



Recent References on the Administration of Drugs of Abuse  
(including Amphetamines, Barbiturates, Cocaine, GHB, Heroin, Nicotine, and PCP)  
Using ALZET® Osmotic Pumps

**Amphetamines (2011-Present)**

**Q9516:** T. C. Uzuneser, *et al.* Presynaptic vesicular accumulation is required for antipsychotic efficacy in psychotic-like rats. *Journal of Psychopharmacology* 2021;35(1):65-77

**Agents:** Amphetamine sulfate, d- **Vehicle:** Saline; **Route:** CSF/CNS (lateral ventricle); **Species:** Rat; **Pump:** 2001; **Duration:** 7 days;

**ALZET Comments:** Dose (); 0.9% Saline used; Controls received mp w/ vehicle; animal info (Male Sprague-Dawley rats, 300-350 g); behavioral testing (locomotion test); d-amphetamine sulfate aka AMPH; ALZET brain infusion kit 2 used; Brain coordinates (0.8 mm posterior, 1.4 mm lateral, 4.5 mm ventral from the bregma); cyanoacrylate adhesive;

**Q7057:** P. Petschner, *et al.* Gene expression analysis indicates reduced memory and cognitive functions in the hippocampus and increase in synaptic reorganization in the frontal cortex 3 weeks after MDMA administration in Dark Agouti rats. *BMC Medicine* 2018;19(1):580

**Agents:** Methamphetamine, 3,4-methylenedioxy- **Vehicle:** Saline; **Route:** SC; **Species:** Rat; **Pump:** 2001; **Duration:** Not Stated; **ALZET Comments:** Controls received mp w/ vehicle; animal info (8-week old Dark Agouti rats weighing 152 +/- 3.58 g);

**Q7766:** A. R. Johnson, *et al.* Amphetamine maintenance differentially modulates effects of cocaine, methylenedioxypyrovalerone (MDPV), and methamphetamine on intracranial self-stimulation and nucleus accumbens dopamine in rats. *Neuropsychopharmacology* 2018;43(8):1753-1762

**Agents:** amphetamine **Vehicle:** saline, bacteriostatic; **Route:** SC; **Species:** Rat; **Pump:** 2ML2; **Duration:** 7, 13 days; **ALZET Comments:** Dose (0.1 or 0.32 mg/kg/h), (2ML2 pump 0.5 µl/h); Controls received mp w/ vehicle; animal info (male, Sprague-Dawley, 300-350g); behavioral testing (operant chambers); comparison of IP injection vs mp; dependence;

**Q6700:** D. Moller, *et al.* Discovery of G Protein-Biased Dopaminergics with a Pyrazolo[1,5-a]pyridine Substructure. *J Med Chem* 2017;60(7):2908-2929

**Agents:** Amphetamine **Vehicle:** DMSO; acetic acid; water; **Route:** SC; **Species:** Rat; **Pump:** 2ML1; **Duration:** 7 days; **ALZET Comments:** Dose (1.5 mg/kg/day); 2% acetic acid, 25% DMSO used; Controls received mp w/ vehicle; animal info (Male Sprague-Dawley rats weighing 300-350 g); dependence

**Q6443:** S. V. Kyosseva, *et al.* Chronic administration of MDMA ("ECSTASY") increases insulin-regulated glucose transporter GLUT4 in rat brain and heart. *Comptes Rendus de l'Académie bulgare des Sciences* 2017;

**Agents:** Methamphetamine, 3,4-methylenedioxy **Vehicle:** Saline; **Route:** SC; **Species:** Rat; **Pump:** 2ML2; **Duration:** 10 days; **ALZET Comments:** Dose (0.3 or 3 mg/kg/day); animal info (Sprague-Dawley rats);

**Q6649:** E. E. Reichard, *et al.* PEGylation of a High-Affinity Anti-(+)Methamphetamine Single Chain Antibody Fragment Extends Functional Half-Life by Reducing Clearance. *Pharm Res* 2016;33(12):2954-2966

**Agents:** Methamphetamine **Vehicle:** Saline; **Route:** SC; **Species:** Rat; **Pump:** Not Stated; **Duration:** 2 weeks; **ALZET Comments:** Dose (3.2 mg/kg/day); animal info (Adult male Sprague-Dawley rats (275-320 g));

**Q4545:** N. Nanaware-Kharade, *et al.* A Nanotechnology-Based Platform for Extending the Pharmacokinetic and Binding Properties of Anti-methamphetamine Antibody Fragments. *SCIENTIFIC REPORTS* 2015;5(U1-U10)

**Agents:** Methamphetamine **Vehicle:** Not Stated; **Route:** SC; **Species:** Rat; **Pump:** Not Stated; **Duration:** 10 days; **ALZET Comments:** Animal info (male, Sprague Dawley, adult, 280-310g); functionality of mp verified by blood levels;

**Q4443:** A. C. Harris, *et al.* The Anti-(+)-Methamphetamine Monoclonal Antibody mAb7F9 Attenuates Acute (+)-Methamphetamine Effects on Intracranial Self-Stimulation in Rats. *PLoS One* 2015;10(U408-U420)

**Agents:** Methamphetamine hydrochloride **Vehicle:** Saline; **Route:** SC; **Species:** Rat; **Pump:** 2ML2; **Duration:** 7 days; **ALZET Comments:** Controls received mp w/ vehicle; animal info (male, Sprague Dawley, 275-300g); functionality of mp verified by elevations in ICSS; behavioral testing (ICSS); dependence; pumps removed after 7 days;



**Q4390:** P. W. Czoty, *et al.* Effects of the dopamine/norepinephrine releaser phenmetrazine on cocaine self-administration and cocaine-primed reinstatement in rats. *PSYCHOPHARMACOLOGY* 2015;232(2405-2414

**Agents:** Amphetamine, D-; phenmetrazine **Vehicle:** Saline; **Route:** SC; **Species:** Rat; **Pump:** 2001; **Duration:** 14 days;  
**ALZET Comments:** Controls received mp w/ vehicle; animal info (male, Sprague-Dawley, 300-350g); pumps replaced every 7 days; behavioral testing (cocaine self-administration, food self-administration); dependence;

**Q3632:** B. A. Zimmer, *et al.* Reduction of the reinforcing effectiveness of cocaine by continuous D-amphetamine treatment in rats: importance of active self-administration during treatment period. *Psychopharmacology* 2014;231(5):949-954

**Agents:** Amphetamine, D- **Vehicle:** Saline, sterile; **Route:** SC; **Species:** Rat; **Pump:** 2001; **Duration:** 7 days;  
**ALZET Comments:** Controls received mp w/ vehicle; animal info (male, Sprague-Dawley, 12 week old, 350g); behavioral testing (cocaine self-administration); dependence; pumps removed on day 7; used amphetamine concentration of approx 73ug/ul.

