



**Recent References (2015-2019) on Tolerance and Dependence Research
Using ALZET® Osmotic Pumps**

Q6948: Y. Zhang, *et al.* Hyperbaric oxygen produces a nitric oxide synthase-regulated anti-allodynic effect in rats with paclitaxel-induced neuropathic pain. *Brain Res* 2019;

ALZET Comments: S-Methyl-L-thiocitrulline; Saline; SC; Rat; 1007D; 7 days; Dose (0.5 ± 0.1 µL/hr/day); 0.9% saline used; animal info (male Sprague Dawley); post op. care (Ampicillin, meloxicam); enzyme inhibitor (S-Methyl-L-thiocitrulline is a neuronal nitric oxide synthase (nNOS) inhibitor); Brain coordinates (AP–1.0 mm, ML –2.0 mm, DV –3.5mm from bregma); bilateral cannula used; dependence;

Q6994: D. C. Walters, *et al.* Preclinical tissue distribution and metabolic correlations of vigabatrin, an antiepileptic drug associated with potential use-limiting visual field defects. *Pharmacol Res Perspect* 2019;7(1):e00456

ALZET Comments: Vigabatrin; PBS; SC; Mice; 2002; 12 days; Dose (35, 70, and 140 mg/kg/d); Controls received mp w/ vehicle; animal info (Male C57BL/6J mice, 8-10 weeks old, 20.8-26.1 g); post op. care (Carprofen); dependence;

Q6996: C. A. Turner, *et al.* Neural cell adhesion molecule peptide mimetics modulate emotionality: pharmacokinetic and behavioral studies in rats and non-human primates. *Neuropsychopharmacology* 2019;44(2):356-363

ALZET Comments: Plannexin, FGLL peptide mimetic; Saline; SC; Rat; 14 days; Dose (10 mg/kg - FGLL, plannexin- 10 mg/kg); 0.9% saline used; animal info (Male, Sprague-Dawley rats, 250 g); behavioral testing (Forced Swim Test, Elevated Plus-Maze); FGLS is a neural cell adhesion molecule peptide mimetic; dependence;

Q6998: K. L. Smith, *et al.* Opioid system modulators buprenorphine and samidorphan alter behavior and extracellular neurotransmitter concentrations in the Wistar Kyoto rat. *Neuropharmacology* 2019;146(3):316-326

ALZET Comments: Escitalopram; SC; Rat; 2ML4; 14 days; Dose (10 mg/kg/day); animal info (Wistar Kyoto rat); behavioral testing (Forced swim test, Marble burying test); dependence;

Q6791: R. Saravia, *et al.* Anti-inflammatory agents for smoking cessation? Focus on cognitive deficits associated with nicotine withdrawal in male mice. *Brain Behav Immun* 2019;75(2):228-239

ALZET Comments: Nicotine hydrogen tartate salt; Saline; SC; Mice; 2002; 14 days; Dose (25 mg/kg/day); animal info (8-weeks old male C57BL/6J mice (Charles River).); dependence;

Q7004: S. Moon, *et al.* Morphine Dependence is Attenuated by Treatment of 3,4,5-Trimethoxy Cinnamic Acid in Mice and Rats. *Neurochem Res* 2019;

ALZET Comments: Morphine; Trimethoxy cinnamic acid, 3, 4, 5-; Saline; CSF/CNS (lateral ventricle); Rat; 2ML1; 7 days; Dose (26 nmol/10µ l/hr); Controls received mp w/ vehicle; animal info (male Sprague–Dawley rats, 220–240 g)); behavioral testing (Conditioned Place Preference Test); dependence;

Q7009: N. R. Laferriere, *et al.* Inhibition of microRNA-124-3p as a novel therapeutic strategy for the treatment of Gulf War Illness: Evaluation in a rat model. *Neurotoxicology* 2019;71(1):16-30

ALZET Comments: rno-miR-124-3p; CSF, artificial; CSF/CNS (lateral ventricle); Rat; 2004; 28 days; Dose (concentrations of 0, 0.05, 0.1 or 0.5 nmol/day); post op. care (carprofen); ALZET brain infusion kit 2 used; Brain coordinates (1.00mm caudal and 1.40mm lateral to bregma, with no height adjustment spacers); bilateral cannula used; dependence; Therapeutic indication (Gulf War Illness);.

Q6131: A. Kliewer, *et al.* Phosphorylation-deficient G-protein-biased mu-opioid receptors improve analgesia and diminish tolerance but worsen opioid side effects. *Nat Commun* 2019;10(1):367

ALZET Comments: Fentanyl citrate; morphine sulphate salt pentahydrate; PBS; water, sterile; SC; Mice (transgenic); 1007D; 7 days; Dose (Fentanyl (2mg/kg/day); Morphine (17 mg/kg/day)); animal info (knock-in mice with 11S/T-A mutations (Oprm1tm3.1Shlz, MGI:6117673, 11S/T-A)); behavioral testing (hot plate test; open field locomotion test); dependence; “...we used subcutaneously implanted osmotic pumps to deliver opioids at a constant rate. This approach is a powerful means of assessing both tolerance and dependence in rodents” (p.5).



Q6064: R. F. Keller, *et al.* Comparison between dopaminergic and non-dopaminergic neurons in the VTA following chronic nicotine exposure during pregnancy. *Sci Rep* 2019;9(1):445

ALZET Comments: Nicotine hydrogen tartrate salt; Saline; SC; Rat (pregnant); 28 days; Dose (6 mg/kg/d); Controls received mp w/ vehicle; animal info (Pregnant female Sprague–Dawley (SD) rats); dependence;.

Q6978: R. D. Cole, *et al.* Adolescent and adult nicotine exposure differentially impacts oral nicotine and oral saccharin self-administration in mice. *Behav Brain Res* 2019;359(836-844

ALZET Comments: nicotine hydrogen tartrate; Saline; SC; Mice; 1002; 2 weeks; Dose (3.0 mg/kg/d - adolescent, 6.3 mg/kg/d-adult); Controls received mp w/ vehicle; animal info (adolescent, adult); stability verified by (measuring the residual volume following surgical removal at the end of the exposure period for each time point); half-life 10 min (p.841); dependence;.

Q6986: R. B. Bassey, *et al.* Combined early life stressors: Prenatal nicotine and maternal deprivation interact to influence affective and drug seeking behavioral phenotypes in rats. *Behav Brain Res* 2019;359(814-822

ALZET Comments: Nicotine hydrogen tartrate; Saline; SC; Rat (pregnant); 2004; 14 days; Dose (4 mg/kg/day); 0.9% saline used; Controls received mp w/ vehicle; animal info (Timed-pregnant Sprague–Dawley rats 250 g- 300 g); pumps implanted during gestation); behavioral testing (open field test, forced swim test); dependence;.

