References (2016-Present) on the Use of Cyclodextrin with ALZET® Osmotic Pumps

Q10966: K. Nagaoka*, et al.* Acetaminophen improves tardive akathisia induced by dopamine D(2) receptor antagonists. Journal of Pharmacological Sciences 2023;151(1):9-16
Agents: Haloperidol **Vehicle:** Cyclodextrin, hydroxypropyl-b; **Species:** Rat; **Strain:** Wistar; **Pump:** 2ML4; **Duration:** 21 days;
ALZET Comments: Dose: (1 mg/kg/day); animal info (Male, 9 weeks old, 200-250 g); pumps replaced: removed on the 21st day and new pumps were implanted in the same manner; behavioral testing (open field test.); akathisia

Q10940: H. Higashiyama*, et al.* Evolution of the therian face through complete loss of the premaxilla. Evolution & Development 2023;25(1):103-118
Agents: Cyclopamine **Vehicle:** Sodium phosphate citrate buffer; Cyclodextrin, 2-hydropropyl-beta; **Route:** SC; **Species:** Mice; **Pump:** 2001D;
ALZET Comments: Dose 1.5 mg/100 ul cyclodextrin; 30% cyclodextrin used; cleft lip/palate

Q10584: K. Kudo*, et al.* Secreted Phospholipase A(2) Modifies Extracellular Vesicles and Accelerates B Cell Lymphoma. Cell Metabolism 2022;34(4):615-633 e8
Agents: Varespladib **Vehicle:** Sulfobutylether-beta-cyclodextrin; **Route:** Intrasplenic; **Species:** Mice; **Pump:** 2006; 1004; **Duration:** 3 weeks;
ALZET Comments: Dose (1 ug/g body weight/day); Controls received mp w/ vehicle; mouse jugular catheter used; animal info: humanized NOG mice; Varespladib is a sPLA2 inhibitor; immunology;

Q10529: C. Gineste*, et al.* Enzymatically dissociated muscle fibers display rapid dedifferentiation and impaired mitochondrial calcium control. iScience 2022;25(12):105654
Agents: NV56 **Vehicle:** Cyclodextrin; **Route:** SC; **Species:** Mice; **Pump:** 2006; **Duration:** 6 weeks;
ALZET Comments: Dose (140 ug/day); Controls received mp w/ vehicle; animal info (Mice; 14 weeks old, Tfam KO; About to enter terminal disease with severe weight loss and muscle weakness); NV556 is a cyclophilin inhibitor

Q10528: R. D. B. E. C. Gillis, A.; Ziegler A.I.; Chung, N.C.; Pon, C.K.; Shackleford, D.M.; Andreassen, B.K.,; Halls, M.L. Carvedilol blocks neural regulation of breast cancer progression in vivo. Journal of the American College of Cardiology 2022;
Agents: Carvedilol **Vehicle:** Glacial acetic acid; Hydroxypropyl-β-cyclodextrin; **Species:** Mice; **Pump:** 1004; **Duration:** 28 days;
ALZET Comments: Dose: (2 mg/kg/day); 1% glacial acetic acid; 20% hydroxypropyl-β-cyclodextrin vehicle used; Controls received mp w/ vehicle; animal info: Six-week old female BALB/c nu/nu mice; cancer (Breast cancer); studies are currently evaluating prophylactic use of carvedilol in cancer patients to prevent cancer therapy-induced cardiotoxicity with mixed results (52,53). The findings presented here suggest that future evaluation of carvedilol for primary prevention for cardiotoxicity may be an ideal opportunity to also evaluate biomarkers of its effect on cancer progression. (pg.19); cancer (breast)

Q10324: Z. L. Sebo*, et al.* Testosterone metabolites differentially regulate obesogenesis and fat distribution. molecular Metabolism 2021;44(101141
Agents: Testosterone; Dihydrotestosterone; Estradiol; Letrozole; Bicalutamide **Vehicle:** 2-hydroxypropyl-B-cyclodextrin; PBS; DMSO; **Route:** SC; **Species:** Mice; **Pump:** 1004; **Duration:** Not Stated;
ALZET Comments: Dose: Testosterone (2 mg/kg body weight/day); Estradiol (2 ug/kg body weight/day); Letrozole (0.4 mg/kg body weight/day); Dutasteride (0.5 mg/kg body weight/day); 10% DMSO vehicle used Controls received mp w/ vehicle; animal info: ARdY mice and mTmG mice 3 weeks of age; replacement therapy; (Testosterone)dependence;

Q10203: X. Jin*, et al.* Oestrogen inhibits salt-dependent hypertension by suppressing GABAergic excitation in magnocellular AVP neurons. Cardiovascular Research 2021;117(10):2263-2274
Agents: Oestrogen; ICI 182780 **Vehicle:** Hydroxypropyl-b-cyclodextrin; **Route:** CSF/CNS (ICV); **Species:** Rat; **Pump:** 2002;
ALZET Comments: 20% hydroxypropyl-b-cyclodextrin used; Controls received mp w/ vehicle; animal info: Sprague-Dawley rats, 6–7weeks of age; post op. care: antibiotic (ubacillin); Blood pressure measured via: Tail cuff; Telemetry method; Blood pressure results (see pg.11); BIKII used; Brain coordinates ((AP: 1.0mm from the bregma, ML: 1.6mm from the midline, DV: 4mm below the surface of the skull); cardiovascular;

