



References on the Administration of Amphetamines
Using ALZET® Osmotic Pumps

- 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); 3,4-methylenedioxymethamphetamine aka MDMA or ecstasy;
- 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)); Methamphetamine aka METH; dependence; Industry authored (InterveXion Therapeutics, LLC);
- 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; dependence; cardiovascular;
- 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

Q0496: N. Kitanaka, *et al.* Withdrawal from Fixed-Dose Injection of Methamphetamine Decreases Cerebral Levels of 3-Methoxy-4-hydroxyphenylglycol and Induces the Expression of Anxiety-Related Behavior in Mice. *Neurochemical Research* 2010;35(5):749-760

Agents: Methamphetamine **Vehicle:** Saline, sterile; **Route:** SC; **Species:** Mice; **Pump:** 2002; **Duration:** 1 week;

ALZET Comments: Controls received mp w/ vehicle; animal info (ICR, 38-55 g); wound clips used; behavioral testing (tail suspension)

Q0413: A. Der-Avakian, *et al.* Neonatal Maternal Separation Exacerbates the Reward Enhancing Effect of Acute Amphetamine Administration and the Anhedonic Effect of Repeated Social Defeat in Adult Rats. *Neuroscience* 2010;170(4):1189-1198

Agents: Amphetamine **Vehicle:** Not Stated; **Route:** SC; **Species:** Rat; **Pump:** 2ML1; **Duration:** 7 days;

ALZET Comments: Controls received mp w/saline; animal info (maternally separated, Long Evans); behavioral testing (maternal behavior)

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 sytastic 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 12-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.

Q0363: S. J. White, *et al.* Vulnerability to (+)-Methamphetamine Effects and the Relationship to Drug Disposition in Pregnant Rats during Chronic Infusion. *Toxicological Sciences* 2009;111(1):27-36

Agents: Methamphetamine; amphetamine **Vehicle:** Not Stated; **Route:** SC; **Species:** Rat (pregnant); **Pump:** 2ML2; **Duration:** 2 weeks;

ALZET Comments: Controls received mp w/ saline; animal info (female, Sprague-Dawley, 180-270 g); dose-response (fig. 1); no stress (see pg.) There were no observable adverse health changes" pg 30; stress/adverse reaction (see pg. 30) "Two rats (in the 10- and 13.2-mg/kg/day groups) developed an abscess at the pump site, which appeared to be confined to the sc minipump implantation site." pg 30; "one animal chewed her skin at the pump site, exposing the osmotic pump" pg 30. "CIS corrected for the bioavailability or fraction of the drug absorbed (CIS/F) was calculated using the equation, CIS/F = infusion rate/CSS, where CSS is the steady-state drug concentration" pg 29

P9610: C. H. K. West, *et al.* Antidepressant drugs with differing pharmacological actions decrease activity of locus coeruleus neurons. *INTERNATIONAL JOURNAL OF NEUROPSYCHOPHARMACOLOGY* 2009;12(5):627-641

Agents: Desipramine; mirtazapine; chlorpheniramine; Paroxetine; scopolamine; amphetamine; escitalopram; chlordiazepoxide **Vehicle:** Not Stated; **Route:** SC; IP; **Species:** Rat; **Pump:** 2ML2; **Duration:** 14, 21 days;

ALZET Comments: Controls received mp w/vehicle; dose-response (Fig 2-5); pumps replaced on day 14; good methods pg 629; animal info (male, Sprague Dawley, 5-7 mo old, 550-700g); "Importantly, use of minipumps also eliminates the need for repeated handling and injection of animals to administer the drug chronically." pg. 628; IP catheter used



Q0361: E. M. Laurenzana, *et al.* Functional and biological determinants affecting the duration of action and efficacy of anti-(+)-methamphetamine monoclonal antibodies in rats. *Vaccine* 2009;27(50):7011-7020

Agents: Methamphetamine **Vehicle:** Saline, sterile; **Route:** SC; **Species:** Rat; **Pump:** 1003D; **Duration:** Not Stated; **ALZET Comments:** Animal info (male, Sprague-Dawley, 250-280 g); 2-week ALZET pump used

Q0431: K. A. Chiodo, *et al.* Decreased reinforcing effects of cocaine following 2 weeks of continuous d-amphetamine treatment in rats. *Psychopharmacology* 2009;206(3):447-456

Agents: Amphetamine, D- **Vehicle:** Saline, sterile; **Route:** SC; **Species:** Rat; **Pump:** 2001; **Duration:** 14 days; **ALZET Comments:** Animal info (male, Sprague-Dawley, 350 g)