Q6905: L. B. Wollman, *et al.* Developmental plasticity of GABAergic neurotransmission to brainstem motoneurons. *J Physiol* 2018;596(23):5993-6008

ALZET Comments: Nicotine bitartrate; Saline; SC; Rat (pregnant); 1007D; (6 mg/kg/day); Controls received mp w/ vehicle; animal info (pregnant dams on gestational day 5); post op. care (buprenorphine sc 0.5 mg/kg); dependence;.

Q7051: S. Semenova, *et al.* Differential effects of withdrawal from intermittent and continuous nicotine exposure on reward deficit and somatic aspects of nicotine withdrawal and expression of alpha4beta2* nAChRs in Wistar male rats. *Pharmacol Biochem Behav* 2018;171(54-65

ALZET Comments: Nicotine; Saline; SC; Rat; 2ML4; 20 days; Dose (1.2, 3.16, or 6.32 mg/kg/dau); animal info (male Wistar rats weighing 320-360g); dependence;.

Q7090: Poretti MB, *et al.* Reproductive performance of male mice after hypothalamic ghrelin administration. *Reproduction* 2018;156(2):121-132

ALZET Comments: Ghrelin, acyl-; CSF, artificial; CSF/CNS (hypothalamus); Mice; 1007D, 2006; 7 days, 42 days; Dose (0.5 umol/h/day- 1007D, 0.15 umol/h/day-2006) Controls received mp w/ vehicle; animal info (Adult male mice, 60 days old, 30 g); Brain coordinates (relative to bregma: anterior 0.15 mm, lateral 0.05 mm, vertical 5.5 mm); cyanoacrylate adhesive; dependence;.

Q6963: D. H. Malin, *et al.* A subtype-specific neuropeptide FF receptor antagonist attenuates morphine and nicotine withdrawal syndrome in the rat. *Neurosci Lett* 2018;684(98-103

ALZET Comments: Morphine sulfate, Nicotine bitartrate; Saline, isotonic; SC; Rat; 2ML1; 7 days; Dose (morphine at 0.3 and 0.6 mg/kg/hr, nicotine at 9 mg/kg/day); Controls received mp w/ vehicle; animal info (male Sprague-Dawley rats averaging 234 g); dependence;.

Q7224: F. S. Lucia, *et al.* Transient Hypothyroidism During Lactation Arrests Myelination in the Anterior Commissure of Rats. A Magnetic Resonance Image and Electron Microscope Study. *Front Neuroanat* 2018;12(31

ALZET Comments: Thyroxine. L-; SC; Rat; 2001; 7 days; Dose (1 uL/hr/day); animal info (Wistar, adult, female, 250-300 g); dependence;.

Q7215: H. Li, *et al.* Fibroblast growth factor 21 increases insulin sensitivity through specific expansion of subcutaneous fat. *Nat Commun* 2018;9(1):272

ALZET Comments: Fibroblast growth factor 21, mouse recomb.; Saline; SC; Mice; 4 weeks; Dose (0.1 mg/kg/day); Controls received mp w/ vehicle; animal info (8 week old, FGF21KO); Resultant plasma level (1.5 ng/ml, which was 2–3 times of the 8-week HFD-induced endogenous FGF21 level of 0.6 ng/ml (Fig. 3f)); dependence;.



Q7199: C. Lee, *et al.* Differential regulation of neuronal excitability by nicotine and substance P in subdivisions of the medial habenula. *Anim Cells Syst (Seoul)* 2018;22(3):165-171

ALZET Comments: Nicotine; Sodium Chloride; SC; Mice; 1004; 14 days; Dose (1 mg/kg/hr); animal info (5 weeks old, Male, C57BL/6); dependence;

Q7191: J. E. Kim, *et al.* P2RX7-MAPK1/2-SP1 axis inhibits MTOR independent HSPB1-mediated astroglial autophagy. *Cell Death Dis* 2018;9(5):546

ALZET Comments: BzATP, OxATP, A740003, Compound C, 3-chloroacetyl indole, Mithramycin A, U0126, RNA, small interfering (Heat shock protein B1); CSF/CNS (lateral ventricle); Mice; 1007D; 7 days; Dose: BzATP (5 mM), OxATP (5 mM) A740003 (10 µM), Comp C (100 nM), 3CAI (25 µM), MMA (25 µM), U0126 (25 µM); animal info (Male, C57BL/6J, 25-30 g, 60-90 days old); BzATP is a P2RX7 agonist, OxATP and A740003 are P2RX7 antagonists; enzyme inhibitor (mitogen-activated protein kinase 1/2); ALZET brain infusion kit 3 used; Brain coordinates (lateral cerebral ventricle 1.0mm lateral to bregma); dependence; no stress: doses were well tolerated, and no signs of neurotoxicity (hind-limb paralysis, vocalization, food intake, or neuroanatomical damage) were observed;

Q7142: V. Gudmundsdottir, *et al.* Integrative network analysis highlights biological processes underlying GLP-1 stimulated insulin secretion: A DIRECT study. *PLoS One* 2018;13(1):e0189886

ALZET Comments: Liraglutide; Liraglutide; SC; Mice; 1002; 14 days; Dose (600 µg/kg/d); Controls received mp w/ vehicle; animal info (10-12 weeks, female) ; Liraglutide aka GLP-1 receptor agonist; dependence; stress/adverse reaction: (Due to wound healing problems after the mini pump surgery three mice were sacrificed during the time course of the experiment.) (see pg. 12);.

Q7134: S. J. Fliesler, *et al.* Prevention of Retinal Degeneration in a Rat Model of Smith-Lemli-Opitz Syndrome. *Sci Rep* 2018;8(1):1286

ALZET Comments: AY9944; SC; Rat; 2ML4; 2ML4; animal info (Pregnant, adult, female, Sprague Dawley); DHCR7 aka 7-dehydrocholesterol reductase; enzyme inhibitor (DHCR7 inhibitor); dependence;

Q7122: S. Crespo Yanguas, *et al.* TAT-Gap19 and Carbenoxolone Alleviate Liver Fibrosis in Mice. *Int J Mol Sci* 2018;19(3):

ALZET Comments: TAT-Gap19, Carbenoxolone; Saline; Saline; Mice; 8 weeks; Dose (1 mg/kg/day); Controls received mp w/ vehicle; animal info (Male, Balb/c); TAT-Gap19 aka connexin43 hemichannel inhibitor, CBX-hemichannel and gap junction inhibitor; dependence; Therapeutic indication (Liver fibrosis);.

Q7120: D. F. Cobice, *et al.* Quantification of 11beta-hydroxysteroid dehydrogenase 1 kinetics and pharmacodynamic effects of inhibitors in brain using mass spectrometry imaging and stable-isotope tracers in mice. *Biochem Pharmacol* 2018;148(88-99)

ALZET Comments: Cortisol; radio-isotopes; DMSO; propylene glycol; 2H tracer; SC; Mice; 1003D; 2 days; Dose (1.75 mg/day); Controls received mp w/ vehicle; animal info (Male, C57Bl6, 12 weeks old); stable-isotope labelled [9,11,12,12-2H]4-cortisol; dependence;

Q7113: Y.-H. Chen. Profound deficits in hippocampal synaptic plasticity after traumatic brain injury and seizure is ameliorated by prophylactic levetiracetam. *Oncotarget* 2018;9(14):11515-11527

ALZET Comments: Angiotensin II; PBS; SC; Mice; 2004; 4 weeks; Dose (2.5 µg/kg/min); animal info (8 week-old, male, ApoE^{-/-}); dependence; .

