**Recent References (2015-2019) on the Administration of Nicotine Using ALZET® Osmotic Pumps**


**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;.


**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;.

**Q6079**: D. DiPalma, *et al.* Persistent attenuation of nicotine self-administration in rats by co-administration of chronic nicotine infusion with the dopamine D1 receptor antagonist SCH-23390 or the serotonin 5-HT2C agonist lorcaserin. Pharmacol Biochem Behav 2019;176(16-22)

**ALZET Comments**: Nicotine; Saline; SC; Rat; 2ML4; 4 weeks; Dose (2.5 mg/kg/day); Controls received mp w/ vehicle; animal info (young adult female Sprague-Dawley rats, aged 66–72 days with an average weight of 210 g); post op. care (ketoprofen (5 mg/kg, s.c.); topical bupivacaine); behavioral testing (lever press);.


**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;.


**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;.


**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;.


**ALZET Comments**: Nicotine; Saline; SC; Mice; 2004; 1 or 6 months; Dose (0.4 mg/kg/h and 2.0 mg/kg/h); dose-response (); dose-response (); pumps replaced every 4 weeks; long-term study; stress/adverse reaction: Mice treated with the higher nicotine dose (2.0 mg/kg/h) lost weight after surgery and 50% died after one week. This was as a result of combined toxic effects of isoflurane and a higher dose of nicotine. Therefore, pentobarbital was used instead of isoflurane for induction of anesthesia, which reduced the mortality rate and improved weight gain in the higher dose group. (see pg. 172);.

**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;.
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.;

ALZET Comments: Nicotine; Saline; SC; Rat; 7 days; Dose (2 mg/kg/day); Controls received mp w/ vehicle; animal info (Male Sprague-Dawley rats).;

ALZET Comments: Nicotine; Saline; SC; Rat; 2ML4; Dose (6 mg/kg/day); Controls received mp w/ vehicle; animal info (female Sprague-Dawley dams);

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

ALZET Comments: Nicotine; Saline; SC; Mice; 1004; 14 days; Dose (1 mg/kg/hr); 9% NaCl used; animal info (male C57BL/6 mice, 6–8 weeks of age);

ALZET Comments: Nicotine hydrogen tartrate; Saline; SC; Rat (pregnant); 4 weeks; Dose (6 mg/kg/day); Controls received mp w/ vehicle; animal info (pregnant female Sprague–Dawley rats); minipumps released nicotine for 4 weeks from gestational day 6 to postnatal day 14;

ALZET Comments: Nicotine hydrogen tartrate; Saline; SC; Mice; 2002; 14 days; Dose (24 mg/kg/day); Controls receiveJacksod mp w/ vehicle; animal info (8 week old ICR male mice);

ALZET Comments: Nicotine; Saline; SC; Rat; 2006; Controls received mp w/ vehicle; animal info (3-month old Wistar rats);

ALZET Comments: Nicotine; Saline; SC; Rat; 2ML4; 28 days; Dose (3 mg/kg/day); 0.9% sterile saline solution used; Controls received mp w/ vehicle; animal info (male Long Evans rats); post op. care (NSAID analgesic, an antibiotic);

ALZET Comments: Nicotine hydrogen tartrate; Saline; SC; Rat; 2ML2; 16 days; Dose (4.5 mg/kg/day); animal info (Adult female, Sprague-Dawley, 290 g, 6-7 months old); ischemia (Nicotine-induced);
ALZET Comments: Nicotine hydrogen tartrate; Saline; SC; Rat; 2ML2; 16-21 days; Dose (4.5 mg/kg/day); Controls received mp w/ vehicle; animal info (adult female Sprague–Dawley rats); ischemia (brain);.

ALZET Comments: Nicotine; Saline; SC; Rats; 2ML1; 1 week; Dose (9 mg/kg/day); 0.9% Saline used; Controls received mp w/ vehicle; animal info (Male, Sprague-Dawley, 6 weeks old, 200-250 g); behavioral testing (Open Field Test); Brain coordinates (3.8 mm posterior to bregma, 2.5 mm lateral to midline,); neurodegenerative (Concussion);.

