



**Recent References (20120-2017) on Teratology Research  
Using ALZET® Osmotic Pumps**

**Q5905:** M. von Chamier, *et al.* Impact of gestational nicotine exposure on intrauterine and fetal infection in a rodent model. *Biol Reprod* 2017;96(5):1071-1084

**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);.

**Q5993:** P. Svitok, *et al.* Prenatal exposure to angiotensin II increases blood pressure and decreases salt sensitivity in rats. *Clin Exp Hypertens* 2017;39(6):489-494

**ALZET Comments:** Angiotensin II; SC; Rat (pregnant); 2002; 2 weeks; Controls received mp w/ vehicle; animal info (pregnant); teratology; Dose (2 ug/kg/hr);.

**Q5690:** B. Carusillo Theriault, *et al.* Cerebral microbleeds in a neonatal rat model. *PLoS One* 2017;12(2):e0171163

**ALZET Comments:** Endotoxin, LPS; IV (jugular); Rat (pregnant); 2001D; 24 hours; animal info (female, Wistar E19); ischemia (intrauterine); no stress (see pg. 4 "No mortality was experienced for dams undergoing the above protocol"); behavioral testing (Righting Reflex, negative geotaxis, open field, elevated plus maze, Morris water maze, balance beam); teratology; Dose (600 ng/hr); Resultant plasma level (4.5 EU/mL after 16 hours of infusion);.

**R0347:** A. Ziv-Gal, *et al.* Evidence for bisphenol A-induced female infertility: a review (2007-2016). *Fertil Steril* 2016;106(4):827-56

**ALZET Comments:** Bisphenol A; Mice; monkey; 24, 28 days; animal info (mice CD-1, GD8-PND16; monkey African green); teratology; Dose (mice 25 ug/kg/day; monkey 50 ug/kg/day);.

**Q5114:** S. Zhao, *et al.* A proteomic study on liver impairment in rat pups induced by maternal microcystin-LR exposure. *Environ Pollut* 2016;212(197-207

**ALZET Comments:** Microcystin-LR; Saline; IP; Rat (pregnant); 2004; 4 weeks; Controls received mp w/ vehicle; animal info (Sprague Dawley, 12 weeks old, GD8); teratology; teratology; microcystin-LR aka MCLR; Dose (10 ug/kg/day); "It should be noted that the actual delivered dose of MCLR decreased as the pregnancy progressed because the weight of the mother at GD8 was used to calculate the MCLR dose, and the body weight increased from this point throughout pregnancy." pg 198.

**Q4920:** L. Zhao, *et al.* Prenatal nicotinic exposure upregulates pulmonary C-fiber NK1R expression to prolong pulmonary C-fiber-mediated apneic response. *Toxicol Appl Pharmacol* 2016;290(107-15

**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  $\alpha 7nAChR$  antagonist; methyllycaconitine aka MLA; Dose (nicotine 6 mg/kg/day; MLA 3 mg/kg/day);.

**Q5513:** L. Zhao, *et al.* From the Cover: Prenatal Nicotinic Exposure Attenuates Respiratory Chemoreflexes Associated With Downregulation of Tyrosine Hydroxylase and Neurokinin 1 Receptor in Rat Pup Carotid Body. *Toxicol Sci* 2016;153(1):103-11

**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);.



**Q5491:** L. B. Wollman, *et al.* Developmental nicotine exposure alters cholinergic control of respiratory frequency in neonatal rats. *Dev Neurobiol* 2016;76(10):1138-49

**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);.

**Q5211:** O. O. Talton, *et al.* Maternal Hyperleptinemia Improves Offspring Insulin Sensitivity in Mice. *Endocrinology* 2016;157(7):2636-48

**ALZET Comments:** Leptin; Saline; SC; Mice (pregnant); 2004; Controls received mp w/ vehicle; animal info (female, WT); stress/adverse reaction: (see pg. 2645); teratology; diabetes; Dose (350 ng/h);.

**Q5684:** Y. L. Tain, *et al.* Maternal melatonin or N-acetylcysteine therapy regulates hydrogen sulfide-generating pathway and renal transcriptome to prevent prenatal N(G)-Nitro-L-arginine-methyl ester (L-NAME)-induced fetal programming of hypertension in adult male offspring. *Am J Obstet Gynecol* 2016;215(5):636 e1-636 e72

**ALZET Comments:** L-NAME; SC; Rat (pregnant); Controls received mp w/ saline; animal info (female, Sprague Dawley); teratology; cardiovascular; Bp measured using tail cuff; Bp measured using tail cuff; Dose (60 mg/kg/day);.

**Q5396:** W. Ling, *et al.* In Utero Bisphenol A Exposure Induces Abnormal Neuronal Migration in the Cerebral Cortex of Mice. *Front Endocrinol (Lausanne)* 2016;7(7

**ALZET Comments:** Bisphenol A; IP; Mice (pregnant); 1007D; 4 days; Controls received mp w/ vehicle; animal info (pregnant ICR mice); dose-response (embryo); teratology; Therapeutic indication (teratogen, brain development); Dose (0, 40, 400 ug/kg); embryonic brain development during pregnancy.