Q7112: Y. Chen, *et al.* Silencing MR-1 attenuates atherosclerosis in ApoE^{-/-} mice induced by angiotensin II through FAK-Akt-mTOR-NF-kappaB signaling pathway. *Korean J Physiol Pharmacol* 2018;22(2):127-134

ALZET Comments: Angiotensin II; PBS; SC; Mice; 2004; 4 weeks; Dose (2.5 µg/kg/min); animal info (8 week-old, male, ApoE^{-/-}); dependence; .



Q7106: L. M. Carcoba, *et al.* Amino acid modulation of dopamine in the nucleus accumbens mediates sex differences in nicotine withdrawal. *Addict Biol* 2018;23(5):1046-1054

ALZET Comments: Nicotine hydrogen tartrate salt; Saline; Saline; Rat; 2ML2; 14 days; 0.9% saline used; animal info (Adult male and female Wistar rats); post op. care (analgesic flunixin- 2.5 mg/kg); dependence;

Q7104: E. S. Calipari, *et al.* Granulocyte-colony stimulating factor controls neural and behavioral plasticity in response to cocaine. *Nat Commun* 2018;9(1):9

ALZET Comments: Antibody, anti-GCSF neutralizing antibody, Immunoglobulin G, pre-immune; Saline; CSF/CNS (nucleus accumbens); Mice; 1007D; 7 days; Dose (1 ug/day); animal info (Male, C57BL/6 J, 7 weeks old , 20–25 g); Multiple pumps per animal (2); Brain coordinates (From bregma: anteroposterior, +1.5; mediolateral, + 1.0; dorsoventral, –4.5); bilateral cannula used; The cannulae were permanently fixed to the skull with Loctite adhesive; dependence;

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

ALZET Comments: Haloperidol, olanzapine; Cyclodextrin, 2-Hydroxypropyl-B-; SC; Rat; 2ML4; 8 weeks; 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;

Q7101: M. W. Burke, *et al.* Perinatal MAO Inhibition Produces Long-Lasting Impairment of Serotonin Function in Offspring. *Brain Sci* 2018;8(6):

ALZET Comments: Clorgyline, deprenyl, L-; Saline; SC; Mice (pregnant); 1002, 2004; 6 weeks; Dose (0.25 mg/kg/day-deprenyl, 1 mg/kg/day-clorgyline, or both); 0.9% saline used; Controls received mp w/ vehicle; animal info (Male, MAO-A/B knockout); behavioral testing (Locomotor test); Model 1002 pumps replaced with Model 2004 pumps on E17; MOA aka Monoamine oxidase; enzyme inhibitor (clorgyline, L-deprenyl); dependence;

Q7100: J. K. Brynildsen, *et al.* Activation of AMPK by metformin improves withdrawal signs precipitated by nicotine withdrawal. *Proc Natl Acad Sci U S A* 2018;115(16):4282-4287

ALZET Comments: Nicotine, Metformin; Saline; CSF/CNS (lateral ventricle); Mice; 1002; 2 weeks; Dose (18 mg/kg/day-nicotine, 50 ug/day-metformin); 0.85% saline used; Controls received mp w/ vehicle; behavioral testing (Marble Burying Test, Novelty-Induced Hypophagia Test); Brain coordinates (anteroposterior, –0.8 mm; mediolateral, +1.5 mm); dependence;

Q7092: P. Alvarez, *et al.* Neonatal Handling Produces Sex Hormone-Dependent Resilience to Stress-Induced Muscle Hyperalgesia in Rats. *J Pain* 2018;19(6):670-677

ALZET Comments: ICI 182,780; DMSO; Corn oil; SC; Rat; 2004; 28 days; Dose (0.1 mg/kg/d); 5% DMSO and 95% corn oil used; Controls received inert implant; animal info (Male and female Sprague Dawley rats, 250 to 400 g, 50-75 days old); ICI 182,780 is a selective estrogen receptor degrader fulvestrant; dependence;

Q7093: K. A. Alkadhi. Delayed effects of combined stress and Abeta infusion on L-LTP of the dentate gyrus: Prevention by nicotine. *Neurosci Lett* 2018;682(10-15

ALZET Comments: Amyloid peptide, beta (1-40); Amyloid peptide, beta (1-42); Acetonitrile, Trifluoacetic acid; CSF/CNS (lateral ventricle); Rat; 14 days; Dose (300 pmol peptides/day); 35% acetonitrile, 0.1% trifluoacetic acid (TFA); animal info (Adult male Wistar rats, 7 weeks old, 200-225 g); dependence;

Q7095: F. Aizawa, *et al.* The involvement of free fatty acid-GPR40/FFAR1 signaling in chronic social defeat stress-induced pain prolongation in C57BL/6J male mice. *Psychopharmacology (Berl)* 2018;235(8):2335-2347

ALZET Comments: GW1100; DMSO; SC; Mice; 14 days; Dose (1.0 µg/12 µL/day); 0.4% DMSO used; Controls received mp w/ vehicle; animal info (Male C57BL/6J- 8 weeks old, male ICR- 5 weeks old); behavioral testing (Open-field test, Social interaction test, Elevated plus-maze test); GW1100 is a GPR40/FFAR1 antagonist; Brain coordinates (Bregma – 1.0 mm, mid-sagittal line– 1.0 mm); dependence;



Q5935: M. Yuan, *et al.* The alpha3beta4 nAChR partial agonist AT-1001 attenuates stress-induced reinstatement of nicotine seeking in a rat model of relapse and induces minimal withdrawal in dependent rats. *Behav Brain Res* 2017;333(251-257)
ALZET Comments: Nicotine; SC; Rat; 2ML1; 7 days; animal info (male, Sprague Dawley, 300-350g, adult); behavioral testing (open field chambers); dependence; Dose (3.15 mg/kg/day);.

Q6517: S. Tolu, *et al.* Nicotine enhances alcohol intake and dopaminergic responses through beta2* and beta4* nicotinic acetylcholine receptors. *Sci Rep* 2017;7(45116)
ALZET Comments: Nicotine; Saline; SC; Mice (knockout); 2004; 26 days; Dose (10 mg/kg/d); 0.9% saline used; Controls received mp w/ vehicle; animal info (8–16 week old male C57BL/6J wild-type, $\beta 2^{-/-}$ 18 and $\beta 4^{-/-}$ mice); pumps replaced every 4 weeks; Resultant plasma level (10 to 50 ng/ml); dependence;.