Q10275: H. Higashiyama*, et al.* Mammalian face as an evolutionary novelty. Proceedings of the National Academy of Sciences of the United States of America 2021;118(44):
Agents: Cyclopamine **Vehicle:** Sodium phosphate; Citrate; 2-hydropropyl-b-cyclodextrin; **Route:** SC; **Species:** Mice; **Pump:** 2001D; **Duration:** Not Stated;
ALZET Comments: Dose (1.5 mg/100 ul cyclodextrin); 30% HPBCD used; animal info (B6;129S4-Dlx1 < tm1(cre/ERT2)Zjh>/J(Dlx1-CreERT2) adult mice maintained with a mixed; (C57BL6/ICR) genetic background); teratology;

Q9257: E. F. Halff*, et al.* Effects of chronic exposure to haloperidol, olanzapine or lithium on SV2A and NLGN synaptic puncta in the rat frontal cortex. Behavioural Brain Research 2021;405(113203
Agents: Haloperidol; Lithium Chloride; Olanzapine **Vehicle:** Cyclodextrin, 2-Hydroxypropyl-B-; **Route:** SC; **Species:** Rat; **Pump:** 2ML4; **Duration:** 28 days;
ALZET Comments: Dose (0.5 mg/kg/day Haloperidol; 2 mmol/L/kg/day Lithium Chloride; 7.5 mg/kg/day Olanzapine); Controls received mp w/ vehicle; animal info (Male Sprague-Dawley rats, 220-270 g, 6-10 weeks old); Haloperidol aka HAL, Olanzapine aka OLZ, Lithium Chloride aka Li; neurodegenerative (Schizophrenia);

Q8713: P. S. Cassidy*, et al.* siRNA targeting Schlemm's canal endothelial tight junctions enhances outflow facility and reduces IOP in a steroid-induced OHT rodent model. Molecular Therapy: Methods & Clinical Development 2021;20(86-94
Agents: Dexamethasone **Vehicle:** Cyclodextrin; **Route:** SC; **Species:** Mice; **Pump:** Not stated; **Duration:** 4 weeks;
ALZET Comments: Dose (2 mg/kg/day); Controls received mp w/ vehicle; animal info (C57BL/6J); Dexamethasone aka DEX; dependence;

Q10114: D. C. Borcherding*, et al.* Suppression of Breast Cancer by Small Molecules That Block the Prolactin Receptor. Cancers (Basel) 2021;13(11):
Agents: SMI-6 **Vehicle:** Hydroxypropyl-b-cyclodextrin; **Route:** SC; **Species:** Mice; **Pump:** 1004; **Duration:** 4 weeks;
ALZET Comments: Dose: (0.11 u/h); dose-response (see pg 3) fig.1; PEG300; 37% hydroxypropyl-b-cyclodextrin; Controls received mp w/ vehicle; animal info: Eight-week-old female athymic nu/nu mice; SMI-6 aka small molecule inhibitor 6; cancer (Breast cancer);

Q8337: L. D. Asico*, et al.* Elucidating the Role of Lipid Rafts on G Protein-Coupled Receptor Function in the Mouse Kidney: An In Vivo Approach. Methods Mol Biol 2021;2187(187-206
Agents: Cyclodextrin, methyl-b-; **Vehicle:** Saline; **Route:** Abdomen; **Species:** Mice; **Pump:** Not stated; **Duration:** 7 days;
ALZET Comments: Dose (40 mg/kg/day); Controls received mp w/ vehicle; animal info (Adult (8-10 week) male mice); methyl-b-cyclodextrin aka B-MCD; dependence;

Q9527: M. H. Wang*, et al.* A novel interaction between soluble epoxide hydrolase and the AT1 receptor in retinal microvascular damage. Prostaglandins Other Lipid Mediators 2020;148(106449
Agents: Angiotensin II; Benzoic Acid **Vehicle:** Cyclodextrin, Hydroxypropyl; **Route:** SC; **Species:** Mice; **Duration:** 4 weeks;
ALZET Comments: Dose (3 mg/kg/day); Controls received mp w/ vehicle; animal info (8-week-old male sEH mice); Blood pressure measured via tail cuff method;110 mmHg - 150 mmHg; Angiotensin II aka Ang II, Benzoic Acid aka t-AUCB; cardiovascular;

Q9514: M. A. Ulleryd*, et al.* RNA sequencing data describing transcriptional changes in aorta of ApoE-/- mice after alpha 7 nicotinic acetylcholine receptor (alpha7nAChR) stimulation. Data in Brief 2020;30(105415
Agents: Alpha 7 nicotinic acetylcholine receptor agonist **Vehicle:** Cyclodextrin; Saline; **Route:** SC; **Species:** Mice; **Pump:** 2004; **Duration:** 8 weeks;
ALZET Comments: Dose (50 µmol/kg/day); 28% cyclodextrin used; Controls received mp w/ vehicle; animal info (Male apoE-/- mice, 10 weeks old); pumps replaced every 4 weeks; Alpha 7 nicotinic acetylcholine receptor agonist aka α7nAChR agonist;

