Recent References (2016-2020) on Cerebral Ischemia Research Using ALZET® Osmotic Pumps


Agents: G1; G36; Oligodeoxynucleotide, IL1RA antisense; Scrambled Missense Vehicle: DMSO; Saline; Route: SC; CNS/CSF (left lateral ventricle); Species: Rat; Pump: 2004; 2002; 2001; Duration: 14 days;

ALZET Comments: Dose (10 ug/day; 10 nmol/day); 1% DMSO, 0.9% saline used; Controls received mp w/ vehicle; animal info (Adult female Sprague-Dawley rats); G1 aka GPER agonist; G36 aka GPER antagonist; ALZET brain infusion kit Lot no 10331-14 used; Brain coordinates (anteroposterior, 0.8 mm; lateral, 1.5 mm; depth, 3.5 mm; from bregma); ischemia (GPER neuroprotective effects);


Agents: Mdivi-1 Vehicle: Not Stated; Route: Not Stated; Species: Rat; Pump: 1003D; Duration: Not Stated;

ALZET Comments: Dose (1 mg/kg/day); Controls received mp w/ vehicle; animal info (Adult male Sprague-Dawley rats 250–300 g); behavioral testing (Bames Maze Task, Morris Water Maze Test); enzyme inhibitor (selective inhibitor of mitochondrial fission protein Drp1);

Q4964: S. Bake, et al. Insulin-like Growth Factor (IGF)-1 treatment stabilizes the microvascular cytoskeleton under ischemic conditions. Experimental Neurology 2019;311(162-172

Agents: Insulin-like growth factor-I, recomb. Human; JB-1 Vehicle: CSF, artificial; Route: CSF/CNS (right lateral ventricle); Species: Rat; Pump: 1003D; 1007D; Duration: 1 day; 5 days;

ALZET Comments: Dose (100 μg/ml rhIGF-1; 20 μg/ml JB-1); Controls received mp w/ vehicle; animal info (Female Sprague-Dawley rats; 10–12 months; weight range 325–350 g); JB-1 is an IGFR inhibitor; Brain coordinates (– 1.0mm posterior to bregma, −1.4mm medial lateral, −3.5mm from dural surface); cyanoacrylate adhesive; ischemia (cerebral);


Agents: Phenserine, (+)-; Pifithrin-a Vehicle: Saline, physiological; DMSO; Route: SC; Species: Mice; Pump: 2002; Duration: 14 days;

ALZET Comments: Dose (25 mg/kg/day (+)-Phenserine); (2 mg/kg/day PFT-a); 10% DMSO in saline for PFT-a; Controls received mp w/ vehicle; animal info (male, 10–12-week-old, C57/BL6); behavioral testing (Accuscan activity monitor, novel object recognition); (+) -phenserine aka Posiphen; ischemia (cerebral); Therapeutic indication (stroke);


Agents: neurotrophic factor, recombinant human glial cell line-derived; neurotrophic factor, mesencephalic astrocyte-derived Vehicle: PBS; Route: CSF/CNS (Lateral ventricle); Species: Rat; Pump: 2002; Duration: 13 days;

ALZET Comments: Dose ((GDNF 0.25 μg/μL at 12 μL/day), (MANF 0.25 μg/μL at 12 μL/day)); Controls received mp w/ vehicle; animal info (male, Sprague-Dawley, 220-260g); GDNF promotes differentiation and tangential migration of cortical GABAergic neurons during brain development. MANF is a non-classical neurotrophic factor that resides in the endoplasmic reticulum; Brain coordinates (A/P 0.5; L/M +1.9; D/V 2.5); Cannula placement verified via stereotaxic frame; ischemia (Cerebral ischemia); pumps were implanted from day 3 to day 16 of experiment before being removed.; Therapeutic indication (the neuroregenerative potential of MANF via promoting neuroblast recruitment to the lesioned cortex in stroke rats);


Agents: Estradiol, 17b Vehicle: Cyclodextrin, B-; Route: SC; Species: Rat; Pump: Not Stated; Duration: 14 days;

ALZET Comments: Dose (0.0167 mg); 20% β-cyclodextrin used; animal info (3 month old, female, Sprague Dawley); ischemia (Cerebral);
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: YY1-siRNA; Vehicle: Not stated; Route: CSF/CNS; Species: Mice; Pump: Not stated; Duration: 4 days;
ALZET Comments: animal info (Male, C57B/6, 25-35 g); Brain coordinates (mediolateral=1.0 mm, anteroposterior=0.2 mm; dorsoventral=3.1 mm); ischemia (Cerebral);