Q5895: M. Thomsen, *et al.* Effects of Acute and Chronic Treatments with Dopamine D2 and D3 Receptor Ligands on Cocaine versus Food Choice in Rats. *J Pharmacol Exp Ther* 2017;362(1):161-176
ALZET Comments: PF-592,379; NPA; L-741,626; PG01037; SC; Rat; 2ml1; 7 days; animal info (male, Sprague Dawley, 8 weeks old); dependence; no stress: "We previously verified that 7 days of continuous water administration and presence of the minipumps did not produce any significant changes in choice behavior ." pg 164.

Q5985: M. V. Singh, *et al.* Abnormal CD161(+) immune cells and retinoic acid receptor-related orphan receptor gamma-mediated enhanced IL-17F expression in the setting of genetic hypertension. *J Allergy Clin Immunol* 2017;140(3):809-821 e3
ALZET Comments: Nicotine; Saline; SC; Rat; 2001D; 24 hours; Controls received mp w/ vehicle; animal info (1-38 weeks) ; dependence; Dose (15 mg/kg);.

Q6771: S. Schreiber, *et al.* Interaction between methylphenidate, methadone and different antidepressant drugs on antinociception in mice, and possible clinical implications. *World J Biol Psychiatry* 2017;18(4):300-307
ALZET Comments: methadone; escitalopram; venlafaxine; desipramine; clomipramine; SC; Mice; 2002; 14 days; Dose: methadone (0.5 mg/kg) venlafaxine (2.5 mg/kg); escitalopram (20mg/kg); desipramine (1mg/kg); clomipramine (0.5 mg/kg); animal info (Male ICR mice, 25-35g); dependence.

Q6768: R. Saravia, *et al.* CB1 Cannabinoid Receptors Mediate Cognitive Deficits and Structural Plasticity Changes During Nicotine Withdrawal. *Biol Psychiatry* 2017;81(7):625-634
ALZET Comments: Nicotine hydrogen tartrate salt; Saline; SC; Mice (knockout); 2002; 14 days; Dose (25 mg/kg/day); animal info (CB1R constitutive knockout (KO) mice; conditional KO mice and their wild-type (WT) littermates (8–12 weeks old)); dependence;.

Q5887: A. Rivera, *et al.* Dopamine D4 receptor stimulation prevents nigrostriatal dopamine pathway activation by morphine: relevance for drug addiction. *Addict Biol* 2017;22(5):1232-1245
ALZET Comments: Morphine; PD168,077; DMSO; NaCl; SC; Rat; 2ML1; 6 days; animal info (male, Sprague Dawley, 225-250g); 2% DMSO used; behavioral testing (withdrawal behavior; tail-flick test); dependence; Dose (Morphine 20 mg/kg/day; PD168,077 1 or 3 mg/kg/day);.

Q5886: A. H. Rezvani, *et al.* Differential efficacies of the nicotinic alpha4beta2 desensitizing agents in reducing nicotine self-administration in female rats. *Psychopharmacology (Berl)* 2017;234(17):2517-2523
ALZET Comments: YL-2-203; VMY-2-94; Saline; SC; Rat; 4 weeks; Controls received mp w/ vehicle; animal info (female, Sprague Dawley, young adult); behavioral testing (locomotor activity); dependence; Dose (2 or 6 mg/kg/day);.

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
ALZET Comments: Amphetamine; DMSO; acetic acid; water; SC; Rat; 2ML1; 7 days; 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.



Q6065: V. D. McLane, *et al.* Long-term morphine delivery via slow release morphine pellets or osmotic pumps: Plasma concentration, analgesia, and naloxone-precipitated withdrawal. *Life Sci* 2017;185(1-7)

ALZET Comments: Morphine; Saline; SC; Mice; 2001; 7 days; Dose (64 mg/mL); animal info (8 week old C57BL/6NCR mice); comparison of pellets vs mp; Resultant plasma level (Fig. 1, Pg 3); dependence;.

Q6451: O. O. Kalejaiye, *et al.* Enhanced susceptibility of CA3 hippocampus to prenatal nicotine exposure. *J Dev Orig Health Dis* 2017;8(2):155-160

ALZET Comments: Nicotine; Saline; SC; Rat (pregnant); 2004; Dose (4 mg/kg/d.); Controls received mp w/ vehicle; animal info (Timed-pregnant Sprague-Dawley rats weighing 250–300 g); dependence;.

Q6313: A. Jackson, *et al.* Varenicline, the clinically effective smoking cessation agent, restores probabilistic response reversal performance during withdrawal from nicotine. *Addict Biol* 2017;22(5):1316-1328

ALZET Comments: Nicotine hydrogen tartrate; Saline; SC; Rat; 2ML2; 7 days; Dose (3.16 mg/kg/day); 0.9% saline used; animal info (Male hooded Lister rats weighing 280-300g); post op. care (carprofen 5 mg/kg IP); dependence;.

Q6455: A. Jackson, *et al.* In vivo interactions between alpha7 nicotinic acetylcholine receptor and nuclear peroxisome proliferator-activated receptor-alpha: Implication for nicotine dependence. *Neuropharmacology* 2017;118(38-45)

ALZET Comments: Nicotine; Saline; Mice; Dose (24 mg/kg/day); Controls received mp w/ vehicle; animal info (ICR male mice); dependence;.

Q6256: T. E. Grieder, *et al.* Deletion of alpha5 nicotine receptor subunits abolishes nicotinic aversive motivational effects in a manner that phenocopies dopamine receptor antagonism. *Eur J Neurosci* 2017;46(1):1673-1681

ALZET Comments: Nicotine; SC; Mice; 1002; 12 days; Dose (7 mg/kg/day); animal info (Adult male C57BL/6 mice); dependence;.

Q6269: S. Elhassan, *et al.* Effects of Nicotine Metabolites on Nicotine Withdrawal Behaviors in Mice. *Nicotine Tob Res* 2017;19(6):763-766

ALZET Comments: Nicotine; Saline; SC; Mice; 2002; 14 days; Dose (24 mg/kg/day); Controls received mp w/ vehicle; animal info (Male adult ICR mice weighing 20–25 g); dependence;.

Q6397: M. Cholanian, *et al.* Developmental nicotine exposure alters potassium currents in hypoglossal motoneurons of neonatal rat. *J Neurophysiol* 2017;117(4):1544-1552

ALZET Comments: Nicotine bitartrate; Saline; SC; Rat (pregnant); 1007D; Dose (6 mg/kg/day); Controls received mp w/ vehicle; animal info (Sprague-Dawley dams); Resultant plasma level (60 to 92 ng/ml); dependence;.

