Recent References (2018-2020) on the Intravenous Administration of Agents Using ALZET® Osmotic Pumps


**Agents:** Zymosan; CU-CPT22  
**Vehicle:** Not stated;  
**Route:** CSF/CNS (intracerebral); IV;  
**Species:** Mice;  
**Pump:** 1007D; 1004; 1002;  
**Duration:** 1 week; 28 days; 2 weeks;  
**ALZET Comments:** Dose (25 ug zymosan; 10 ug/day CU-CPT22); animal info (male and female 5xFAD mice); CU-CPT22 aka Toll-like receptor 2 agonist; Brain coordinates (A = 0, L = 1, H = 2.5); neurodegenerative (Alzheimer’s disease);  


**Agents:** Z-DON  
**Vehicle:** CSF, Artificial; DMSO;  
**Route:** CNS/CSF (intracerebral); IV;  
**Species:** Mice;  
**Pump:** 2001;  
**Duration:** 7 days;  
**ALZET Comments:** Dose (100 uM); 0.4% DMSO used; Controls received mp w/ vehicle; animal info (male C57BL/6J mice, 8-10 weeks old); Z-DON aka Transglutaminase 2 inhibitor; ALZET brain infusion kit 2 used; Brain coordinates (1.2 mm laterally to and 0.5 mm posterior to the bregma (right side)); gene therapy;  

**Q8557:** S. E. Joppe, et al. Genetic targeting of neurogenic precursors in the adult forebrain ventricular epithelium. Life Sci Alliance 2020;3(7):  
**Agents:** Ara-C;  
**Vehicle:** Not stated;  
**Route:** CSF/CNS (intracerebral); IV;  
**Species:** Mice;  
**Pump:** 1007D;  
**Duration:** 7 days;  
**ALZET Comments:** Controls received mp w/ vehicle; animal info (male mice); ALZET brain infusion kit 3 used; Brain coordinates (0 mm AP and −0.9 mm ML to the bregm); gene therapy;  

**Q8544:** K. Hu, et al. Asthmatic Airway Vagal Hypertonia Involves Chloride Dyshomeostasis of Preganglionic Neurons in Rats. Front Neurosci 2020;14(31  
**Agents:** Minocycline  
**Vehicle:** CSF, Artificial;  
**Route:** CSF/CNS (intracerebral); IV;  
**Species:** Rat;  
**Pump:** Not stated;  
**Duration:** 15 days;  
**ALZET Comments:** Dose (172 ng/mL); animal info (Male Sprague–Dawley rats, seven-week-old, 170–190 g); Minocycline aka MC; ALZET brain infusion kit 2 used; Brain coordinates (0.8 mm caudal to the bregma; 1.5 mm lateral to the midline; 4 mm below the surface of the skull); dependence;  

**Q8517:** F. Gulcu Bulmus, et al. Kisspeptin and RF9 prevent paroxetine-induced changes in some parameters of seminal vesicle fluid in the male rats. Andrologia 2020;52(4):e13538

**Agents:** Kisspeptin; Peptide, RFamide  
**Vehicle:** Saline;  
**Route:** CSF/CNS (intracerebral); IV;  
**Species:** Rat;  
**Pump:** Not stated;  
**Duration:** 10 days;  
**ALZET Comments:** Dose (1 nmol Kisspeptin and 20 nmol RF9); Controls received mp w/ vehicle; animal info (male Sprague Dawley rats (21-day-old) weighing 40 ± 2 g ); RFamide Peptide aka RF9; peptides; Brain coordinates (according to the bregma, in the anterior– posterior plane: 0.90 mm; in the lateral plane: 1.4 mm; and 4 mm on the vertical plane); dependence;

Agents: Angiotensin (1-7) Vehicle: Saline, Sterile; Route: CSF/CNS (intracerebral); IV; Species: Rat; Pump: Not stated; Duration: 28 days;

ALZET Comments: Dose (200 ng/kg/h); 0.9% NaCl used; Controls received mp w/ vehicle; animal info (Wistar adult male rats, 240-280 g); Angiotensin (1-7) aka Ang-(1-7); Brain coordinates (0.8 mm posterior and 1.4 mm lateral to the bregma); neurodegenerative (Epilepsy);


Agents: Haemoglobin; Haptoglobin Vehicle: Saline; Route: CSF/CNS (intracerebral); IV; Species: Mice; Pump: 2002; Duration: 2 weeks;

ALZET Comments: Dose (20mg/ml Haemoglobin; 14mg/ml Haptoglobin); 0.9% Saline used; Controls received mp w/ vehicle; animal info (Locally bred male C57BL/6 mice, 10–12 weeks of age); post op. care (Buprenorphine); Haemoglobin aka Hb; Haptoglobin aka Hp; ALZET brain infusion kit 3 used; Brain coordinates (from bregma: anteroposterior, ±0.4 mm; lateral, 1 mm; depth, 2.5 mm.); cyanoacrylate adhesive; toxicology;