Q9508: B. Tuku*, et al.* Testosterone Protects Against Severe Influenza by Reducing the Pro-Inflammatory Cytokine Response in the Murine Lung. Frontiers in Immunology 2020;11(697
Agents: Testosterone **Vehicle:** "Cyclodextrin, 2-ß-Hydroxypropl-"; **Route:** SC; **Species:** Mice; **Pump:** 2004; **Duration:** 2 weeks;
ALZET Comments: Dose (5 mg/ml); 45%% "Cyclodextrin, 2-ß-Hydroxypropl-" used; Controls received mp w/ vehicle; animal info (Six weeks old female mice); replacement therapy (testosterone);

Q8921: E. C. Onwordi*, et al.* Synaptic density marker SV2A is reduced in schizophrenia patients and unaffected by antipsychotics in rats. Nature Communications 2020;11(1):246
Agents: Haloperidol; Olanzapine **Vehicle:** Cyclodextrin, B-Hydroxypropyl; **Route:** SC; **Species:** Rat; **Pump:** 2ML4; **Duration:** 28 days;
ALZET Comments: Dose (0.5 or 2 mg/kg/day ; 7.5 mg/kg/day); 20% B-Hydroxypropylcyclodextrin used; Controls received mp w/ vehicle; animal info (Male Sprague-Dawley rats, body weight 240–270 g, 6–10 weeks of age); Haloperidol aka HAL; Olanzapine aka OLZ; neurodegenerative (Schizophrenia);

Q8873: Y. Lu*, et al.* Neuron-Derived Estrogen Is Critical for Astrocyte Activation and Neuroprotection of the Ischemic Brain. The Journal of Neuroscience 2020;40(38):7355-7374
Agents: Estradiol, 17B- **Vehicle:** Cyclodextrin; **Route:** SC; **Species:** Mice; **Pump:** Not Stated; **Duration:** 14 days;
ALZET Comments: Dose (0.0167 mg); 20% Cyclodextrin used; Controls received mp w/ vehicle; animal info (three-month-old ovariectomized female mice); behavioral testing (Barnes Maze; Novel Object Recognition Test); 17B-Estradiol aka E2; ischemia (Ischemic Brain);

Q10220: K. Krskova*, et al.* Insulin-Regulated Aminopeptidase Inhibition Ameliorates Metabolism in Obese Zucker Rats. Frontiers in Molecular Sciences 2020;7(586225
Agents: HFI-419 **Vehicle:** Cyclodextrin; **Route:** SC; **Species:** Rat; **Pump:** Not Stated; **Duration:** 2 weeks;
ALZET Comments: Dose: (29 ug/100 g BW/day); 30% Cyclodextrin vehicle used; Controls received mp w/ vehicle; animal info: Male Zucker fatty rats, 34 weeks; IRAP inhibitor–HFI-419; Obesity

Q8584: Z. Z. Kirshner*, et al.* Impact of estrogen receptor agonists and model of menopause on enzymes involved in brain metabolism, acetyl-CoA production and cholinergic function. Life Sciences 2020;256(117975
Agents: 17 B-Estradiol; 4,4′,4′′-(4- Propyl-[1H]-pyrazole-1,3,5-triyl) trisphenol; Diarylpropiolnitrile; G-1 **Vehicle:** DMSO; Hydroxypropyl-B-cyclodextrin; **Route:** SC; **Species:** Rat; **Pump:** 2002; **Duration:** 30 days;
ALZET Comments: Dose (3 ug/day 17 B-Estradiol; 5 ug/day other agonists); 10% DMSO, 20% Hydroxypropl-ß-Cyclodextrin used; Controls received mp w/ vehicle; animal info (Female Sprague–Dawley rats, 11 weeks of age); 17 B-Estradiol aka E2; 4,4′,4′′-(4- Propyl-[1H]-pyrazole-1,3,5-triyl) trisphenol aka PPT; Diarylpropiolnitrile aka DPN; G-1 aka GPER1 agonist; replacement therapy (estradiol);

Q8558: V. Joseph*, et al.* Progesterone decreases apnoea and reduces oxidative stress induced by chronic intermittent hypoxia in ovariectomized female rats. Experimental Physiology 2020;105(6):1025-1034
Agents: Progesterone **Vehicle:** 2-Hydroxypropl-b-cyclodextrin; **Route:** SC; **Species:** Rat; **Pump:** 2ML4; **Duration:** 28 days;
ALZET Comments: Dose (4 mg/kg/day); Controls received mp w/ vehicle; animal info (Sprague-Dawley female rats (220-250g/57-70 days old)); post op. care (buprenorphine); Blood pressure measured via tail cuff method;93.3 mmHg - 105.2 mmHg; Progesterone aka prog; dependence;