Q6014: E. Barbier, *et al.* Dependence-induced increase of alcohol self-administration and compulsive drinking mediated by the histone methyltransferase PRDM2. *Mol Psychiatry* 2017;22(12):1746-1758

ALZET Comments: RG-108; Cyclodextrin, 2-hydroxypropyl-b-; CSF/CNS (dorsomedial prefrontal cortex); Rat; 2004; animal info (Male Wistar rats; 200–225 g); RG-108 is a DNA methyltransferase inhibitor; Brain coordinates (anterior–posterior:+2.5 mm, medial–lateral: ± 1.5 mm, dorsal–ventral: – 3.5 mm, 10°); dependence;.

Q6422: Bade AN, *et al.* MEMRI is a biomarker defining nicotine-specific neuronal responses in subregions of the rodent brain. *Am J Transl Res* 2017;9(2):601-610

ALZET Comments: Nicotine; Saline; SC; Rat; 2ML1; 1 week; Dose (3.0 mg/kg/day); Controls received mp w/ vehicle; animal info (250-300g male Wistar rats); dependence;.

Q5511: J. Zhao, *et al.* Thalidomide Promotes Morphine Efficacy and Prevents Morphine-Induced Tolerance in Rats with Diabetic Neuropathy. *Neurochem Res* 2016;41(12):3171-3180

ALZET Comments: Morphine; Saline; SC; Rat; 2ML2; 14 days; Controls received mp w/ vehicle; animal info (male, Sprague Dawley, 180-200g); behavioral testing (von Frey testing; hind paw withdrawal); dependence; Dose (2 mg/kg/day);.



Q5502: T. Yayeh, *et al.* Morphine dependence is attenuated by red ginseng extract and ginsenosides Rh2, Rg3, and compound K. *J Ginseng Res* 2016;40(4):445-452

ALZET Comments: Ginsenoside, Rg3; ginsenoside, Rh; compound K; morphine; Saline; CSF/CNS; Rat; 2ML1; 7 days; Controls received mp w/ vehicle; animal info (male, Sprague Dawley, 220-240g); behavioral testing (conditioned place preference; escaping behavior); dependence; cyanoacrylate wound closure; Dose (morphine 26nmol/10ul/hr, ginsenoside 10 ug/ul/h); Brain coordinates (L: 1.3 mm; AeP: e0.5 mm; and DeV: e4.3 mm);.

Q5206: B. Sjogren, *et al.* Digoxin-Mediated Upregulation of RGS2 Protein Protects against Cardiac Injury. *J Pharmacol Exp Ther* 2016;357(2):311-9

ALZET Comments: Digoxin; DMSO; saline; SC; Mice; 2002; 3 days; 7 days; 10 days; Controls received mp w/ vehicle; animal info (male, C57BL6J or RGS2 -/-, 8-18 weeks old); 0.04% DMSO used; dependence; pumps primed overnight in 37C saline; Dose (2 ug/kg/day);.

Q5204: S. J. Simmons, *et al.* Nicotinic receptor blockade decreases fos immunoreactivity within orexin/hypocretin-expressing neurons of nicotine-exposed rats. *Behav Brain Res* 2016;314(226-33

ALZET Comments: Nicotine; Saline; SC; Rat; 2001; 7 days; Controls received mp w/ vehicle; animal info (male, Sprague Dawley, adult); behavioral testing (open field); dependence; used staples (9mm); Dose (3.16 mg/kg/day free base);.

Q6657: V. Sanchez, *et al.* Long-lasting effects of adolescent oxycodone exposure on reward-related behavior and gene expression in mice. *Psychopharmacology (Berl)* 2016;233(23-24):3991-4002

ALZET Comments: Oxycodone; Saline; SC; Mice; 1004; 28 days; Dose (3 mg/kg/day); 0.9% saline used; Controls received mp w/ vehicle; animal info (Adolescent male C57Bl/6 mice); dependence; "Minipumps were selected for these experiments to maximize

drug exposure without the stress of multiple injections and to control the onset of withdrawal." pg. 3993 ;.

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

ALZET Comments: Methamphetamine; Saline; SC; Rat; 2 weeks; 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);.

Q6644: G. L. Powell, *et al.* Developmental nicotine exposure disrupts dendritic arborization patterns of hypoglossal motoneurons in the neonatal rat. *Dev Neurobiol* 2016;76(10):1125-37

ALZET Comments: Nicotine, bitartate; Saline; SC; Rat (pregnant); 28 days; Dose (6 mg/kg/day); Controls received mp w/ vehicle; animal info (Pregnant Sprague-Dawley rats); dependence;.

Q4870: V. Parikh, *et al.* Cognitive control deficits during mecamylamine-precipitated withdrawal in mice: Possible links to frontostriatal BDNF imbalance. *NEUROBIOLOGY OF LEARNING AND MEMORY* 2016;128(110-116

ALZET Comments: Nicotine hydrogen tartrate; Saline, sterile; SC; Mice; 1004; 28 days; Controls received mp w/ vehicle; animal info (male, C57BL6J, 8-10 weeks old, 20-25g); functionality of mp verified by plasma cotinine levels; behavioral testing (visual discriminations, operant training); dependence; Dose (18 mg/kg/day free base resulted in 100-150 ng/ml plasma cotinine levels);.

Q5551: E. D. Levin, *et al.* Reduction of nicotine self-administration by chronic nicotine infusion with H1 histamine blockade in female rats. *Psychopharmacology (Berl)* 2016;233(15-16):3009-15

ALZET Comments: Nicotine ditartrate, pyrilamine; Saline; SC; Rat; 2ML2, 2ML4; 2 weeks; Controls received mp w/ vehicle; Multiple pumps per animal (2); animal info (Young adult female Sprague-Dawley rats, 8 weeks old); Nicotine dependence; Chronic nicotine infusion via sc implanted osmotic minipumps is functionally similar to the zero order kinetic of steady nicotine infusion achieved by nicotine skin patches; Therapeutic indication (Nicotine dependency); Dose (Nicotine



administered for 4 weeks with 2ML4 at 2.5, 5 mg/kg/day, Pyrilamine administered for 2 weeks with 2ML2 at 25 mg/kg/day);

Q5383: M. G. Kutlu, *et al.* Impairment of contextual fear extinction by chronic nicotine and withdrawal from chronic nicotine is associated with hippocampal nAChR upregulation. *Neuropharmacology* 2016;109(341-8

ALZET Comments: Nicotine Hydrogen Tartrate Salt; Saline; SC; Mice; 1002; 11 days, 13 days; Controls received mp w/ vehicle; animal info (adult (8-10 weeks old) male C57BL6/J mice); functionality of mp verified by measurement of withdrawal, plasma levels; dose-response (pg. 342); behavioral testing (contextual fear conditioning training, retention tests, and extinction sessions); dependence; chronic nicotine and withdrawal; Dose (3.1, 6.3, or 12.6 mg/kg/day);

Q6574: J. S. Kim, *et al.* Anti-opioid Effects of RFRP-3 on Magnocellular Neuron Activity in Morphine-naïve and Morphine-treated Female Rats. *Endocrinology* 2016;157(10):4003-4011

ALZET Comments: Morphine; Saline; Rat; 2002; 10.1210/en.2016-1374; Dose (10 mg/kg/day); Controls received mp w/ vehicle; animal info (Female adult freely-cycling Sprague-Dawley rats weighing ~280 g); dependence.