**Q3319:** T. F. Rau, *et al.* Administration of low dose methamphetamine 12 h after a severe traumatic brain injury prevents neurological dysfunction and cognitive impairment in rats. *Experimental Neurology* 2014;253(1):31-40

**Agents:** Methamphetamine **Vehicle:** Not Stated; **Route:** IV (femoral); **Species:** Rat; **Pump:** 2001D; **Duration:** 24 hours;  
**ALZET Comments:** Controls received mp w/ vehicle; animal info (male, Wistar, 350-500g); functionality of mp verified by plasma serum levels; dose-response (pg.33); behavioral testing (foot fault assessment, morris water maze); pumps implanted in inguinal crease; catheter preloaded with 50% dextrose/50% heparin; pumps removed after 61-65hours;

**Q3814:** I. D. Blum, *et al.* A highly-tunable dopaminergic oscillator generates ultradian rhythms of behavioral arousal. *eLife Journal* 2014;3(U146-U189

**Agents:** Methamphetamine **Vehicle:** Saline; **Route:** SC; **Species:** Mice; **Pump:** 1002; **Duration:** 2 weeks;  
**ALZET Comments:** Animal info (Bmal1 -/-, ); behavioral testing (locomotor activity running wheels); dependence; delayed delivery; catheter filled with saline for 4 day recovery; used plastics one catheter;

**Q3416:** C. T. Bauer, *et al.* The effect of chronic amphetamine treatment on cocaine-induced facilitation of intracranial self-stimulation in rats. *Psychopharmacology* 2014;231(2461-2470

**Agents:** Amphetamine **Vehicle:** Saline; **Route:** SC; **Species:** Rat; **Pump:** 2ML4; **Duration:** 14 days;  
**ALZET Comments:** Controls received mp w/ vehicle; animal info (male, Sprague-Dawley, 311-406g); post op. care (Ketoprofen 5 mg/kg); behavioral testing (cocaine self administration); dependence; pumps removed after 14 days;

**Q5002:** M. Iijima, *et al.* Effect of an mGlu2/3 receptor antagonist on depressive behavior induced by withdrawal from chronic treatment with methamphetamine. *Behavioural Brain Research* 2013;246(24-8

**Agents:** methamphetamine (MAP) **Vehicle:** saline; **Route:** SC; **Species:** Rat; **Pump:** 2ML1; **Duration:** 5 days;  
**ALZET Comments:** animal info: male, Sprague-Dawley, 5 wks old; tolerance studies; dependence; behavioral testing: forced swimming test, locomotor activity; mp used to infuse methamphetamine to induce a withdrawal-like effect in rats to study the effect of LY341495 (mGlu2/3 receptor antagonist) on withdrawal-induced depressive behavior; dose: 2.5, or 5 mg/kg/day

**Q2909:** G. L. Ding, *et al.* MRI of Neuronal Recovery after Low-Dose Methamphetamine Treatment of Traumatic Brain Injury in Rats. *PLoS One* 2013;8(4):U175-U183

**Agents:** Methamphetamine **Vehicle:** Not Stated; **Route:** IV; **Species:** Rat; **Pump:** Not Stated; **Duration:** 24 hours;  
**ALZET Comments:** Controls received mp w/ saline; animal info. (male, wistar rats, 200-300 g); functionality of mp verified by MRI measurement of fractional anisotropy

**Q2683:** T. F. Rau, *et al.* Treatment with low-dose methamphetamine improves behavioral and cognitive function after severe traumatic brain injury. *JOURNAL OF TRAUMA AND ACUTE CARE SURGERY* 2012;73(1):S165-S172

**Agents:** Methamphetamine **Vehicle:** Not Stated; **Route:** IV (femoral); **Species:** Rat; **Pump:** 2001D; **Duration:** 24 hours;  
**ALZET Comments:** Control animals received mp w/ saline; animal info (Wistar, male, adult, 400 g); PE50 tubing used

**Q1237:** H. Miyata, *et al.* Decreases in Brain Reward Function Reflect Nicotine- and Methamphetamine-Withdrawal Aversion in Rats. *Current Neuropharmacology* 2011;9(1):63-67

**Agents:** Nicotine; Methamphetamine **Vehicle:** Saline; **Route:** SC; **Species:** Rat; **Pump:** 2001; **Duration:** 7 days;  
**ALZET Comments:** Controls received mp w/ vehicle; animal info (Sprague-Dawley, male, 332-396 g)



**Q10024:** H. Hasan, *et al.* Rodent Models of Methamphetamine Misuse: Mechanisms of Methamphetamine Action and Comparison of Different Rodent Paradigms. *Methods and Protocols, Methods in Molecular Biology* 2011;  
**Agents:** Methamphetamine **Vehicle:** Saline; **Route:** SC; **Species:** Rat; **Pump:** Not Stated; **Duration:** 7 days;  
**ALZET Comments:** Dose (7 mg/kg/day); Controls received mp w/ vehicle; animal info (adult male Sprague-Dawley rats); Methamphetamine aka METH; dependence;

**Q1707:** K. S. Bhatia, *et al.* Reversal of long-term methamphetamine sensitization by combination of pergolide with ondansetron or ketanserin, but not mirtazapine. *Behavioural Brain Research* 2011;223(1):227-232  
**Agents:** Methamphetamine hydrochloride **Vehicle:** Saline; **Route:** SC; **Species:** Rat; **Pump:** 2ML1; **Duration:** 7 days;  
**ALZET Comments:** Controls received mp w/ vehicle; animal info (Sprague Dawley, male, 275-300 g); functionality of mp verified via residual volume

### Cocaine (2011-Present)

**Q9271:** M. Fakhoury, *et al.* Intracranial Self-Stimulation and the Curve-Shift Paradigm: A Putative Model to Study the Brain Reward System. *The Brain Reward System* 2021;  
**Agents:** Cocaine **Vehicle:** Not Stated; **Route:** SC; **Species:** Rat; **Pump:** 2ML2; **Duration:** Not Stated;  
**ALZET Comments:** Dose (4 mg/kg); Controls received mp w/ vehicle; dependence;

**Q8149:** K. Ouk, *et al.* Chronic paroxetine treatment prevents disruption of methamphetamine-sensitive circadian oscillator in a transgenic mouse model of Huntington's disease. *Neuropharmacology* 2018;131(337-350  
**Agents:** Cocaine hydrochloride **Vehicle:** Saline; **Route:** SC; **Species:** Mice; **Pump:** 1004; **Duration:** 4 weeks;  
**ALZET Comments:** Dose (30 mg/kg/day); 0.9% Saline used; Controls received mp w/ vehicle; animal info (12 weeks old); neurodegenerative (Huntington's Disease);

**R0335:** R. M. Post. Epigenetic basis of sensitization to stress, affective episodes, and stimulants: implications for illness progression and prevention. *Biorheology* 2016;18(4):315-24  
**Agents:** Cocaine **Vehicle:** Not Stated; **Route:** Not Stated; **Species:** Not Stated; **Pump:** Not Stated; **Duration:** Not Stated;  
**ALZET Comments:**

**Q4278:** A. K. Radke, *et al.* Cocaine withdrawal in rats selectively bred for low (LoS) versus high (HiS) saccharin intake. *PHARMACOLOGY BIOCHEMISTRY AND BEHAVIOR* 2015;129(51-55  
**Agents:** Cocaine hydrochloride **Vehicle:** Saline, sterile; **Route:** SC; **Species:** Rat; **Pump:** 2ML2; **Duration:** 2 weeks;  
**ALZET Comments:** Controls received mp w/ vehicle; animal info (male, Holtzman/Harlan Sprague Dawley); no stress (see pg.53); post op. care (topical antibiotic ointment); behavioral testing (saccharin intake);

**Q3606:** C. M. Pudiak, *et al.* Tolerance to cocaine in brain stimulation reward following continuous cocaine infusions. *Pharmacology Biochemistry and Behavior* 2014;122(246-252  
**Agents:** Cocaine **Vehicle:** Saline; sodium metabisulfate; **Route:** SC; **Species:** Rat; **Pump:** 2ML2; **Duration:** 14 days;  
**ALZET Comments:** Controls received mp w/ vehicle; animal info (male, Long-Evans, 275-350g); functionality of mp verified by residual volume; 0.3% sodium metabisulfate used to prevent degradation; stress/adverse reaction: (see pg.294); post op. care (neospirin); dependence; "Cocaine delivered continuously via osmotic minipump may better mimic the high drug-plasma concentrations maintained by an addict during a binge than daily administered cocaine injections." pg 250; pumps removed after 14 days; pumps primed at 37C for at least 4 hours;

**Q3579:** P. A. Narayana, *et al.* Chronic cocaine administration causes extensive white matter damage in brain: Diffusion tensor imaging and immunohistochemistry studies. *PSYCHIATRY RESEARCH-NEUROIMAGING* 2014;221(3):220-230  
**Agents:** Cocaine **Vehicle:** Saline; **Route:** SC; **Species:** Rat; **Pump:** 2ML4; **Duration:** 28 days;  
**ALZET Comments:** Controls received mp w/ vehicle; animal info (male, SD, 280-300g); behavioral testing (fine motor movement; ambulation; rearing activities; general motor behavior); dependence; MRI; pumps primed for 24 hours in 37C saline;