Q8863: J. L. Jiang*, et al.* Triple reuptake inhibition of serotonin, norepinephrine, and dopamine increases the tonic activation of alpha2-adrenoceptors in the rat hippocampus and dopamine levels in the nucleus accumbens. Progress in Neuropsychopharmacology & Biological Psychiatry 2020;103(109987
Agents: Nomifensine; Escitalopram **Vehicle:** 2-Hydroxypropyl-B-cyclodextrin; **Route:** SC; **Species:** Rat; **Pump:** Not Stated; **Duration:** 2 days; 14 days;
ALZET Comments: Dose (5 mg/kg/day Nomifensine; 10 mg/kg/day Escitalopram); 20% 2-Hydroxypropyl-B-Cyclodextrin used; Controls received mp w/ vehicle; animal info (Adult male Sprague-Dawley rats weighing 250–350 g); Multiple pumps per animal (2 pumps); dependence;

Q9270: C. Y. Ho*, et al.* CX3CR1-microglia mediates neuroinflammation and blood pressure regulation in the nucleus tractus solitarii of fructose-induced hypertensive rats. Journal of Neuroinflammation 2020;17(1):185
Agents: AZD8797 **Vehicle:** 2-hydroxypropyl-B-cyclodextrin; **Route:** CSF/CNS (intracerebroventricular); **Species:** Rat; **Pump:** Not Stated; **Duration:** 14 days;
ALZET Comments: Controls received mp w/ vehicle; animal info (Wistar-Kyoto rats); Blood pressure measured via tail-cuff method;109.8 ± 1.8 mmHg - 125.1 ± 2.2 mmHg;AZD8797 aka CX3CR1 inhibitor; cardiovascular;

Q8190: C. M. Duan*, et al.* SRT2104 attenuates chronic unpredictable mild stress-induced depressive-like behaviors and imbalance between microglial M1 and M2 phenotypes in the mice. Behav Brain Res 2020;378(112296
Agents: SRT2104 **Vehicle:** Cyclodextrin, Hydroxypropyl; **Route:** CSF/CNS (hippocampus); **Species:** Mice; **Pump:** 1002; **Duration:** 12 days;
ALZET Comments: Controls received mp w/ vehicle; animal info (Adult male C57BL/6 mice (age: 6 weeks; weight: 18–22 g)); behavioral testing (swim test); Sirtuin 1 agonist aka SRT2104; dependence;

Q8446: V. Dobrocsyova*, et al.* AVE0991, a Nonpeptide Angiotensin 1-7 Receptor Agonist, Improves Glucose Metabolism in the Skeletal Muscle of Obese Zucker Rats: Possible Involvement of Prooxidant/Antioxidant Mechanisms. Oxidative Medicine and Cellular Longevity 2020;2020(6372935
Agents: AVE0991 **Vehicle:** Cyclodextrin; **Route:** Not Stated; **Species:** Rat; **Pump:** Not Stated; **Duration:** 2 weeks;
ALZET Comments: Dose (0.5mg/kg BW/day); 30% Cyclodextrin used; Controls received mp w/ vehicle; animal info (33-week-old male obese Zucker rats); Resultant plasma level (2.75 uM/(min*mg); AVE0991 aka nonpeptide Mas receptor agonist; dependence;

Q8389: G. Birolini*, et al.* Striatal infusion of cholesterol promotes dose-dependent behavioral benefits and exerts disease-modifying effects in Huntington's disease mice. EMBO Mol Med 2020;12(10):e12519
Agents: cholesterol (cyclodextrin, methyl-b balanced) **Vehicle:** CSF, Artificial; **Route:** CSF/CNS (corpus striatum); **Species:** Mice; **Pump:** 1004; **Duration:** 28 days;
ALZET Comments: Controls received mp w/ vehicle; animal info (wild-type mice, 5 weeks old); behavioral testing (Rotarod, Activity Cage, Novel object recognition (NOR) test); methyl-b-cyclodextrin aka MBCD; ALZET brain infusion kit 3 used; Brain coordinates (stereotaxic coordinates 1.75 mm mediolateral, 0.5 mm anteroposterior, 3 mm dorsoventral);

Q7424: E. Noirrit*, et al.* Effects of conjugated estrogen and bazedoxifene on hemostasis and thrombosis in mice. Endocrine Connections 2019;
Agents: Estrogen, conjugated; Bazedoxifene **Vehicle:** Cyclodextrin, hydroxypropyl-beta; HEPES buffer; **Route:** SC; **Species:** Mice; **Pump:** Not Stated; **Duration:** 3 weeks;
ALZET Comments: Dose (BZA (10 mg/kg/day), CE (3 mg/kg/day)); animal info (Female C57BL/6J mice 4 weeks old); replacement therapy (ovariectomized);

Q6965: S. Laouafa*, et al.* Roles of oestradiol receptor alpha and beta against hypertension and brain mitochondrial dysfunction under intermittent hypoxia in female rats. Acta Physiologica 2019;e13255
Agents: Propylpyraoletriol, diarylpropionitril **Vehicle:** Cyclodextrin, 2-Hydroxypropyl-B-; **Route:** SC; **Species:** Rat; **Pump:** 2ML4; **Duration:** 28 days;
ALZET Comments: Dose (PPT-30 µ g/kg/day);(DPN-100 µ g/kg/day) animal info (female Sprague- Dawley); post op. care (bupevacaïne, lidocaine); propylpyraoletriol is an oestradiol receptor (ER) alpha agonist, diarylpropionitril is an ER beta agonist;