Q5850: E. D. Holliday, *et al.* Long-term effects of chronic nicotine on emotional and cognitive behaviors and hippocampus cell morphology in mice: comparisons of adult and adolescent nicotine exposure. *Eur J Neurosci* 2016;44(10):2818-2828

ALZET Comments: Nicotine; Saline; SC; Mice; 1002; 12 days; Controls received mp w/ vehicle; animal info ; behavioral testing (Fear conditioning, forced swim test, elevated plus maze); dependence; Therapeutic indication (Anxiety, depression, learning, memory); Dose (12.6 mg/kg/day);

Q4834: R. Hill, *et al.* Ethanol Reversal of Tolerance to the Respiratory Depressant Effects of Morphine. *Neuropsychopharmacology* 2016;41(762-773

ALZET Comments: Buprenorphine; methadone; Saline; SC; Mice; 6 days; Controls received mp w/ vehicle; animal info (male, CD-1, 30g); behavioral testing (tail flick latencies, mouse locomotion); dependence; Dose (Buprenorphine 5 mg/kg/day; methadone 60 mg/kg/day);

Q5359: K. Gong, *et al.* GluN2B N-methyl-D-aspartate receptor and excitatory amino acid transporter 3 are upregulated in primary sensory neurons after 7 days of morphine administration in rats: implication for opiate-induced hyperalgesia. *Pain* 2016;157(1):147-58

ALZET Comments: Morphine; Ro 25-6981; Saline; SC; Rat; 2ML1; 1 week; Controls received mp w/ vehicle; animal info (Male Sprague-dawley rats, 220-250 g); functionality of mp verified by behavioral tests; good methods (pg. 148); post op. care (opiate administration using pumps); behavioral testing (Hargreaves plantar test); Dependence/tolerance induced; Opiate use; Dose (15 mg/ml Morphine, 5 mg/kg Ro 25-6981);

Q5786: G. Dezfuli, *et al.* Evidence for the role of beta2* nAChR desensitization in regulating body weight in obese mice. *Neuropharmacology* 2016;110(Pt A):165-174

ALZET Comments: Nicotine; Saline; SC; Mice; 2002; Controls received mp w/ vehicle; animal info (15 weeks old) ; pumps replaced every 2 weeks (at the end of the initial 14-day treatment period, the pump was removed and a new pump was implanted with a higher dose. This was repeated for the third and highest dose of nicotine); pumps replaced every 2 weeks (at the end of the initial 14-day treatment period, the pump was removed and a new pump was implanted with a higher dose. This was repeated for the third and highest dose of nicotine); comparison of twice daily SC injections vs mp; dose-response (18, 36, 72 mg/kg); good methods (2.3. Osmotic pump placement pg. 166); dependence; Therapeutic indication (Nicotine, body weight, food intake); Dose (18, 36, 72 mg/kg);

Q4674: P. Zanos, *et al.* Region-specific up-regulation of oxytocin receptor binding in the brain of mice following chronic nicotine administration. *NEUROSCIENCE LETTERS* 2015;600(33-37

ALZET Comments: Nicotine; SC; Mice; 2002; 14 days; Controls received mp w/ saline; animal info (male, C57BL/6J); dependence;



Q4206: E. Yildirim, *et al.* ABT-089, but not ABT-107, ameliorates nicotine withdrawal-induced cognitive deficits in C57BL/6J mice. *Behavioural Pharmacology* 2015;26(241-248)

ALZET Comments: Nicotine hydrogen tartrate; Saline; SC; Mice; 1002; 12 days; Controls received mp w/ vehicle; animal info (male, C57BL/6J, 8-12 weeks old); behavioral testing (fear conditioning, contextual and cued fear conditioning, five-choice serial reaction time task); dependence; pumps removed after 12 days.

Q4188: C. Xiao, *et al.* Nicotinic Receptor Subtype-Selective Circuit Patterns in the Subthalamic Nucleus. *Journal of Neuroscience* 2015;35(3734-3746)

ALZET Comments: Nicotine hydrogen tartrate; Saline; SC; Mice (transgenic); 1002; 2002; 7 days; 14 days; Controls received mp w/ vehicle; animal info (male, a4-GFP, 5-6 weeks old); dependence; "Nicotine or vehicle (saline) was administered to mice (5- to 6-week-old) by subcutaneously implanted osmotic minipumps (model 1002 or 2002, Alzet) for 7 or 14 d to avoid repetitive handling, which causes stress" pg 3735;.

Q4625: A. P. Varani, *et al.* Lack of GABA(B) receptors modifies behavioural and biochemical alterations induced by precipitated nicotine withdrawal. *NEUROPHARMACOLOGY* 2015;90(90-101)

ALZET Comments: Nicotine hydrogen tartrate salt; SC; Mice; 2001; 6 days; Controls received mp w/ saline; animal info (male, BALB/C, 20-30g); behavioral testing (nicotine withdrawal; locomotor activity); dependence;.

Q4619: O. V. Torres, *et al.* Nicotine Withdrawal Increases Stress-Associated Genes in the Nucleus Accumbens of Female Rats in a Hormone-Dependent Manner. *NICOTINE & TOBACCO RESEARCH* 2015;17(422-430)

ALZET Comments: Nicotine; SC; Rat; 2ML2; 14 days; Controls received sham surgery; animal info (female, Wistar, PD60-62); behavioral testing (elevated plus maze, light-dark transfer procedures); dependence;.

Q5271: T. A. Slotkin, *et al.* Prenatal drug exposures sensitize noradrenergic circuits to subsequent disruption by chlorpyrifos. *Toxicology* 2015;338(8-16)

ALZET Comments: Nicotine Bitartrate; Water, bacteriostatic; SC; Rat (pregnant dams); 2ML2; 17 days; Controls received mp w/ vehicle; animal info (pregnant Sprague-Dawley rats, 211-217g); animal info (pregnant Sprague-Dawley rats, 211-217g); dependence; Wound clips used; Dose (3 mg/kg/day);.

Q5268: P. Y. Shih, *et al.* Nicotine Dependence Reveals Distinct Responses from Neurons and Their Resident Nicotinic Receptors in Medial Habenula. *Mol Pharmacol* 2015;88(6):1035-44

ALZET Comments: Nicotine hydrogen-tartrate salt; Saline; SC; mice; 2004; 14 days; Controls received mp w/ vehicle; animal info (Adult (2-3 months old) mice; C57BL/6 wild-type); functionality of mp verified by plasma levels; functionality of mp verified by plasma levels; dependence; Dose (1 mg/kg/hr); Resultant plasma level (0.3 uM; 40 ng/ml);.