Agents: Carboplatin Vehicle: Not stated; Route: CSF/CNS (intracerebral); IV; Species: Rat; Pump: Not stated; Duration: 7 days;

ALZET Comments: Dose (84 ug/g); animal info (Fischer rats); cancer (Glioma);


Agents: TLQP-21 Vehicle: CSF, Artificial; Route: CSF/CNS (intracerebral); IV; Species: Mice; Pump: Not stated; Duration: 28 days;

ALZET Comments: Dose (15 μg/day); Controls received mp w/ vehicle; animal info (wild-type C57BL/6 J mice, 3 months); Brain coordinates (P = − 0.1, ML = ±1.0 and DV = − 3.0 from bregma (mm)); neurodegenerative (Alzheimer’s disease);


Agents: Vasoactive intestinal peptide Vehicle: Hartmann’s Solution; Route: IV (iliac); Species: Rat; Pump: Not stated; Duration: 14 weeks;

ALZET Comments: Dose (5 pmol/kg/min); Controls received mp w/ vehicle; animal info (Fourteen week old spontaneous hypertensive rat); long-term study; Blood pressure measured via tail cuff plethysmography; 193 mmHg - 200 mmHg; Vasoactive intestinal peptide aka VIP; peptides; dependence;


Agents: Erythropoietin, recombinant human Vehicle: Saline; Route: CSF/CNS (intracerebral); IV; Species: Mice; Pump: 2006; Duration: 14 days;

ALZET Comments: Dose (3000 U/kg); Controls received mp w/ vehicle; animal info (Tg21 mice); recombinant human Erythropoietin aka recombinant human EPO; ALZET brain infusion kit 3 used; Brain coordinates (midline, 1.00 mm; anteroposterior, 0.34 mm; dorsoventral, 2.30 mm); dental cement used; replacement therapy (Erythropoietin);


Agents: Nimodipine Vehicle: PEG-400; Route: IV; SC; Species: Rat; Pump: Not stated; Duration: 12 days;

ALZET Comments: Dose (30 mg/kg); Controls received mp w/ vehicle; animal info (adult male Sprague Dawley rats); neurodegenerative (multiple sclerosis);

Agents: APY-d3 Vehicle: CSF, Artificial; Route: CSF/CNS (intracerebral); IV; Species: Mice; Pump: 1002; Duration: 2 weeks;
ALZET Comments: Dose (5 mm); animal info (In-bred C57BL/6J male mice, 10–12 weeks of age); behavioral testing (accelerating rotarod; horizontal ladder task); APY-d3 aka peptide solution, β APYCVYR β ASWSC; peptides; ALZET brain infusion kit 3 used; Brain coordinates (0.1 mm caudal and 1.0 mm lateral of bregma); cyanoacrylate adhesive; gene therapy;


Agents: Peptide-1, recombinant human glucagon-like Vehicle: Saline; Route: IV; Species: Rat; Pump: 2004; Duration: 12 weeks;
ALZET Comments: "Dose (1.5 pmol/kg/min); Controls received mp w/ vehicle; animal info (Eight-week-old male/female Wistar rats weighing 300 – 10 g); diabetes;"


Agents: 2-[(4-biphenylsulfonyl)amino]-3-phenyl-propionic acid Vehicle: Not Stated; Route: IV (inferior mesenteric vein); IP; Species: Rat (transgenic); Pump: 2ML1; 2001; Duration: 7 days;
ALZET Comments: Dose (100 μg/h); animal info (Male Lew-Tg(CAG-EGFP)ys rats); enzyme inhibitor (Matrix metalloproteinases 2/9);

Q7500: F. Wang, et al. Site-1 protease-derived soluble (pro)renin receptor targets vasopressin receptor 2 to enhance urine concentrating capability. JCI Insight 2019;4(7):

Agents: Histidine-tagged sPRR Vehicle: Not stated; Route: IV (jugular); Species: Mice; Pump: 1007D; Duration: 7 days;
ALZET Comments: Dose (30 μg/kg/day); Controls received mp w/ vehicle; animal info (experiments. Male 10- to 12-week-old C57/BL6 mice);


Agents: Nicotine Ditartrate Vehicle: Saline; Route: SC, IV (jugular); Species: Rat; Pump: 2ML4; Duration: 4 weeks;
ALZET Comments: Dose (2.5 mg/kg/day); animal info (Young adult female Sprague-Dawley rats); post op. care (ketoprofen, bupivacaine); behavioral testing (dual-lever experiment);


Agents: Insulin, human Vehicle: PBS; Route: IV (jugular); Species: Mice; Pump: Not Stated; Duration: 24 hours;
ALZET Comments: Dose (Human Insulin .01 U/kg/day); Controls received mp w/ vehicle; animal info (C3H/HeN mice, aged 7-9 weeks); ALZET internal jugular vein catheter used; cardiovascular;


Agents: Bevacizumab; RNA, small interfering (anti-HIF-1α/PEG); Immunotoxin, DTAT/DTATEGF; Endostatin; 17-ODYA; Miconazole; Vehicle: Not Stated; Route: CSF/CNS (intratumoral), IV; Species: Mice; Pump: Not Stated; Duration: Not Stated;
ALZET Comments: enzyme inhibitor (CYP epoxygenase); cancer (glioblastoma); This review describes methods (including convection-enhanced delivery devices, implantable polymer devices, nanocarriers, and cellular vehicles) to deliver antiangiogenic factors to intracranial tumors.