**Q3428:** F. F. Caputi, *et al.* Dynorphin/KOP and nociceptin/NOP gene expression and epigenetic changes by cocaine in rat striatum and nucleus accumbens. *PROGRESS IN NEURO-PSYCHOPHARMACOLOGY & BIOLOGICAL PSYCHIATRY* 2014;49(1):36-46

**Agents:** Cocaine **Vehicle:** Not Stated; **Route:** SC; **Species:** Rat; **Pump:** 2001; **Duration:** 7 days;  
**ALZET Comments:** Controls received mp w/ saline; animal info (male, Sprague Dawley, 200-250g);

**Q2161:** A. K. Stoker, *et al.* Involvement of metabotropic glutamate receptor 5 in brain reward deficits associated with cocaine and nicotine withdrawal and somatic signs of nicotine withdrawal. *Psychopharmacology* 2012;221(2):317-327

**Agents:** Nicotine; cocaine hydrochloride **Vehicle:** Saline, sterile; **Route:** SC; IP; **Species:** Mice; **Pump:** 2004; 1003D; **Duration:** 3, 28 days;

**ALZET Comments:** Controls received mp w/ vehicle; animal info (mGlu5 KO, wt)

**Q1704:** A. K. Stoker, *et al.* Withdrawal from chronic cocaine administration induces deficits in brain reward function in C57BL/6J mice. *Behavioural Brain Research* 2011;223(1):176-181

**Agents:** Cocaine hydrochloride **Vehicle:** Saline, sterile; **Route:** IP; **Species:** Mice; **Pump:** 1003D; **Duration:** 3 days;

**ALZET Comments:** Controls received mp w/ saline; animal info (C57BL/6, male, 7-8 wks old) withdrawal; "continuous cocaine administration via intraperitoneal osmotic minipumps is an excellent tool for the assessment of the effects of cocaine administration and withdrawal on various behavioral measures." pg 180

### GHB (Gamma-hydroxybutyrate)

**P6690:** S. T. Szabo, *et al.* Effects of sustained gamma-hydroxybutyrate treatments on spontaneous and evoked firing activity of locus coeruleus norepinephrine neurons. *Biological Psychiatry* 2004;55(9):934-939

**Agents:** Hydroxybutyrate, gamma- **Vehicle:** Saline; **Route:** SC; **Species:** Rat; **Pump:** Not Stated; **Duration:** 2,10 days;

**ALZET Comments:** Controls received mp w/ vehicle; dependence; agent is a drug of abuse, known as "liquid ecstasy" or GHB (sodium oxybate); pump model not listed

**Q7544:** Y. Basaki, *et al.* gamma-Hydroxybutyric acid and 5-fluorouracil, metabolites of UFT, inhibit the angiogenesis induced by vascular endothelial growth factor. *Angiogenesis* 2001;4(3):163-73

**Agents:** Hydroxybutyrate, gamma- **Vehicle:** Saline; **Route:** SC; **Species:** Mice; **Pump:** Not Stated; **Duration:** 5 days;

**ALZET Comments:** Dose (2.5, 12.6, 63 mg/kg/day); Controls received mp w/ vehicle; animal info (female, BALB/cA or ICR); cardiovascular; Therapeutic indication (inhibition of VEGF-induced angiogenesis); GHB is a metabolite of tegafur;

### Heroin

**Q10404:** N. Baidoo, *et al.* Inhibition of noradrenergic and corticotrophin-releasing factor systems: Effects on enhancement of memory consolidation by unconditioned and conditioned heroin withdrawal. *Neuropharmacology* 2022;209(109018)

**Agents:** Heroin **Vehicle:** Not Stated; **Route:** SC; **Species:** Rat; **Pump:** 2002; **Duration:** 14 days;

**ALZET Comments:** Dose (3.5 mg/kg/day); animal info (Male; Weighed 225-250 g); behavioral testing (Conditioning chambers; Y-apparatus); dependence;

**Q4818:** S. Daniels, *et al.* Alterations of naltrexone-induced conditioned place avoidance by pre-exposure to high fructose corn syrup or heroin in Sprague–Dawley rats. *Psychopharmacology* 2016;233(4):425-433

**Agents:** Heroin **Vehicle:** Not Stated; **Route:** SC; **Species:** Rat; **Pump:** 2ML2; **Duration:** 14 days;

**ALZET Comments:** Controls received mp w/ vehicle; animal info (male, Sprague Dawley, 175-200g); behavioral testing (place conditioning); used wound clips; Dose (3.5 mg/kg/day);



**Q2457:** A. M. Williams, *et al.* The effect of intermittent alcohol vapor or pulsatile heroin on somatic and negative affective indices during spontaneous withdrawal in Wistar rats. *Psychopharmacology* 2012;223(1):75-88

**Agents:** Heroin **Vehicle:** Saline; **Route:** SC; **Species:** Rat; **Pump:** 2ML4; **Duration:** 30 days;

**ALZET Comments:** Control animals received mp w/ vehicle; animal info (Wistar, male, 70 days old); pulsatile delivery; "By filling the pumps with saline and attaching polyethylene (PE60) tubing to the pump, based on the tubing inner diameter and pump flow rate characteristics, the volume needed for different infusion periods (e.g., 14- or 10-h periods) could be determined"; "the tubing was filled with alternating heroin solution and mineral oil"; pulsatile delivery; good methods, pg 78; image of pump with connected Lynch coil; wound clips used; post op. care (Baytril); behavioral testing (elevated plus maze forced swim test)

**P9748:** G. Klein, *et al.* The contribution of MOR-1 exons 1-4 to morphine and heroin analgesia and dependence. *Neuroscience Letters* 2009;457(3):115-119

**Agents:** Heroin hydrochloride; morphine sulfate **Vehicle:** Saline; **Route:** SC; **Species:** Mice; **Pump:** 2001; **Duration:** Not Stated;

**ALZET Comments:** Controls received mp w/vehicle; dependence; animal info (adult, male, CD-1)

**Q0587:** B. Kest, *et al.* Gnao1 (G- $\alpha_o$  PROTEIN) IS A LIKELY GENETIC CONTRIBUTOR TO VARIATION IN PHYSICAL DEPENDENCE ON OPIOIDS IN MICE. *Neuroscience* 2009;162(4):1255-1264

**Agents:** Morphine; heroin **Vehicle:** Saline; **Route:** SC; **Species:** Mice; **Pump:** 2001; **Duration:** 7 days;

**ALZET Comments:** Animal info (Naive, adult, 7-12 wks old, male, AcB/BcA)

**P6278:** M. R. Azar, *et al.* A non-invasive gating device for continuous drug delivery that allows control over the timing and duration of spontaneous opiate withdrawal. *Journal of Neuroscience Methods* 2004;135(1-2):129-135

**Agents:** Heroin **Vehicle:** Saline; **Route:** SC; **Species:** Rat; **Pump:** 2ML2; **Duration:** 192 hours;

**ALZET Comments:** Comparison of sc injections & pellet vs. mp; dependence; 3 day recovery period; pumps connected to a novel gating device to allow on-off delivery; assembly schematic (p. 131); infusions were delivered in 48 hour intervals; animal info (m, wistar, 300-380 grams)

**P3132:** Y. Shaham, *et al.* Relapse to heroin-seeking in rats under opioid maintenance: the effects of stress, heroin priming, and withdrawal. *J. Neurosci* 1996;16(5):1957-1963

**Agents:** Heroin **Vehicle:** Not Stated; **Route:** SC; **Species:** Rat; **Pump:** 2002; **Duration:** Not Stated;

**ALZET Comments:** Controls received mp with saline or sham operation; dependence

**P0588:** W. K. Schmidt, *et al.* Nalbuphine. *Drug and Alcohol Dependence* 1985;14(339-362)

**Agents:** Ethylketocyclazocine; Heroin; Meperidine; Oxymorphone; Pentazocine; Propoxyphene; Bremazocine; Buprenorphine; Butorphanol; Methadone; Morphine; Nalbuphine; U-50,488H; **Route:** SC; **Species:** Mice; **Pump:** Not Stated; **Duration:** 3 days;