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)

ALZET Comments: Cocaine hydrochloride; Saline, sterile; SC; Rat; 2ML2; 2 weeks; 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); dependence; pumps removed after 2 weeks;.

Q4276: E. V. Radchenko, *et al.* Agonist and antagonist effects of cytosine in vivo. *NEUROPHARMACOLOGY* 2015;95(206-214)

ALZET Comments: Nicotine hydrogen tartrate; PBS; SC; Rat; 2ML2; 14 days; Controls received mp w/ saline; animal info (male, Wistar, adult); behavioral testing (locomotor activity, nicotine self administration); dependence;.

Q3955: X. L. Qi, *et al.* A critical role for the melanocortin 4 receptor in stress-induced relapse to nicotine seeking in rats. *Addiction Biology* 2015;20(324-335)

ALZET Comments: Nicotine; Saline; SC; Rat; 2ML4; 28 days; Controls received mp w/ vehicle; animal info (male, Wistar, 250-300g); dependence;.

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)



ALZET Comments: Methamphetamine; SC; Rat; 10 days; Animal info (male, Sprague Dawley, adult, 280-310g); functionality of mp verified by blood levels; dependence; cardiovascular;.

Q4539: P. P. Muldoon, *et al.* Inhibition of monoacylglycerol lipase reduces nicotine withdrawal. BRITISH JOURNAL OF PHARMACOLOGY 2015;172(869-882

ALZET Comments: Nicotine; SC; Mice; 2002; 14 days; Controls received mp w/ saline; animal info (male, ICR, 8-10 weeks old); dependence; pumps removed after 14 days;.

Q5238: P. Muelken, *et al.* A Two-Day Continuous Nicotine Infusion Is Sufficient to Demonstrate Nicotine Withdrawal in Rats as Measured Using Intracranial Self-Stimulation. PLoS One 2015;10(12):e0144553

ALZET Comments: Nicotine bitartrate; Saline, physiological; SC; Rat; 2ML2; 14 days; Controls received mp w/ vehicle; animal info (Male Wistar rats, 275–300 g); functionality of mp verified by elevations in intracranial self-stimulation; dose-response (pg 8, 9); post op. care (buprenorphine, ceftriaxone); behavioral testing (intracranial self-stimulation pg 4); Dependence, nicotine; “elevations in ICSS thresholds beginning on the second day of infusion” (Pg. 1); primed in saline for 1 hour prior to implantation; Dose (3.2 mg/kg/day);.

Q4520: D. H. Malin, *et al.* Reversal of morphine tolerance by a compound with NPFF receptor subtype-selective actions. NEUROSCIENCE LETTERS 2015;584(141-145

ALZET Comments: Morphine sulfate; SC; Rat; 2ML1; 7 days; Controls received mp w/ saline; animal info (male, Sprague Dawley, 405g); behavioral testing (tail flick apparatus); dependence;.

Q5025: R. Maayan, *et al.* Dehydroepiandrosterone Attenuates Cocaine-Seeking Behaviour Independently of Corticosterone Fluctuations. J Neuroendocrinol 2015;27(11):819-26

ALZET Comments: Corticosterone; DMSO; SC; Rat; 2002; 14 days; Controls received mp w/ vehicle; animal info (male, Sprague Dawley, 250-350g); functionality of mp verified by plasma levels; behavioral testing (lever pressing); dependence; Dose (15 mg/kg);.

Q3984: J. O. Lo, *et al.* Vitamin C supplementation ameliorates the adverse effects of nicotine on placental hemodynamics and histology in nonhuman primates. American Journal of Obstetrics and Gynecology 2015;212(U271-U278

ALZET Comments: Nicotine bitartrate; Water, bacteriostatic; SC; Monkey (macaque, pregnant); 2ML4; 134 days; Controls received mp w/ vehicle; animal info (female, Rhesus, pregnant, GD26); functionality of mp verified by blood levels; pumps replaced every 3 weeks; post op. care (cefazolin 150 mg BID); long-term study; teratology; dependence;.

Q4997: S. L. Lin, *et al.* Predicting Neuroinflammation in Morphine Tolerance for Tolerance Therapy from Immunostaining Images of Rat Spinal Cord. PLoS One 2015;10(10):e0139806

ALZET Comments: Morphine; gabapentin; CSF/CNS (intrathecal); Rat; 5 days; Controls received mp w/ saline; animal info (male, Wistar, 320-400g); behavioral testing (anti-nociceptive test;); dependence; Dose (Morphine 15 ug/h; gabapentin 15 ug/h);.

Q3979: C. P. Lin, *et al.* Role of Spinal CXCL1 (GROalpha) in Opioid Tolerance A Human-to-rodent Translational Study. Anesthesiology 2015;122(666-676

ALZET Comments: CXCL1; antibody, CXCL1; CXCR2 antileukine hexapeptide; morphine; CSF/CNS (intrathecal); Rat; 5 days; 2 days; Controls received mp w/ saline; animal info (male, Sprague Dawley, 250-275g, adult); behavioral testing (tail flick response); dependence; used PE10 intrathecal catheter tubing;.

Q4498: T. O. Lilius, *et al.* Ketamine coadministration attenuates morphine tolerance and leads to increased brain concentrations of both drugs in the rat. BRITISH JOURNAL OF PHARMACOLOGY 2015;172(2799-2813

ALZET Comments: Morphine; Saline, isotonic; SC; Rat; 2ML1; 5 days; Controls received mp w/ vehicle; animal info (male, Sprague Dawley, 300-350g); functionality of mp verified by serum levels; behavioral testing (tail flick, hot plate, rotarod test); pumps removed after 5 days; dependence;.



Q7008: M. Y. Lee, *et al.* Continuous topical drug delivery using osmotic pump in animal cochlear implant model: Continuous steroid delivery is effective for hearing preservation. *Acta Otolaryngol* 2015;135(8):791-8

ALZET Comments: Dexamethasone; Saline; Ear (cochlea); Guinea pig; 1007D; 7 days; Dose (4 mg/ml); Controls received mp w/ vehicle; animal info (female Harley Albino guinea pigs, 255–455 g, 7–9 weeks old); dependence;.

Q5219: B. G. Lee, *et al.* Effects of the BDNF Val66Met Polymorphism on Anxiety-Like Behavior Following Nicotine Withdrawal in Mice. *Nicotine Tob Res* 2015;17(12):1428-35

ALZET Comments: Nicotine hydrogen tartrate salt; Saline; SC; mice; 2002; 2 weeks; Controls received mp w/ vehicle; animal info: Mice (23–38 g; 2–4 months old); functionality of mp verified by behavior; behavioral testing (withdrawal measurements); Dependence nicotine; Dose: 18 mg /kg/day.