Agents: Irisin Vehicle: Saline; Route: IV; Species: Rat; Pump: 2ML2; Duration: 2 weeks;
ALZET Comments: Dose (50 nmol/day); Controls received mp w/ vehicle; animal info (adult male, 330-390 g, Sprague Dawley rats); Blood pressure measured via tail cuff method; replacement therapy (Irisin);

Agents: Ovine prolactin Vehicle: CSF, artificial; Route: IV; Species: Rat; Pump: 2001; Duration: 7 days;
ALZET Comments: Dose (2.5 ug/ul/hr); Controls received mp w/ vehicle; animal info (10 week old, female, Sprague-Dawley); bilateral cannula used; dependence;

Agents: Rotenone, MPTP Vehicle: Not Stated; Route: IV, IP; Species: Rat; Pump: Not Stated; Duration: 14 days, 33 days;
ALZET Comments: Dose (Rotenone (3 mg/kg/day); MPTP (46 mg/kg/day)); neurodegenerative (Parkinson’s);

Agents: Zinc metallochaperone 1 Vehicle: DMSO; Route: IV (jugular); Species: Mice (nude); Pump: 2001; Duration: 7, 17 days;
ALZET Comments: Dose (1 mg/kg/d); Controls received mp w/ vehicle; animal info (8-12 week old mice); pumps replaced after 1 week; comparison of IV bolus injection vs continuous pump infusion; half-life: <30 min (p. 4505); cancer (therapeutics);

Agents: angiotensin(1–7) Vehicle: Not Stated; Route: IV (jugular); Species: Dog; Pump: Not Stated; Duration: 2 weeks;
ALZET Comments: Dose (6 μg/kg/h); Controls did not receive mp; animal info (Mongrel, 11-15 kg); cardiovascular; Therapeutic indication (intravenously administered Ang-(1–7) may be responsible for inhibiting atrial remodeling induced by rapid atrial pacing, which in turn decreases HSP27 gene and protein expression.);

Agents: MKEY; MKEY, scrambled Vehicle: Formic acid; Route: IV (jugular); Species: Mice; Pump: 1007D; Duration: 7 days;
ALZET Comments: Dose (1.3 mg/kg/day); animal info (C57BL/6 mice); cardiovascular;

Agents: ghrelin, unacylated- Vehicle: saline, sterile, heparinized, BSA buffered; Route: IV (jugular); Species: Mice; Pump: 1007D; Duration: 7 days;
ALZET Comments: Dose (48μg/day); sterile isotonic saline containing BSA (1mg/ml) and heparin (5U/ml) used; Controls received mp w/ vehicle; animal info (6 months, C57BL/6 and GOAT-null); UAG is considered an inactive precursor to acyl-ghrelin; neurodegenerative (Parkinson’s); replacement therapy (ghrelin);

Agents: angiotensin (1-9) Vehicle: Not stated; Route: IV (jugular); Species: Rat; Pump: 2002; Duration: 14 days;
**ALZET® Bibliography**

**ALZET Comments:** Dose ((Ang(1-9) 600 ng/kg/min), (PD123319 28 ng/kg/min), (A779 100 ng/kg/min)); Controls received sham surgery and mp w/ vehicle; animal info (male, Sprague-Dawley, 150+-10g); PD123319 is an AT2R blocker. A779 is a Mas receptor blocker; replacement therapy (Uninephrectomized); cardiovascular; vehicle used but identity not stated.; Therapeutic indication (Ang-(1-9) protects against hypertensive cardiovascular and kidney damage induced by volume overload by decreasing inflammation in the heart, aortic wall, and kidney; these effects are not mediated by the Mas or AT2 receptor.);

**Q7762:** C. R. Chitambar, _et al._ Gallium Maltolate Disrupts Tumor Iron Metabolism and Retards the Growth of Glioblastoma by Inhibiting Mitochondrial Function and Ribonucleotide Reductase. Mol Cancer Ther 2018;17(6):1240-1250

**Agents:** gallium, (tris-hydroxy-2-methyl-4H-pyran-4-onato) **Vehicle:** Not Stated; **Route:** IV (Jugular); **Species:** Rat; **Pump:** Not Stated; **Duration:** 10 days;

**ALZET Comments:** Dose (50 mg/kg/day); animal info (Male athymic rats 250g); (tris-hydroxy-2-methyl-4H-pyran-4-onato)gallium aka GaM; cancer (glioblastoma);