**ALZET Comments:** Comparison of sc morphine pellets vs. mp infusion; controls received unspecified placebo infusion

### Nicotine (2021-Present)

**Q11014:** J. Vargas-Medrano, *et al.* Sex and diet-dependent gene alterations in human and rat brains with a history of nicotine exposure. *Frontiers in Psychiatry* 2023;14(1104563)

**Agents:** Nicotine **Vehicle:** Saline; **Route:** Not Stated; **Species:** Rat; **Strain:** Wistar; **Pump:** 2ML2; **Duration:** 14 days;

**ALZET Comments:** Dose (3.2 mg/kg/day); Controls received sham operation; animal info: Adult rats between 60 and 75 days of age post op. care: topical antibiotic ointment (Neosporin) on the wound, SC administration of analgesic flunixin (2.5 mg/kg); dependence;

**Q11000:** M. L. Smith, *et al.* Identification of candidate genes for nicotine withdrawal in C57BL/6J x DBA/2J recombinant inbred mice. *Genes, Brain and Behavior* 2023;22(2):e12844

**Agents:** Nicotine **Vehicle:** Saline; **Route:** SC; **Species:** Mice; **Strain:** C57BL/6J; DBA/2J; BXD RI; **Pump:** 2002; **Duration:** 14 days;

**ALZET Comments:** Dose (24 mg/kg/day); 0.9% sodium chloride used; Controls received mp w/ vehicle; animal info: 7-8 weeks; behavioral testing: plus-maze test, elevated plus maze, somatic signs; dependence



**Q10960:** L. D. McGill, *et al.* Prenatal nicotine exposure alters gene expression profiles of neurons in the sub-regions of the VTA during early postnatal development. *Scientific Reports* 2023;13(1):4911

**Agents:** Nicotine hydrogen tartrate **Vehicle:** Saline; **Route:** SC; **Species:** Rat; **Strain:** Sprague Dawley; **Pump:** Not Stated; **Duration:** 7 days;

**ALZET Comments:** Dose (6 mg/kg/day); Controls received mp w/ vehicle; animal info: Pregnant, female; dependence;

**Q11048:** A. Kubo, *et al.* The Influence of Nicotine on Trophoblast-Derived Exosomes in a Mouse Model of Pathogenic Preeclampsia. *International Journal of Molecular Sciences* 2023;24(13):

**Agents:** Nicotine hydrogen tartrate salt **Vehicle:** Saline; **Route:** CSF/CNS; **Species:** Mice; **Strain:** ICR; **Pump:** 2002;

**ALZET Comments:** Dose (3 mg/kg/day); animal info: 8–12 weeks; blood pressure measured via Tail cuff; blood pressure results see p.3 cardiovascular; therapeutic indication (Preeclampsia);

**Q11044:** B. A. Karamian, *et al.* Varenicline mitigates the increased risk of pseudarthrosis associated with nicotine. *The Spine Journal* 2023;23(8):1212-1222

**Agents:** Nicotine; varenicline **Vehicle:** Not Stated; **Route:** CSF/CNS; **Species:** Rat; **Strain:** Sprague-Dawley; **Pump:** 2ML4;

**Duration:** 8 weeks;

**ALZET Comments:** Dose: Nicotine 15mg/kg/day, 22.5mg/kg/day, 30mg/kg/day; Varenicline 1mg/kg/day, 2mg/kg/day; animal info: eight-week-old male Sprague-Dawley rats ~300 grams; post op. care: skin closed with running sub-cuticular 4-0 Vicrylsuture, incision was dressed with triple antibiotic ointment; pumps replaced after 4 weeks; functionality of mp verified by serum levels; good methods (pump replacement) p. 2-3; therapeutic indication: (Pseudarthrosis, spinal fusion)

**Q10921:** R. Jain. Role of Habb-e-Jawahar in Attenuating Nicotine Withdrawal in Rats. *Journal of Drug and Alcohol Research* 2023;12(**Agents:** Nicotine tartrate, dihydrate **Vehicle:** Saline; **Route:** SC; **Species:** Rat; **Strain:** Wistar; **Pump:** 2ML1; **Duration:** 7 days;

**ALZET Comments:** Dose (9 mg/kg/day); Controls received mp w/ vehicle; animal info (Male; Albino ; Weighed 175-250 g); behavioral testing (Motor activity); dependence;

**Q11105:** A. Ganaway, *et al.* Investigating the Modulation of the VTA Neurons in Nicotine-Exposed Pups during Early Maturation Using Optogenetics. *International Journal of Molecular Sciences* 2023;24(3):

**Agents:** Nicotine hydrogen tartrate **Vehicle:** Not Stated; **Route:** SC; **Species:** Rat; **Strain:** Sprague-Dawley, WT; **Pump:** Not Stated; **Duration:** 28 days;

**ALZET Comments:** Dose (6 mg/kg/day); Controls received mp w/ vehicle; animal info (Female; Pregnant); dependence;

**Q11253:** B. Buzzi, *et al.* Differential roles of diacylglycerol lipase (DAGL) enzymes in nicotine withdrawal. *Brain Research* 2023;1817(148483

**Agents:** Nicotine bitartrate **Vehicle:** Saline; **Route:** SC; **Species:** Mice; **Strain:** DAGL- $\alpha$  KO; WT (99% C57BL/6, 1% 129/ SvEv); **Pump:** Not Stated; **Duration:** 14 days;

**ALZET Comments:** Dose (24 mg/kg/day); controls received mp w/ vehicle; behavioral testing: light-dark box; somatic withdrawal signs; hot-plate test; dependence; 200  $\mu$ l pump used no model specified

**Q11236:** J. An, *et al.* Nicotine exacerbates atherosclerosis and plaque instability via NLRP3 inflammasome activation in vascular smooth muscle cells. *Theranostics* 2023;13(9):2825-2842

**Agents:** Nicotine **Vehicle:** Saline; **Route:** Not Stated; **Species:** Mice; **Strain:** Apoe $^{-/-}$ ; **Pump:** 2006; **Duration:** 6 weeks;

**ALZET Comments:** Dose (5 mg/kg/day); 0.9% NaCl used; Controls received mp w/ vehicle; animal info (Male; 8 weeks old; Fed Western diet of 21% milk fat and 0.15% cholesterol); toxicology; "...nicotine infusion for 6 weeks significantly increased the plaque size and plaque area percentage of internal elastic lamina area in BA compared with that of vehicle-treated mice. These data suggest that nicotine, the core component in cigarette smoking and electronic cigarette smoking, markedly aggravates atherogenesis in Apoe $^{-/-}$  mice." p. 4



**Q11195:** Y. Alkhalif, *et al.* L-theanine attenuates nicotine reward and withdrawal signs in mice. *Neuroscience Letters* 2023;807(137279)

**Agents:** Nicotine **Vehicle:** Saline; **Route:** SC; **Species:** Mice; **Strain:** ICR; **Pump:** 2002; **Duration:** 14 days;  
**ALZET Comments:** Dose (24 mg/kg); Controls received mp w/ saline; animal info (Male; 8 weeks old); dependence; behavioral testing: Light-Dark box test, hot-plate test

**Q10741:** J. Zubcevic, *et al.* Nicotine Exposure During Rodent Pregnancy Alters the Composition of Maternal Gut Microbiota and Abundance of Maternal and Amniotic Short Chain Fatty Acids. *Metabolites* 2022;12(8):

**Agents:** Nicotine tartrate **Vehicle:** Saline, sterile; **Route:** SC; **Species:** Rat; **Strain:** Sprague Dawley; **Pump:** 2ML4; **Duration:** 28 days;  
**ALZET Comments:** Dose (6 mg/kg); Controls received mp w/ vehicle; animal info (Female; ~9 weeks old; Virgin); teratology;