Agents: Methylene blue; Vehicle: Saline; Route: SC; Species: Rat; Pump: 1003D; Duration: 3 days;
ALZET Comments: Dose (0.5 mg/kg/day); Controls received mp w/ vehicle; animal info (Male, Sprague Dawley, 3 months old, 250-300 g); ischemia (Global Cerebral Ischemia);

Agents: RNA, small interfering (ASK1); Vehicle: siPORTNeoFX Transfection agent; Route: CSF/CNS (left lateral ventricle); Species: Mice; Pump: 1003D; Duration: 3 days;
ALZET Comments: Dose (1 lL/h/ day); animal info (Adult,C57BL/6, male); enzyme inhibitor (apoptosis signal-regulating kinase 1); ALZET brain infusion kit used; ALZET brain infusion kit used; ischemia (Cerebral);

Agents: Vasopressin; Vehicle: Not Stated; Route: SC; Species: Rat; Pump: 2002; Duration: 3.5 days;
ALZET Comments: Dose (2.4 μg/24 h); animal info (Male Wistar rats weiging 250–300 g); ischemia (cerebral); cardiovascular; Minipumps used administer asopressin to induce prolonged hyponatremia;

Agents: Bumetanide; Vehicle: Saline; Route: CSF/CNS (lateral ventricle); Species: Rat; Pump: 2004; Duration: 21 days;
ALZET Comments: Dose (0.2 mg/kg/day); animal info (Adult male Wistar rats); enzyme inhibitor (selective Na+K+-Cl−-co-transporter inhibitor,); ALZET brain infusion kit used; Brain coordinates (AP-0.9 mm, ML+ 1.9 mm); ischemia (cerebral);

Agents: Memantine; Vehicle: Saline; Route: SC; Species: Mice; Pump: 2004; Duration: 28 days;
ALZET Comments: Dose (4 or 20 mg/kg/d); animal info (8-12 week old C57BL6/j male mice weighing 23-28g); ischemia (cerebral); “…we decided to use a subcutaneous delivery strategy for memantine in this study using miniosmotic pumps, given that miniosmotic pumps allowed to achieve most stable plasma memantine levels ” pg.981 ; Therapeutic indication (stroke);

Agents: Cytosine-β-Darabinofuranoside; Vehicle: Saline; Route: CSF/CNS (lateral ventricle); Species: Rat; Pump: 2001; Duration: 7 days;
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Bibliography

ALZET Comments: 0.9% Saline used; Controls received mp w/ vehicle; Brain coordinates (1.6 mm lateral to the midline, .8 mm posterior to the bregma, and 4.0 mm deep); Therapeutic indication (cerebral ischemia);

Agents: Bradykinin B1 receptor agonist; Bradykinin B2 receptor agonist; Vehicle: Saline; Route: SC; Species: Mice; Pump: 1007D; Duration: Not Stated;
ALZET Comments: Controls received mp w/ vehicle; animal info (C57/BL6, 18weeks old); ischemia (cerebral); Compound AKA: SarLys[Hyp3, IgI5, DPhe8]desArg9-bradykinin and [Hyp(3),Thi(5),(N)Chg(7),Thi(8)]-bradykinin; Dose (720 nmol/kg/day and 240 nmol/kg/day);

Agents: miR-378 Vehicle: Not Stated; Route: CSF/CNS; Species: Mice; Pump: 1003D; Duration: Not Stated;
ALZET Comments: Controls received mp w/ vehicle; animal info (C57BL6J, 18-22g); ischemia (cerebral); pumps primed overnight at 37C; Brain coordinates ( Bregma: - 2.2 mm, dorsoventral: 3 mm, lateral: 1 mm);

Agents: Ara-C Vehicle: Not Stated; Route: CSF/CNS; Species: mice; Pump: 1007D; Duration: 7 days;
ALZET Comments: animal info (C57BL6J, 8-10 weeks old, 20-25g); ischemia (cerebral);

Agents: Bumetanide Vehicle: Water, sterile; Route: CSF/CNS; Species: Rat; Pump: 2004; Duration: 21 days;
ALZET Comments: animal info (male, Wistar, 200-250g); ischemia (cerebral); behavioral testing (Morris water maze); pumps primed overnight in 37C saline; used dental cement; Dose (200 ug/kg/day); Brain coordinates (anteroposterior -0.9, mediolateral +1.5);