**Q4810:** Kang Chen, *et al.* Early postnatal nicotine exposure disrupts the  $\alpha 2^*$  nicotinic acetylcholine receptor-mediated control of oriens-lacunosum moleculare cells during adolescence in rats. *Neuropharmacology* 2016;101(57-67

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

**Q4807:** Jayne C. Charnock, *et al.* The impact of a human IGF-II analog ([Leu27]IGF-II) on fetal growth in a mouse model of fetal growth restriction. *Am J Physiol Endocrinol Metab* 2016;310):E24-E31

**ALZET Comments:** Insulin-like growth factor 2, Leu27; HCl; SC; 5 days; Controls received mp w/ vehicle; animal info (female, eNOS -/-, E12.5); teratology; Dose (1 mg/kg/day); noted using "100ul miniosmotic pump (200D)" pgE25;.

**Q4827:** S. Gizurason, *et al.* Placental Protein 13 Administration to Pregnant Rats Lowers Blood Pressure and Augments Fetal Growth and Venous Remodeling. *Fetal Diagnosis and Therapy* 2016;39(56-63

**ALZET Comments:** Placental protein 13; SC; Rat (pregnant); 2ML1; 1 week; Controls received mp w/ mutant PP13 ?(DelT221) or saline; animal info (female, Sprague Dawley, 12 weeks old, GD8); teratology; cardiovascular; bp measured using tail cuff; Dose (0.625 ng/hour); Industry authored (Telemarpe Ltd.);.

**Q5631:** K. Bravo, *et al.* Perinatal Fluoxetine Exposure Impairs the CO<sub>2</sub> Chemoreflex. Implications for Sudden Infant Death Syndrome. *Am J Respir Cell Mol Biol* 2016;55(3):368-76

**ALZET Comments:** Fluoxetine; DMSO; SC; Mice (pregnant); 2004; Controls received mp w/ vehicle (dimethyl sulfoxide 40%); animal info (CF-1 mice: 5-7 days of gestation); functionality of mp verified by Plasma fluoxetine concentration determined by HPLC with a diode array detector; 40% DMSO used; teratology; "Delivering fluoxetine by osmotic minipumps was less stressful for dams than were oral gavages or injections; this avoided maternal stress, which has consequences on fetal brain development. The plasma concentration of fluoxetine in dams was similar to the reported plasma level in patients under fluoxetine treatment" pg 372; Therapeutic indication (Hypercapnia; respiration); Dose (7 mg/kg/day);.

**Q4832:** Achikam Haima, *et al.* The effects of gestational stress and Selective Serotonin reuptake inhibitor antidepressant treatment on structural plasticity in the postpartum brain — A translational model for postpartum depression. *Hormones and Behavior* 2016;77(124-131



**ALZET Comments:** Citalopram HBr; Saline; SC; Rat; 2ML4; 21 days; Controls received mp w/ vehicle; animal info (female, Sprague-Dawley, GD); functionality of mp verified by residual volume; post op. care (ibuprofen 15 mg/kg in drinking water for 7 days); post op. care (ibuprofen 15 mg/kg in drinking water for 7 days); teratology; Therapeutic indication (post partum stress); Dose (10 mg/kg/day);.

**Q4263:** J. G. Zhuang, *et al.* Prenatal nicotinic exposure augments cardiorespiratory responses to activation of bronchopulmonary C-fibers. AMERICAN JOURNAL OF PHYSIOLOGY-LUNG CELLULAR AND MOLECULAR PHYSIOLOGY 2015;308(L922-L930)

**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;.

**Q4270:** S. J. Zhao, *et al.* A proteomic analysis of prenatal transfer of microcystin-LR induced neurotoxicity in rat offspring. Journal of Proteomics 2015;114(197-213)

**ALZET Comments:** Microcystin-LR; Saline; SC; Rat; 2004; 28 days; Controls received mp w/ vehicle; animal info (female, Sprague Dawley, GD8); teratology;.

**Q4123:** Y. L. Tain, *et al.* Maternal Citrulline Supplementation Prevents Prenatal N(G)-Nitro-L-Arginine-Methyl Ester (L-NAME)-Induced Programmed Hypertension in Rats. Biology of Reproduction 2015;92(U27-U33)

**ALZET Comments:** L-NAME; SC; Rat (pregnant); Animal info (female, Sprague Dawley, 10 weeks old); teratology; cardiovascular;.

**Q4602:** Y. L. Tain, *et al.* Transcriptome Analysis in Rat Kidneys: Importance of Genes Involved in Programmed Hypertension. INTERNATIONAL JOURNAL OF MOLECULAR SCIENCES 2015;16(4744-4758)

**ALZET Comments:** L-NAME; SC; Rat (pregnant); Controls received mp w/ saline, iso-osmotic; animal info (female, Sprague Dawley); teratology; cardiovascular; bp measured using tail cuff;.

**Q4592:** P. Standen, *et al.* Maternal insulin-like growth factor 1 and 2 differentially affect the renin-angiotensin system during pregnancy in the guinea pig. GROWTH HORMONE & IGF RESEARCH 2015;25(141-147)

**ALZET Comments:** Insulin-like growth factor-1; insulin-like growth factor 2; Acetic acid; SC; Guinea pig; 2002; 18 days; Controls received mp w/ vehicle; animal info (GD20); teratology; cardiovascular;.