**Q11210:** S. H. Patel, *et al.* The Impact of Nicotine along with Oral Contraceptive Exposure on Brain Fatty Acid Metabolism in Female Rats. *International Journal of Molecular Sciences* 2022;23(24):

**Agents:** Nicotine **Vehicle:** Saline; **Route:** Not Stated; **Species:** Rat; **Strain:** Sprague-Dawley; **Pump:** Not Stated; **Duration:** 16; 21 days;  
**ALZET Comments:** Dose (4.5 mg/kg/day); Controls received mp w/ saline; animal info: 6-week-old and 14-week-old female

**Q10621:** F. Navarrete, *et al.* Biomarkers of the Endocannabinoid System in Substance Use Disorders. *Biomolecules* 2022;12(3):

**Agents:** Nicotine **Vehicle:** Not Stated; **Route:** Not Stated; **Species:** Mice; **Strain:** C57BL/6J; **Pump:** Not Stated; **Duration:** 14 d  
**ALZET Comments:** Dose (25 mg/kg/day); animal info (Male ); toxicology; dependence;

**Q10757:** E. Y. P. Kung Huang, *et al.* Effect of Dextromethorphan on Nicotine-Induced Reward, Behavioral Sensitization, Withdrawal Signs, and Drug Seeking-Related behavior in Rats. *Nicotine and Tobacco Research* 2022;

**Agents:** Nicotine, Dextromethorphan **Vehicle:** Saline; **Route:** SC; **Species:** Rat; **Strain:** SD; **Pump:** 2ML1; **Duration:** 7 Days;  
**ALZET Comments:** Dose (Nicotine 9 mg/kg/day; DM 10 mg/kg/day); animal info (Male; 8 weeks old; Weighed 300-400 g); behavioral testing (Locomotor activity); dependence; Therapeutic indication (Nicotine dependence);

**Q11154:** J. Keady, *et al.* Age-specific impacts of nicotine and withdrawal on hippocampal neuregulin signaling. *European Journal of Neuroscience* 2022;56(6):4705-4719

**Agents:** Nicotine tartrate **Vehicle:** Saline; **Route:** SC; **Species:** Mice; **Strain:** B6/129S F1 (C57/B6 and 129S hybrid); **Pump:** 2002; **Duration:** 14 days;  
**ALZET Comments:** Dose (18 mg/kg/d); 0.9% saline used; Controls received mp w/ vehicle; animal info: Male and female mice 8–20 weeks of age; wound clips used; behavioral testing: open field; dependence;

**Q10558:** R. Joglekar, *et al.* Developmental Nicotine Exposure And Masculinization Of The Rat Preoptic Area. *Neurotoxicology* 2022;89(41-54)

**Agents:** Nicotine **Vehicle:** DMSO; **Route:** SC; **Species:** Rat; **Pump:** 2ML4; **Duration:** Not Stated;  
**ALZET Comments:** Dose (2 mg/kg/day); Controls received mp w/ vehicle; animal info (Male; Female Sprague Dawley; Weighed 225-250 g); behavioral testing (Elevated plus maze); toxicology;

**Q10532:** E. R. Greco, *et al.* Maternal Nicotine Exposure Induces Congenital Heart Defects In The Offspring Of Mice. *Journal of Cellular and Molecular Medicine* 2022;26(3223-3234)

**Agents:** Nicotine **Vehicle:** Not Stated; **Route:** SC; **Species:** Mice; **Pump:** 2004; **Duration:** Not Stated;  
**ALZET Comments:** Dose: (0.75 or 1.5 mg/kg/day); animal info: adult Female mice at 8–10 weeks of age; post op. care: buprenorphine (0.05 mg/kg, s.c.) cardiovascular; good methods (pg. 3224)

**Q10609:** C. M. Francisco, *et al.* Resveratrol Reverses Male Reproductive Damage in Rats Exposed to Nicotine During The Intrauterine Phase and Breastfeeding. *Andrology* 2022;10(5):951-972

**Agents:** Nicotine **Vehicle:** Not Stated; **Route:** SC; **Species:** Rat; **Pump:** 2ML4; **Duration:** 50 days;  
**ALZET Comments:** Dose: Nicotine (2 mg/kg/day); Controls received mp w/ vehicle; animal info: Wistar rats pregnant female; cyanoacrylate glue used; pumps replaced after 28 days; dependence



**Q10519:** A. C. Dutra-Tavares, *et al.* Adolescent nicotine potentiates the inhibitory effect of raclopride, a D(2)R antagonist, on phencyclidine-sensitized psychotic-like behavior in mice. *Toxicology and Applied Pharmacology* 2022;456(116282)

**Agents:** Nicotine **Vehicle:** Water, milli-Q; **Route:** SC; **Species:** Mice; **Pump:** 1002; **Duration:** 8 days;

**ALZET Comments:** Dose (24 mg/kg/day); Controls received mp w/ vehicle; animal info: C57BL/6 mice, post op. care: flunixin and enrofloxacin for pain and infection management; behavioral testing (Open field); dependence; no stress (see pg. 3)

**Q10516:** V. Despotovski, *et al.* Early Postnatal Exposure to Intermittent Hypercapnic Hypoxia (IHH), but Not Nicotine, Decreases Reelin in the Young Piglet Hippocampus. *NEUROTOXICITY RESEARCH* 2022;40(6):1859-1868

**Agents:** Nicotine **Vehicle:** Water, sterile; **Route:** IP; **Species:** Piglet; **Pump:** 2ML2; **Duration:** 12 days;

**ALZET Comments:** Dose (2 mg/kg/day); Controls received mp w/ vehicle; animal info (Piglets; Hypercapnic hypoxia exposure; 10-13 days old);

**Q10509:** B. Cruz, *et al.* Alcohol self-administration and nicotine withdrawal alter biomarkers of stress and inflammation and prefrontal cortex changes in Gbeta subunits. *The American Journal of Drug and Alcohol Abuse* 2022;1-12

**Agents:** Nicotine, hydrogren ditartrate **Vehicle:** Saline; **Route:** SC; **Species:** Rat; **Pump:** 2ML2; **Duration:** 14 days;

**ALZET Comments:** Dose (3.2 mg/kg/day); 0.9% saline used; animal info (Male; Rats; Weighed 250-300 g); wound clips used;

**Q10533:** T. E. Grieder, *et al.* Administration of BDNF in the ventral tegmental area produces a switch from a nicotine-non-dependent D1R-mediated motivational state to a nicotine-dependent-like D2R-mediated motivational state. *European Journal of Neuroscience* 2021;55(3):714-724

**Agents:** Nicotine hydrogen tartrate **Vehicle:** Saline; **Route:** SC; **Species:** Mice; **Pump:** 1002; **Duration:** 12 days;

**ALZET Comments:** Dose: (7 mg/kg/day) Controls received mp w/ vehicle; animal info: 10 weeks old C57BL/6 WT mice; dependence;

**Q10403:** S. Arakaki, *et al.* Role of noradrenergic transmission within the ventral bed nucleus of the stria terminalis in nicotine withdrawal-induced aversive behavior. *Neuropsychopharmacology Reports* 2022;42(2):233-237

**Agents:** Nicotine **Vehicle:** Saline; **Route:** SC; **Species:** Rat; **Pump:** 2ML2; 2ML4; **Duration:** Not Stated;

**ALZET Comments:** "Dose: (13.7 mg/kg/d) as nicotine tartrate (4.8 mg/kg/d as a nicotine base; Controls received mp w/ vehicle; animal info: Sprague–Dawley rats weighing 190–250g; behavioral testing (elevated plus-maze test; CPA test); dependence; Nicotine dependence in rats was established in rats by subcutaneous implantation with a nicotine-filled osmotic minipump (2ML2) for microdialysis experiments, 2ML4 for behavioral experiments"