Q4490: P. T. Leach, *et al.* Withdrawal From Chronic Nicotine Reduces Thyroid Hormone Levels and Levothyroxine Treatment Ameliorates Nicotine Withdrawal-Induced Deficits in Hippocampus-Dependent Learning in C57BL/6J Mice. *NICOTINE & TOBACCO RESEARCH* 2015;17(690-696

ALZET Comments: Nicotine; SC; Mice; 1002; 12 days; 13 days;; Controls received mp w/ vehicle; no stress "Mice were observed to identify any adverse reactions to surgeries (none were observed)" (see pg. 692); behavioral testing (fear conditioning); dependence; pumps removed at 12 days;.

Q5018: K. J. Jackson, *et al.* Effects of orally-bioavailable short-acting kappa opioid receptor-selective antagonist LY2456302 on nicotine withdrawal in mice. *Neuropharmacology* 2015;97(270-4

ALZET Comments: Nicotine hydrogen tartrate salt; Saline; SC; Mice; 2002; 14 days; 28 days; Controls received mp w/ vehicle; animal info (male, ICR, 8-10 weeks old); behavioral testing (elevated plus maze; hyperalgesia); dependence; Dose (24 mg/kg/day);.

Q5164: B. G. Hoegberg, *et al.* Regulation of alpha4beta2alpha5 nicotinic acetylcholinergic receptors in rat cerebral cortex in early and late adolescence: Sex differences in response to chronic nicotine. *Neuropharmacology* 2015;99(347-55

ALZET Comments: Nicotine hydrogen tartrate; Saline; SC; 2002; 14 days; Controls received mp w/ vehicle; animal info: Sprague Dawley rats; dose-response (pg 350); post op. care (buprenorphine); dependence; Dose: 17 mg/kg/day.

Q4445: J. L. Hawkins, *et al.* NICOTINE STIMULATES EXPRESSION OF PROTEINS IMPLICATED IN PERIPHERAL AND CENTRAL SENSITIZATION. *NEUROSCIENCE* 2015;290(115-125

ALZET Comments: Nicotine; PBS; SC; Rat; 2ML2; 14 days; Controls received mp w/ vehicle; animal info (male, Sprague Dawley, adult, 400-500g); functionality of mp verified by cotinine levels; behavioral testing (von Frey filaments); dependence;.

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

ALZET Comments: Methamphetamine hydrochloride; Saline; SC; Rat; 2ML2; 7 days; 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;.

Q4434: K. Grasing, *et al.* Enduring effects of tacrine on cocaine-reinforced behavior: Analysis by conditioned-place preference, temporal separation from drug reward, and reinstatement. *PHARMACOLOGICAL RESEARCH* 2015;97(40-47

ALZET Comments: Tacrine; Saline; SC; Rat; 2ML1; 7 days; Controls received mp w/ vehicle; animal info (male, Wistar, 9 weeks old); behavioral testing (conditioned-place preference; locomotor activity; dependence;.

Q3907: T. F. Gamage, *et al.* Differential effects of endocannabinoid catabolic inhibitors on morphine withdrawal in mice. *Drug and Alcohol Dependence* 2015;146(7-16

ALZET Comments: Morphine; Mice; Pumps mentioned in materials and methods section; dependence;.

Q5140: J. B. de la Pena, *et al.* Cigarette smoke exposure during adolescence enhances sensitivity to the rewarding effects of nicotine in adulthood, even after a long period of abstinence. *Neuropharmacology* 2015;99(9-14



ALZET Comments: Nicotine; SC; Rat; 2ML2; 14 days; Controls received sham pumps; animal info: Male Sprague Dawley; dose-response (pg 12); behavioral testing (conditioned place preferences (CPP) and self-administration tests); dependence, nicotine; Dose: 3.2 mg/kg/day.

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

ALZET Comments: Amphetamine, D-; phenmetrazine; Saline; SC; Rat; 2001; 14 days; 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;.

Q4382: E. P. Conceicao, *et al.* Maternal nicotine exposure leads to higher liver oxidative stress and steatosis in adult rat offspring. *FOOD AND CHEMICAL TOXICOLOGY* 2015;78(52-59

ALZET Comments: Nicotine; Saline; SC; Rat (lactating); 2ML2; 14 days; Controls received mp w/ vehicle; animal info (female, Wistar, PN2); teratology; toxicology; dependence;.

Q4363: C. M. Chen, *et al.* Maternal Nicotine Exposure Induces Epithelial-Mesenchymal Transition in Rat Offspring Lungs. *Neonatology* 2015;108(179-187

ALZET Comments: Nicotine; SC; Rat; 2ML2; 2ML4; 14 days; Controls received mp w/ saline; animal info (female, Sprague Dawley); teratology; dependence;.

Q5133: V. J. Cerpa, *et al.* The Alteration of Neonatal Raphe Neurons by Prenatal-Perinatal Nicotine. Meaning for Sudden Infant Death Syndrome. *Am J Respir Cell Mol Biol* 2015;53(4):489-99

ALZET Comments: Nicotine bitartrate; saline; SC; Mice (pregnant); 2004; 28 days; Controls received mp w/ vehicle; animal info 5-7 days pregnant adult mice; dependence, nicotine; Pump delivery mimics the tendency of smokers to maintain a constant blood level of nicotine throughout the day; Dose: (60 mg kg⁻¹ day⁻¹).

Q4320: E. Barbier, *et al.* DNA Methylation in the Medial Prefrontal Cortex Regulates Alcohol-Induced Behavior and Plasticity. *JOURNAL OF NEUROSCIENCE* 2015;35(6153-6164

ALZET Comments: RG108; Cyclodextrin, 2-hydroxypropyl-b-; CSF/CNS; CSF/CNS (medial prefrontal cortex); Rat; 2002; 2004; 1 week; Controls received mp w/ vehicle; animal info (male, Wistar, 200-225g); 5% cyclodextrin used; behavioral testing (two bottle free choice; alcohol self-administration); tissue perfusion (medial prefrontal cortex); dependence;.

Q4306: S. D. Alsharari, *et al.* Effects of Menthol on Nicotine Pharmacokinetic, Pharmacology and Dependence in Mice. *PLoS One* 2015;10(U459-U474

ALZET Comments: Nicotine tartrate salt; Saline; Mice; 7 days; Controls received mp w/ vehicle; animal info (male, ICR, 20-25g, adult); functionality of mp verified by plasma levels; behavioral testing (tail-flick test; somatic signs; elevated plus-maze); dependence; pumps removed after 7 days;.

Q3798: R. M. Allen, *et al.* Continuous exposure to dizocilpine facilitates the acquisition and escalation of cocaine consumption in male Sprague-Dawley rats. *Drug and Alcohol Dependence* 2015;147(137-143

ALZET Comments: Dizocilpine; Sodium chloride; SC; Rat; 2ML2; 2ML1; 15 days; 22 days; Animal info (male, Sprague Dawley, 225-250g, 8 weeks old); stress/adverse reaction: (see pg. 139); "17 of the 66 rats used in this study were excluded from final analysis. Three rats were removed from the acquisition experiment because they repeatedly removed their minipump incision site sutures."; dependence;.