**Q4800:** K. B. a. T. E. Spencer. Biological Roles of Interferon Tau (IFNT) and Type I IFN Receptors in Elongation of the Ovine Conceptus1. Biology of Reproduction 2015;92(2)(47):1-10

**ALZET Comments:** oligonucleotides, antisense morpholino; PBS; Intrauterine; Sheep (ewe, pregnant); 2ML1; 7 days; Controls received mp w/ control oligonucleotides; animal info (female, Columbia Rambouillet); teratology; cyanoacrylate adhesive; used vinyl catheter tubing (0007760) to cannulate uterine lumen; pump affixed to mesosalpinx using cyanoacrylate glue;.

**Q4105:** T. A. Slotkin, *et al.* Prenatal nicotine changes the response to postnatal chlorpyrifos: Interactions targeting serotonergic synaptic function and cognition. Brain Research Bulletin 2015;111(84-96)

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

**Q4937:** T. A. Slotkin, *et al.* Developmental Neurotoxicity of Tobacco Smoke Directed Toward Cholinergic and Serotonergic Systems: More Than Just Nicotine. Toxicol Sci 2015;147(1):178-89

**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 ( $215 \pm 2$  g); control pumps contained bacteriostatic water and equivalent concentrations 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.

**Q4936:** S. P. Singh, *et al.* HIF-1alpha Plays a Critical Role in the Gestational Sidestream Smoke-Induced Bronchopulmonary Dysplasia in Mice. PLoS One 2015;10(9):e0137757

**ALZET Comments:** Mecamylamine; Saline, sterile; SC; Mice; 2006; animal info (3-4 month sold); teratology;

**Q4282:** I. Rayen, *et al.* Developmental exposure to SSRIs, in addition to maternal stress, has long-term sex-dependent effects on hippocampal plasticity. PSYCHOPHARMACOLOGY 2015;232(1231-1244

**ALZET Comments:** Fluoxetine; Propylenediol; saline; SC; Rat; 2ML4; 4 weeks; Controls received mp w/ vehicle; animal info (female, Sprague Dawley, adult, 250-300g); 50% propylenediol used; teratology; "These implants also reduced the effect of stress associated with repeated injections or oral gavage." pg 1233;

**Q4568:** G. L. Powell, *et al.* Influence of developmental nicotine exposure on spike-timing precision and reliability in hypoglossal motoneurons. JOURNAL OF NEUROPHYSIOLOGY 2015;113(1862-1872

**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;

**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;

**Q4521:** G. Maneenil, *et al.* Oral, Nasal and Pharyngeal Exposure to Lipopolysaccharide Causes a Fetal Inflammatory Response in Sheep. PLoS One 2015;10(U1091-U1101

**ALZET Comments:** Endotoxin, LPS; Oral cavity; Sheep (ewe); 1 day; 6 days; Controls received mp w/ saline; animal info (Merino); teratology; immunology;

**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;

**Q3978:** R. Lim, *et al.* Activin and NADPH-oxidase in preeclampsia: insights from in vitro and murine studies. American Journal of Obstetrics and Gynecology 2015;212(U456-U467

**ALZET Comments:** Activin A, recombinant human; SC; Mice; 2001; Controls received mp w/ saline; animal info (female, C57BL6, 8-10 weeks old, GD10); functionality of mp verified by plasma levels; teratology; preeclampsia model;

**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;

**Q4485:** S. Kumar, *et al.* Role of Lipocalin-type prostaglandin D(2) synthase (L-PGDS) and its metabolite, prostaglandin D(2), in preterm birth. PROSTAGLANDINS & OTHER LIPID MEDIATORS 2015;118(28-33



**ALZET Comments:** BWA868C; PGD2, 11-deoxy-11-methylene; Saline; Mice; 1004; 28 days; Controls received mp w/ vehicle; animal info (L-PGDS); teratology; toxicology; BWA868C; PGD2, 11-deoxy-11-methylene are DP1 and DP2 receptor antagonists;.

**Q4473:** L. Kass, *et al.* Prenatal Bisphenol A exposure delays the development of the male rat mammary gland. REPRODUCTIVE TOXICOLOGY 2015;54(37-46)

**ALZET Comments:** Bisphenol A; DMSO; SC; Rat; 1002; 14 days; Controls received mp w/ vehicle; animal info (female, WistarGD9); teratology; toxicology;.

**Q4449:** G. W. Heyne, *et al.* Definition of Critical Periods for Hedgehog Pathway Antagonist-Induced Holoprosencephaly, Cleft Lip, and Cleft Palate. PLoS One 2015;10(U757-U770)

**ALZET Comments:** Cyclopamine; SC; Mice (pregnant); 2001D; 1 day; Animal info (female, C57BL6J, GD8.25-9.4); teratology;.