**Q10730:** H. Xia, *et al.* Selecting Relevant Genes From Microarray Datasets Using a Random Forest Model. *IEEE Access* 2021;9(97813-97821

**Agents:** Nicotine **Vehicle:** Saline; **Route:** SC; **Species:** Rat; **Pump:** Not Stated; **Duration:** Not Stated;

**ALZET Comments:** animal info: pregnant Sprague Dawley (SD) rats; toxicology; dependence

**Q10070:** C. Y. Tsai, *et al.* Perinatal nicotine exposure alters lung development and induces HMGB1-RAGE expression in neonatal mice. *Birth Defects Research* 2021;113(7):570-578

**Agents:** Nicotine **Vehicle:** Saline, sterile; **Route:** SC; **Species:** Mice; **Pump:** 2001; 2004; **Duration:** 7 days; 28 days;

**ALZET Comments:** Dose (6 mg/kg/day); Controls received mp w/ vehicle; animal info (pregnant C57BL/6N mice); dependence;

**Q9415:** C. B. Pietrobon, *et al.* Pancreatic steatosis in adult rats induced by nicotine exposure during breastfeeding. *Endocrine* 2021;72(1):104-115

**Agents:** Nicotine **Vehicle:** Saline; **Route:** SC; **Species:** Rat; **Pump:** 2ML2; **Duration:** 14 days;

**ALZET Comments:** Dose (6 mg/kg/d); 0.9% NaCl used; Controls received mp w/ vehicle; animal info (virgin female Wistar rats, 3 months old); Nicotine aka NIC; dependence;





**Q9410:** T. C. Peixoto, *et al.* Nicotine exposure during lactation causes disruption of hedonic eating behavior and alters dopaminergic system in adult female rats. *Appetite* 2021;160(105115

**Agents:** Nicotine **Vehicle:** Saline; **Route:** SC; **Species:** Rat; **Pump:** 2ML2; **Duration:** 14 days;

**ALZET Comments:** Dose (6 mg/kg body mass); Controls received mp w/ vehicle; animal info (Wistar male and female); Nicotine aka Nic; dependence;

**Q10287:** T. Nemoto, *et al.* Prenatal Nicotine Exposure Induces Low Birthweight and Hyperinsulinemia in Male Rats. *Frontiers in Endocrinology* 2021;12(694336

**Agents:** Nicotine **Vehicle:** Saline; **Route:** SC; **Species:** Rat; **Pump:** 2004; **Duration:** 28 days;

**ALZET Comments:** Dose: (3 mg nicotine/kg bodyweight/day); Controls received mp w/ vehicle; animal info: Wistar female rats (9 weeks old)teratology; dependence;

**Q10263:** M. J. Mulcahy, *et al.* Protein profiling in the habenula after chronic (-)-menthol exposure in mice. *Journal of Neurochemistry* 2021;158(6):1345-1358

**Agents:** Nicotine **Vehicle:** Ethanol; Saline; **Route:** SC; **Species:** Mice; **Pump:** 1002; **Duration:** 10 days; 12 days;

**ALZET Comments:** Dose: (2 mg/kg/hr); (60% ethanol, 40% saline) vehicle used; Controls received mp w/ vehicle; animal info: Male C57/Bl6 mice 2.5–3.5 months of age and with weights of 20–32g; dependence;

### Pentobarbital

**P5450:** Y. Kim, *et al.* Changes of the level of G protein alpha-subunit mRNA by tolerance to and withdrawal from pentobarbital in rats. *Neurochemical Research* 2002;27(6):527-533

**Agents:** Pentobarbital **Vehicle:** Saline; **Route:** CSF/CNS; **Species:** Rat; **Pump:** 2001; **Duration:** 7 days;

**ALZET Comments:** Controls received mp w/ vehicle; tolerance; dependence; one week recovery period after cannula placement

**P4317:** C.-G. Jang, *et al.* Autoradiography of [<sup>3</sup>H] glutamate binding during pentobarbital tolerance and withdrawal in the rat. *Brain Research Bulletin* 1999;48(1):99-102

**Agents:** Pentobarbital **Vehicle:** Saline; **Route:** CSF/CNS; **Species:** Rat; **Pump:** 2ML1; **Duration:** 6 days;

**ALZET Comments:** Controls received mp with vehicle; tolerance; dependence; animals allowed one week recovery after cannula placement

**P4177:** S. Oh, *et al.* Changes in (3H)forskolin binding to adenylate cyclase and (3H)phorbol dibutyrate binding to protein kinase c in pentobarbital tolerant/dependent rats. *Neurochem. Res* 1998;23(4):463-467

**Agents:** Pentobarbital **Vehicle:** Not Stated; **Route:** CSF/CNS; **Species:** Rat; **Pump:** 2ML1; **Duration:** 7 days;

**ALZET Comments:** guide cannula implanted; rats were allowed 1 week recovery before implantation of pump; tolerance; dependence

**P4188:** C.-G. Jang, *et al.* Changes in NMDAR2 subunit mRNA levels during pentobarbital tolerance/withdrawal in the rat brain: an in situ hybridization study. *Neurochem. Res* 1998;23(11):1371-1377

**Agents:** Pentobarbital **Vehicle:** Saline; **Route:** CSF/CNS; **Species:** Rat; **Pump:** 2ML1; **Duration:** 6 days;

**ALZET Comments:** controls received mp w/saline; tolerance

**P3852:** S. Oh, *et al.* Role of NMDA receptors in pentobarbital tolerance/dependence. *Neurochem. Res* 1997;22(7):767-774

**Agents:** Pentobarbital **Vehicle:** Saline; **Route:** CSF/CNS; **Species:** Rat; **Pump:** 2ML1; **Duration:** 7 days;

**ALZET Comments:** controls received mp w/saline; tolerance; dependence

**P3421:** T. Suzuki, *et al.* An autoradiographic study of [3H]flunitrazepam binding sites in the brain of rat made tolerant to and dependent on pentobarbital. *European Journal of Pharmacology* 1996;295(169-179

**Agents:** Pentobarbital **Vehicle:** Saline; **Route:** CSF/CNS; **Species:** Rat; **Pump:** 2ML1; **Duration:** 6 days;

**ALZET Comments:** controls received vehicle infusion; tolerance; dependence; recipe for equithesin anesthesia provided on p. 170



**P3422:** T. Ito, *et al.* Chronic pentobarbital administration alters g-aminobutyric acid(A) receptor a(6)-subunit mRNA levels and diazepam-insensitive [3H]Ro15-4513 binding. *Synapse* 1996;22(106-113

**Agents:** Pentobarbital **Vehicle:** Not Stated; **Route:** CSF/CNS; **Species:** Rat; **Pump:** 2ML1; **Duration:** 6 days;  
**ALZET Comments:** tolerance; dependence

**P3351:** T. Suzuki, *et al.* Changes in [3H] Flunitrazepam binding in the brain of rats made tolerant to and dependent upon pentobarbital. *Life Sci* 1995;57(5):L-69

**Agents:** Pentobarbital **Vehicle:** Not Stated; **Route:** CSF/CNS; **Species:** Rat; **Pump:** 2ML1; **Duration:** 6 days;  
**ALZET Comments:** controls received mp w/saline; tolerance; dependence; animals allowed 1 week recovery after cannula placement

**P3112:** Y. T. Tseng, *et al.* In situ hybridization evidence of differential modulation by pentobarbital of GABAA receptor a1- and B3-subunit mRNAs. *J. Neurochem* 1994;63(301-309

**Agents:** Pentobarbital **Vehicle:** Not Stated; **Route:** CSF/CNS; **Species:** Rat; **Pump:** 2ML1; **Duration:** 6 days;  
**ALZET Comments:** tolerance

**P3173:** T. Miyaoka, *et al.* Binding characteristics of [3H]flunitrazepam in pentobarbital-withdrawal rats. *Neurochem. Res* 1994;19(1):37-42

