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

Apomorphine

Q4660: T. T. Yan, *et al.* Daily Injection But Not Continuous Infusion of Apomorphine Inhibits Form-Deprivation Myopia in Mice. INVESTIGATIVE OPHTHALMOLOGY & VISUAL SCIENCE 2015;56(2475-2485
Agents: Apomorphine **Vehicle:** Not Stated; **Route:** SC; **Species:** Mice; **Pump:** 1002; **Duration:** 4 weeks;
ALZET Comments: Controls received mp w/ vehicle; animal info (male, C57Bl6, 4 weeks old); functionality of mp verified by residual volume; pumps replaced every 2 weeks; comparison of injection vs mp;

Q0779: R. Sarkis, *et al.* Chronic dizocilpine or apomorphine and development of neuropathy in two rat models I: Behavioral effects and role of nucleus accumbens. Experimental Neurology 2011;228(1):19-29
Agents: MK-801; apomorphine HCL hemihydrate **Vehicle:** Saline; Ascorbic acid; **Route:** CSF/CNS (nucleus accumbens); **Species:** Rat; **Pump:** 2002; **Duration:** Not Stated;
ALZET Comments: Controls received mp w/ vehicle; animal info (adult, female, Sprague Dawley, 200-300 g); post op. care (dexamethasone injections to prevent brain edema); behavioral testing (mechanical allodynia, Paw withdrawal latency, cold allodynia, hotplate test, spontaneous motor activity); cannula placement verified by picomicrograph of brain section; CCI, chronic constriction injury; SNI, spared nerve injury

Bromocriptine

Q10331: T. Shimizu, *et al.* Inhibition of cardiac PERK signaling promotes peripartum cardiac dysfunction. Sci Rep 2021;11(1):18687
Agents: Bromocriptine **Vehicle:** Not Stated; **Route:** Not Stated; **Species:** Mice; **Pump:** Not Stated; **Duration:** 3 weeks;
ALZET Comments: Dose:(400 iU/kg/day); animal info: PERK mice, age 8 weeks old; Blood pressure measured via: tail cuff; Blood pressure measurement: (see pg 7 fig 4); Bromocriptine aka (BCR)cardiovascular; Peripartum cardiomyopathy

Q9787: S. N. Framnes-DeBoer, *et al.* Bromocriptine improves glucose tolerance independent of circadian timing, prolactin, or the melanocortin-4 receptor. American Journal of Physiology Endocrinology and Metabolism 2020;318(1):E62-E71
Agents: Bromocriptine **Vehicle:** Not Stated; **Route:** SC; **Species:** Mice; **Pump:** 1002; **Duration:** 2 weeks;
ALZET Comments: Dose (8 mg/kg/day); Controls received mp w/ vehicle; animal info (9-17 weeks old, C57BL/6J); diabetes;

Q9785: C. Folgueira, *et al.* Hypothalamic dopamine signaling regulates brown fat thermogenesis. Nature Metabolism 2019;1(8):811-829
Agents: Bromocriptine mesylate **Vehicle:** DMSO; **Route:** CSF/CSN; **Species:** Rat; **Pump:** 1007D or 2002; **Duration:** 7,14 days;
ALZET Comments: Dose (20, 40, or 80 ug); Controls received mp w/ vehicle; animal info (Sprague Dawley, 20-25 g, 8-10 weeks old); neurodegenerative (Dopamine Signaling);

Dopamine

Q10418: A. B. Caglayan, *et al.* The Unconventional Growth Factors Cerebral Dopamine Neurotrophic Factor and Mesencephalic Astrocyte-Derived Neurotrophic Factor Promote Post-ischemic Neurological Recovery, Perilesional Brain Remodeling, and Lesion-Remote Axonal Plasticity. Translational Stroke Research 2022;
Agents: Cerebral dopamine neurotrophic factor, recombinant human; Mesencephalic astrocyte-derived neurotrophic factor, recombinant human **Vehicle:** NaCl; **Route:** CSF/CNS (left ventricle); **Species:** Mice; **Pump:** 2004; **Duration:** 28 days;
ALZET Comments: "Dose: (1 ug/day); (0.9% NaCl), vehicle used; Controls received mp w/ vehicle; animal info: male C57Bl6/j mice (8–10 weeks)behavioral testing: RotaRod test, Grip strength; Open field test; Elevated o maze test; Cerebral Dopamine Neurotrophic Factor aka (CDNF); ALZET brain infusion kit 3 used; Brain coordinates (contralateral motor cortex (0.5 mm rostral and 2.5 mm lateral to the bregma); neurodegenerative (stroke); ischemia (cerebral); "

