Recent References (2018-Present) on the Administration of Estrogens Using ALZET® Osmotic Pumps

**Agents:** 17 B-Estradiol **Vehicle:** DMSO; Propylene Glycol; **Route:** SC; **Species:** Mice; **Pump:** 1004; **Duration:** 4 weeks;
**ALZET Comments:** Dose (0.5 ug/day); 50% DMSO used; Controls received mp w/ vehicle; animal info (C57BL/6 mice, 2-3 months old); 17 B-Estradiol aka E2; replacement therapy (estradiol);

**Agents:** Estradiol receptor beta; Oxytocin; Lentivirus **Vehicle:** CSF, artificial; **Route:** CSF/CNS; **Species:** Mice; **Pump:** 2002; **Duration:** 2 weeks;
**ALZET Comments:** Animal info (Male mice, 6 weeks old); behavioral testing (Animal Behavior Test); Brain coordinates (anteroposterior (AP) = −1.4, mediolateral (ML) = ±3.5, dorsoventral (DV) = −5.1); neurodegenerative (Autism spectrum disorders);

**Agents:** G protein-coupled estrogen receptor 1 **Vehicle:** DMSO; Saline; **Route:** IP; **Species:** Rat; **Pump:** 2ML4; **Duration:** Not Stated;
**ALZET Comments:** Dose (400 μg/kg/day); 75% DMSO in Saline used; Controls received mp w/ vehicle; animal info (female Dahl SS rats, 12-14 weeks old); Blood pressure measured via telemetry; G protein-coupled estrogen receptor 1 aka GPER1; cardiovascular;

**Agents:** Estradiol, 17B-; Tamoxifen; Raloxifene; BE360 **Vehicle:** PEG 300; **Route:** SC; **Species:** Mice; **Pump:** 2002; **Duration:** 2 weeks;
**ALZET Comments:** Dose (0.1 μg/day 17B-Estradiol; 1000 μg/day Tamoxifen; 1000 μg/day Raloxifene; 30 and 100 μg/day BE360); animal info (Female ddY mice (8 weeks old)); behavioral testing (Forced swimming test); 17B-Estradiol aka E2, Tamoxifen aka TAM, Raloxifene aka RAL; replacement therapy (estradiol);

**Agents:** Estradiol, 17B-; Testosterone, 17a-methyl **Vehicle:** Ethanol; Saline; **Route:** IP; **Species:** Fish; **Pump:** 1007D; **Duration:** 21 days;
**ALZET Comments:** Dose (0.48 μg/day 17B-Estradiol; 1000 μg/day Tamoxifen; 1000 μg/day Raloxifene; 30 and 100 μg/day BE360); animal info (Female ddY mice (8 weeks old)); behavioral testing (Forced swimming test); 17B-Estradiol aka E2, Tamoxifen aka TAM, Raloxifene aka RAL; replacement therapy (estradiol);

**Agents:** Estradiol, 17B- **Vehicle:** Cyclodextrin; **Route:** SC; **Species:** Mice; **Pump:** Not Stated; **Duration:** 14 days;
**ALZET Comments:** Dose (0.0167 mg); Controls received mp w/ vehicle; animal info (male and female catfish); functionality of mp verified by residual volume; 17B-estradiol aka E2, 17α-methylestradiol aka MT; replacement therapy (testosterone; estradiol);
Q8591: S. V. Koebele, et al. Characterizing the effects of tonic 17beta-estradiol administration on spatial learning and memory in the follicle-deplete middle-aged female rat. Horm Behav 2020;126(104854
Agents: Estradiol, 17-beta- Vehicle: PEG; Route: SC; Species: Rat; Pump: 2006; Duration: 6 weeks;
ALZET Comments: Dose (3 ug/day); Controls received mp w/ vehicle; animal info (female, virgin, Fischer-344 rats, 11 months old); 17-beta-estradiol aka E2; replacement therapy (estradiol);

