Recent References (2015-2020) on the Administration of Chemotherapeutic Agents Using ALZET® Osmotic Pumps

This is a truncated list. A list of all Chemotherapeutic Agents administered using ALZET Osmotic Pumps can be found here.

**Ara-C**


**Agents:** Ara-C; **Vehicle:** Not stated; **Route:** CSF/CNS (intracerebral); IV; **Species:** Mice; **Pump:** 1007D; **Duration:** 7 days;

**ALZET Comments:** Controls received mp w/ vehicle; animal info (male mice); ALZET brain infusion kit 3 used; Brain coordinates (0 mm AP and −0.9 mm ML to the bregm); gene therapy;


**Agents:** Ara-C; **Vehicle:** Serum, Physiological; **Route:** CSF/CNS (lateral ventricle); **Species:** Sheep; **Pump:** 2ML4; **Duration:** 4 weeks;

**ALZET Comments:** 4% Physiological Serum used; Controls received mp w/ vehicle; animal info (primiparous parturient Ile de France ewes (2–3 years old)); post op. care (amoxicillin, diurizone, finadyne, morphine); functionality of mp verified; Brain coordinates (rostrocaudal plane, 36 mm; mediolateral plane, 4.3 ± 0.7mm from the middle of the third ventricle; and depth, 16.6 ± 1mm from the cortex surface); bilateral cannula used;


**Agents:** Ara-C; **Vehicle:** Not Stated; **Route:** CSF/CNS (third ventricle); **Species:** Sheep; **Pump:** 2ML4; **Duration:** 4 Weeks;

**ALZET Comments:** Dose (500ug/day); animal info (Ewes, 58.8 ± 4.5 kg , 59.4 ± 4 kg ); Ara-C aka cytosine-b-D-arabinofuranoside; Ara-C aka cytosine-b-D-arabinofuranoside;


**Agents:** Ara-C; ganciclovir; **Vehicle:** Not Stated; **Route:** CSF/CNS (lateral ventricle); **Species:** Mice; **Pump:** 1007D; **Duration:** 3 days; 7 days; 14 days;

**ALZET Comments:** animal info (Oct4 CKO;tk); Brain coordinates (10.2 mm anterior, 10.7 mm lateral, depth of 2.5 mm below the skull, relative to bregma)


**Agents:** Ara-C; **Vehicle:** Not Stated; **Route:** CSF/CNS; **Species:** Mice; **Pump:** Not Stated; **Duration:** 6 days;

**ALZET Comments:** animal info (Wild-type CD1 mice); Ara-C is an antimitotic agent a.k.a. cytosine-b-D-arabinofuranoside;


**Agents:** Ara-C; **Vehicle:** Not Stated; **Route:** CSF/CNS (lateral ventricle); **Species:** Mice (knockout); **Pump:** 2001; **Duration:** 7 days;

**ALZET Comments:** Animal info (2 months); ALZET Brain infusion kit used; Dose (2%);

**Bevacizumab**

**ALZET Comments**: Etoposide, Bevacizumab, IMCA12, Interleukin-13-PE38, Tetrakis Chlorin; CSF/CNS (intratumoral); Mice, Rat; 2001D, 1003D, 1007D, 1004, 2004; 24 hours, 3, 7, 21, 28 days; ALZET brain infusion kit 1,2, and 3 used; cancer (Glioblastoma).


**ALZET Comments**: Bevacizumab; PBS; CSF/CNS (intratumoral); Mice; Pump model not stated; 28 days; Dose (25 ug/ul); Controls received mp w/ vehicle; comparison of weekly IV injections vs intratumoral delivery via minipump; cancer (Glioma); “Localized BEV delivery by Alzet micro-osmotic pumps is more effective in reducing tumor size and tumor cell infiltration when compared with systemic administration.”.


**ALZET Comments**: Bevacizumab; Saline; CSF/CNS (intratumoral); Mice (nude); 1004; 28 days; Controls received mp w/ vehicle; animal info (athymic, nu/nu); ALZET brain infusion kit used; cancer (glioma); immunology; “Bevacizumab was delivered into the tumor using chronic pump-mediated delivery, defined as “convection-enhanced delivery” or CED. This CED method was used because it has the advantage of achieving the desirable drug concentration in the microenvironment of the glioma while avoiding the use of high initial doses.” pg 2;.