Q9868: W. Zhang*, et al.* Inhibition of NADPH oxidase within midbrain periaqueductal gray decreases pain sensitivity in Parkinson's disease via GABAergic signaling pathway. Physiological Research 2020;
Agents: 6-hydroxydopamine **Vehicle:** CSF, Artificial; **Route:** CSF/CNS; **Species:** Rat; **Pump:** 1003D; **Duration:** 3 days;
ALZET Comments: Dose (6 ul/min); Controls received mp w/ vehicle; animal info (Male, Sprague Dawley, 200-250 g); behavioral testing (Rotation Behavior Test); 6-hydroxydopamine aka 6-OHDA ; Brain coordinates (3.3 mm rostral to the interaural line, 1.4 mm left of the midline, and 6.5 and 6.8 mm ventral to the dural surface);

Q8597: T. Kasamatsu*, et al.* Ocular dominance plasticity: Molecular mechanisms revisited. J Comp Neurol 2020;528(17):3039-3074
Agents: Dopamine, hydroxy-6 **Vehicle:** Not stated; **Route:** CSF/CNS (visual cortex); **Species:** Cat; **Pump:** Not stated;
ALZET Comments: Controls received mp w/ vehicle; animal info (young kittens); dependence;

Q8762: F. Han*, et al.* Dopamine D2 receptor modulates Wnt expression and control of cell proliferation. Scientific Reports 2019;9(1):16861
Agents: RNA, small interfering (Dopamine D2 Receptor) **Vehicle:** Not Stated; **Route:** SC; **Species:** Mice; **Duration:** 28 days;
ALZET Comments: Dose (3 ug/day); animal info (C57BL/6, Male, 20 g, 8-10 weeks old); Dopamine D2 Receptor siRNA aka D2R Receptor ; ischemia (Renal);

Q6442: C. Laloux*, et al.* Continuous cerebroventricular administration of dopamine: A new treatment for severe dyskinesia in Parkinson's disease? Neurobiol Dis 2017;103(24-31
Agents: Dopamine, anaerobia **Vehicle:** Saline; **Route:** CSF/CNS; **Species:** Mice; **Pump:** 2001; **Duration:** 7 days;
ALZET Comments: Controls received mp w/vehicle; animal info (5 month old C57Bl/6 J mice); neurodegenerative (Parkinson's)

Q6038: P. Dubovy*, et al.* Local chemical sympathectomy of rat bone marrow and its effect on marrow cell composition. Autonomic Neuroscience: Basic and Clinical 2017;206(19-27
Agents: Guanethidine, 6-hydroxydopamine hydrochloride **Vehicle:** Saline, Ascorbic acid; **Route:** SC; **Species:** Rat; **Pump:** 2002; **Duration:** 2 weeks;
ALZET Comments: Controls received mp w/ vehicle; animal info (240-250g); Good alzet diagram ;

Q3720: J. Wedel*, et al.* Simultaneous subcutaneous implantation of two osmotic minipumps connected to a jugular vein catheter in the rat. Laboratory Animals 2014;48(338-341
Agents: Dopamine, N-octanoyl **Vehicle:** Tween 80; saline; **Route:** IV (jugular); **Species:** Rat; **Pump:** 2ML4; **Duration:** 14 days;
ALZET Comments: animal info (male, Brown Norway, 230-270 g, female, Wistar, 280-310 g); good methods; "Our data show that double pump implantation is a feasible alternative to changing pumps or the use of extracorporeal pump systems connected via a long wire to partly restrained animals." pg 338; N-octanoyl-dopamine also known as NOD; multiple pumps (2) used; two pumps connected to Y connector, in-house made Y-tube; "we showed that the simultaneous implantation of two slow-flow rate osmotic pumps connected to a jugular vein catheter is feasible and is not linked to additional signs of discomfort compared with single pump-implanted rats." pg 341