**Q3870:** A. W. Eifert, *et al.* Effect of melatonin or maternal nutrient restriction on vascularity and cell proliferation in the ovine placenta. ANIMAL REPRODUCTION SCIENCE 2015;153(13-21)

**ALZET Comments:** Melatonin; luzindole; DMSO; water; Intrauterine; Sheep (ewe; pregnant); 2ML4; 28 days; Controls received mp w/ vehicle; animal info (female, Western white face, GD62); functionality of mp verified by serum levels; 45% DMSO used; good methods (pg 15); no stress (see pg. 15); post op. care (BID IM injection flunixin meglumine; QD IP injection Penicillin G Procaine); teratology; cardiovascular; used 20 cm of PE 60 tubing; pumps primed overnight 37C saline with catheters;.

**Q4511:** D. E. Ehrlich, *et al.* Prenatal stress, regardless of concurrent escitalopram treatment, alters behavior and amygdala gene expression of adolescent female rats. NEUROPHARMACOLOGY 2015;97(251-258)

**ALZET Comments:** Escitalopram oxalate; Saline; SC; Rat; 2ML4; Controls received mp w/ vehicle; animal info (female, nulliparous Sprague Dalwey, 200-225g); behavioral testing (open field, social interaction, novel object recognition, elevated plus maze); teratology;.

**Q4387:** J. S. M. Cuffe, *et al.* Differential mRNA Expression and Glucocorticoid-Mediated Regulation of TRPM6 and TRPM7 in the Heart and Kidney throughout Murine Pregnancy and Development. PLoS One 2015;10(U1394-U1410)

**ALZET Comments:** Dexamethasone sodium phosphate; corticosterone; Saline; SC; Mice (pregnant); 1003D; 60 hours; Controls received mp w/ saline; animal info (female, E12.5, C57Bl6J, 8-10 weeks old); teratology; cardiovascular;.

**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;.

**Q4364:** C. M. Chen, *et al.* Maternal nicotine exposure during gestation and lactation induces kidney injury and fibrosis in rat offspring. PEDIATRIC RESEARCH 2015;77(56-63)

**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;.

**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;.

**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;.



**Q4311:** J. Ayraam, *et al.* Prenatal nicotine exposure increases hyperventilation in alpha4-knock-out mice during mild asphyxia. *RESPIRATORY PHYSIOLOGY & NEUROBIOLOGY* 2015;208(29-36

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

**Q4312:** I. L. M. H. Aye, *et al.* Adiponectin supplementation in pregnant mice prevents the adverse effects of maternal obesity on placental function and fetal growth. *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA* 2015;112(12858-12863

**ALZET Comments:** Adiponectin; PBS; SC; Mice (pregnant); 1003D; 4 days; Controls received mp w/ PBS; animal info (female, C57BL6J); teratology; diabetes;.

**Q4234:** E. D. Zhu, *et al.* Effect of Bisphosphonates on the Rapidly Growing Male Murine Skeleton. *Endocrinology* 2014;155(1188-1196

**ALZET Comments:** Clodronate; SC; Mice; 20 days; Controls received mp w/ vehicle; animal info (male, C57BL6, 18 days old); teratology;.

**Q3647:** D. Zhang, *et al.* Nicotine exposure increases the complexity of dopamine neurons in the parainterfascicular nucleus (PIF) sub-region of VTA. *Journal of NeuroEngineering and Rehabilitation* 2014;11(U1-U6

**ALZET Comments:** Nicotine; Saline; SC; Rat; 14 days; Controls received mp w/ vehicle; animal info (female, Sprague Dawley, GD5, 280-300g); teratology; dependence;.

**Q4151:** A. A. Vestal-Laborde, *et al.* The Opioid System and Brain Development: Effects of Methadone on the Oligodendrocyte Lineage and the Early Stages of Myelination. *Developmental Neuroscience* 2014;36(409-421

**ALZET Comments:** Methadone; Saline; SC; Rat (pregnant); 2ML4; 28 days; Controls received mp w/ vehicle; animal info (female, Pregnant, Sprague Dawley, GD7); teratology; dependence;.

**Q3677:** G. Valdes, *et al.* Administration of angiotensin II and a bradykinin B2 receptor blocker in midpregnancy impairs gestational outcome in guinea pigs. *Reproductive Biology and Endocrinology* 2014;12(U1-U8

**ALZET Comments:** Angiotensin II; bradyzide; SC; Guinea pig (pregnant); 2ML2; 14 days; Controls received mp w/ saline; animal info (virgin, Pirbright white, 600g); teratology; cardiovascular; peptides; bp measured using neonatal blood pressure cuff; AngII determined to be subpressor dose via pilot study; pumps removed after 14 day infusion.

**Q4129:** M. L. Tan, *et al.* The potential role of free chitosan in bone trauma and bone cancer management. *Biomaterials* 2014;35(7828-7838

**ALZET Comments:** Chitosan; starch; Water; SC; Mice (pregnant); 1002; 5 days; Controls received mp w/ vehicle; animal info (female, pregnant, Balb/c); cancer (osteosarcoma; breast cancer; colorectal cancer); no stress (see pg. 7831); teratology; cardiovascular; chitosan is a biopolymer derived from chitin; Dose (5 mg/kg/day);.