ALZET Comments: Nicotine hydrog tartrate salt; Saline; Saline; 2ML2; 1004; 14 days; 0.9% saline used; animal info (Adult, male and female, Wistar rats); post op. care (analgesic flunixin- 2.5 mg/kg); dependence; .

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;.

ALZET Comments: Nicotine; SC; Rat; 2ML1; 7 days; Controls received mp w/ vehicle; animal info (male, Sprague Dawley, 300-350g, adult); behavioral testing (open fiel chambers); dependence; Dose (3.15 mg/kg/day);.

ALZET Comments: Nicotine hydrogen tartrate; Saline; SC; Mice; 2002; 14 days; Controls received mp w/ vehicle; animal info (male mice 20 g, 5–7 weeks old); Dose (48 mg/kg/d);.

ALZET Comments: Nicotine tartrate; PBS; SC; Mice; 2004; 28 days; Controls received mp w/ vehicle; animal info (female, BALB/c, 10 weeks old); post op. care (clips were removed 7-10 days post operation); immunology; “Subcutaneous osmotic pumps containing nicotine tartrate salt produces a stable plasma nicotine concentration that has long been utilized in the field of neuroscience for the study of chronic nicotine effects” pg L517; Used Reflex wound clips (2-3 per mouse); Dose (24 mg/kg/day); Used Reflex clips; wound clips removed 7-10 days postop;.

ALZET Comments: Nicotine Hydrogen Tartate; SC; Rat (pregnant); 2006; 6 weeks; Dose (4 mg/kg/day); animal info (timed-pregnant Sprague Dawley (SD) rats); comparison of injections vs mp;.

ALZET Comments: Nicotine tartrate; Saline; SC; Rat (pregnant); 2ML4; Controls received mp w/ vehicle; animal info (female, Sprague Dawley, GD6); post op. care (single housed; heating pads); teratology; “To test our hypothesis, we combined a maternal nicotine infusion model that achieves high levels of plasma nicotine and cotinine without causing fetal loss or changes in birth weight.” pg 1072; Used wound clips; Dose (6 mg/kg/day);.
Q6526: A. Vivekanandarajah, et al. Intermittent hypercapnic hypoxia effects on the nicotinic acetylcholine receptors in the developing piglet hippocampus and brainstem. Neurotoxicology 2017;60(23-33

ALZET Comments: Nicotine Hydrogen Tartrate Salt; Water (sterile); IP; Pig (neonate); 2ML2; 14 days; Dose (2.0 mg/kg/day); animal info (mixed-breed miniature piglets); comparison of patch vs mp; Resultant plasma level (serum cotinine: 23.1 +17.3 ng/mL); “The use of an osmotic minipump as opposed to a skin patch was chosen as the method of nicotine delivery given it provides a steady state, same dose, infusion over our 14 day study whereas patches result in sudden spikes in plasma levels and require replacement of patches every 1–2 days dependent on chosen patch ” pg. 2.:


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, β2−/− and β4−/− mice); pumps replaced every 4 weeks; Resultant plasma level (10 to 50 ng/ml); dependence;.


ALZET Comments: Nicotine; Saline; SC; Rat (neonate); 2ML4; 6 days; Dose (4 ug/kg/min); Controls received mp w/ vehicle; animal info (pregnant Sprague-Dawley rats);}


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;.


ALZET Comments: Nicotine salt; PBS; SC; Mice; 1004; Dose (13 mg of nicotine free base/kg/day); Controls received mp w/ vehicle; animal info (C57BL/6J mice); Resultant plasma level (~49 ng/ml or ~300 nM);.


ALZET Comments: Nicotine; PBS; SC; Mice; 2006; 42 days; Dose (15 mg/kg/day); Controls received mp w/ vehicle; animal info (male DBA/1J mice);.


ALZET Comments: Nicotine; Saline; SC; Rat (pregnant); 2ML4; 6 days; Dose (4 ug/kg/min); Controls received mp w/ vehicle; animal info (pregnant Sprague-Dawley rats); cardiovascular;.