Q0098: A. Leblois*, et al.* Striatal Dopamine Modulates Basal Ganglia Output and Regulates Social Context-Dependent Behavioral Variability through D_1 Receptors. Journal of Neuroscience 2010;30(16):5730-5743
Agents: Dopamine; SCH23390 **Vehicle:** Saline; **Route:** CSF/CNS (area X); **Species:** Bird (zebra finch); **Pump:** 1002;
ALZET Comments: Controls received mp w/ vehicle; good methods (pg 5731); ALZET brain infusion kit used; animal info (adult, male); Y-connector used; pump externalized with a backpack; pump placed inside microcentrifuge tube; cannula placement verified by histological examination

R0352: A. A. Boulton. Animal Models of Dementia. Springer Protocols 2010;48(1-721
Agents: Amphetamine sulfate; Dopamine **Vehicle:** Propylene Glycol; **Route:** SC; CSF/CNS (nucleus accumbens); **Species:** Rat; **Pump:** 2ML2; **Duration:** 14 days;
ALZET Comments: comparison of injections and sylastic pellet vs mp; pulsed delivery; PE tubing contained drug and a dye in short sections interspersed with a substance immiscible with drug, to allow 12 hour infusions of drug and l2-hour infusions of the inert substance (perfluorodecalin) throughout a 14 day infusion period.; pumps primed in a physiological saline solution at 37°C for 4 hours.

Fenoldopam

Q8166: N. Ben-Jonathan*, et al.* Activation of the cGMP/protein kinase G system in breast cancer by the dopamine receptor-1. Cancer Drug Resist 2019;
Agents: Fenoldopam **Vehicle:** Not stated; **Route:** SC; **Species:** Mice; **Pump:** Not stated; **Duration:** 3 weeks;
ALZET Comments: animal info (Athymic nude mice); Fenoldopam mesylate aka fenoldopam; cancer (Breast);

Q5317: D. C. Borcherding*, et al.* Expression and therapeutic targeting of dopamine receptor-1 (D1R) in breast cancer. Oncogene 2016;35(24):3103-13
Agents: Fenoldopam **Vehicle:** PBS; **Route:** SC; **Species:** Mice; **Pump:** 1004; **Duration:** 1 week, 3 weeks;
ALZET Comments: Controls received mp w/ vehicle; animal info (Eight-week-old female athymic nu/nu mice; inoculated with MDA-MB-231 cells or SUM159 cells); functionality of mp verified by measurement of tumor volumes; cancer (breast cancer); dose-response (pg. 3109); Xenograft models; Dose (400 ng/kg/min or 133 ng/kg/min);

Haloperidol (2016-Present)

Q10966: K. Nagaoka*, et al.* Acetaminophen improves tardive akathisia induced by dopamine D(2) receptor antagonists. Journal of Pharmacological Sciences 2023;151(1):9-16
Agents: Haloperidol **Vehicle:** Cyclodextrin, hydroxypropyl-b; **Species:** Rat; **Strain:** Wistar; **Pump:** 2ML4; **Duration:** 21 days;
ALZET Comments: Dose: (1 mg/kg/day); animal info (Male, 9 weeks old, 200-250 g); pumps replaced: removed on the 21st day and new pumps were implanted in the same manner; behavioral testing (open field test.); akathisia

Q9312: M. Kimura*, et al.* Effects of repeated electroconvulsive shocks on dopamine supersensitivity psychosis model rats. Schizophrenia Research 2021;228(1-6
Agents: Haloperidol **Vehicle:** Glacial acetic acid; **Route:** SC; **Species:** Rat; **Pump:** 2ML2; **Duration:** 14 days;
ALZET Comments: Dose (0.75 mg/kg/day); 2% Glacial Acetic Acid used; Controls received mp w/ vehicle; animal info (twelve-week-old male Wistar rats, 240-270 g); Haloperidol aka HAL; ischemia (Schizophrenia);