**Q3663:** T. Takeda, *et al.* Maternal Exposure to Dioxin Imprints Sexual Immaturity of the Pups through Fixing the Status of the Reduced Expression of Hypothalamic Gonadotropin-Releasing Hormone. *MOLECULAR PHARMACOLOGY* 2014;85(1):74-82

**ALZET Comments:** Gonadotropin-releasing hormone; Saline; HCl; CSF/CNS; Rat; 2002; Controls received mp w/ vehicle; animal info (male, Wistar, PND63); ALZET brain infusion kit 2 used; behavioral testing (sexual behavior); stability verified by (incubation of GnRH at 37C for 2 weeks - half of GnRH remains in unchanged form pg.78); teratology; Cannula placement verified via 0.1% infusion of bromophenol blue; 0.1 M HCl.

**Q4122:** Y. L. Tain, *et al.* Long-Term Effects of Maternal Citrulline Supplementation on Renal Transcriptome Prevention of Nitric Oxide Depletion-Related Programmed Hypertension: The Impact of Gene-Nutrient Interactions. *International Journal of Molecular Sciences* 2014;15(23255-23268

**ALZET Comments:** L-NAME; SC; Rat (pregnant); Controls received mp w/ saline; animal info (female, Sprague Dawley, 10 weeks old); teratology; cardiovascular;.



**Q3659:** E. Somm, *et al.* Protective effects of maternal nutritional supplementation with lactoferrin on growth and brain metabolism. *PEDIATRIC RESEARCH* 2014;75(1):51-61

**ALZET Comments:** Dexamethasone; SC; Rat (pregnant); 7 days; Controls received mp w/ vehicle; animal info (female, Sprague Dawley OFA, gestational day 14); teratology; pumps used to induce intrauterine growth restriction; dose: 100 ug/kg/day.

**Q4078:** K. Sakai, *et al.* Prenatal administration of neuropeptide bombesin promotes lung development in a rat model of nitrofen-induced congenital diaphragmatic hernia. *Journal of Pediatric Surgery* 2014;49(1749-1752

**ALZET Comments:** Bombesin; IP; Rat (pregnant); 2002; Controls received mp w/ saline; animal info (female, Sprague Dawley, pregnant E14); teratology;

**Q3358:** I. Rayen, *et al.* Developmental fluoxetine exposure facilitates sexual behavior in female offspring. *Psychopharmacology* 2014;231(1):123-133

**ALZET Comments:** Fluoxetine; Propylenediol; saline; SC; Rat; 2ML4; 4 weeks; Controls received mp w/ vehicle; animal info (female, Sprague Dawley, 250-300g, postpartum); 50% propylenediol used; behavioral testing (locomotor activity; sexual behavior testing); teratology; "...this mode of administration was chosen instead of repeated injections or oral gavage to pups, in order to minimize stress. In addition, minipumps have successfully been used during the postpartum period" pg125; effects of prenatal stress;

**Q3585:** T. Numakawa, *et al.* Impairments in Brain-Derived Neurotrophic Factor-Induced Glutamate Release in Cultured Cortical Neurons Derived from Rats with Intrauterine Growth Retardation: Possible Involvement of Suppression of TrkB/Phospholipase C-gamma Activation. *Neurochemical Research* 2014;39(4):785-792

**ALZET Comments:** Thromboxane2, analog; PBS; IP; Rat (pregnant); 2ML1; Controls received mp w/ vehicle; animal info (female, Long Evans, pregnant); teratology;

**Q3583:** I. Nitsos, *et al.* The Impact of Chronic Intrauterine Inflammation on the Physiologic and Neurodevelopmental Consequences of Intermittent Umbilical Cord Occlusion in Fetal Sheep. *REPRODUCTIVE SCIENCES* 2014;21(658-670

**ALZET Comments:** Endotoxin, LPS; Amniotic sac; Sheep (fetus); 2ML4; 4 weeks; Controls received mp w/ saline; animal info (female, pregnant, GD80); post op. care (benacillin); teratology; immunology; E.coli LPS 055:B5, 18 mg/ml;

**Q4023:** T. Nishimura, *et al.* Fetal Growth Retardation and Lack of Hypotaurine in Ezrin Knockout Mice. *PLoS One* 2014;9(U723-U731

**ALZET Comments:** Hypotaurine; PBS; SC; Mice (pregnant); 10 days; Controls received mp w/ vehicle; animal info (female, Ez+/-, GD8.5); functionality of mp verified by plasma levels; teratology;

**Q3748:** T. Negishi, *et al.* Altered social interactions in male juvenile cynomolgus monkeys prenatally exposed to bisphenol A. *NEUROTOXICOLOGY AND TERATOLOGY* 2014;44(46-52

**ALZET Comments:** Bisphenol A; DMA; PEG; SC; Monkey (Cynomolgus - pregnant); 2004; 28 days; Control animals received mp w/ vehicle; animal info (cynomolgus, 2.5-4.0 kg, 5-13 years old, GD20); "We administered BPA in pregnant females on gestational day 20 at 10 µg/kg/day through pumps implanted to produce an exposure regimen with a steady level of circulating BPA without the stress of daily restraint essential for oral administration." pg 50; teratology; 50% DMA used; 50% PEG used.