Q5099: J. Xing, et al. HIF-1alpha Activation Attenuates IL-6 and TNF-alpha Pathways in Hippocampus of Rats Following Transient Global Ischemia. Cellular Physiology and Biochemistry 2016;39(2):511-20
Agents: SC144; etanercept Vehicle: CSF, artificial; Route: CSF/CNS; Species: Rat; Pump: Not Stated; Duration: 24 hours;
ALZET Comments: Controls received mp w/ vehicle; animal info (male, Sprague Dawley, 200-300g); ALZET brain infusion kit used; ischemia (cerebral); used polycarbonate tubing; SC144 is a gp130 inhibitor; Brain coordinates (3.7 mm posterior to the bregma, 4.1 mm lateral to the midline, and 3.5 mm under the dura);

Agents: Ephrin-B2-Fc, recombinant murine chimera Vehicle: Saline; Route: CSF/CNS; Species: Rat; Pump: 1003D; Duration: 3 days;
ALZET Comments: animal info (male, Sprague Dawley, 8-10 weeks old, ~280g); ischemia (cerebral); Brain coordinates;

Agents: Estradiol, 17B- Vehicle: Cyclodextrin, B-; Route: SC; Species: Rat; Mice; Pump: 2002; Duration: 14 days;
ALZET Comments: animal info (Rats female, Sprague Dawley, 3 months old, OVX; Mice C27BL/6 PELP1, young adult, OVX); 20% Cyclodextrin used; ischemia (cerebral); replacement therapy (estradiol infusion); immunology; Resultant plasma level (10-15 pg/mL);

Agents: Protein, NgR(OMNI)-Fc Vehicle: Not Stated; Route: SC; Species: Mice; Pump: 1002; Duration: 28 days;
ALZET Comments: pumps replaced every 14 days; ischemia (cerebral); behavioral testing (pasta matrix task); Dose (0.77 mg/28 days);

Agents: Doxycycline Vehicle: PBS; Route: CSF/CNS (right lateral ventricle); Species: Mice (transgenic); Pump: 1007D; Duration: 7 days;
ALZET Comments: Dose ((12 ng/day or 1,200 ng/day); Controls received mp w/ vehicle; animal info (transgenic mice expressing Pou5f1 (Oct4), Sox2, Myc, and Klf4); Doxycycline aka DOX; ALZET brain infusion kit 3 used; Brain coordinates ((AP +0.3 mm from Bregma; ML −0.7 mm from Bregma; DV −2.0 mm from Dura); ischemia (cerebral); Therapeutic indication (Cerebral ischemia);

Agents: Erythropoietin, recombinant human Vehicle: Not Stated; Route: CSF/CNS; Species: Mice; Pump: Not Stated; Duration: 30 days;
ALZET Comments: Controls received mp w/ vehicle; animal info (C57BL6); good methods (Jove Video; picture of pump and implantation pg. 4); ischemia (cerebral); post op. care (Carprofen 4 mg/kg); behavioral testing (rotarod test; hand grip strength); cyanoacrylate adhesive; “In this work we have shown the method of implantation of minipumps with a cannula connected to the skull in order to deliver the plasticity promoting protein rhEpo directly into the ventricle, thus circumventing the BBB.” pg 8; Cannula placement verified via histologic analysis "The are no evident severe tissue alterations based on Nissl staining as compared to the corresponding contralateral area”;

Agents: Glibenclamide Vehicle: DMSO; Route: SC; Species: Rat; Pump: 2001; Duration: 1 day;
ALZET Comments: Dose (10 μg/kg); Controls received mp w/ vehicle; animal info (male Sprague-Dawley rats); ischemia (cerebral);

Agents: Interleukin-4 Vehicle: Saline; Route: CSF/CNS (ventricle); Species: Mice (knockout); Pump: 2001; Duration: 7 days;
ALZET Comments: Controls received mp w/ vehicle; animal info (C57/BL6 mice; 8-10 weeks, 25-30 g); ischemia (cerebral; stroke model); behavioral testing (Rotarod, corner, foot fault, and Morris water maze tests); healing, recovery; learning, memory; Therapeutic indication (Cerebral ischemia); Dose (60 ng/day); Brain coordinates: −0.20 mm anterior and 1.00 mm lateral to bregma;

Agents: Nicotine Vehicle: Saline; Route: SC; Species: Rat; Pump: Not Stated; Duration: 4 weeks;
ALZET Comments: Controls received mp w/ saline; animal info (male, Sprague Dawley, 250-300g); ischemia (cerebral); “The subcutaneous osmotic minipump releases nicotine at a constant rate, which resulted in stable plasma nicotine and cotinine levels that match the chronic smokers. The doses of nicotine used in the present study have been reported to result in stable plasma nicotine levels corresponding reasonably well with plasma levels in habitual light (0.5–1 pack/day) and moderate (2 packs/day) smokers” pg 331; traumatic brain injury; Dose (2 or 4 mg/kg/day);