Recent References (2010-Present) on the Administration of Cholinergic Agents Using ALZET® Osmotic Pumps

Acetylcholine

Q9514: M. A. Ulleryd, et al. RNA sequencing data describing transcriptional changes in aorta of ApoE-/- mice after alpha 7 nicotinic acetylcholine receptor (alpha7nAChR) stimulation. Data in Brief 2020;30(105415

**Agents:** Alpha 7 nicotinic acetylcholine receptor agonist **Vehicle:** Cyclodextrin; Saline; **Route:** SC; **Species:** Mice; **Pump:** 2004; **Duration:** 8 weeks;

**ALZET Comments:** Dose (50 μmo/kg/day); 28% cyclodextrin used; Controls received mp w/ vehicle; animal info (Male apoE-/- mice, 10 weeks old); pumps replaced every 4 weeks; Alpha 7 nicotinic acetylcholine receptor agonist aka α7nAChR agonist; gene therapy;

Atropine


**Agents:** Atropine **Vehicle:** Saline; **Route:** SC; **Species:** Rat; **Pump:** 2ML; **Duration:** Not stated;

**ALZET Comments:** Dose (10 mg/kg); Controls received mp w/ vehicle; animal info (13 weeks old, Brown Norway); dependence;

Q4725: T. Kashihara, et al. beta(2)-Adrenergic and M(2)-muscarinic receptors decrease basal t-tubular L-type Ca(2+) channel activity and suppress ventricular contractility in heart failure. European Journal of Pharmacology 2014;724(;):122-131

**Agents:** Atropine; ICI-118,551 **Vehicle:** Saline; DMSO; **Route:** Not Stated; **Species:** Mice; **Pump:** 1004; **Duration:** 21 days;

**ALZET Comments:** Animal info (male, C57BL6, 8-10 weeks old); cardiovascular;


**Agents:** Atropine **Vehicle:** Not Stated; **Route:** Not Stated; **Species:** Mice; **Pump:** 2001; **Duration:** 6 hours;

**ALZET Comments:** Animal info (male, Trpm4 -/-, 12-32 weeks old); cardiovascular;

Carbachol

Q4121: Y. Suzuki, et al. Vagal Hyperactivity Due to Ventromedial Hypothalamic Lesions Increases Adiponectin Production and Release. Diabetes 2014;63(1637-1648

**Agents:** Carbachol **Vehicle:** Saline; **Route:** SC; **Species:** Rat; **Pump:** Not Stated; **Duration:** 5 days;

**ALZET Comments:** Controls received mp w/ vehicle; animal info (female, Sprague-Dawley, 13 weeks old); carbachol is a parasympathetic stimulator; obesity;


**Agents:** Carbachol **Vehicle:** Saline; **Route:** SC; **Species:** Rat; **Pump:** Not Stated; **Duration:** 5 days;

**ALZET Comments:** Controls received mp w/ vehicle; animal info (Sprague Dawley, female, 13 wks old)


**Agents:** Physostigmine; carbachol; nicotine; pirenzepine; oxotremorine; mecamylamine **Vehicle:** Saline; **Route:** CSF/CNS; **Species:** Rat; **Pump:** 2002; 2004; **Duration:** Not Stated;

**ALZET Comments:** Controls received mp w/ vehicle; animal info (female, Sprague Dawley, 250 g.); neurodegenerative (Alzheimer's Disease)
**Oxotremorine**
Agents: Physostigmine; carbamol; nicotine; pirenzepine; oxotremorine; mecamylamine  
**Vehicle:** Saline;  
**Route:** CSF/CNS;  
**Species:** Rat;  
**Pump:** 2002; 2004;  
**Duration:** Not Stated;  
**ALZET Comments:** Controls received mp w/ vehicle; animal info (female, Sprague Dawley, 250 g.); neurodegenerative (Alzheimer’s Disease)