Q9311: M. Kimura*, et al.* Reduction of dopamine and glycogen synthase kinase-3 signaling in rat striatum after continuous administration of haloperidol. Pharmacology, Biochemistry and Behavior 2021;202(173114
Agents: Haloperidol **Vehicle:** Glacial acetic acid; **Route:** SC; **Species:** Rat; **Pump:** 2ML2; **Duration:** 14 days;
ALZET Comments: Dose (0.75 mg/kg/day); Controls received mp w/ vehicle; animal info (12 wk male Wistar rats, 240-260 g);

Q9257: E. F. Halff*, et al.* Effects of chronic exposure to haloperidol, olanzapine or lithium on SV2A and NLGN synaptic puncta in the rat frontal cortex. Behavioural Brain Research 2021;405(113203
Agents: Haloperidol; Lithium Chloride; Olanzapine **Vehicle:** Cyclodextrin, 2-Hydroxypropyl-B-; **Route:** SC; **Species:** Rat; **Pump:** 2ML4; **Duration:** 28 days;
ALZET Comments: Dose (0.5 mg/kg/day Haloperidol; 2 mmol/L/kg/day Lithium Chloride; 7.5 mg/kg/day Olanzapine); Controls received mp w/ vehicle; animal info (Male Sprague-Dawley rats, 220-270 g, 6-10 weeks old);

Q8921: E. C. Onwordi*, et al.* Synaptic density marker SV2A is reduced in schizophrenia patients and unaffected by antipsychotics in rats. Nature Communications 2020;11(1):246
Agents: Haloperidol; Olanzapine **Vehicle:** Cyclodextrin; **Route:** SC; **Species:** Rat; **Pump:** 2ML4; **Duration:** 28 days;
ALZET Comments: Dose (0.5 or 2 mg/kg/day ; 7.5 mg/kg/day); 20% B-Hydroxypropylcyclodextrin used; Controls received mp w/ vehicle; animal info (Male Sprague-Dawley rats, body weight 240–270 g, 6–10 weeks of age); (Schizophrenia);

Q8240: T. A. Lanz*, et al.* Postmortem transcriptional profiling reveals widespread increase in inflammation in schizophrenia: a comparison of prefrontal cortex, striatum, and hippocampus among matched tetrads of controls with subjects diagnosed with schizophrenia, bipolar or major depressive disorder. Transl Psychiatry 2019;9(1):151
Agents: Haloperidol or Risperidone **Vehicle:** Acetic Acid; **Route:** CSF/CNS; **Species:** Rat; **Pump:** Not stated; **Duration:** 21 days;
ALZET Comments: Dose (haloperidol-0.25 mg/kg/day or risperidone-5 mg/kg/day); 1% Acetic Acid used; Controls received mp w/ vehicle; animal info (2 months old, Sprague Dawley, Male); neurodegenerative (Psychiatric Disorder);

Q7882: T. C. Uzuneser*, et al.* Schizophrenia dimension-specific antipsychotic drug action and failure in amphetamine-sensitized psychotic-like rats. European Neuropsychopharmacology 2018;28(12):1382-1393
Agents: haloperidol **Vehicle:** water, distilled, ascorbic acid, cyclodextrin; **Route:** SC; **Species:** Rat; **Pump:** 2ML2; **Duration:** 14 days;
ALZET Comments: Dose (0.05, 0.5 mg/kg/day); distilled water containing 0.3% ascorbic acid / 10% cyclodextrin used; Controls received mp w/ vehicle; animal info (male, Sprague-Dawley, 330-380 g); behavioral testing (AMPH-induced locomotion, within-session habituation, acoustic startle response, novel object recognition); HAL is an antipsychotic drug that targets the postsynaptic D2 receptors; schizophrenia induced by amphetamine-sensitization-induced psychosis model;