**ALZET Comments**: Bevacizumab; Saline; SC; Mice; 1002; 4 weeks; Controls received mp w/ vehicle; animal info (G-CSF-KO, 10-12 weeks); cardiovascular;.

**Bleomycin**


**Agents**: Bleomycin **Vehicle**: Not Stated; **Route**: SC; **Species**: Mice; **Pump**: Not Stated; **Duration**: 14 days;

**ALZET Comments**: Dose (50 μg/hour); animal info (Wild-type C57BL/6J mice Six-week-old); Therapeutic indication (lung fibrosis);


**Agents**: Bleomycin **Vehicle**: Not stated; **Route**: SC; **Species**: Mice; **Pump**: Not stated; **Duration**: 28 days;

**ALZET Comments**: Dose (100 mg/kg); animal info (C57BL/6); dependence;


**Agents**: Bleomycin hydrochloride **Vehicle**: Saline; **Route**: SC; **Species**: Mice; **Pump**: 2001; **Duration**: 14 days;

**ALZET Comments**: Dose (100 mg/kg); Controls received i.p. injection w/ DMSO; animal info (7 weeks, female, C57BL/6); comparison of i.p. temsirolimus injection vs mp; BLM causes marked inflammation and epithelial injury in the lung; immunology; BLM dissolved in saline for pump (injury group) although controls used i.p. injected DMSO;

**Q7769**: F. Kurosaki, et al. AAV6-Mediated IL-10 Expression in the Lung Ameliorates Bleomycin-Induced Pulmonary Fibrosis in Mice. Hum Gene Ther 2018;29(11):1242-1251

**Agents**: bleomycin **Vehicle**: Saline, sterile; **Route**: SC; **Species**: Mice; **Pump**: 2001; **Duration**: 7 days;

**ALZET Comments**: Dose (1 μL/h of 125 mg/kg bleomycin); Controls received no vector and mp w/ vehicle; animal info (10-12 weeks, male, C57BL6/J, 25-30g); immunology;

**Agents:** Bleomycin  
**Vehicle:** Saline; **Route:** SC; **Species:** Mice; **Pump:** 2001; **Duration:** 7 days;  
**ALZET Comments:** Dose (140 mg/kg); Controls received mp w/ vehicle; animal info (5 week old, C57BL/6, female); dependence;

**Carboplatin**


**Agents:** Carboplatin  
**Vehicle:** Not stated; **Route:** CSF/CNS (intracerebral); IV; **Species:** Rat; **Pump:** Not stated; **Duration:** 7 days;  
**ALZET Comments:** Dose (84 ug/g); animal info (Fischer rats); cancer (Glioma);

**Cisplatin**


**Agents:** Cisplatin  
**Vehicle:** Saline; **Route:** CSF/CNS; **Species:** Mice; **Pump:** 1003D; **Duration:** 3 days;  
**ALZET Comments:** Dose (1080, 120, or 12 ug/kg/day); 0.9% Saline used; animal info (C57BL/6, NSG, 8-10 weeks old, 18-21 weeks old); ALZET brain infusion kit 3 used; cyanoacrylate adhesive; cancer (Glioma);

**Doxorubicin**


**Agents:** Doxorubicin  
**Vehicle:** Saline; **Route:** SC; **Species:** Rats; **Pump:** 2002; **Duration:** 14 days;  
**ALZET Comments:** Controls received mp w/ vehicle; Dose (30 mg/kg body weight); animal info (Male Wistar rats);


**Agents:** Doxorubicin  
**Vehicle:** PBS; **Route:** SC; **Species:** Mice; **Pump:** 2002; **Duration:** 14 days;  
**ALZET Comments:** Dose (15 μg/g); Controls received mp w/ vehicle; animal info (CBA x C57BL/6 F1 female mice); cardiovascular; “ Local toxicity or vesicant effects of doxorubicin (tissue damage from escaping out of the vein) do not occur with Alzet pumps and so were also absent” pg. 4;


**Agents:** Doxorubicin hydrochloride  
**Vehicle:** PBS; **Route:** IP; **Species:** Mice; **Pump:** 1007D; **Duration:** 7 days;  
**ALZET Comments:** Controls received mp w/ vehicle; cancer (Sarcoma); Therapeutic indication (Cancer; soft tissue sarcoma; xenograft model);

**Endostatin**

Agents: Bevacizumab; RNA, small interfering (anti-HIF-1α/PEG); Immunotoxin, DTAT/DTATEGF; Endostatin; 17-ODYA; Miconazole; **Vehicle**: Not Stated; **Route**: CSF/CNS (intratumoral), IV; **Species**: Mice; **Pump**: Not Stated; **Duration**: Not Stated; 
**ALZET Comments**: enzyme inhibitor (CYP epoxygenase); cancer (glioblastoma); This review describes methods (including convection-enhanced delivery devices, implantable polymer devices, nanocarriers, and cellular vehicles) to deliver antiangiogenic factors to intracranial tumors.