P9284: G. S. Griesbach, *et al.* Voluntary exercise or amphetamine treatment, but not the combination, increases hippocampal brain-derived neurotrophic factor and synapsin I following cortical contusion injury in rats. *Neuroscience* 2008;154(2):530-540

Agents: Amphetamine sulfate **Vehicle:** Saline, sterile; **Route:** SC; **Species:** Rat; **Pump:** 2001; **Duration:** 7 days; **ALZET Comments:** Controls received mp w/ vehicle; no stress (see pg. 535); post op. care (Bupivacaine, antibiotic ointment); ischemia (cerebral); animal info (male, Sprague Dawley, 285 g., CCI injury); behavioral testing (voluntary wheel exercise); "This drug administration method was chosen since our prior studies of RW exposure after TBI have left animals undisturbed for the 1 week exercise period." (p. 530)

P9397: K. A. Chiodo, *et al.* Cocaine self-administration reinforced on a progressive ratio schedule decreases with continuous D-amphetamine treatment in rats. *Psychopharmacology* 2008;200(4):465-473

Agents: Amphetamine sulfate, D- **Vehicle:** Saline; **Route:** SC; **Species:** Rat; **Pump:** 2001; **Duration:** 7,14 days; **ALZET Comments:** Controls received mp w/ vehicle; pump replaced after 7 days; no stress (see pg. 470, 472); tolerance; animal info (male, Sprague Dawley, 350 g.) Behavioral testing (cocaine self-administration, food-reinforced responding); "the present dose delivered via mini-pump is not debilitating or overtly toxic." (p. 472)

P8685: C. Davidson, *et al.* Deprenyl treatment attenuates long-term pre- and post-synaptic changes evoked by chronic methamphetamine. *European Journal of Pharmacology* 2007;573(1-3):100-110

Agents: Methamphetamine **Vehicle:** Saline; **Route:** SC; **Species:** Rat; **Pump:** 2ML1; **Duration:** 7 days; **ALZET Comments:** Controls received mp w/ vehicle; functionality of mp verified by residual volume; dose-response (fig. 1, p. 104); stress/adverse reaction: (see pg. 101) "Animals that did show self-injuries were treated with an oral antibiotic (Sulfatrim) in their drinking water and, if this was ineffective they were humanely destroyed" p. 101; good methods p. 102; half-life (p. 101) "short"; post op. care (Apo-sulfatrim); animal info (male, Sprague-Dawley, 360-400g); "The pump was removed after 7 days... no animal had greater than 0.2 ml methamphetamine (ie 10% initial volume) remaining" (p. 102)

P7972: X. W. Zhang, *et al.* Methamphetamine induces long-term changes in GABA_A receptor alpha 2 subunit and GAD₆₇ expression. *Biochemical and Biophysical Research Communications* 2006;351(1):300-305

Agents: Methamphetamine **Vehicle:** Not Stated; **Route:** SC; **Species:** Rat; **Pump:** 2ML1; **Duration:** 7 days; **ALZET Comments:** Controls received mp w/ saline; functionality of mp verified by residual volume; comparison of injections vs. mp; good methods (p. 301); animal info (male, Sprague-Dawley, 300-320 grams); behavioral study

P7795: D. Peleg-Raibstein, *et al.* Withdrawal from continuous amphetamine administration abolishes latent inhibition but leaves prepulse inhibition intact. *Psychopharmacology* 2006;185(2):226-239

Agents: Amphetamine **Vehicle:** Not Stated; **Route:** SC; **Species:** Rat; **Pump:** 2001; 2ML1; **Duration:** 7 days; **ALZET Comments:** Controls received mp w/ vehicle or saline; dose-response (fig. 4); comparison of escalating SC dose injections vs. mp; dependence; post op. care (PVP-iodine); animal info (male, wistar, 300-350 g)

P7312: R. Zhou, *et al.* The anti-apoptotic, glucocorticoid receptor cochaperone protein BAG-1 is a long-term target for the actions of mood stabilizers. *Journal of Neuroscience* 2005;25(18):4493-4502

Agents: Amphetamine; Fluvoxamine; Haloperidol **Vehicle:** Water; Ethanol; **Route:** SC; **Species:** Rat; **Pump:** 2ML4; **Duration:** 3 weeks; **ALZET Comments:** Functionality of mp verified by residual volume; 50% ethanol used [not suggested by ALZET]