Q7829: T. Hashimoto*, et al.* Lack of dopamine supersensitivity in rats after chronic administration of blonanserin: Comparison with haloperidol. European Journal of Pharmacology 2018;830(26-32
Agents: Haloperidol; PG-01037 dihydrochloride **Vehicle:** Acetic Acid, glacial; NaOH; Tween 80 Buffered; **Route:** SC; **Species:** Rat; **Pump:** 2ML2; **Duration:** 14 days;
ALZET Comments: Dose ((haloperidol 0.75 mg/kg/day), PG-01037 (0.6 mg/kg/day)); 2% glacial acetic acid/H2O solution (pH 3.6 w/ NaOH) with 0.5% Tween 80 used; Controls received mp w/ vehicle; animal info (7 weeks, male, Wistar); post op. care (antibiotic treatment; identity not stated); behavioral testing (Quinpirole-induced hyperlocomotion); comparison of oral administration of haloperidol vs mp; PG-01037 is a selective dopamine D3 antagonist; minipumps were removed 14 days after implantation. "In this study, we were unable to use an osmotic pump for continuous administration of blonanserin due to poor solubility in the vehicle used for haloperidol." p.31;

Q7821: D. Groos*, et al.* Chronic antipsychotic treatment targets GIRK current suppression, loss of long-term synaptic depression and behavioural sensitization in a mouse model of amphetamine psychosis. J Psychopharmacol 2018;269881118812235
Agents: haloperidol; olanzapine **Vehicle:** Not Stated; **Route:** SC; **Species:** Mice; **Pump:** 1007D; **Duration:** 7 days;
ALZET Comments: "Dose ((Hal 0.5 mg/kg/d), (Ola 10 mg/kg/d)); Controls received mp w/ vehicle; animal info (6-12 weeks, male, C57BL/6 or homo- and heterozygous C57Bl6-D2eGFP); behavioral testing (TruScan open field); Resultant plasma level ((Hal 5.85 ± 0.27 ng/mL), (Ola 45.93 ± 5.72 ng/mL)); haloperidol (Hal) and olanzapine (Ola) are antipsychotic drugs; “Furthermore, in animal studies, APDs were often administered with regimens that fail to achieve the high D2R occupancy (>70%) required to yield therapeutic benefits (Farde et al., 1988; Kapur and Mamo, 2003; Kapur et al., 2003). To overcome such limitations, we delivered haloperidol or olanzapine via implanted osmotic mini-pumps, which offers a reliable method to obtain clinically meaningful levels of D2R blockade (Amato et al., 2011; Amato et al., 2018; Samaha et al., 2007, 2008).” pg.75 ; Brain concentration of agents include ((Hal 3.42 ± 0.42 ng/g), (Ola 26.32 ± 1.78 ng/g));

Q7103: A. Calevro*, et al.* Effects of chronic antipsychotic drug exposure on the expression of Translocator Protein and inflammatory markers in rat adipose tissue. Psychoneuroendocrinology 2018;95(28-33
Agents: Haloperidol, olanzapine **Vehicle:** Cyclodextrin; **Route:** SC; **Species:** Rat; **Pump:** 2ML4; **Duration:** 8 weeks;
ALZET Comments: Dose (Haloperidol- 2mg/ kg/ day, Olanzapine-10 mg/kg/ day); Controls received mp w/ vehicle; animal info (10-week old, male, Sprague-Dawley, 240–250 g); pumps replaced every 4 weeks; long-term study; dependence;

Q5973: A. Servonnet*, et al.* Neurotensin in the nucleus accumbens reverses dopamine supersensitivity evoked by antipsychotic treatment. Neuropharmacology 2017;123(10-21
Agents: Haloperidol **Vehicle:** Acetic acid, water; **Route:** SC; **Species:** Rat; **Pump:** 2ML2; **Duration:** Not Stated;
ALZET Comments: Controls received mp w/ vehicle; animal info (200-225 g); Mp vs. intermittent administration by injection; Therapeutic indication (Anti-psychosis); Dose (0.5 mg/kg);