Q7882: T. C. Uzuneser*, et al.* Schizophrenia dimension-specific antipsychotic drug action and failure in amphetamine-sensitized psychotic-like rats. European Neuropsychopharmacology 2018;28(12):1382-1393
Agents: haloperidol **Vehicle:** water, distilled, ascorbic acid and cyclodextrin buffered; **Route:** SC; **Species:** Rat; **Pump:** 2ML2; **Duration:** 14 days;
ALZET Comments: Dose (0.05, 0.5 mg/kg/day); distilled water containing 0.3% ascorbic acid / 10% cyclodextrin used; Controls received mp w/ vehicle; animal info (male, Sprague-Dawley, 330-380 g); behavioral testing (AMPH-induced locomotion, within-session habituation, acoustic startle response, novel object recognition); HAL is an antipsychotic drug that targets the postsynaptic D2 receptors; schizophrenia induced by amphetamine-sensitization-induced psychosis model;

Q7244: R. Thakkar, *et al.* 17beta-Estradiol Regulates Microglia Activation and Polarization in the Hippocampus Following Global Cerebral Ischemia. Oxidative Medicine and Cellular Longevity 2018;2018(4248526
Agents: Estradiol, 17b **Vehicle:** Cyclodextrin, B-; **Route:** SC; **Species:** Rat; **Pump:** Not Stated; **Duration:** 14 days;
ALZET Comments: Dose (0.0167 mg); 20% β-cyclodextrin used; animal info (3 month old, female, Sprague Dawley); ischemia

Q6916: A. Mitrofanova, *et al.* Hydroxypropyl-beta-cyclodextrin protects from kidney disease in experimental Alport syndrome and focal segmental glomerulosclerosis. Kidney Int 2018;94(6):1151-1159
Agents: Cyclodextrin, hydroxypropyl-b- **Vehicle:** Not Stated; **Route:** SC; **Species:** Mice; **Pump:** 2004; **Duration:** 10 weeks;
ALZET Comments: Dose (40 mg/kg); animal info (5-week-old BALB/c mice);

Q7227: M. McMillin, *et al.* FXR-Mediated Cortical Cholesterol Accumulation Contributes to the Pathogenesis of Type A Hepatic Encephalopathy. CMGH 2018;6(1):47-63
Agents: Farnesoid X receptor morpholino, FXR mismatch, Cyclodextrin 2-hydroxypropyl-beta **Vehicle:** Endo-Porter solution;
Route: CSF/CNS; **Species:** Mice; **Pump:** Not Stated; **Duration:** Not Stated;
ALZET Comments: Dose (2-HbC, 6 mg/kg/day; FXR morpholino 1mg/kg; FXR mismatch 1 mg/kg); animal info (C57Bl/6 mice 25–30 g); ALZET brain infusion kit used; Brain coordinates (anteroposterior -0.34, mediolateral -1.0, and dorsoventricular -2.0);

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
Agents: Haloperidol, olanzapine **Vehicle:** Cyclodextrin, 2-Hydroxypropyl-B-; **Route:** SC; **Species:** Rat; **Pump:** 2ML4; **Duration:** 8 weeks;
ALZET Comments: 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;

Q7779: M. Buscato, *et al.* The antagonist properties of Bazedoxifene after acute treatment are shifted to stimulatory action after chronic exposure in the liver but not in the uterus. Mol Cell Endocrinol 2018;472(87-96
Agents: Estrogen, Conjugated Equine; Bazedoxifene **Vehicle:** Hydroxypropyl-beta-cyclodextrin; HEPES buffer; **Route:** SC;
Species: Mice; **Pump:** Not Stated; **Duration:** 14 days;
ALZET Comments: Dose (CE- 3 mg/kg/day, BZA- 10 mg/kg/day); animal info (Female, C57BL/6J); Conjugated Equine Estrogen aka CE, Bazedoxifene aka BE; replacement therapy (Estrogen);

Q6548: D. S. Yang, *et al.* Cyclodextrin has conflicting actions on autophagy flux in vivo in brains of normal and Alzheimer model mice. Hum Mol Genet 2017;26(5):843-859
Agents: Cyclodextrin, 2-hydroxypropyl-b- **Vehicle:** CSF (artificial); **Route:** CSF/CNS (right lateral ventricle); **Species:** Mice;
Pump: 2002; **Duration:** 14 days;
ALZET Comments: Dose (40 mg/kg/day); Controls received mp w/ vehicle; animal info (TgCRND8 and wild type (WT) mice); ~6.5 hour half-life (p.12); 2-hydroxypropyl-b-cyclodextrin aka CYCLO; Brain coordinates (AP – 0.22mm to bregma, ML 1.0mm to bregma, and DV 2.5mm to cranium.); neurodegenerative (Alzheimer's Disease);

Q5694: S. C. Tso, *et al.* Development of Dihydroxyphenyl Sulfonylisoindoline Derivatives as Liver-Targeting Pyruvate Dehydrogenase Kinase Inhibitors. J Med Chem 2017;60(3):1142-1150
Agents: Compound 17 **Vehicle:** DMSO; Cyclodextrin, 2-hydroxypropyl-b-; **Route:** SC; **Species:** Mice; **Pump:** 2001; **Duration:** 14 days; 2 weeks;
ALZET Comments: animal info (male, C57BL6J, 6-8 weeks old); 30% DMSO used; 17.5% Cyclodextrin; cardiovascular; Dose (40-50 mg/kg/day);