P7514: C. H. K. West, *et al.* A selective test for antidepressant treatments using rats bred for stress-induced reduction of motor activity in the swim test. *Psychopharmacology* 2005;182(1):9-23

Agents: Amitriptyline HCl; Venlafaxine HCl; Clordiazepoxide HCl; Imipramine HCl; Phenelzine sulfate; Scopolamine HBr; Desipramine HCl; Bupropion HCl; Chlorpheniramine maleate; Fluoxetine HCl; Sertraline; Amphetamine sulfate, D- **Vehicle:** Water, sterile distilled; PEG; **Route:** SC; **Species:** Rat; **Pump:** 2ML2; **Duration:** 6,14 days;

ALZET Comments: Controls received mp w/ vehicle; functionality of mp verified by agent blood levels; dose-response (fig. 5); animal info (male, female, susceptible, selectively bred); some animals had saline-filled catheter attached to mp to delay drug infusion by 5 days; "The most notable advantage of minipump delivery is that it eliminates stress resulting from daily injection of drug....minipumps also provide constant infusion of drug" (pg. 22)

P7173: C. Davidson, *et al.* Acute and chronic continuous methamphetamine have different long-term behavioral and neurochemical consequences. *Neurochemistry International* 2005;46(3):189-203

Agents: Methamphetamine **Vehicle:** Saline, sterile; **Route:** SC; **Species:** Rat; **Pump:** 2ML1; **Duration:** 7 days;

ALZET Comments: Controls received mp w/ vehicle; functionality of mp verified by residual volume; comparison of SC injections vs. mp; half-life (p. 189) 15-70 minutes in rodents; dependence; "MP treatment provides a better pharmacodynamic model for the human methamphetamine binger and may also better approximate the neuropathological outcome known in humans." (p. 200)

P7090: B. D. Armstrong, *et al.* The neurotoxic effects of 3,4-methylenedioxymethamphetamine (MDMA) and methamphetamine on serotonin, dopamine, and GABA-ergic terminals: An in-vitro autoradiographic study in rats. *Neurotoxicology* 2004;25(6):905-914

Agents: Methamphetamine hcl; Methamphetamine hcl, 3,4-methylenedioxy- **Vehicle:** Water, distilled; **Route:** SC; **Species:** Rat; **Pump:** 2ML1; **Duration:** 5 days;

ALZET Comments: Controls received mp w/ vehicle; toxicology

P6686: S. Semenova, *et al.* Clozapine treatment attenuated somatic and affective signs of nicotine and amphetamine withdrawal in subsets of rats exhibiting hyposensitivity to the initial effects of clozapine. *Biological Psychiatry* 2003;54(11):1249-1264

Agents: Nicotine tartrate; amphetamine; clozapine **Vehicle:** HCL; saline; **Route:** SC; **Species:** Rat; **Pump:** 2ML1; **Duration:** 7,14 days;

ALZET Comments: Controls received mp w/ vehicle; pumps replaced every 7 days for the 14 day study infusing clozapine; dependence; "in this experiment involving three pump implantations each pump was placed in a different part of the rats' body (left or right side of the back of the animal or at the shoulder area)." p. 1252; behavioral study

R0216: T. Kita, *et al.* Current research on methamphetamine-induced neurotoxicity: Animal model of monoamine disruption. *JOURNAL OF PHARMACOLOGICAL SCIENCES* 2003;92(3):178-195

Agents: Amphetamine **Vehicle:** Not Stated; **Route:** SC; **Species:** Mice; **Pump:** Not Stated; **Duration:** 1 week;

ALZET Comments: Toxicology; ALZET pumps mentioned on pg. 181, ref. 36; "These pumps have a continuous uniform rate assuring a constant drug concentration." (p. 181)

P5001: N. E. Paterson, *et al.* Effects of repeated withdrawal from continuous amphetamine administration on brain reward function in rats. *Psychopharmacology* 2000;152(440-446)

Agents: Amphetamine sulfate **Vehicle:** Saline; **Route:** SC; **Species:** Rat; **Pump:** 2ML1; **Duration:** 6 days;

ALZET Comments: controls received mp w/ vehicle; dose-response (fig 1. p. 443); dependence; 2 administration periods, 1 6-day period, 12 days of withdrawal, then another 6-day period; "Even though the duration of amphetamine withdrawal was no longer, the magnitude of the effect was greater, and the use of mini-pumps eased drug administration considerably compared to repeated experimenter-administered injections". p. 445;