ALZET Comments: Nicotine hydrogenn tartrate; Saline; SC; Rat (pregnant); 4 weeks; Dose (0.6 mg/kg/day); Controls received mp w/ vehicle; animal info (pregnant Sprague–Dawley rats);.


ALZET Comments: Nicotine; Saline; SC; Rat; 2006; 6 weeks; Dose (12 mg/kg/day); Controls received mp w/ vehicle; animal info (Six-week-old male Wistar rats);
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;.

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;.

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

Q6137: J. Huang, et al. Hypoxia and nicotine effects on Pituitary adenylate cyclase activating polypeptide (PACAP) and its receptor 1 (PAC1) in the developing piglet brainstem. Neurotoxicology 2017;62(30-38
ALZET Comments: Nicotine; Water; IP; Pig; 2ML2; 14 days; Dose (2 mg/kg/day); Controls received mp w/ vehicle; “The delivery of nicotine via the minipump provides a steady state infusion over our 14 day study whereas other methods result in sudden spikes in plasma levels (reviewed by Shiffman et al., 2005) and require more animal handling and stress.” pg. 31;.

ALZET Comments: Nicotine; SC; Mice; 2002; 12 days; Dose (7 mg/kg/day); animal info (Adult male C57BL/6 mice); Resultant plasma level (~0.3 μM);.

ALZET Comments: Nicotine; Saline; SC; Mice; 12 days; Dose (12.6 mg/kg/day and 6.3 mg/kg/day); animal info (Male C57BL/6j mice); behavioral testing (mice were trained in trace fear conditioning after 24 h abstinence and tested 24 h after training);.


ALZET Comments: Nicotine; Saline; SC; Rat (pregnant); 1007D; 28 days; Controls received mp w/ vehicle; animal info (Implanted at gestational day 5); half-life 20-24 hrs (p.255); Therapeutic indication (AMPA, Hypoglossal nucleus, Nicotine, Desensitization, developmental nicotine exposure); Dose (6 mg/kg/day).


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.


ALZET Comments: Nicotine hydrochloride tartrate; Saline, physiological; SC; Mice; 2002; 14 days; Dose (12 and 24 mg/kg/day); animal info (8-week-old male C57BL/6J and beta2 KO mice).


ALZET Comments: Nicotine; mecamylamine; methyllycaconitine; SC; Rat (pregnant); 2004; 28 days; Controls received mp w/ vehicle; animal info (female, Sprague Dawley, 250-300g); pumps replaced on GD7; Multiple pumps per animal (2); no stress (see pg. 110-111); teratology; Dose (nicotine 6 mg/kg/day; mecamylamine 0.03 mg/kg/day; methyllycaconitine 3 mg/kg/day).

Q5113: L. Zhao, et al. Bronchopulmonary C-fibers' IL1RI contributes to the prolonged apneic response to intra-atrial injection of capsaicin by prenatal nicotinic exposure in rat pups. Toxicol Appl Pharmacol 2016;303(58-64

ALZET Comments: Nicotine; methyllycaconitine; Saline; SC; Rat; 2004; 28 days; Controls received mp w/ vehicle; animal info (female, Sprague Dawley, 250-350g); pumps replaced every 28 days; Multiple pumps per animal (2); long term study; teratology; MLA is an a7nAChR antagonist; methyllycaconitine aka MLA; Dose (nicotine 6 mg/kg/day; MLA 3 mg/kg/day).


ALZET Comments: Nicotine; SC; Rat; 2004; 28 days; Controls received mp w/ vehicle; animal info (female, Sprague Dawley, 250-350g); pumps replaced every 21 days; teratology; Dose (6 mg/kg/day).


ALZET Comments: Nicotine bitartrate; saline; sc; Rat (PREGNANT); Controls received mp w/ vehicle or sham surgery; animal info (female, Sprague Dawley, GD5); no stress (see pg. 1141); teratology; Dose (6 mg/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).