**Q4016:** D. Navarro, *et al.* Late Maternal Hypothyroidism Alters the Expression of Camk4 in Neocortical Subplate Neurons: A Comparison with Nurr1 Labeling. *Cerebral Cortex* 2014;24(2694-2706

**ALZET Comments:** Parathormone (1-84), rat; calcitonin, rat; Acetate buffer; SC; Rat; 2001; 22 days; Animal info (female, Wistar, E0); replacement therapy (thyroidectomy); teratology;

**Q3549:** R. J. Lipinski, *et al.* Characterization of Subtle Brain Abnormalities in a Mouse Model of Hedgehog Pathway Antagonist-Induced Cleft Lip and Palate. *PLoS One* 2014;9(U557-U563



**ALZET Comments:** Cyclopamine; Cyclodextrin, 2-hydroxypropyl-b-; sodium phosphate; citrate buffer; SC; Mice (pregnant); 2001D; Controls received mp w/ vehicle; animal info (female, C57BL6J, GD 8.25); 30% 2-hydroxypropyl-B-cyclodextrin used; no stress (see pg. e102604); teratology; cleft palate;.

**Q3922:** E. R. Horn, *et al.* Gender- Related Sensitivity of Development and Growth to Real Microgravity in *Xenopus laevis*. *Journal of Experimental Zoology Part A-Ecological Genetics and Physiology* 2014;321(1-12

**ALZET Comments:** Nettle powder; Water, spring; In vitro; Toad (tadpole); 2ML2; 12 days; Animal info (*Xenopus laevis*); teratology; spaceflight;.

**Q3765:** E. Dhimolea, *et al.* Prenatal Exposure to BPA Alters the Epigenome of the Rat Mammary Gland and Increases the Propensity to Neoplastic Development. *PLoS One* 2014;9(U200-U208

**ALZET Comments:** Bisphenol A; DMSO; SC; Rat (pregnant); Control animals received mp w/ vehicle; animal info (female, sexually mature, Wistar-Furth, 8wks old); 50% DMSO used; teratology.

**Q3838:** H. C. Chou, *et al.* Maternal nicotine exposure during gestation and lactation induces cardiac remodeling in rat offspring. *REPRODUCTIVE TOXICOLOGY* 2014;50(4-10

**ALZET Comments:** Nicotine; Saline; SC; Rat (pregnant); 2ML2; 2ML4; 14 days; 28 days; Controls received mp w/ vehicle; animal info (female, GD7); functionality of mp verified by blood levels; dose-response (pg 6); teratology; dependence; cardiovascular;.

**Q3856:** C. az-Garcia, *et al.* Pregnancy after allogeneic uterus transplantation in the rat: perinatal outcome and growth trajectory. *Fertility and Sterility* 2014;102(1545-U353

**ALZET Comments:** Tacrolimus; NaCl; SC; Rat; 2ML4; 2004; 8 weeks; Controls received mp w/ vehicle; animal info (female, Lewis, virgin); functionality of mp verified by blood levels; pumps replaced every 2 weeks; teratology;.

**Q3270:** E. Zana-Taieb, *et al.* Effect of Two Models of Intrauterine Growth Restriction on Alveolarization in Rat Lungs: Morphometric and Gene Expression Analysis. *PLoS One* 2013;8(11):U35-U45

**ALZET Comments:** L-NAME; Saline; SC; Rat (pregnant); Controls received high protein diet; animal info (Female, Sprague Dawley); teratology;.

**Q2888:** H. Wang, *et al.* Prenatal Nicotine and Maternal Deprivation Stress De-Regulate the Development of CA1, CA3, and Dentate Gyrus Neurons in Hippocampus of Infant Rats. *PLoS One* 2013;8(6):U924-U939

**ALZET Comments:** Nicotine hydrogen tartrate; Saline; SC; Mice (pregnant); 2004; 2006; 21 days; Controls received mp w/ saline; animal info (pregnant dams); teratology;.

**Q3615:** E. E. Roguski, *et al.* Fostering itself increases nicotine self-administration in young adult male rats. *Psychopharmacology* 2013;229(2):227-234

**ALZET Comments:** Nicotine hydrogen tartrate; Water; Rat (pregnant); 2ML4; 10 days; 18 days; Controls received mp w/ vehicle; animal info (female, Sprague Dawley); pumps replaced after P2 with higher dosage; behavioral testing (locomotor activity, nicotine self-administration); teratology; dependence;.

**Q3587:** B. A. O'Connell, *et al.* Treatment of pregnant spiny mice at mid gestation with a synthetic glucocorticoid has sex-dependent effects on placental glycogen stores. *PLACENTA* 2013;34(10):932-940

**ALZET Comments:** Dexamethasone; Saline; SC; Mice (pregnant); 1003D; 72 hours; Controls received mp w/ vehicle; animal info (female, spiny mouse, day 20 gestation); teratology; pumps removed after 72 hours;.

**Q3243:** T. Miki, *et al.* Activity-Dependent Neurotrophin Signaling Underlies Developmental Switch of Ca<sup>2+</sup> Channel Subtypes Mediating Neurotransmitter Release. *Journal of Neuroscience* 2013;33(48):18755-18763

**ALZET Comments:** Tetrodotoxin; K252a; Saline; CSF/CNS (cerebellum); Rat (neonate); 1007D; 7 days; Controls received mp w/ vehicle; animal info (Wistar/ST, Postnatal day 6); ALZET brain infusion kit 1 used; tissue perfusion (cerebellum); teratology; good methods(pg. 18757); Pump implantation shown figure 6A pg.P18761. K252a is a CaM kinase and phosphorylase inhibitor;.