P3426: M. Macedoni-Luksic, *et al.* Scopolamine modulates the effects of continuous amphetamine in rats. *Acta Pharmaceutica* 1996;46(23-30)

Agents: Amphetamine sulfate, d-; Scopolamine hydrobromide **Vehicle:** Saline; **Route:** SC; **Species:** Rat; **Pump:** 2ML1; **Duration:** 7 days;

ALZET Comments: controls received mp w/ saline; functionality of mp verified by residual volume; tolerance



P2346: T. H. Lee, *et al.* In vitro extracellular recording from nigral dopamine neurons following continuous d-amphetamine infusion. *European Journal of Pharmacology* 1993;232(125-129)

Agents: Amphetamine sulfate **Vehicle:** Saline; **Route:** SC; **Species:** Rat; **Pump:** 2ML1; **Duration:** 7 days;
ALZET Comments: dependence

P2463: M. T. Martin-Iverson, *et al.* Effects of chronic treatment of rats with "designer" amphetamines on brain regional monamines. *Can. J. Physiol. Pharmacol* 1991;69(1825-1832)

Agents: Amphetamine; Amphetamine, 4-methoxy-; Amphetamine, 4-ethoxy- **Vehicle:** Propylene glycol; **Route:** SC; **Species:** Rat; **Pump:** 2ML2; **Duration:** 14 days;
ALZET Comments: controls received mp w/ Propylene glycol; dose-response (graph, p. 1830); toxicology

P2146: S. M. Lillrank, *et al.* Animal models of amphetamine psychosis: neurotransmitter release from rat brain slices. *Int. J. Neurol* 1991;60(1-15)

Agents: Amphetamine sulfate **Vehicle:** Saline; **Route:** SC; **Species:** Rat; **Pump:** 2001; **Duration:** 7 days;
ALZET Comments: comparison of IP injections vs. mp; brain tissue distribution; tolerance; half-life (45-60 min, p.10)

P1542: T. H. Lee, *et al.* Time-dependent changes in the sensitivity of dopamine neurons to low doses of apomorphine following amphetamine infusion. *Brain Research* 1989;483(17-29)

Agents: Amphetamine, d- **Vehicle:** Water; **Route:** SC; **Species:** Rat; **Pump:** 2001; 2ML1; **Duration:** 7 days;
ALZET Comments: Controls received plastic pellets; multiple pumps per animal (2) (2001); comparison of IP injections vs. mp infusion

P1345: M. Tanaka, *et al.* Dopaminergic activity and met-enkephaline levels in the rat striatum after continuous treatment with various dopaminergic agents. *Neuroscience* 1988;14(114-116)

Agents: Apomorphine; Haloperidol; Methamphetamine **Vehicle:** Not Stated; **Route:** SC; **Species:** Rat; **Pump:** Not Stated; **Duration:** 2 weeks;
ALZET Comments: japanese with english abstract

P1547: L. J. Ryan, *et al.* Continuous amphetamine administration induces tyrosine hydroxylase immunoreactive patches in the adult rat neostriatum. *Brain Research Bulletin* 1988;21(133-137)

Agents: Amphetamine sulfate, d-; Cocaine HCl **Vehicle:** Saline; **Route:** IV (jugular); SC; **Species:** Rat; **Pump:** 2ML1; **Duration:** 3, 30 days;
ALZET Comments: controls received silastic plug implant

P1158: K.-I. Honma, *et al.* Activity rhythms in the circadian domain appear in suprachiasmatic nuclei lesioned rats given methamphetamine. *Physiology & Behavior* 1987;40(6):767-774

Agents: Methamphetamine **Vehicle:** Not Stated; **Route:** SC; **Species:** Rat; **Pump:** 2002; **Duration:** 21 days;
ALZET Comments: controls received sham operation; rats received bilateral lesions in the suprachiasmatic nucleus (SCN); comparison of methamphetamine in drinking water vs. mp infusion; functionality of mp verified

P1080: P. F. Gately, *et al.* Sequential changes in behavior induced by continuous infusions of amphetamine in rats. *Psychopharmacology* 1987;91(217-220)

Agents: Amphetamine **Vehicle:** Saline; **Route:** SC; **Species:** Rat; **Pump:** 2ML2; **Duration:** 9 days;
ALZET Comments: controls received mp w/saline

P1203: H. A. Robertson. Cerebral decortication reverses the effect of amphetamine on striatal D2 dopamine binding site density. *Neuroscience Letters* 1986;72(3):325-329