**Agents:** Pentobarbital **Vehicle:** Not Stated; **Route:** CSF/CNS; **Species:** Rat; **Pump:** 2ML1; **Duration:** 6 days;  
**ALZET Comments:** controls received mp with saline; animals allowed 1 week recovery after cannula placement

**P3111:** Y. T. Tseng, *et al.* Differential effects on GABAA receptor  $\gamma$ 2-subunit messenger RNA by tolerance to and withdrawal from pentobarbital -- an in situ hybridization study. *Life Sci* 1993;53(L321-L326

**Agents:** Pentobarbital **Vehicle:** Not Stated; **Route:** CSF/CNS; **Species:** Rat; **Pump:** Not Stated; **Duration:** Not Stated;  
**ALZET Comments:** Tolerance

**P3113:** Y. T. Tseng, *et al.* Region-specific changes of GABAA receptors by tolerance to and dependence upon pentobarbital. *European Journal of Pharmacology* 1993;236(23-30

**Agents:** Pentobarbital **Vehicle:** Saline; **Route:** CSF/CNS; **Species:** Rat; **Pump:** 2ML1; **Duration:** 6, 7 days;  
**ALZET Comments:** controls received mp with saline; tolerance; dependence; animals allowed 1 week recovery after cannula placement; brain and serum samples taken at 0, 2, 4, 7 days during infusion & 6, 24, 48 hrs. after withdrawal

**P2338:** K. Toshiyuki, *et al.* Induction of tolerance to and physical dependence on phentobarbital continuous intracerebroventricular administration. *J. Pharmacol. Exp. Ther* 1993;266(3):1300-1305

**Agents:** Pentobarbital **Vehicle:** Saline; **Route:** CSF/CNS; **Species:** Rat; **Pump:** 2ML1; **Duration:** 6 days;  
**ALZET Comments:** tolerance; dependence

**P3675:** T. Kimura, *et al.* Induction of tolerance to and physical dependence on pentobarbital continuous intracerebroventricular administration. *J. Pharmacol. Exp. Ther* 1993;266(3):1300-1305

**Agents:** Pentobarbital, sodium **Vehicle:** Saline, normal; **Route:** CSF/CNS; **Species:** Rat; **Pump:** 2ML1; **Duration:** 6 days;  
**ALZET Comments:** controls received mp w/ filtered, normal saline; tolerance; dependence; good illustration of pump placement (p. 1301)

### Phencyclidine

**Q9018:** S. Takahashi, *et al.* ASP2905, a specific inhibitor of the potassium channel Kv12.2 encoded by the Kcnh3 gene, is psychoactive in mice. *Behavioural Brain Research* 2020;378(112315

**Agents:** Phencyclidine **Vehicle:** Saline; **Route:** SC; **Species:** Mice; **Pump:** 1002; **Duration:** 14 days;  
**ALZET Comments:** Dose (1.2 mg/day/mouse); Controls received mp w/ vehicle; animal info (male ddY mice aged 4–5 weeks); behavioral testing (Forced Swim Test; Water-Finding Task); Phencyclidine aka PCP; neurodegenerative (Schizophrenia);



**Q9086:** S. Thomson, *et al.* Reduced expression of synapsin II in a chronic phencyclidine preclinical rat model of schizophrenia. *Synapse* 2019;73(5):e22084

**Agents:** Phencyclidine **Vehicle:** Saline; **Route:** SC; **Species:** Rat; **Pump:** 2ML2; **Duration:** 14 days;

**ALZET Comments:** Dose (5 mg/kg/day); 0.9% Saline used; Controls received mp w/ vehicle; animal info (Male, Sprague Dawley, 250-300 g, 3 months old); Phencyclidine aka PCP; gene therapy;

**Q2590:** A. Balla, *et al.* Effects of novel, high affinity glycine transport inhibitors on frontostriatal dopamine release in a rodent model of schizophrenia. *European Neuropsychopharmacology* 2012;22(12):902-910

**Agents:** Phencyclidine hydrochloride **Vehicle:** Saline, sterile, physiological; **Route:** SC; **Species:** Rat; **Pump:** 2ML4;

**ALZET Comments:** Control animals received mp w/ vehicle; animal info (Sprague Dawley, male, wks old, 160-200 g, 280-320 g)

**Q0375:** C. S. Pedersen, *et al.* Chronic infusion of PCP via osmotic mini-pumps: A new rodent model of cognitive deficit in schizophrenia characterized by impaired attentional set-shifting (ID/ED) performance. *Journal of Neuroscience Methods* 2009;185(1):66-69

**Agents:** Phencyclidine **Vehicle:** Not Stated; **Route:** SC; **Species:** Rat; **Pump:** Not Stated; **Duration:** 14 days;

**ALZET Comments:** Controls received mp w/saline; animal info (Lister hooded, male); post op. care (Bairtil, Rimadyl); "Using PCP mini-pump infusion instead of the well described intraperitoneal dosing bears the advantage of reducing the animal's stress levels, bypasses the risk of potential mis-dosing that could arise from multiple dosing events and consequently may reduce the number of animals needed." pg 69

**P7825:** G. Pitas, *et al.* Anti-phencyclidine monoclonal antibody binding capacity is not the only determinant of effectiveness, disproving the concept that antibody capacity is easily surmounted. *Drug Metabolism and Disposition* 2006;34(6):906-912

**Agents:** Phencyclidine HCL **Vehicle:** Saline, sterile; **Route:** SC; **Species:** Rat; **Pump:** 2ML1; **Duration:** 4 days;

**ALZET Comments:** Functionality of mp verified by serum PCP concentrations; half-life (pg. 907) 3.9 hours in rats; tolerance; animal info (male, Sprague-Dawley, 270-300g.)

**P6979:** F. Sams-Dodd. (+) MK-801 and phencyclidine induced neurotoxicity do not cause enduring behaviours resembling the positive and negative symptoms of schizophrenia in the rat. *Basic & Clinical Pharmacology & Toxicology* 2004;95(5):241-246

**Agents:** MK-801; phencyclidine hydrochloride **Vehicle:** Sodium chloride; **Route:** SC; **Species:** Rat; **Pump:** 2ML2; **Duration:** 6 days;

**ALZET Comments:** Controls received mp w/ vehicle; dose-response; comparison of SC injections vs. mp; post op. care (wound plast); NMDA antagonists

**P5913:** E. M. Laurenzana, *et al.* Treatment of adverse effects of excessive phencyclidine exposure in rats with a minimal dose of monoclonal antibody. *The Journal of Pharmacology and Experimental Therapeutics* 2003;306(3):1092-1098

**Agents:** Phencyclidine; phencyclidine HCL; **Vehicle:** Saline; sterile; **Route:** SC; **Species:** Rat; **Pump:** 2ML2; **Duration:** 14 days;

**ALZET Comments:** Controls received mp w/ vehicle; serum levels taken; good methods p. 1093; half-life (p. 1093) =3.9 h in rats; dependence; behavioral study

**P6200:** A. Balla, *et al.* Subchronic continuous phencyclidine administration potentiates amphetamine-induced frontal cortex dopamine release. *Neuropsychopharmacology* 2003;28(1):34-44

**Agents:** Phencyclidine, HCL **Vehicle:** Saline, sterile physiological; **Route:** SC; **Species:** Rat; **Pump:** 2ML4; **Duration:** 3,14 days;

**ALZET Comments:** Controls received mp w/ vehicle; functionality of mp verified by serum PCP levels

**P5135:** A. K. Jebelli, *et al.* Prenatal phencyclidine induces heightened neurodegeneration in rats in some brain regions, especially during 2nd trimester, but possible anti-apoptotic effects in others. *Pharmacol Toxicol* 2002;90(20-25)

**Agents:** Phencyclidine **Vehicle:** Saline; **Route:** SC; **Species:** Rat (pregnant); **Pump:** 2ML1; **Duration:** 5 days;