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

ALZET Comments: Nicotine hydrogen tartrate; Saline, sterile; SC; Mice; 1004; 28 days; Controls received mp w/ vehicle; animal info (male, C57BL6/J, 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);

Q4869: C. C. P. a. S. M. Miraglia. Prenatal and lactation nicotine exposure affects Sertoli cell and gonadotropin levels in rats. REPRODUCTION 2016;151(117-133

ALZET Comments: Nicotine hydrogen tartrate salt; Water, bacteriostatic; SC; Rat (pregnant; lactating); 2ML4; 4 weeks; Controls received mp w/ vehicle; animal info (GD1); pumps replaced after birth; no stress (see pg. 123); cyanoacrylate adhesive; “There were no cases of stillbirth, birth defects, or other signs of toxicity that could be attributed to nicotine. Behavioral changes in the rat dams that could be attributed to the stress caused by the osmotic minipump implant were also not evidenced. Body weights were obtained at every chosen age of killing and no differences were found when nicotine and control groups were compared, at any ageequivalent subgroup. The” pg 123; Dose (2 mg/kg/day);


ALZET Comments: Nicotine; Saline; SC; Rat; 4 weeks; Controls received mp w/ saline; animal info (male, Sprague Dawley, 250-300g); ischemia (cerebral); “The subcutaneous osmotic minipump releases nicotine at a constant rate, which resulted in stable plasma nicotine and cotinine levels that match the chronic smokers. The doses of nicotine used in the present study have been reported to result in stable plasma nicotine levels corresponding reasonably well with plasma levels in habitual light (0.5–1 pack/day) and moderate (2 packs/day) smokers” pg 331; traumatic brain injury; Dose (2 or 4 mg/kg/day);


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);


ALZET Comments: Nicotine Hydrogen Tartrate Salt; Saline; SC; Mice (lactating); Rat; 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);


ALZET Comments: Nicotine; Saline; SC; Mice (lactating); Rat; 1002; 2ML2; 14 days; Dose (21 mg/kg/day for mice and 6 mg/kg/day for rats); Controls received mp w/ vehicle; behavioral testing (Elevated plus maze test; object location and recognition memory tasks); Plasma half-life of nicotine in mice is 6–9 min; in rats it is about 54 min (p.14);

ALZET Comments: Nicotine; Saline; SC; Rat (lactating); 2ML2; 14 days; animal info (female, Sprague Dawley, ); teratology; Dose (6 mg/kg/day).

ALZET Comments: Nicotine; Saline; SC; Rat; 2006; 40 days; Controls received mp w/ vehicle; animal info (female, Wistar, 3 months old, 266+/-6.5g); pumps replaced after 40 days; Dose (6 mg/kg/day).

ALZET Comments: Nicotine hydrogen tartrate salt; Water; SC; Pig (mini); 2ML2; 14 days; Controls received mp w/ vehicle; animal info (male mixed breed miniature piglets, postnatal day 2, 1.27 kg); functionality of mp verified by brain analysis; toxicology; Chronic postnatal nicotine and intermittent hypercapnic hypoxia (IH); Dose (2 mg/kg/day).

ALZET Comments: Nicotine; Saline; SC; Mice; 2002; Controls received mp w/ vehicle; animal info (1 month old); comparison of twice daily SC injections vs mp; Dose (15 mg/kg/day).

ALZET Comments: Nicotine, Angiotensin II; Saline; SC; Mice; 2004; 28 days; Controls received mp w/ vehicle; animal info (15 weeks old) ; stress/adverse reaction: Nicotine plus AngII cotreatment induced the formation of aortic aneurysms in 6 out of 12 mice (Figure 2(a)), two of which died on the 7th and 11th day after implantation of the pump. Autopsy indicated that the two mice had died of aneurysm rupture. (see pg. 4 ); Therapeutic indication (AAA, Abdominal aortic aneurysm); Dose (4 mg/kg/day).