Q6763: A. L. Russell, *et al.* The interaction of dietary isoflavones and estradiol replacement on behavior and brain-derived neurotrophic factor in the ovariectomized rat. Neurosci Lett 2017;640(53-59
Agents: Estradiol, 17b- **Vehicle:** Cyclodextrin, 2-hydroxypropyl-b- ; water; **Route:** SC; **Species:** Rat; **Pump:** 2002; **Duration:** 14 days;
ALZET Comments: Dose (0.25 mg/kg body weight); 27% hydroxypropyl-β-cyclodextrin used; animal info (ovariectomized (OVX) female Sprague Dawley rats, weighing between 200–225 g,); replacement therapy (estradiol);

Q6196: L. Naia, *et al.* Comparative Mitochondrial-Based Protective Effects of Resveratrol and Nicotinamide in Huntington's Disease Models. Mol Neurobiol 2017;54(7):5385-5399
Agents: Resveratrol; Nicotinamide **Vehicle:** Cyclodextrin, 2-hydroxypropyl-b; Saline; **Route:** SC; **Species:** Mice; **Pump:** Not Stated; **Duration:** 28 days;
ALZET Comments: Dose (resveratrol 1 mg/kg/day; nicotinamide 250 mg/kg/day); Controls received mp w/ vehicle; animal info (9-month-old YAC128 transgenic mice and age-matched WT controls); neurodegenerative (Huntington's Disease);

Q6702: A. Nagahisa, *et al.* Pharmacology of grapiprant, a novel EP4 antagonist: receptor binding, efficacy in a rodent postoperative pain model, and a dose estimation for controlling pain in dogs. J Vet Pharmacol Ther 2017;40(3):285-292
Agents: Grapiprant **Vehicle:** Cyclodextrin, sulfobutylether-b-; **Route:** SC; **Species:** Rat; **Pump:** 2ML1; **Duration:** 7 days;
ALZET Comments: Dose (15, 30, and 60 mg/mL); 20% sulfobutylether-b-cyclodextrin used; Controls received mp w/ vehicle; animal info (Seven-week-old male Sprague Dawley rats);

Q6204: S. McIlvride, *et al.* A progesterone-brown fat axis is involved in regulating fetal growth. Sci Rep 2017;7(1):10671
Agents: Progesterone; Prolactin **Vehicle:** Cyclodextrin, 2-hydroxypropyl-b; **Route:** SC; **Species:** Mice; **Pump:** 2002; **Duration:** 14 days;
ALZET Comments: Dose (progesterone 250 µg/day; prolactin 7 µg/day); 20% (w/v) 2-hydroxypropyl-beta-cyclodextrin used; Controls received mp w/ vehicle; animal info (7–8 week old female mice with bilateral oophorectomy); replacement therapy (oophorectomy);

Q6156: M. Levesque, *et al.* Allopregnanolone decreases interictal spiking and fast ripples in an animal model of mesial temporal lobe epilepsy. Neuropharmacology 2017;121(12-19
Agents: Allopregnanolone **Vehicle:** Cyclodextrin, sulfobutyl ether-b; water; **Route:** SC; **Species:** Rat; **Pump:** 2ML2; **Duration:** 12 days;
ALZET Comments: Dose (9.6 mg/kg/day to 12.8 mg/kg/day); Sulfobutyl ether-b-cyclodextrin (SBEBCD; Captisol) was dissolved in 5 ml of water and 0.08 g of allopregnanolone was added to obtain a concentration of 16 ug/ml; Controls received mp w/ saline; animal info (45-50 day old Male Sprague-Dawley rats weighing 150-200 g); post op. care (given 15 mg/kg loading dose of allopregnanolone to avoid a delay in achieving the steady-state level);

Q6301: J. K. Karimy, *et al.* Inflammation-dependent cerebrospinal fluid hypersecretion by the choroid plexus epithelium in posthemorrhagic hydrocephalus. Nat Med 2017;23(8):997-1003
Agents: TAK-242 **Vehicle:** DMSO; saline; cyclodextrin, 2-hydroxypropyl-b-; **Route:** IV (jugular); **Species:** Rat; **Pump:** 2ML1; **Duration:** 7 days;
ALZET Comments: Dose (1 mg/kg); 0.5% DMSO, 10% b-cyclodextrin used; TAK-242 aka ethyl (6R)-6-[N-(2-chloro-4-fluorophenyl)sulfamoyl]cyclohex-1-ene-1-carboxylate;

Q6029: A. Dey, *et al.* Glucocorticoid-mediated activation of GSK3beta promotes tau phosphorylation and impairs memory in type 2 diabetes. Neurobiol Aging 2017;57(75-83
Agents: Corticosterone; 2-hydroxypropyl-B-cyclodextrin; TDZD-8TDZD-8, **Vehicle:** Saline; **Route:** CSF/CNS (hippocampus); **Species:** Mice; **Pump:** Not Stated; **Duration:** 2 weeks;
ALZET Comments: animal info (5 weeks); functionality of mp verified by ELISA; bilateral cannula; behavioral testing (Y-maze, novel object preference task); TDZD-8 is a non-ATP-competitive selective inhibitor of GSK3b; Dose (2 uM/day);