**ALZET Comments:** controls received a saline pellet as a "sham minipump"; teratology

**P4816:** S. V. Kyosseva, *et al.* Differential and region-specific activation of mitogen-activated protein kinases following chronic administration of phencyclidine in rat brain. *Neuropsychopharmacology* 2001;24(267-277)

**Agents:** Phencyclidine HCL **Vehicle:** Saline; **Route:** SC; **Species:** Rat; **Pump:** 2ML2; **Duration:** 3,10, 20 days;

**ALZET Comments:** Controls received mp w/ vehicle; dose-response p. 270-271



- P4936:** A. Balla, *et al.* Continuous phencyclidine treatment induces schizophrenia-like hyperreactivity of striatal dopamine release. *Neuropsychopharmacology* 2001;25(2):157-164  
**Agents:** Phencyclidine HCl **Vehicle:** Saline, sterile; **Route:** SC; **Species:** Rat; **Pump:** 2ML4; **Duration:** 2,3 weeks;  
**ALZET Comments:** Controls received mp w/ vehicle; functionality of mp verified by serum PCP levels; dose response (graphs p. 160); schizophrenia
- P5180:** A. Balla, *et al.* Phencyclidine-induced dysregulation of dopamine response to amphetamine in prefrontal cortex and striatum. *Neurochem. Res* 2001;26(8-9):1001-1006  
**Agents:** Phencyclidine HCl **Vehicle:** Saline; **Route:** SC; **Species:** Rat; **Pump:** 2ML4; **Duration:** 2 weeks;  
**ALZET Comments:** Controls received mp w/ vehicle; functionality of mp verified by PCP serum levels; NMDA antagonist
- P4348:** Z. A. Martinez, *et al.* Effects of sustained phencyclidine exposure on sensorimotor gating of startle in rats. *Neuropsychopharmacology* 1999;21(28-39)  
**Agents:** Phencyclidine HCl **Vehicle:** Not Stated; **Route:** SC; **Species:** Rat; **Pump:** Not Stated; **Duration:** 5 days;  
**ALZET Comments:** Controls received silastic polymer pellets ~ the same size and shape as mps; comparison of repeated IP injections vs. mp
- R0133:** G. Ellison. The N-methyl-D-aspartate antagonists phencyclidine, ketamine and dizocilpine as both behavioral and anatomical models of the dementias. *Brain Research Reviews* 1995;20(250-267)  
**Agents:** Phencyclidine; MK-801 **Vehicle:** Not Stated; **Route:** Not Stated; **Species:** Not Stated; **Duration:** 1,5 days;  
**ALZET Comments:** schizophrenia models; brief mention of mp on p. 256
- P2961:** T. F. Burke, *et al.* [3H]MK-801 binding to well-washed rat brain membranes following cessation of chronic phencyclidine treatment. *Pharmacology, Biochemistry and Behavior* 1995;51(2&3):435-438  
**Agents:** Phencyclidine **Vehicle:** Not Stated; **Route:** SC; **Species:** Rat; **Pump:** 2ML2; **Duration:** 10 days;  
**ALZET Comments:** Controls received mp with saline; dependence
- P3907:** G. Ellison. Competitive and non-competitive NMDA antagonists induce similar limbic degeneration. *NeuroReport* 1994;5(18):2688-2692  
**Agents:** Phencyclidine HCl; MK-801; LY-235959 **Vehicle:** Not Stated; **Route:** Not Stated; **Species:** Rat; **Pump:** Not Stated;  
**Duration:** 1, 5 days;  
**ALZET Comments:** controls received empty mp; comparison of single injections vs. mp
- P2952:** P. Saransaari, *et al.* Phencyclidine treatment in mice: effects on phencyclidine binding sites and glutamate uptake in cerebral cortex preparations. *J. Neural Transm* 1993;93(47-59)  
**Agents:** Phencyclidine HCl **Vehicle:** Not Stated; **Route:** SC; **Species:** Mice; **Pump:** 2001; **Duration:** 3 days;  
**ALZET Comments:** Controls received empty mp
- P2840:** M. S. Owens, *et al.* Dose- and time-dependent changes in phencyclidine metabolite covalent binding in rats and the possible role of CYP2D1. *The Journal of Pharmacology and Experimental Therapeutics* 1993;265(3):1261-1266  
**Agents:** Phencyclidine HCl **Vehicle:** Saline; **Route:** SC; **Species:** Rat; **Pump:** 2ML2; **Duration:** 1, 2, 3, 4, 10, 20 days;  
**ALZET Comments:** Controls received mp with saline, no treatment or sham surgery; pumps replaced at 10 days
- P3777:** G. Ellison, *et al.* Dissimilar patterns of degeneration in brain following four different addictive stimulants. *NeuroReport* 1993;5(17-20)  
**Agents:** Phencyclidine HCl **Vehicle:** Not Stated; **Route:** SC; **Species:** Rat; **Pump:** Not Stated; **Duration:** 5 days;  
**ALZET Comments:** comparison of pellets vs. mp
- P2714:** S. M. Lillrank, *et al.* Phencyclidine treatments differentially affect dopamine and D-aspartate release from frontal cortical and striatal slices from mice. *Int. J. Neurosci* 1992;64(69-81)  
**Agents:** Phencyclidine HCl **Vehicle:** Not Stated; **Route:** SC; **Species:** Mice; **Pump:** 2001; **Duration:** 3,7 days;  
**ALZET Comments:** Controls received sham operations



**P2225:** M. E. Bronson, *et al.* Withdrawal from chronic phencyclidine produces a pentylenetetrazol-like discriminative stimulus. *Life Sci* 1992;50(7):499-504

**Agents:** Phencyclidine **Vehicle:** Water; **Route:** SC; **Species:** Rat; **Pump:** 2ML2; **Duration:** 10 days;  
**ALZET Comments:** controls received mp w/water; dependence; phencyclidine is PCP

**P1877:** W. D. Wessinger, *et al.* Chronic administration of phencyclidine: pharmacokinetic comparison of intravenous and subcutaneous infusions in Sprague-Dawley rats. *Drug Metabolism and Disposition* 1991;19(3):719-721

**Agents:** Phencyclidine **Vehicle:** Saline; **Route:** SC; **Species:** Rat; **Pump:** 2ML2; **Duration:** 10 days;  
**ALZET Comments:** comparison of iv infusion by external infusion pump vs. sc infusion by ALZET pump; sc infusion data were much more reproducible (p. 719)

**P1819:** B. W. Massey, *et al.* Alterations in rat brain [3H]-TCP binding following chronic phencyclidine administration. *Life Sci* 1990;47(L139-L143)

**Agents:** Phencyclidine **Vehicle:** Not Stated; **Route:** Not Stated; **Species:** Rat; **Pump:** 2ML2; **Duration:** 10 days;  
**ALZET Comments:** no comment posted

**P1767:** B. W. Massey, *et al.* Effects of terminating chronic phencyclidine on schedule-controlled behavior in rats. *Pharmacol. Biochem. Behav* 1990;36(117-121)

**Agents:** Phencyclidine **Vehicle:** Saline; **Route:** SC; **Species:** Rat; **Pump:** 2ML4; **Duration:** 10 days;  
**ALZET Comments:** dependence

**P0225:** T. Nabeshima, *et al.* Development of dispositional tolerance to phencyclidine by osmotic minipump in the mouse. *Journal of Pharmacological Methods* 1982;7(239-253)

**Agents:** Phencyclidine **Vehicle:** Not Stated; **Route:** SC; **Species:** Mice; **Pump:** 1701; **Duration:** 1, 5 days;  
**ALZET Comments:** no comment posted

**P0183:** T. Nabeshima, *et al.* Calcium-dependent GABA release from mouse brain slices following acute and chronic phencyclidine administration. *Research Communications in Substances of Abuse* 1981;2(4):343-354

**Agents:** Phencyclidine HCl **Vehicle:** Saline; **Route:** SC; **Species:** Mice; **Pump:** 1701; **Duration:** 2, 6 days;  
**ALZET Comments:** Comparison of acute ip injections vs. chronic infusion