**Q2788:** Y. Li, *et al.* Promoter methylation represses AT(2)R gene and increases brain hypoxic-ischemic injury in neonatal rats. *NEUROBIOLOGY OF DISEASE* 2013;60(1):32-38

**ALZET Comments:** Nicotine; Saline; SC; Rat (pregnant); 2ML4; 28 days; Control animals received mp w/ vehicle; animal info (Sprague Dawley, female); teratology.

**Q2810:** A. D. Kasberg, *et al.* SP8 regulates signaling centers during craniofacial development. *Developmental Biology* 2013;381(2):312-323

**ALZET Comments:** Cyclophamide; Sodium citrate phosphate; cyclodextrin, hydroxypropyl beta; SC; Mice (pregnant); 2001D; 24 hours; 30% cyclodextrin used; multiple pumps used (2); "Due to the low penetrance of the rescue via IP injection... we used micro-osmotic pumps to provide a more effective method of delivering cyclophamide." pg 320; comparison of IP injections versus SC mp; teratology.

**Q2490:** S. J. Jaiswal, *et al.* Developmental Nicotine Exposure Alters AMPA Neurotransmission in the Hypoglossal Motor Nucleus and Pre-Botzinger Complex of Neonatal Rats. *Journal of Neuroscience* 2013;33(6):2616-2625

**ALZET Comments:** Nicotine bitartrate; Saline, physiological; SC; Rat (pregnant); 28 days; Control animals received mp w/ vehicle; animal info (Sprague Dawley, female, GD5); teratology.

**Q4814:** Heloísa Helena Vilela Costa, *et al.* Continuous central infusion of cannabinoid receptor agonist WIN 55,212-2 decreases maternal care in lactating rats: Consequences for fear conditioning in adulthood males. *Behav. Brain Res* 2013;257(31-38)

**ALZET Comments:** WIN-55212-2; NaCl; tween, DMSO; CSF/CNS; Rat; 1007D; 7 days; Controls received mp w/ vehicle; animal info (female, Wistar, 9 weeks old); 10% DMSO used; dose-response (pg 34); behavioral testing (fear conditioning, maternal behavior); teratology; "The continuous infusion of WIN in the CNS using an osmotic minipump in lactating dams eliminates the possibility that WIN affects the behavior of the offspring when offered in the milk. Thus, any behavioral change in offspring could be attributed only to changes in maternal behavior from the administration of WIN in the dams." pg 37; Cannula placement verified via Evans Blue dye postmortem; Dose (10 or 100 nmol/h);

**Q3487:** C. Gorini, *et al.* Prenatal nicotine exposure enhances the trigeminocardiac reflex via serotonin receptor facilitation in brainstem pathways. *Journal of Applied Physiology* 2013;115(4):415-421

**ALZET Comments:** Nicotine; Rat (pregnant); 28 days; Animal info (female, Sprague Dawley, adult, third day of gestation); teratology; dependence;

**Q3486:** J. H. Gooi, *et al.* Enhanced Uterine Artery Stiffness in Aged Pregnant Relaxin Mutant Mice Is Reversed with Exogenous Relaxin Treatment. *Biology of Reproduction* 2013;89(1):U76-U86

**ALZET Comments:** Relaxin, human H2 recombinant; SC; Mice (pregnant); 1007D; 5 days; Controls received mp w/ placebo; animal info (female, Rln -/-, 8 or 5 months old, day 12.5 of pregnancy); functionality of mp verified by blood plasma; teratology; cardiovascular; dose: 3.33 ug/kg/hr;

**Q3071:** X. D. Feng, *et al.* Cortisol stimulates proliferation and apoptosis in the late gestation fetal heart: differential effects of mineralocorticoid and glucocorticoid receptors. *American Journal of Physiology-Regulatory Integrative and Comparative Physiology* 2013;305(4):R343-R350

**ALZET Comments:** Cortisol; potassium canrenoate; mifepristone; Saline; SC; Sheep (ewe); 2ML2; 10 days; Controls received mp w/ vehicle; animal info (female, singleton pregnancies); teratology; cardiovascular; impact of maternal stress during late gestation.

**Q2803:** G. Q. Chang, *et al.* Prenatal Exposure to Nicotine Stimulates Neurogenesis of Orexigenic Peptide-Expressing Neurons in Hypothalamus and Amygdala. *Journal of Neuroscience* 2013;33(34):13600-13611

**ALZET Comments:** Nicotine; Saline; SC; Rat (pregnant); 2002; Control animals received mp w/ vehicle; animal info (Sprague Dawley, female, 220-240 g); teratology.



**Q2905:** J. Cao, *et al.* Gestational nicotine exposure modifies myelin gene expression in the brains of adolescent rats with sex differences. *TRANSLATIONAL PSYCHIATRY* 2013;3(;):U33-U42

**ALZET Comments:** Nicotine; SC; Rat (pregnant); 2002; 14 days; Controls received mp w/ saline; dependence; animal info (Sprague Dawley, pregnant, delivery started from gestation day 4); teratology.