Q5738: L. E. Sebel*, et al.* Haloperidol Selectively Remodels Striatal Indirect Pathway Circuits. Neuropsychopharmacology 2017;42(4):963-973
Agents: Haloperidol-Hcl **Vehicle:** Saline; **Route:** SC; **Species:** Mice; **Pump:** 2004; **Duration:** 14 days;
ALZET Comments: Controls received mp w/ vehicle; animal info (hemizygous bacterial artificial chromosome (BAC) transgenic mice (p28-p38) expressing eGFP under either Drd1a or Drd2 control); Therapeutic indication (Schizophrenia); Dose (0.25 mg/kg/day);

Q6192: Y. Oda*, et al.* Alterations in glutamatergic signaling in the brain of dopamine supersensitivity psychosis and non-supersensitivity psychosis model rats. Psychopharmacology (Berl) 2017;234(20):3027-3036
Agents: Haloperidol **Vehicle:** Acetic acid, glacial; Water; **Route:** SC; **Species:** Rat; **Pump:** 2ML2; **Duration:** 14 days;
ALZET Comments: Dose (0.75 mg/kg/day); 2% glacial acetic acid/H2O solution (pH adjusted to 3.8 with NaOH); Controls received mp w/ vehicle; animal info (Eleven-week-old male Wistar rats weighing 240–270 g); Therapeutic indication (dopamine supersensitivity psychosis);

Q6104: K. Chikama*, et al.* Chronic atypical antipsychotics, but not haloperidol, increase neurogenesis in the hippocampus of adult mouse. Brain Research 2017;1676(77-82
Agents: Haloperidol; quetiapine; aripiprazole; clozapine; olanzapine; risperidone **Vehicle:** Not Stated; **Route:** IP; **Species:** Mice; **Pump:** 1004; **Duration:** 21 days;
ALZET Comments: Dose (haloperidol 1 mg/kg/d, quetiapine 20 mg/kg/d, aripiprazole 3 mg/kg/d, clozapine 20 mg/kg/d, olanzapine 2 mg/kg/d, risperidone 0.5 mg/kg/d); Controls received mp w/ vehicle; "It is known that osmotic pumps serve some preferable aspect such as to reduce stress to the animals, minimize unwanted experimental variables, and hold the drug concentration constant" pg. 80;

Q6316: A. Almey*, et al.* Interactions between estradiol and haloperidol on perseveration and reversal learning in amphetamine-sensitized female rats. Horm Behav 2017;89(113-120
Agents: Haloperidol **Vehicle:** Saline; **Route:** SC; **Species:** Rat; **Pump:** 2002; **Duration:** 14 days;
ALZET Comments: Dose (0.25 mg/day, 0.13 mg/day); Controls received mp w/ vehicle; animal info (female Sprague-Dawley rats); behavioral testing (Locomotor activity boxes); Haloperidol aka HAL;

Q5414: D. Madularu*, et al.* High estrogen and chronic haloperidol lead to greater amphetamine-induced BOLD activation in awake, amphetamine-sensitized female rats. Horm Behav 2016;82(56-63
Agents: Haloperidol **Vehicle:** Saline; **Route:** SC; **Species:** Rat; **Pump:** 2002; **Duration:** 14 days;
ALZET Comments: Controls received mp w/ vehicle; Animal info (OVX Sprague Dawley rats, 200-250 g, 2 months old); post op. care (Anafen analgesic 0.1 mL/rat, and local antibiotic ointment); replacement therapy (estrogen replacement); MRI compatible PEEK tubing used; Dose (0.25 mg/kg/day); Therapeutic indication (Schizophrenia);

Q6020: W. R. Crum*, et al.* Chronic exposure to haloperidol and olanzapine leads to common and divergent shape changes in the rat hippocampus in the absence of grey-matter volume loss. Psychol Med 2016;46(15):3081-3093
Agents: Haloperidol, Olanzapine **Vehicle:** Cyclodextrin, hydroxypropyl-β-, Ascorbic acid; **Route:** SC; **Species:** Rat; **Pump:** 2ML4; **Duration:** 28 days;
ALZET Comments: Controls received mp w/vehicle; animal info (10 weeks old) pumps replaced every 4 weeks; Therapeutic indication Learning and memory, hippocampus, antipsychotic); Dose (HAL (2 mg/kg/day), or OLZ (10 mg/kg/day);

