegenerative (Traumatic Brain Injury); 50mg/mL in saline/650 mg Cremophor/32.9% ethanol/mL;

Agents: Cyclosporin A Vehicle: Not Stated; Route: SC; Species: Rat; Pump: 2ML1; 2ML4; Duration: 2 weeks; 8 weeks;
ALZET Comments: Dose (50 mg/mL); animal info (spastic Han-Wistar, 30 days); no stress (see pg. 268); behavioral testing (locomotor activity); cardiovascular;“This method of chronic delivery prevents painful daily injection and subsequent behavioral changes in treated animals. We did not detect any negative effects of cyclosporine, and no behavioral alterations were observed in treated mutants other than natural disease progression” pg 268; Dose (15 mg/kg/day);

Agents: Cyclosporin Vehicle: Not Stated; Route: SC; Species: Rat; Pump: 2004; Duration: Not Stated;
ALZET Comments: Dose (50 mg/mL);

Agents: Cyclosporine Vehicle: Not Stated; Route: SC; Species: Rat; Pump: 2004; Duration: 28 days;
ALZET Comments: Dose (15 mg/kg/day); animal info (30 days of age, male sHW mutant rats); neurodegenerative (replacement/augmentation);

Q6203: S. J. Min, et al. Leptomycin B attenuates neuronal death via PKA- and PP2B-mediated ERK1/2 activation in the rat hippocampus following status epilepticus. Brain Research 2017;1670(14-23
Agents: Cyclosporin A; H-89; Leptomycin B; U0126 Vehicle: Not Stated; Route: SC; Species: Rat; Pump: 1007D; Duration: 3 days;
ALZET Comments: Dose [H-89 (10 uM); LMB (30 mg/ml); LMB (30 mg/ml) + H-89 (10 uM); CsA (250 uM); LMB (30 mg/ml) + CsA (250 uM); U0126 (25 uM); and LMB (30 mg/ml) + U0126 (25 uM)]; Controls received mp w/ vehicle; animal info (Adult male Sprague-Dawley rats weighing 320–370 g); H-89 is a PKA inhibitor; U0126 is an ERK ½ inhibitor; ALZET brain infusion kit 1 used; Brain coordinates (1 mm posterior; 1.5 mm lateral; -3.5 mm depth); Therapeutic indication (seizure);

Agents: Immunoglobulin G1, anti-Nogo-A antibody 11C7; Immunoglobulin G1, anti-cyclosporin A Vehicle: Not Stated; Route: CSF/CNS; Species: Rat; Pump: 2ML2; Duration: 2 weeks;

Agents: Cyclosporine Vehicle: Not Stated; Route: SC; Species: Rat; Pump: Not Stated; Duration: Not Stated;

ALZET Comments: Dose (10 mg/kg/day); animal info (female Sprague-Dawley rats weighing 200-250 g); Therapeutic indication (spinal cord injury);


Agents: Cyclosporine A Vehicle: Ethanol; Cremophor EL; Route: SC; Species: Mice; Pump: 2004; Duration: 4 weeks;

ALZET Comments: Controls received mp w/ vehicle; animal info (female mice, C57Bl/6, 18-20 g); functionality of mp verified by plasma levels; 33% ethanol, 62% Cremophor EL used; toxicology; Cyclosporine A aka CsA; CsA does not induce liver or kidney toxicity; Dose (20 mg/kg/day); Resultant plasma level (1087±124 ng/mL, 711±91 ng/mL after 1 week, 4 weeks);

Q4841: A. Kawamura, et al. Teratocarcinomas Arising from Allogeneic Induced Pluripotent Stem Cell-Derived Cardiac Tissue Constructs Provoked Host Immune Rejection in Mice. SCIENTIFIC REPORTS 2016;6(1-13

Agents: Tacrolimus (cyclosporin) Vehicle: Not Stated; Route: SC; Species: Mice; Pump: 1002; Duration: 27 days;

ALZET Comments: cancer (teratocarcinoma); immunology; animal info (BALB/c); functionality of mp verified by plasma levels; pumps replaced after 14 days; BLI; Dose (1.5 mg/kg);


Agents: Vascular Endothelial Growth Factor, Angiotensin II, Losartan, Cyclosporine Vehicle: Saline; Route: SC; Species: Mice; Pump: Not Stated; Duration: 21 days;

ALZET Comments: Controls received mp w/ vehicle; animal info (Calcineurin (CN) B1 (Cnb1_/fl) conditional knockout mice, C57BL/6 mice); dose-response; vegf aka vascular endothelial growth factor; Dose (VEGF 25 ug/kg/day, AngII 1 ug/kg/min, CsA 5 mg/kg/day, Losartan 10 mg/kg/day);


Agents: Cyclosporine Vehicle: Not Stated; Route: IP; Species: Mice; Pump: 1004; Duration: 4 weeks;

ALZET Comments: Animal info (male, BALB/c, 13 weeks old); cancer (cholangiocarcinoma);


Agents: Cyclosporin; FK506; NIM811 Vehicle: Saline; Route: SC; Species: Mice; Pump: 2002; Duration: 7 days; 25 days; 32 days;

ALZET Comments: Controls received mp w/ vehicle; animal info (male, C57BL6J, 6-8 weeks old, 25-30g); pumps replaced every 2 weeks; ischemia (cerebral); post op. care (SC injection of warmed saline); behavioral testing (foot fault task);


Agents: Cyclosporine Vehicle: Not Stated; Route: SC; Species: Rat; Pump: 2ML4; Duration: Not Stated;

ALZET Comments: Animal info (female, Wistar); immunology; “Because of the planned long duration of the follow-up (6 months), concerns over daily injections of cyclosporine led us to use subcutaneously implanted microosmotic pumps preset to release the drug in a controlled fashion.” pg 93;


Agents: Tacrolimus (cyclosporin) Vehicle: NaCl; Route: SC; Species: Rat; Pump: 2ML4; 2004; Duration: 8 weeks;

ALZET Comments: Controls received mp w/ vehicle; animal info (female, Lewis, virgin); functionality of mp verified by blood levels; pumps replaced every 2 weeks; teratology;


Agents: Cyclosporine Vehicle: Not Stated; Route: SC; Species: Rat; Pump: 2ML4; Duration: Not Stated;

ALZET Comments: Animal info (female, Wistar); immunology; “Because of the planned long duration of the follow-up (6 months), concerns over daily injections of cyclosporine led us to use subcutaneously implanted microosmotic pumps preset to release the drug in a controlled fashion.” pg 93;