**Etoposide**


**ALZET Comments**: Etoposide, Bevacizumab, IMCA12, Interleukin-13-PE38, Tetrakis Chlorin; CSF/CNS (intratumoral); Mice, Rat; 2001D, 1003D, 1007D, 1004, 2004; 24 hours, 3, 7, 21, 28 days; ALZET brain infusion kit 1,2, and 3 used; cancer (Glioblastoma);

**Fluorouracil**

**Q7630**: H. Y. Jang, *et al*. Schedule-dependent synergistic effects of 5-fluorouracil and selumetinib in KRAS or BRAF mutant colon cancer models. Biochemical Pharmacology 2019;160(110-120

**Agents**: fluorouracil, 5- **Vehicle**: Saline; **Route**: SC; **Species**: Mice; **Pump**: Not Stated; **Duration**: 7 days; 
**ALZET Comments**: Dose (10, 30 mg/kg/day); Controls received mp w/ vehicle; animal info (5.5 weeks, male, athymic, Balb-c/nu); cancer (colorectal); “An equivalent dose of 5-FU (JW Pharmaceutical, Seoul, Korea) was continuously delivered by osmotic pumps (Durect, Cupertino, CA, USA) over 7 days, to minimize possible side effects of severe weight loss by repeated bolus injections of 5-FU [26].” pg.112; Therapeutic indication (improved effectiveness of capecitabine (5-FU precursor) monotherapy due to synergistic effect with MEK inhibitor);


**Agents**: Fluorouracil, 5- **Vehicle**: Not Stated; **Route**: CSF/CNS (ventricle); **Species**: Rat; **Pump**: Not Stated; **Duration**: Not Stated; 
**ALZET Comments**: cancer (glioblastoma); “The use of Alzet osmotic pumps delivered the prodrug directly to the brain at a constant and defined pace, and therefore reduced the dose of the prodrug required for the same therapeutic effect.” pg.5;

**Imatinib**


**Agents**: PKC inhibitor, Imatinib, or both **Vehicle**: Saline; **Route**: SC; **Species**: Mice; **Pump**: 2002; **Duration**: 14 days; 
**ALZET Comments**: Dose (PKC inhibitor- 0.5 mM, Imatinib-1 mM ); Controls received mp w/ vehicle; gene therapy;


**Agents**: Ro-31-8220; imatinib **Vehicle**: PBS; **Route**: SC; **Species**: Mice (transgenic); **Pump**: 2002; **Duration**: 14 days; 
**ALZET Comments**: Dose (Ro-31-8220 (1 mM); imatinib (0.5 mM)); Controls received mp w/ vehicle; animal info (6-12 week old transgenic mice); enzyme inhibitor (Protein Kinase C);


**Agents**: Angiotensin II; Imatinib mesylate **Vehicle**: Saline; **Route**: SC; **Species**: Mice; **Pump**: 1002; **Duration**: 2 weeks;
ALZET® Bibliography

**ALZET Comments:** Dose (Angiotensin II: 3 mg/kg/day; Angiotensin II + Imatinib mesylate: 60 mg/kg per day); 0.9% saline used; Controls received mp w/ vehicle; animal info (12-30 week old C57BL/6 male mice weighing 25-35g); enzyme inhibitor (tyrosine kinase, c-Abl); cardiovascular; Pump incorrectly noted as model #1014D


**Agents:** Imatinib mesylate **Vehicle:** Saline; **Route:** SC; **Species:** Mice (pregnant); **Pump:** 2001; **Duration:** 5 days;

**ALZET Comments:** Controls received mp w/ vehicle; animal info (10 weeks old); cancer (Breast); Imatinib mesylate a.k.a Gleevec; Therapeutic indication (Mammary gland development, Breast cancer); Dose (21 mg/mouse/week); enzyme inhibitor (tyrosine kinase);