Agents: Amphetamine, d- **Vehicle:** Propylene glycol; **Route:** SC; **Species:** Rat; **Pump:** 2002; **Duration:** 16 days;
ALZET Comments: controls received mp w/ vehicle; rats were hemidecorticated



- P1201:** K. Krauchi, *et al.* Peripheral mechanisms are involved in the appearance of disturbed circadian rhythmicity and tolerance after chronic methamphetamine. *Annual Review of Chronopharmacology* 1986;3(21-24
Agents: Methamphetamine **Vehicle:** Saline; **Route:** SC; **Species:** Rat; **Pump:** 2002; **Duration:** 14 days;
ALZET Comments: controls received mp w/ saline; some animals given ascorbic acid and/or MA in drinking water; comparison of MA in drinking water vs. mp infusion
- P1200:** K. Kashihara, *et al.* Behavioral hypersensitivity to apomorphine after chronic methamphetamine-intermittent vs. continuous regimen. *Psychiatry and Clinical Neurosciences* 1986;40(1):81-84
Agents: Methamphetamine **Vehicle:** Not Stated; **Route:** SC; **Species:** Rat; **Pump:** 2ML2; **Duration:** 14 days;
ALZET Comments: controls received cutaneous incision on the back-no mp or drugs; apomorphine challenge 7 days after mp removal; comparison of intermittent therapy vs. mp infusion
- P0735:** W. H. Vogel, *et al.* Biochemical and behavioral changes in rats during and after chronic d-amphetamine exposure. *Drug and Alcohol Dependence* 1985;15(3):245-253
Agents: Amphetamine sulfate, d- **Vehicle:** PEG; **Route:** SC; **Species:** Rat; **Pump:** 2002; **Duration:** 12 days;
ALZET Comments: controls received mps w/ polyethylene glycol
- P1170:** R. W. Fuller. Toxic effects of psychomotor stimulants. *Psychopharmacology* 1985;21(3):528-532
Agents: Amphetamine **Vehicle:** Not Stated; **Route:** Not Stated; **Species:** Mice; Rat; **Pump:** Not Stated; **Duration:** Not Stated;
ALZET Comments: References the mp for continuous infusion of amphetamine in rats or mice
- P0908:** P. Frey. Changes in cholecystokinin content in rat brain after subchronic treatment with neuroleptics. *Annals of the New York Academy of Sciences* 1985;448(601-603
Agents: Flupenthixol, cis-; Flupenthixol, trans-; Amitriptyline; Amphetamine; Atropine; Chlorpromazine; Clozapine; Fluphenazine; Haloperidol; Morphine; Prazosin **Vehicle:** Not Stated; **Route:** SC; **Species:** Rat; **Pump:** Not Stated; **Duration:** 2 weeks;
ALZET Comments: mp model not stated; comparison of sc injections vs. mp infusion; antihypertensive
- P0529:** G. A. Ricaurte, *et al.* Further evidence that amphetamines produce long-lasting dopamine neurochemical deficits by destroying dopamine nerve fibers. *Brain Research* 1984;303(2):359-364
Agents: Amphetamine sulfate, d-; Methamphetamine HCl, d- **Vehicle:** Saline; **Route:** SC; **Species:** Rat; **Pump:** 2001; **Duration:** .5, 12 days;
ALZET Comments: Comparison of agents effects; control rats did not receive mp due to expense; peptides
- P0470:** L. Kokkinidis. Effects of chronic intermittent and continuous amphetamine administration on acoustic startle. *Pharmacology Biochemistry and Behavior* 1984;20(3):367-371
Agents: Amphetamine sulfate, d- **Vehicle:** Saline; **Route:** SC; **Species:** Mice; **Pump:** 2001; **Duration:** 1 week;
ALZET Comments: Intermittent sc injec twice daily vs. mp infusion; measured amount of residual amp. in pumps at end of exp
- P0418:** L. R. Steranka. Long-term effects of a priming dose and short-term infusion of amphetamine on striatal dopamine neurons in rats. *European Journal of Pharmacology* 1983;96(159-163
Agents: Amphetamine sulfate, d- **Vehicle:** Water; **Route:** SC; **Species:** Rat; **Pump:** 2ML1; **Duration:** .5-24 hours;
ALZET Comments: Pump primed overnight in saline at 37C; each pump used to treat several rats; control rats were implanted w/ used pump
- P0341:** F. Orzi, *et al.* Comparative effects of acute and chronic administration of amphetamine on local cerebral glucose utilization in the conscious rat. *Journal of Cerebral Blood Flow & Metabolism* 1983;3(2):154-160
Agents: Amphetamine sulfate, d- **Vehicle:** Not Stated; **Route:** SC; **Species:** Rat; **Pump:** 2001; 2002; **Duration:** 1, 2 weeks;
ALZET Comments: Comparison of routes of admin; 2 pumps (2001 or 2002)/animal
- P0374:** E. B. Nielsen, *et al.* Reduction of 3H-spiroperidol binding in rat striatum and frontal cortex by chronic amphetamine: dose response, time course and role of sustained dopamine release. *Psychopharmacology* 1983;81(81-85
Agents: Amphetamine, d- **Vehicle:** PEG 300; **Route:** SC; **Species:** Rat; **Pump:** 2001; **Duration:** 5, 9, 14 days;
ALZET Comments: Pumps replaced after 1 week; up to multiple pumps per animal (3)