Agents: 17 B-Estradiol; 4,4′,4′′-(4- Propyl-[1H]-pyrazole-1,3,5-triyl) trisphenol; Diarylpropiolnitrile; G-1 Vehicle: DMSO; Hydroxypropl-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);

Agents: Estradiol benzoate, 17-beta- Vehicle: PEG; Route: SC; Species: Rat; Pump: Not stated; Duration: 28 days;
ALZET Comments: Dose (750 ng/6 ul/day); animal info (Transgenic male (300 g) and female Long Evans rats (260 g)); replacement therapy (estradiol);

Agents: Estradiol, 17B- Vehicle: Not stated; Route: Intraovarian; Species: Mice; Pump: Not stated; Duration: 8 weeks;
ALZET Comments: Dose (20 ug/kg/day); animal info (Six-month-old WT C57Bl6 mice); 17B-Estradiol aka E2; replacement therapy (estradiol);

Agents: Estradiol, 17 beta- Vehicle: Not stated; Route: SC; Species: Rat; Pump: 2ML4; Duration: 5 weeks;
ALZET Comments: Dose (75 pg/kg/d); Controls received mp w/ vehicle; animal info (Male 8 week old Sprague–Dawley rats (300–350 g)); cardiovascular; Therapeutic indication (Pulmonary arterial hypertension);

Agents: 17B-Estradiol Vehicle: DMSO; Route: SC; Species: Mice; Pump: 1004; Duration: Not Stated;
ALZET Comments: Dose (13.9 mM); Controls received mp w/ vehicle; animal info (Female, 6-8 weeks old, 20-23 g); post op. care (Buprenorphine); gene therapy;

Agents: 17B Estradiol Vehicle: PEG/DMSO; Route: SC; Species: Rat; Pump: 2ML4; 2006; Duration: 7 days; 35 days;
ALZET Comments: Dose (0.5 mg/kg/day); Controls received mp w/ vehicle; animal info (Sprague Dawley, 57-70 days old, Female); cardiovascular;

Agents: Estradiol, 17b- Vehicle: Not Stated; Route: SC; Species: Mice; Pump: Not Stated; Duration: 8 weeks;
ALZET Comments: Dose (2 ug/day); animal info (male non-transgenic (NTG) and DTG mice); behavioral testing (Water Maze Test); 17b-estradiol aka E2; neurodegenerative (neurodegeneration);
Agent: 17b-Estradiol Vehicle: Propylene Glycol; Route: SC; Species: Mice; Pump: 1004; Duration: 28 days;
ALZET Comments: Dose (0.2 mg/g/kg/day); animal info (C57BL/6J, 5 months old); 17B-Estradiol aka Estrogen; dependence;

Agent: 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);

Agent: Estradiol, 17 beta- Vehicle: Not Stated; Route: SC; Species: Mice; Pump: 1007D; Duration: 7 days;
ALZET Comments: Dose (0.0167mg); Controls received mp w/ placebo; animal info (Chimera male);
replacement therapy (ovariectomy);

Q7292: C. B. Herber, et al. 2', 3', 4'-trihydroxychalcone is an Estrogen Receptor Ligand Which Modulates the Activity of 17β-estradiol. bioRxiv 2019;1-10
Agent: Estradiol, 17beta-; trihydroxychalcone, 2', 3', 4'- Vehicle: DMSO, Ethanol, Water; Route: Not Stated; Species: Mice; Pump: 2006; Duration: 4 weeks;
ALZET Comments: Dose (1 μg 17beta-estradiol, 2 ug CC7); 50% DMSO, 25% ethanol, 25% deionized water used; Controls received mp w/ vehicle; animal info (8 week old C57bl/6J female ovariectomized mice);
Therapeutic indication (menopausal hormone therapy);