**Physostigmine**
Agents: physostigmine  
**Vehicle:** water;  
**Route:** SC;  
**Species:** Rat;  
**Pump:** 2ML4;  
**Duration:** 3 weeks;  
**ALZET Comments:** controls received mp w/ saline; animal info: sprague-dawley, male, 250-300g; functionality of mp verified by residual volume; enzyme inhibitor (Acetylcholine); neurodegererative (Traumatic brain injury); except for model number, paper does not mention ALZET much; dose: 1.6 micromoles/kg/day

Agents: Physostigmine  
**Vehicle:** Not Stated;  
**Route:** Not Stated;  
**Species:** Mice;  
**Pump:** Not Stated;  
**Duration:** 2 weeks;  
**ALZET Comments:** Animal info (C57BL/6, 9 wks old); enzyme inhibitor (acetylcholinesterase); hindlimb ischemia

Agents: Physostigmine; scopolamine; pyridostigmine bromide  
**Vehicle:** Not Stated;  
**Route:** SC;  
**Species:** Guinea pig;  
**Pump:** Not Stated;  
**Duration:** 12 days;  
**ALZET Comments:**

Agents: Physostigmine; carbamol; nicotine; pirenzepine; oxotremorine; mecamylamine  
**Vehicle:** Saline;  
**Route:** CSF/CNS;  
**Species:** Rat;  
**Pump:** 2002; 2004;  
**Duration:** Not Stated;  
**ALZET Comments:** Controls received mp w/ vehicle; animal info (female, Sprague Dawley, 250 g.); neurodegenerative (Alzheimer’s Disease)

Agents: Pyridostigmine Bromide; Physostigmine  
**Vehicle:** Saline;  
**Route:** SC;  
**Species:** Mice;  
**Pump:** Not Stated;  
**Duration:** 7 days;  
**ALZET Comments:** Dose (Pyridostigmine Bromide 3 or 10 mg/kg/day; Physostigmine 2.88 mg/kg/day); animal info (Male C57BL6 mice weighing approx. 25 g); neurodegenerative (Gulf War Syndrome);

Agents: Pyridostigmine bromide; physostigmine  
**Vehicle:** Not Stated;  
**Route:** SC;  
**Species:** Mice;  
**Pump:** Not Stated;  
**Duration:** 30 days;  
**ALZET Comments:** Controls received mp w/saline; animal info (male, C57BL6, 25 g); enzyme inhibitor (cholinesterase)
Pyridostigmine


**Agents:** Sodium sulfate; Pyridostigmine bromide  
**Vehicle:** Saline  
**Route:** IP  
**Species:** Mice  
**Pump:** Not Stated  
**Duration:** 7 days;  
**ALZET Comments:** Dose (2 mg/day/kg PB); Controls received mp w/ vehicle; animal info (Pathogen-free 5–6-week-old C57BL/6 mice); Sodium sulfate aka DSS, Pyridostigmine bromide aka PB; dependence;


**Agents:** Pyridostigmine bromide  
**Vehicle:** Not Stated  
**Route:** SC  
**Species:** Mice  
**Pump:** Not Stated  
**Duration:** 6 weeks;  
**ALZET Comments:** Dose (1 mg/kg/day); animal info (Twelve-month-old female mice/15-month old male mice); dependence;

Q8832: C. Rocha-Resende, et al. Immunomodulatory role of non-neuronal cholinergic signaling in myocardial injury. JCI Insight 2019;5  

**Agents:** Pyridostigmine bromide  
**Vehicle:** Saline  
**Route:** SC  
**Species:** Mice  
**Pump:** 1002  
**Duration:** 7 days;  
**ALZET Comments:** Dose ()3 mg/kg/day); Controls received mp w/ vehicle; animal info (C57BL/6J, 8-10 weeks old); Pyridostigmine aka PYR; immunology;


**Agents:** Pyridostigmine Bromide; Donepezil  
**Vehicle:** Not Stated  
**Route:** SC  
**Species:** Rat  
**Pump:** 2004  
**Duration:** 16 weeks;  
**ALZET Comments:** animal info (male, Wistar-Kyoto or SHR); pumps replaced every 4 weeks; long-term study; cardiovascular; bp measured using tail cuff; Dose (Pyridostigmine bromide 1.5 mg/kg/day; donepezil 1.4 mg/kg/day);