**Q4546:** R. J. Napier, *et al.* Low Doses of Imatinib Induce Myelopoiesis and Enhance Host Anti-microbial Immunity. PLoS Pathogens 2015;11(U1651-U1677

**Agents:** Imatinib mesylate **Vehicle:** Water; **Route:** SC; **Species:** Mice; **Pump:** 1007D; 2002; **Duration:** 28 days;

**ALZET Comments:** Controls received mp w/ vehicle; animal info (male, C57BL6, 6 weeks old); functionality of mp verified by serum levels; dose-response (pg.9); immunology; enzyme inhibitor (tyrosine kinase);

**Marimastat**


**ALZET Comments:** Marimastat; DMSO; water; SC; Rat; 2ML4; 28 days; Controls received mp w/ vehicle; animal info (male, Lewis); 50% DMSO used; behavioral testing (resting posture, gait).;

**Methotrexate**

**Q6622:** I. M. Moore, *et al.* Effects of Intraventricular Methotrexate on Neuronal Injury and Gene Expression in a Rat Model: Findings From an Exploratory Study. Biol Res Nurs 2016;18(5):505-14

**ALZET Comments:** Methotrexate; CSF, artificial; CSF/CNS (left lateral ventricle); Rat; 1003D; 1 day; Dose (2 mg/kg or 4 mg/kg); Controls received mp w/ vehicle; ALZET brain infusion kit 2 used; Brain coordinates (2 mm left of sagittal suture and 1 mm posterior to coronal suture to a depth of 3.5 mm); Cannula placement verified via injection of Evan’s blue dye; cyanoacrylate adhesive;

**Paclitaxel**

**Q5313:** M. Cadamuro, *et al.* Low-Dose Paclitaxel Reduces S100A4 Nuclear Import to Inhibit Invasion and Hematogenous Metastasis of Cholangiocarcinoma. Cancer Res 2016;76(16):4775-84

**ALZET Comments:** Paclitaxel; Cremophor EL, Ethanol; IP; Mice (SCID); 1004; 2 weeks; Controls received mp w/ vehicle; animal info (SCID mice 6–8 weeks old); functionality of mp verified by bioluminescence imaging to check metastatic spread; 50% Cremophor, 50% ethanol used; cancer (Cholangiocarcinoma); Xenograft model; Dose (2.6 mg/kg/d).;

**Topotecan**


**Agents:** Topotecan **Vehicle:** Saline; **Route:** CSF/CNS (ventricle); **Species:** Mice; **Pump:** 2004; **Duration:** 28 days;
ALZET Comments: Dose (5.28 μg/day); Controls received mp w/ vehicle; animal info (J:NU mice (homozygous for the Foxn1nu mutation); comparison of bolus dosing vs mp; cancer (Leptomeningeal medulloblastoma);

Agents: Topotecan Vehicle: Not Stated; Route: SC; Species: Mice (nude); Pump: 2001D; Duration: Not Stated;
ALZET Comments: cancer;
Chemotherapeutic Agents Administered Using ALZET® Osmotic Pumps

To request a list of references for an agent, please click the agent below.

<table>
<thead>
<tr>
<th>Angiostatin</th>
<th>Cyclophosphamide</th>
<th>Methotexate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ara-C</td>
<td>Doxorubicin</td>
<td>Paclitaxel</td>
</tr>
<tr>
<td>Azacytidine</td>
<td>Erlotinib</td>
<td>Pemetrexed</td>
</tr>
<tr>
<td>Bevacizumab</td>
<td>Endostatin</td>
<td>Ruxolitinib</td>
</tr>
<tr>
<td>Bleomycin</td>
<td>Etoposide</td>
<td>Sorafenib</td>
</tr>
<tr>
<td>Carboplatin</td>
<td>Fluorouracil</td>
<td>Sunitinib</td>
</tr>
<tr>
<td>CDDP</td>
<td>Gefitinib</td>
<td>TIMP</td>
</tr>
<tr>
<td>Cediranib</td>
<td>Imatinib</td>
<td>Topotecan</td>
</tr>
<tr>
<td>Cetuximab</td>
<td>Marimastat</td>
<td>Vinblastine</td>
</tr>
<tr>
<td>Cisplatin</td>
<td>Metacept 1</td>
<td>Vincristine</td>
</tr>
</tbody>
</table>