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
Agents: RG-108 **Vehicle:** Cyclodextrin, 2-hydroxypropyl-b-; **Route:** CSF/CNS (dorsomedial prefrontal cortex); **Species:** Rat; **Pump:** 2004; **Duration:** Not Stated;
ALZET Comments: 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;

Q6322: S. L. Ciarlone, *et al.* Effects of the synthetic neurosteroid ganaxolone on seizure activity and behavioral deficits in an Angelman syndrome mouse model. Neuropharmacology 2017;116(142-150
Agents: Ganaxolone **Vehicle:** Cyclodextrin , 2-hydroxypropyl-b-; **Route:** SC; **Species:** Mice; **Pump:** 1003D, 1004; **Duration:** 3 days; 4 weeks;
ALZET Comments: Dose (5 mg/mL); 30% 2-hydroxypropyl-β-cyclodextrin used; Controls received mp w/ vehicle; animal info (UBE3Atm1Alb/J null mutation AS, wild-type mice); post op. care (carprofen); behavioral testing (Open field, Rotarod, Wire hang test, Hind limb clasping, Y-maze spontaneous alternation task); Resultant plasma level (Ganaxolone was administered at 5 mg/mL dissolved in aqueous 30% b-cyclodextrin resulting in ~150 nM serum concentration); Ganaxolone is a synthetic neurosteroid; no stress ("To avoid the stress and anxiety of multiple daily injections, we administered ganaxolone via osmotic minipumps implanted subcutaneously, which allow for continuous dosing and a constant plasma concentrations." see pg.147);

Q5689: R. Thakkar, *et al.* NLRP3 Inflammasome Activation in the Brain after Global Cerebral Ischemia and Regulation by 17beta-Estradiol. Oxid Med Cell Longev 2016;2016(8309031
Agents: Estradiol, 17B- **Vehicle:** Cyclodextrin, B-; **Route:** SC; **Species:** Rat; Mice; **Pump:** 2002; **Duration:** 14 days;
ALZET Comments: animal info (Rats female, Sprague Dawley, 3 months old, OVX; Mice C27BL/6 PELP1, young adult, OVX); 20% Cyclodextrin used; ischemia (cerebral); replacement therapy (estradiol infusion); immunology; Resultant plasma level (10-15 pg/mL);

Q5205: Stephanie R. Sisley, *et al.* Hypothalamic Vitamin D Improves Glucose Homeostasis and Reduces Weight. Diabetes 2016;1-35
Agents: Vitamin D3, 1,25-dyhydroxy **Vehicle:** Cyclodextrin; hydroxypropyl-B-; **Route:** CSF/CNS (third ventricle); **Species:** Rat; **Pump:** 1004; **Duration:** 28 days;
ALZET Comments: Controls received mp w/ vehicle; animal info (male, Long Evans, adult); dose-response (Supplementary Figure 3); obesity; Dose (-.264 ug/day); Brain coordinates (i3vt 2.2A/P, 7.8D/V);

Q6665: P. Sini, *et al.* Pharmacological Profile of BI 847325, an Orally Bioavailable, ATP-Competitive Inhibitor of MEK and Aurora Kinases. Mol Cancer Ther 2016;15(10):2388-2398
Agents: BI 847325 **Vehicle:** Cyclodextrin, 2-hydroxypropyl-b-; **Route:** SC; **Species:** Mice (transgenic); **Pump:** Not Stated; **Duration:** Not Stated;
ALZET Comments: Dose (20 mg/kg/day); 25% Cyclodexins used ; animal info (Eight- to 10-week-old female BomTac:NMRI-Foxn1nu mice); enzyme inhibitor (ATP-competitive dual inhibitor of MEK and Aurora kinases); cancer (melanoma);

Q6651: G. W. Rhyasen, *et al.* AZD5153: A Novel Bivalent BET Bromodomain Inhibitor Highly Active against Hematologic Malignancies. Mol Cancer Ther 2016;15(11):2563-2574
Agents: AZD5153 **Vehicle:** DMSO; Cyclodextrin, 2-hydroxypropyl-b-; water; **Route:** SC; **Species:** Mice; **Pump:** 2002; **Duration:** 14 days;
ALZET Comments: Dose (6.4 mg/kg/wk or 12.8 mg/kg/wk); 20% DMSO; 60% v/v HP-B-CD in water used; animal info (Female CB17 SCID and SCID beige mice); enzyme inhibitor (BRD4); "We enhanced these findings by using mini-pump drug infusion, which eliminates PK fluctuations and provides consistent target inhibition. Compared with daily oral dosing, less than one fifth of AZD5153 was needed per week via mini-pump to achieve comparable efficacy." pg. 2573 ; Industry authored (AstraZeneca.);