ALZET Comments: Nicotine; SC; Mice (knockout); 1002; Controls received mp w/ vehicle; animal info (14 days); Dose (6 mg/kg/day).
ALZET Comments: Nicotine hydrogen tartrate; Saline; SC; Rat (pregnant); 2006; 6 weeks; Dose (4 mg/kg/day); animal info (Sprague Dawley pregnant dams weighing 200-250g); comparison of injections vs mp.;

ALZET Comments: Nicotine; SC; Rat; 2ML4; Controls received mp w/ vehicle; animal info (female, Sprague Dawley, 250-350g); pumps replaced on 7th day of gestation; teratology;

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;

ALZET Comments: Nicotine; Saline; SC; Rat (pregnant); 2ML2; 14 days; Controls received mp w/ vehicle; animal info (Wistar rats, pregnant); functionality of mp verified by plasma levels; Pumps primed for 24 hrs; Resultant plasma level (cotinine 25 ng/ml); Dose (6 mg/kg/d);

ALZET Comments: Nicotine hydrogen tartrate; Saline; SC; Mice; 1002; 12 days; Controls received mp w/ vehicle; animal info (male, C57BL6J, 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.

ALZET Comments: Nicotine; Saline; SC; Rat (pregnant); 7 days; Control animals received mp w/vehicle; animal info (Sprague Dawley, female).

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;

Q4649: Y. Wu, et al. Activation of AMPKalpha2 in adipocytes is essential for nicotine-induced insulin resistance in vivo. NATURE MEDICINE 2015;21(373-+ 
ALZET Comments: Nicotine; Saline; SC; Mice; Rat; 4 weeks; 6 weeks; Controls received mp w/ vehicle; animal info (mice male, C57BL6J, 8 weeks old; rat male, Sprague Dawley, 10 weeks old); diabetes;

ALZET Comments: Nicotine Hydrogen Tartrate; water; IP; Pig (mini); 2ML2; 14 days; Controls received mp w/ vehicle; animal info (piglets); functionality of mp verified by blood and urine samples; toxicityology; Dose (2 mg/kg/d); Resultant plasma level (20.3 ± 2.5 ng/mL);
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.

ALZET Comments: Nicotine hydrogen tartrate; Saline; SC; Mice; 2004; 28 days; Controls received mp w/ vehicle; animal info (male, 12-18 weeks old); cardiovascular; pumps removed after 28 days; used wound clips.

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).

ALZET Comments: Nicotine; Water, bacteriostatic; SC; Rat; 2ML2; Controls received mp w/ vehicle; animal info (female, pregnant, Sprague Dawley); teratology; used wound clips.

ALZET Comments: Nicotine; tobacco smoke extract; DMSO; Rat; 2ML4; 28 days; Controls received mp w/ vehicle; animal info (female, non-pregnant, adult, Sprague Dawley); functionality of mp verified by plasma nicotine levels; dose-response (pg 181); teratology; Dose (Nicotine free base 0.2 or 2 mg/kg/day; TSE 0.18 mg/kg/day).

Q4104: T. A. Slotkin, et al. Prenatal nicotine alters the developmental neurotoxicity of postnatal chlorpyrifos directed toward cholinergic systems: Better, worse, or just "different"? Brain Research Bulletin 2015;110(54-67
ALZET Comments: Nicotine; Water, bacteriostatic; SC; Rat; 2ML2; Controls received mp w/ vehicle; animal info (female, pregnant, Sprague Dawley); teratology; "dosage determined by the initial body weights of the dams (215 ± 2 g);control pumps contained bacteriostatic water and equivalent con-centrations of sodium bitartrate. Because weights increased with gestation, the dose rate fell accordingly to 2 mg/kg/day, but the dose rates remained well within the range that produces nicotine plasma levels " pg 55; used wound clips.

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).

ALZET Comments: Nicotine bitartrate; Water, bacteriostatic; SC; Rat; 2004; 28 days; Controls received mp w/ vehicle; animal info: female Long Evans rats; functionality of mp verified by behavioral test; dose-response (pg 43-44); neurodegenerative (learning impairments); behavioral testing (serial multiple choice); effects of adolescent nicotine exposure on learning in adulthood; anesthetized under isoflurane; Dose: 0.033 mg/h.
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.

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

ALZET Comments: Nicotine bitartrate; SC; Rat (pregnant); Controls received mp w/ saline; animal info (Sprague Dawley, GD5); functionality of mp verified by plasma cotinine levels; teratology.