Agent: Estradiol Vehicle: Saline; Route: SC; Species: Rat; Pump: Pump model not stated; Duration: 10 weeks;
ALZET Comments: Dose (0.025 mg/day); Controls received mp w/ vehicle; animal info (female, Sprague-Dawley, 12 weeks old, 250-300 g);
neurodegenerative (Alzheimer’s disease);

Agent: Estradiol Vehicle: CSF, artificial; Route: SC; CSF/CNS (lateral ventricle); Species: Mice; Pump: 1004; Duration: 3 weeks;
ALZET Comments: Dose ((SC 50 μg/kg/day), (ICV 1 μg/kg/day)); Controls received mp w/ vehicle; animal info (16 weeks, female, C57BL/6); behavioral testing (Open field, Light-dark box, Tail suspension, Forced swim); Multiple pumps per animal (2 for SC group); comparison of SC mp vs ICV mp; ALZET brain infusion kit 3 used; Brain coordinates (0.3 mm posterior to the bregma, 0.9 mm lateral to the central sulcus, 2.5 mm below the skull); replacement therapy (estradiol); Therapeutic indication (mouse model of postmenopausal obesity that exhibited anxiety disorder and depression phenotypes were improved by E2 replacement.);

Agent: Estrogen-dendrimer conjugate Vehicle: Not Stated; Route: SC; Species: Mice; Pump: 2004; Duration: 28 days;
ALZET Comments: Dose (240mg/kg/day); Controls received mp w/ vehicle; animal info (C57BL/6J mice);
Agents: estradiol, 17-beta-; DHED Vehicle: PEG; Route: SC; Species: Mice; Pump: Not Stated; Duration: 8 weeks;
ALZET Comments: Dose ((E2 2 μg/day), (DHED 2 μg/day)); Controls received mp w/ vehicle; animal info (5.5-6 months, male, C57BL/6 and APPswe/PS1E9); behavioral testing (radial-arm water maze); pumps replaced every 4 weeks; 10beta,17beta-dihydroxyestra-1,4-dien-3-one (DHED) is a brain-selective prodrug of E2; neurodegenerative (Alzheimer’s); pump model not stated but flow rate listed as 0.025 μL/min; Therapeutic indication (DHED-based estrogen treatment shown to decrease APP and Abeta peptide levels concomitantly improving learning in male animals at an early stage of the neuropathology.);

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 (Cerebral);

Agents: estradiol, 17-beta- Vehicle: PEG; Route: SC; Species: Rat; Pump: 2002; Duration: 13 days;
ALZET Comments: Dose (10 μg/kg/d); Controls received mp w/ vehicle; animal info (PND 21, male, Sprague-Dawley); comparison of soy protein isolate vs mp;

Agents: Estradiol; Estrogen-dendrimer conjugate Vehicle: Not stated; Route: Not Stated; Species: Not Stated; Pump: Not Stated; Duration: 2 weeks;
ALZET Comments: ischamia (placental); replacement therapy (ovarectomy);

Agents: 17B-Estradiol Vehicle: Not stated; Route: SC; Species: Rat; Pump: Not stated; Duration: 1, 3, 7 days;
ALZET Comments: animal info (Female, Wistar;) dependence;

Agents: Angiotensin II, estradiol, 17beta- Vehicle: PBS, Ethanol; Route: SC; Species: Mice; Pump: Not Stated; Duration: Not Stated;
ALZET Comments: Ang-II (1000 ng/kg/min), Estradiol (0.25 ug/hr); Beta-estradiol reconstituted in a PBS-ethanol solution [9:1]; animal info (8- to 12-week-old female C57BL/6 mice);

Agents: Estrogen-dendrimer conjugate, angiotensin II, Estetrol Vehicle: DMSO; Route: SC; Species: Mice; Pump: 2004; Duration: 28 days;
ALZET Comments: Dose (80 ug/kg/day-EDC, 0.5 mg/kg/day- Ang II, 6 mg/kg/day -estetrol ); Controls received mp w/ vehicle; animal info (C57Bl/6); cardiovascular;

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);