L- DOPA

Q6625: G. Mulas*, et al.* Differential induction of dyskinesia and neuroinflammation by pulsatile versus continuous l-DOPA delivery in the 6-OHDA model of Parkinson's disease. Experimental Neurology 2016;286(83-92
Agents: L-DOPA; Benserazide **Vehicle:** Not Stated; **Route:** SC; **Species:** Rat; **Pump:** 2ML2; **Duration:** 2 weeks;
ALZET Comments: Dose (12mg/kg/day); animal info (6-OHDA-lesioned male Sprague-Dawley rats weighing 275-300g); comparison of pulsatile injections vs mp; neurodegenerative (Parkinson's disease);

Q0502: M. Lebel*, et al.* Striatal inhibition of PKA prevents levodopa-induced behavioural and molecular changes in the hemiparkinsonian rat. NEUROBIOLOGY OF DISEASE 2010;38(1):59-67
Agents: L-DOPA **Vehicle:** Not Stated; **Route:** CSF/CNS (striatum); **Species:** Rat; **Pump:** 2004; 2ML1; 2ML4; **Duration:** 21 days;
ALZET Comments: Controls received mp w/ vehicle; pumps replaced every week; cyanoacrylate adhesive; ALZET brain infusion kit 2 used; animal info (male, Sprague Dawley)

Lisuride

Q1973: K. Zweckberger, *et al.* Effects of lisuride hydrogen maleate on pericontusional tissue metabolism, brain edema formation, and contusion volume development after experimental traumatic brain injury in rats. Neuroscience Letters 2011;499(3):189-193
Agents: Lisuride **Vehicle:** Hydrogen maleate; **Route:** SC; **Species:** Rat; **Pump:** 2ML1; **Duration:** Not Stated;
ALZET Comments: Animal info (Sprague Dawley, male, 350-380 g)

Pramipexole

Q9432: H. M. Rodgers, *et al.* Dopamine D1 or D3 receptor modulators prevent morphine tolerance and reduce opioid withdrawal symptoms. Pharmacology, Biochemistry and Behavior 2020;194(172935
Agents: Morphine; SCH 39166; Pramipexole **Vehicle:** Saline; **Route:** SC; **Species:** Rat; **Pump:** 1002; 2002; **Duration:** 14 days;
ALZET Comments: Dose (2 mg/kg); Controls received mp w/ vehicle; animal info (female, Long- Evans rats, weighing 200–225 g); behavioral testing (Withdrawal testing); Multiple pumps per animal (2 or 3); dependence;

Q5373: N. A. Holtz, *et al.* Pharmacologically distinct pramipexole-mediated akinesia vs. risk-taking in a rat model of Parkinson's disease. Prog Neuropsychopharmacol Biol Psychiatry 2016;70(77-84
Agents: Pramipexole HCL; Mirtazapine **Vehicle:** Pramipexole HCL; Mirtazapine; **Route:** SC; **Species:** Rat; **Pump:** 2002, 2ML4; **Duration:** 12 - 14 days;
ALZET Comments: Controls received mp w/ vehicle; animal info (250-300 g, male Sprague-Dawley rats); For mirtazapine, saline brought to 5.5-6.0 pH with 1 N NaOH; good methods (pg. 79); neurodegenerative (Parkinson's disease); behavioral testing (forelimb step task); PPX is a dopamine D2 receptor agonist; Mirtazapine is an atypical antidepressant; akinesia and risk-taking rat model; Dose (PPX 0.3 and 1.2 mg/kg/day; Mirtazapine 5 mg/kg/day);