**Q2865:** N. Acevedo, *et al.* Perinatally Administered Bisphenol A as a Potential Mammary Gland Carcinogen in Rats. *Environmental Health Perspectives* 2013;121(9):1040-1046

**ALZET Comments:** Bisphenol A; DMSO; SC; Rat (pregnant); 2002; 2004; 14, 28 days; Control animals received mp w/ vehicle; animal info (Sprague Dawley, female, virgin, 8-10 wks old); 50% DMSO used; dose-response; teratology.

**Q3687:** W. Wang, *et al.* Autoantibody-Mediated Complement C3a Receptor Activation Contributes to the Pathogenesis of Preeclampsia. *Hypertension* 2012;60(3):712-U273

**ALZET Comments:** SB290157; DMSO; SC; Mice (pregnant); 1007D; 5 days; Controls received mp w/ vehicle; animal info (female, C57Bl6J, ); 50% DMSO used; teratology; cardiovascular; immunology; SB290757 is a non-peptide C3aR antagonist.

**Q1927:** J. Q. Pilarski, *et al.* Increased nicotinic receptor desensitization in hypoglossal motor neurons following chronic developmental nicotine exposure. *Journal of Neurophysiology* 2012;107(1):257-264

**ALZET Comments:** Nicotine; SC; Rat (pregnant); 1007D; Animal info (Sprague Dawley, female); teratology.

**Q1851:** K. E. Pelch, *et al.* Developmental Exposure to Xenoestrogens at Low Doses Alters Femur Length and Tensile Strength in Adult Mice. *Biology of Reproduction* 2012;86(3):U87-U95

**ALZET Comments:** Estradiol; Polyethylene glycol; DMSO; SC; Mice; 1002; 12 days; Controls received mp w/ vehicle; animal info (female, adult, C57BL/6J, ovariectomized); 20% DMSO used; 80% polyethylene glycol used; replacement therapy (ovariectomy); teratology.

**Q1857:** K. Parameshwaran, *et al.* Developmental nicotine exposure induced alterations in behavior and glutamate receptor function in hippocampus. *CELLULAR AND MOLECULAR LIFE SCIENCES* 2012;69(5):829-841

**ALZET Comments:** Nicotine; SC; Rat (pregnant); 2004; Controls received mp w/ physiological saline; "Nicotine in rodents has a short half-life and therefore the use of an osmotic mini pump would ensure a steady infusion. This also fits the human condition, as amniotic fluid maintains a reservoir of steady levels of nicotine so that the fetus is continuously exposed." pg 837; half-life "short" pg 837; teratology.

**Q2301:** K. Nishijima, *et al.* Interactions among pulmonary surfactant, vernix caseosa, and intestinal enterocytes: intra-amniotic administration of fluorescently liposomes to pregnant rabbits. *AMERICAN JOURNAL OF PHYSIOLOGY-LUNG CELLULAR AND MOLECULAR PHYSIOLOGY* 2012;303(3):L208-L214

**ALZET Comments:** Liposomes, fluorescently labeled; coatasome EL-01-C, hydrated; DMSO; water, distilled; Intrauterine; Rabbit (fetus); 2ML1; 1 week; Control animals received mp w/ liposome alone; animal info (Japanese, White, 4.2-5.4 kg, teen); tissue perfusion (fetus); "5-cm sterile PE 60 silicone catheter with silicone flange was attached to each pump" pg L209; Fig 2, image of pump and catheter placement; multiple pumps used (2); teratology.

**Q2165:** H. X. Hu, *et al.* Prenatal nicotine exposure alters the response of the mouse in vitro respiratory rhythm to hypoxia. *RESPIRATORY PHYSIOLOGY & NEUROBIOLOGY* 2012;181(2):234-247

**ALZET Comments:** Nicotine hydrogen tartrate; Water, sterile; SC; Mice (pregnant); 2004; 28 days; Controls received mp w/ vehicle; animal info (CD-1, G4); teratology; While this method is widely used in animals studies, one potential criticism is that, due to the continuous nature of nicotine release from an osmotic mini-pump, it is a poor mimic of episodic smoking in humans. Empirical evidence has shown, however, that smokers tend to have constant blood nicotine levels throughout the day... Additionally, the use of osmotic mini-pumps avoids periods of transient hypoxia-ischemia that occur with each nicotine injection... and allows for the delivery of a continuous fixed dose of nicotine that is very similar to the continuous nicotine delivery provided by transdermal patches in humans." pg 235.

**Q2087:** L. Butruille, *et al.* Prenatal fasudil exposure alleviates fetal growth but programs hyperphagia and overweight in the adult male rat. *European Journal of Pharmacology* 2012;689(1-3):278-284



**ALZET Comments:** L-NAME; fasudil; SC; Rat (pregnant); Controls received mp w/ normal saline; animal info (Wistar Han, 200-250 g, E14, female); enzyme inhibitor (nitric oxide synthase, NOS, Rho-kinase, ROCK); one group contained mixture of fasudil and L-NAME; teratology.