**Agents:** Pyridostigmine  
**Vehicle:** Not Stated  
**Route:** SC  
**Species:** Rat  
**Pump:** 2ML4  
**Duration:** 3 weeks;  
**ALZET Comments:** animal info (male, SHR, 46 weeks old); cardiovascular; bp measured using radiotelemetry; Dose (15 mg/kg/day);


**Agents:** Pyridostigmine Bromide; Donepezil  
**Vehicle:** Not Stated  
**Route:** SC  
**Species:** Rat  
**Pump:** 2004  
**Duration:** 16 weeks;  
**ALZET Comments:** animal info (male, Wistar-Kyoto or SHR); pumps replaced every 4 weeks; long-term study; cardiovascular; bp measured using tail cuff; Dose (Pyridostigmine bromide 1.5 mg/kg/day; donepezil 1.4 mg/kg/day);


**Agents:** Pyridostigmine  
**Vehicle:** Saline, sterile;  
**Route:** SC  
**Species:** Mice  
**Pump:** 1004  
**Duration:** 4 weeks;  
**ALZET Comments:** Controls received mp w/ vehicle; animal info (male, C57BL6, 10-15 weeks old, 25-30g); ischemia (cardiac); cardiovascular; pyrostigmine is an acetylcholinesterase inhibitor; pyrostigmine aka PYR; bp measured using radiotelemetry; pumps primed at 37C saline for 48 hours;


**Agents:** Pyridostigmine  
**Vehicle:** Saline  
**Route:** SC  
**Species:** Rat  
**Pump:** 2ML4  
**Duration:** 14 days; 28 days;  
**ALZET Comments:** Controls received mp w/ vehicle; animal info (male, Sprague Dawley, 220-260g); dose-response (p.416, 418); post op. care (antibiotic ointment); incision closed with (4-0) suture;

Agents: Physostigmine; scopolamine; pyridostigmine bromide
Vehicle: Not Stated; Route: SC; Species: Guinea pig; Pump: Not Stated; Duration: 12 days;

**ALZET Comments:**


Agents: Pyridostigmine bromide; physostigmine
Vehicle: Not Stated; Route: SC; Species: Mice; Pump: Not Stated; Duration: 30 days;

**ALZET Comments:** Controls received mp w/saline; animal info (male, C57BL6, 25 g); enzyme inhibitor (cholinesterase)

### Scopolamine


Agents: Scopolamine hydrobromide
Vehicle: Saline; Route: SC; Species: Rat; Pump: 2002; Duration: 14 days;

**ALZET Comments:** Dose (0.5 mg/kg); Controls received mp w/ vehicle; animal info (adult male Wistar rats, 190-300 g); neurodegenerative (Traumatic brain injury);


Agents: Scopolamine, N-methyl
Vehicle: Saline; Route: Abdomen; Species: Rat; Pump: Not stated; Duration: 14 days;

**ALZET Comments:** Dose (25 mg kg-1 day); Controls received mp w/ vehicle; N-methyl-Scopolamine aka muscarinic antagonist; dependence;


Agents: Scopolamine
Vehicle: Saline; Route: SC; Species: Mice; Pump: 2001; 2006; Duration: 7 days;

**ALZET Comments:** Dose (0.5 mg/KG BW/day); Controls received mp w/ vehicle; animal info (mice aged 8–10 weeks); Scopolamine aka nonselective cholinergic muscarinic receptor antagonist; dependence;


Agents: Scopolamine
Vehicle: Not Stated; Route: SC; Species: Rat; Pump: Not stated; Duration: 3 days;

**ALZET Comments:** Dose (12.5 mg/day); animal info (Sprague-Dawley rats); dependence;


Agents: Scopolamine
Vehicle: PBS; Route: SC; Species: Mice; Pump: 1002; Duration: 28 days;

**ALZET Comments:** Dose (0.2 mg/kg/day); Controls received mp w/ vehicle; animal info (8-week-old WT BALB/c male mice 27–31 g); Therapeutic indication (experimental dry eye);