P0373: E. H. Ellinwood Jr, *et al.* Effect of continuous systemic infusion of d-amphetamine on the sensitivity of nigral dopamine cells to apomorphine inhibition of firing rates. *Brain Research* 1983;273(379-383)

Agents: Amphetamine, d- **Vehicle:** Saline; **Route:** SC; **Species:** Rat; **Pump:** Not Stated; **Duration:** Not Stated;
ALZET Comments: 2 pumps/animal

P0407: M. S. Eison, *et al.* Two routes of continuous amphetamine administration induce different behavioral and neurochemical effects in the rat. *Neuroscience Letters* 1983;39(313-319)

Agents: Amphetamine, d- **Vehicle:** PEG; **Route:** SC; **Species:** Rat; **Pump:** 2001; **Duration:** 2, 5 days;
ALZET Comments: Comparison of sc silicone tube implant vs. mp infusion; comparison of behavioral & neurochem. changes caused by Amph. in different deliv. sys. w/ different release characteristics

P0244: G. Jonsson, *et al.* Selective (+)-amphetamine neurotoxicity on striatal dopamine nerve terminals in the mouse. *British Journal of Pharmacology* 1982;77(335-345)

Agents: Amphetamine **Vehicle:** Saline; **Route:** SC; **Species:** Mice; **Pump:** Not Stated; **Duration:** 2, 7 days;
ALZET Comments: no comment posted

P0191: E. Nwanze, *et al.* Amphetamine neurotoxicity on dopamine nerve terminals in the caudate nucleus of mice. *Neuroscience Letters* 1981;26(163-168)

Agents: Amphetamine sulfate, d- **Vehicle:** Saline; **Route:** SC; **Species:** Mice; **Pump:** Not Stated; **Duration:** 7 days;
ALZET Comments: no comment posted

P0164: E. B. Nielsen. Rapid decline of stereotyped behavior in rats during constant one week administration of amphetamine via implanted ALZET osmotic minipumps. *Pharmacology Biochemistry and Behavior* 1981;15(2):161-165

Agents: Amphetamine **Vehicle:** PEG 300; **Route:** SC; **Species:** Rat; **Pump:** 2001; **Duration:** 7 days;
ALZET Comments: no comment posted

P0144: G. G. Dougherty Jr, *et al.* Amphetamine behavioral toxicity: rotational behavior after chronic intrastriatal infusion. *Biological Psychiatry* 1981;16(5):479-488

Agents: Trifluoperazine; Amphetamine sulfate, d- **Vehicle:** Saline; **Route:** CSF/CNS (corpus striatum); **Species:** Rat; **Pump:** Not Stated; **Duration:** 7 days;
ALZET Comments: caudate putamen

P0079: L. R. Steranka, *et al.* Long-term effects of continuous exposure to amphetamine on brain dopamine concentration and synaptosomal uptake in mice. *European Journal of Pharmacology* 1980;65(4):439-443

Agents: Amphetamine; Chloroamphetamine, p- **Vehicle:** Water; **Route:** SC; **Species:** Mice; **Pump:** Not Stated; **Duration:** 3, 6 days;
ALZET Comments: no comment posted

P0018: L. R. Steranka, *et al.* Long-term effects of continuous exposure to p-chloroamphetamine on central serotonergic mechanisms in mice. *Biochemical Medicine and Metabolic Biology* 1978;27(16):2033-2037

Agents: Chloroamphetamine, p- **Vehicle:** Saline; **Route:** SC; **Species:** Mice; **Pump:** 1701; **Duration:** 3 days;
ALZET Comments: Half-life (p. 2035)