Q4860: E. Maggioli, *et al.* Estrogen protects the blood–brain barrier from inflammation-induced disruption and increased lymphocyte trafficking. Brain, Behavior, and Immunity 2016;51(212-222
Agents: Estradiol **Vehicle:** Cyclodextrin, B-; **Route:** SC; **Species:** Mice; **Pump:** 2002; **Duration:** 14 days;
ALZET Comments: Controls received mp w/ vehicle; animal info (C57BL6 or AnxA1 -/-, 2 months old, OVX); replacement therapy (estradiol infusion); immunology; dose: 100nM

Q5547: E. Jeffery, *et al.* The Adipose Tissue Microenvironment Regulates Depot-Specific Adipogenesis in Obesity. Cell Metabolism 2016;24(1):142-50
Agents: Estrogen, cyclodextran-coated **Vehicle:** Water; **Route:** Not Stated; **Species:** Mouse; **Pump:** 1004;
ALZET Comments: animal info (8 weeks old); Cyclodextran-coated estrogen (Sigma E4389); Mice were allowed to recover for 2 weeks after pump implantation prior to experiment initiation; Therapeutic indication (obesity); Dose (2 ug/kg/day);

Q5347: D. A. Figge, *et al.* Dynamic DNA Methylation Regulates Levodopa-Induced Dyskinesia. J Neurosci 2016;36(24):6514-24
Agents: RG108 **Vehicle:** Cyclodextrin, hydroxypropyl-β-; **Route:** CSF/CNS (dorsal striatum); **Species:** Rat; **Pump:** 2004; **Duration:** 14 days;
ALZET Comments: Controls received mp w/ vehicle; animal info (male Sprague-dawley, 60 – 90 days old, 180-200 g); functionality of mp verified by behavioral testing; 5% cyclodextrin used; Plastics One unilateral guide cannula used; post op. care (7 days of care, buprenorphine and wound care for pain management); behavioral testing (forepaw adjusting steps test); tissue perfusion (brain); delayed delivery "additional polyethylene tubing was added to provide a 14 d prime of vehicle before RG-108 administration" (pg. 6515); "rats were given a unilateral dopamine lesion to the left medial forebrain bundle" (pg. 6515); Brain coordinates: anteroposterior, 0 from bregma, -3mm lateral from midline, and -3.5 mm from the dura; Dose (100 uM);

Q4821: Daniel G. Donner, *et al.* Trenbolone Improves Cardiometabolic Risk Factors and Myocardial Tolerance to Ischemia-Reperfusion in Male Rats With Testosterone-Deficient Metabolic Syndrome. Endocrinology 2016;157(1):368-381
Agents: Testosterone; trenbolone **Vehicle:** Cyclodextrin, 2-hydroxypropyl-b-; **Route:** SC; **Species:** Rat; **Pump:** 2004; **Duration:** 8 weeks;
ALZET Comments: Controls received mp w/ vehicle; animal info (male, Wistar, 12 weeks old, 300g); functionality of mp verified by plasma; pumps replaced every 4 weeks; 45% cyclodextrin used; ischemia (cardiac); post op. care (buprenorphine 10 ug/kg/day IM; enrofloxacin 5 mg/kg ip for 3 days); long-term study; Dose (2 mg/kg/day);

Q6020: W. R. Crum, *et al.* Chronic exposure to haloperidol and olanzapine leads to common and divergent shape changes in the rat hippocampus in the absence of grey-matter volume loss. Psychol Med 2016;46(15):3081-3093
Agents: Haloperidol, Olanzapine **Vehicle:** Cyclodextrin, hydroxypropyl-β-, Ascorbic acid; **Route:** SC; **Species:** Rat; **Pump:** 2ML4; **Duration:** 28 days;
ALZET Comments: Controls received mp w/vehicle; animal info (10 weeks old) pumps replaced every 4 weeks; Therapeutic indication (Learning and memory, hippocampus, antipsychotic); Dose (HAL (2 mg/kg perday), or OLZ (10 mg/kg perday);

Q5276: H. Amhaoul, *et al.* P2X7 receptor antagonism reduces the severity of spontaneous seizures in a chronic model of temporal lobe epilepsy. Neuropharmacology 2016;105(175-85
Agents: JNJ-42253432 **Vehicle:** Cyclodextrin, B-; **Route:** SC; **Species:** Rat; **Pump:** 2ML1; **Duration:** 1 week;
ALZET Comments: Controls received mp w/ vehicle; animal info (7 wk old male Sprague Dawley rats, 255g); 20% cyclodextrin used; good methods (pg. 177); ALZET polyethylene catheter used; Dose (0.6 g/kg/2 ml);

Q4884: S. S. J. X. Z.-H. L. J. H. &, *et al.* Lack of JWA Enhances Neurogenesis and Long-Term Potentiation in Hippocampal Dentate Gyrus Leading to Spatial Cognitive Potentiation. MOLECULAR NEUROBIOLOGY 2016;53(355-368
Agents: Thymidine, 3'-azido-3'-deoxy-; cyclodextrin, methyl-b- **Vehicle:** Saline; PEG 400; **Route:** CSF/CNS (dentate gyrus); **Species:** Mice; **Pump:** Not Stated; **Duration:** 14 days;
ALZET Comments: Controls received mp w/ vehicle; animal info (JWA-nKO); behavioral testing (morris water maze, rotarod test); used Plastics One cannula; used dental cement and screws; enzyme inhibitor (telomerase);