R0319: M. Silindir, *et al.* The benefits of pramipexole selection in the treatment of Parkinson's disease. NEUROLOGICAL SCIENCES 2014;35(1505-1511
Agents: Pramipexole **Vehicle:** Not Stated; **Route:** Not Stated; **Species:** Rat; **Pump:** Not Stated; **Duration:** Not Stated;
ALZET Comments: Comparison of injections vs mp; "While higher therapeutic benefit in early morning akinesia was obtained with pramipexole CR (continuous release via ALZET pumps), motor impairment was reversed for several hours with pramipexole IR (instant release via injections)" pg 1508

Q1781: O. Chernoloz, *et al.* Long-term administration of the dopamine D3/2 receptor agonist pramipexole increases dopamine and serotonin neurotransmission in the male rat forebrain. JOURNAL OF PSYCHIATRY & NEUROSCIENCE 2012;37(2):113-121
Agents: Pramipexole **Vehicle:** Not Stated; **Route:** SC; **Species:** Rat; **Pump:** Not Stated; **Duration:** 14 days;
ALZET Comments: Controls received mp w/ physiologic saline; animal info (Sprague Dawley, male, 270-320 g)

Q0092: B. Ferger, *et al.* Continuous Dopaminergic Stimulation by Pramipexole Is Effective to Treat Early Morning Akinesia in Animal Models of Parkinson's Disease: A Pharmacokinetic-Pharmacodynamic Study Using in Vivo Microdialysis in Rats. Synapse 2010;64(7):533-541
Agents: Pramipexole **Vehicle:** Saline; **Route:** SC; **Species:** Rat; **Pump:** 1007D; 2004; **Duration:** 2, 14 days;
ALZET Comments: Controls received mp w/ vehicle; animal info (male, Wistar, 250-300 g.); comparison of SC injections vs mp; neurodegenerative (Parkinson's Disease); "...this study highlights the potential benefit of CDS (continuous dopaminergic stimulation) using PPX-CR and the advantage over PPX-IR in two symptomatic PD models" pg 540; half-life "long" pg 534; haloperidol-induced catalepsy; pk study

Quinpirole

Q3844: N. Cobacho, *et al.* Dopaminergic modulation of neuropathic pain: Analgesia in rats by a D2-type receptor agonist. Brain Research Bulletin 2014;106(62-71
Agents: Quinpirole hydrochloride **Vehicle:** Water, sterile; **Route:** SC; **Species:** Rat; **Pump:** 2ML1; **Duration:** 7 days;
ALZET Comments: Controls received sham mp; animal info (male, Sprague Dawley, adult, 250-300g); functionality of mp verified by incubating pumps after explantation in 37C saline and noted collected amount of fluid - post explantation in vitro testing; behavioral testing (tactile and cold allodynia); neuropathic pain; pumps primed in 37C saline for 2 hours;

Q0720: T. D. Aumann*, et al.* Neuronal activity regulates expression of tyrosine hydroxylase in adult mouse substantia nigra pars compacta neurons. Journal of Neurochemistry 2011;116(4):646-658
Agents: Apamin; Muscimol; Quinpirole; Riluzole; FPL64176; Nimodipine; Picrotoxin; Benzimidazolinone **Vehicle:** Not Stated; **Route:** CSF/CNS (midbrain); CSF/CNS (dorsal striatum); **Species:** Mice; **Pump:** 1002; **Duration:** 2 weeks;
ALZET Comments: Animal info (eight-week-old, C57BL6/J, male); ALZET brain infusion kit 1 used; neurodegenerative (Parkinson's disease)

Q1584: S. Hood*, et al.* Endogenous Dopamine Regulates the Rhythm of Expression of the Clock Protein PER2 in the Rat Dorsal Striatum via Daily Activation of D(2) Dopamine Receptors. Journal of Neuroscience 2010;30(42):14046-14058
Agents: SCH23390; raclopride; quinpirole; SKF 81297 **Vehicle:** Water, distilled; **Route:** SC; **Species:** Rat; **Pump:** 2ML2; **Duration:** 5, 10 days;
ALZET Comments: Controls received sham surgery; animal info (Wistar, male, 180-210 g); SCH23390 is a D1DA receptor antagonist; raclopride is a D2Da receptor antagonist; wound clips used