Agents: Pirenzepine; Scopolamine hydrobromide; Metyrapone; luteinizing hormone; ACTH
Vehicle: PBS; Route: CSF/CNS (Third ventricle); Species: Mice (knockout); Pump: 1002; Duration: Not Stated;

**ALZET Comments:** Dose (0.6 mg/kg/day Pirenzepine; 1.0 mg/kg Scopolamine hydrobromide; 100mg/kg/day Metyrapone; 2.8 mg/kg/day ACTH; 16ug/day LH); Controls received mp w/ vehicle; animal info (wild-type and Chrm1−/−); luteinizing hormone aka LH and adrenocorticotropic hormone aka ACTH; peptides; Brain coordinates (A/P −1.6 mm posterior to bregma, D/V −4.7 mm);

**Agents:** Scopolamine  
**Vehicle:** Not Stated  
**Route:** SC  
**Species:** Mice  
**Pump:** 1002  
**Duration:** 2 weeks  
**ALZET Comments:** Dose (0.1 mg/day); animal info (10–12-week-old female C57BL/6 mice); Therapeutic indication (experimental dry eye)  


**Agents:** Butylscopolamine  
**Vehicle:** PBS  
**Route:** SC  
**Species:** Mice  
**Pump:** 1007D  
**Duration:** 3 days; 5 days; 7 days  
**ALZET Comments:** Animal info (male, C57BL6J, 9-10 weeks old); ischemia (colitis)  


**Agents:** Scopolamine  
**Vehicle:** Not Stated  
**Route:** SC  
**Species:** Rat  
**Pump:** 2ML4  
**Duration:** 28 days  
**ALZET Comments:** Control animals received mp w/ saline; animal info (male, Sprague Dawley, 200-220 g, adult)  


**Agents:** Scopolamine  
**Vehicle:** Saline  
**Route:** SC  
**Species:** Rat  
**Pump:** 2ML4  
**Duration:** 28 days  
**ALZET Comments:** Dose (44 mg/ml delivered at 2.5 ml/h); functionality of mp verified (The release of SCO was confirmed by the increase of locomotor activity and mydriasis);  


**Agents:** Scopolamine  
**Vehicle:** Saline  
**Route:** IP  
**Species:** Mice  
**Pump:** Not Stated  
**Duration:** 3, 7, 14 days  
**ALZET Comments:** Animal info (SERTKO, TPH1KO, wt)  


**Agents:** Scopolamine  
**Vehicle:** Saline, physiological  
**Route:** SC  
**Species:** Rat  
**Pump:** 2ML4  
**Duration:** 28 days  
**ALZET Comments:** Controls received mp w/ vehicle; animal info (Wistar, male)  


**Agents:** Scopolamine  
**Vehicle:** Saline  
**Route:** SC  
**Species:** Rat  
**Pump:** Not Stated  
**Duration:** 28 days  
**ALZET Comments:** Controls received mp w/ vehicle; animal info (Wistar, male)  


**Agents:** Scopolamine  
**Vehicle:** Not Stated  
**Route:** SC  
**Species:** Rat  
**Pump:** 2ML2  
**Duration:** 10 days  
**ALZET Comments:** Animal info (Lewis, female, 6 wks old)  


**Agents:** Physostigmine; scopolamine; pyridostigmine bromide  
**Vehicle:** Not Stated  
**Route:** SC  
**Species:** Guinea pig  
**Pump:** Not Stated  
**Duration:** 12 days  
**ALZET Comments:**

**Agents:** Scopolamine butylbromide  
**Vehicle:** PBS;  
**Route:** SC;  
**Species:** Mice;  
**Pump:** 2004;  
**Duration:** 8 weeks;  
**ALZET Comments:** Controls received mp w/ vehicle; animal info (6 wks old, male, APC min/+); pumps replaced after 4 weeks; post op. care (betadine)


**Agents:** Scopolamine hydrobromide  
**Vehicle:** Not Stated;  
**Route:** SC;  
**Species:** Rat;  
**Pump:** 2ML2; 2ML4;  
**Duration:** 14, 28 days;  
**ALZET Comments:** Controls did not receive any scopolamine; animal info (male, Sprague Dawley, 6-8 wks old)