ALZET Comments: Nicotine; Saline; SC; Rat (lactating); 2ML2; 14 days; Controls received mp w/ vehicle; animal info (female, Wistar, PN2); Dose (6 mg/kg/day); Resultant plasma level (cotinine dams serum 239 ng/ml and in milk 226 ng/ml; cotinine levels in 15 days old pumps 20 ng/ml).

ALZET Comments: Nicotine; Saline; SC; Rat (lactating); 2ML2; 14 days; animal info (female, Wistar, PN2); behavioral testing (food preference); “Exposure to nicotine through subcutaneous osmotic minipump infusion was used to avoid the adverse effects of nicotine peaks” pg 132; Dose (6 mg/kg/day); Resultant plasma level (25 ng/ml, “similar to those found in typical smokers”).

Q4544: S. Nakauchi, et al. Early postnatal nicotine exposure causes hippocampus-dependent memory impairments in adolescent mice: Association with altered nicotinic cholinergic modulation of LTP, but not impaired LTP. NEUROBIOLOGY OF LEARNING AND MEMORY 2015;118(178-188)
ALZET Comments: Nicotine; SC; Mice (pregnant); 15 days; Controls received mp w/ saline; animal info (C57BL6, pregnant); behavioral testing (object location, object recognition memory task, elevated-plus maze; teratology).

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.

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).

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.

Q4495: J. Y. Li, et al. Exposure to Nicotine During Pregnancy and Altered Learning and Memory in the Rat Offspring. NICOTINE & TOBACCO RESEARCH 2015;17(661-666

ALZET Comments: Nicotine; SC; Rat (pregnant); 2ML4; Controls received mp w/ saline; animal info (female, Sprague Dawley, GD4, 300-350g); behavioral testing (morris water maze, escape latency, cross-platform); teratology.


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.


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).


ALZET Comments: Nicotine hydrogen tartrate; Saline; SC; Mice; 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.

Q4422: Z. Gao, et al. NICOTINE MODULATES NEUROGENESIS IN THE CENTRAL CANAL DURING EXPERIMENTAL AUTOIMMUNE ENCEPHALOMYELITIS. NEUROSCIENCE 2015;297(11-21

ALZET Comments: Nicotine ditartrate; Saline; SC; Mice; 2004; 28 days; Controls received mp w/ vehicle; animal info (C57BL6); functionality of mp verified by serum cotinine levels; immunology.

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. Neupharmacology 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.

Q4382: E. P. Concejiao, 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;.


ALZET Comments: Nicotine hydrogen tartrate; Saline; SC; Mice; 1004; 28 days; Controls received mp w/ vehicle; animal info (B2 +/-); functionality of mp verified by cotinine ELISA; behavioral testing (visual discrimination, strategy set-shifting, reversal learning);.


ALZET Comments: Nicotine tartrate; Saline, sterile; SC; Rat (pregnant); 2ML2; 2ML4; 14 days; Controls received mp w/ vehicle; animal info (female, Sprague Dawley, pregnant, GD7); teratology; used sutures;.


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


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).


ALZET Comments: Nicotine; ABT-107; DMXB; Rat; 2006; Control animals received mp w/ vehicle; animal info (male, Sprague Dawley, 120-140 g); neurodegenerative (Parkinson’s disease).

Q4322: S. Barreda, et al. Developmental nicotine exposure adversely effects respiratory patterning in the barbiturate anesthetized neonatal rat. RESPIRATORY PHYSIOLOGY & NEUROBIOLOGY 2015;208:45-50

ALZET Comments: Nicotine bitartrate; Saline; SC; Rat; 2ML4; 28 days; Controls received mp w/ vehicle; animal info (female, Sprague Dawley, embryonic day 5); post op. care (antibiotics Pen-48, Buprenex 0.5 mg/kg BID); teratology;.


ALZET Comments: Nicotine bitartrate; Water; SC; Mice; 1002; 14 days; Animal info (female, a4 nAChR KO or WT, embryonic day14); teratology;.


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;.