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

Q8458: J. Enriquez Perez*, et al.* Convection-enhanced delivery of temozolomide and whole cell tumor immunizations in GL261 and KR158 experimental mouse gliomas. BMC Cancer 2020;20(1):7
Agents: Temozolomide **Vehicle:** PBS; Saline; **Route:** CSF/CNS (intratumoral); **Species:** Mice; **Pump:** 1003D; **Duration:** 3 days;
ALZET Comments: Dose (2.4mg/Kg/day); 0.9% NaCl used; Controls received mp w/ vehicle; animal info (C57BL/6 female mice 8–10weeks old); temozolomide aka TMZ; ALZET brain infusion kit 3 used; Brain coordinates (1.5 mm to the right and 1.0 mm anterior of the bregma); immunology;

Q7039: X. Yu*, et al.* Synergistic antitumor effects of 9.2.27-PE38KDEL and ABT-737 in primary and metastatic brain tumors. PLoS One 2019;14(1):e0210608
Agents: 9.2.27-PE38KDEL immunotoxin, ABT-737 **Vehicle:** PBS, captisol, mouse serum albumin; **Route:** CSF/CNS (intratumoral); **Species:** Mice (nude); **Pump:** 1007D; **Duration:** 3 days;
ALZET Comments: 5% Captisol and 2% mouse serum albumin used; animal info (Nude mice (22–30 g, 6–8 weeks); ALZET brain infusion kit 3 used; cancer (glioblastoma); “Convection-enhanced delivery (CED), utilizing osmotic pumps, has been successfully used to bypass the blood-brain barrier and to deliver ITs directly into brain tumors” pg.12 ;

Q7065: G. Mastrella*, et al.* Targeting APLN/APLNR improves anti-angiogenic efficiency and blunts pro-invasive side effects of VEGFA/VEGFR2-blockade in glioblastoma. Cancer Research 2019;79(9):2298-2313
Agents: apelin-F13A, DC101, Antibody,anti-VEGFR2 **Vehicle:** CSF, artificial; **Route:** CSF/CNS (intratumoral); **Species:** Mice; **Pump:** 1002; 2004; **Duration:** 14 and 28 days;
ALZET Comments: Dose (30 or 60 µg of apelin-F13A, 0.8 mg of DC101); apelin-F13A is a mutant APLNR ligand, DC101 is a VEGFR2-blocking antibody; ALZET brain infusion kit 3 used; cancer (glioblastoma);

R0378: B. Halle*, et al.* Convection-enhanced Drug Delivery for Glioblastoma: A Systematic Review Focused on Methodological Differences in the Use of the Convection-enhanced Delivery Method. Asian-Australasian Journal of Animal Sciences 2019;14(1):5-14
Agents: Etoposide, Bevacizumab, IMCA12, Interleukin-13-PE38, Tetrakis Chlorin **Vehicle:** Not Stated; **Route:** CSF/CNS (intratumoral); **Species:** Mice, Rat; **Pump:** 2001D, 1003D, 1007D, 1004, 2004; **Duration:** 24 hours, 3, 7, 21, 28 days;
ALZET Comments: ALZET brain infusion kit 1,2, and 3 used; cancer (Glioblastoma);

R0380: A. Clavreul*, et al.* Nanocarriers and nonviral methods for delivering antiangiogenic factors for glioblastoma therapy: the story so far. Int J Nanomedicine 2019;14(2497-2513
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.

Q7219: Y. X. Liu*, et al.* Delivery of bevacizumab by intracranial injection: assessment in glioma model. Onco Targets Ther 2018;11(2673-2683
Agents: Bevacizumab **Vehicle:** PBS; **Route:** CSF/CNS (intratumoral); **Species:** Mice; **Pump:** Not Stated; **Duration:** 28 days;
ALZET Comments: 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 infil¬tration when compared with systemic administration.”

Q5934: D. Yu*, et al.* Multiplexed RNAi therapy against brain tumor-initiating cells via lipopolymeric nanoparticle infusion delays glioblastoma progression. Proc Natl Acad Sci U S A 2017;114(30):E6147-E6156
Agents: RNA, small interfering **Vehicle:** Not Stated; **Route:** CSF/CNS (intratumoral); **Species:** mice (nude); **Pump:** 1002, 2002; **Duration:** 14 days;

ALZET Comments: animal info (athymic nude, 6-8 weeks old); ALZET brain infusion kit 3 used; cancer (glioblastoma); "Because repeated surgery introduces stress and pain that may impact the survival of the experimental animals, we opted for the convection-enhanced delivery (CED) strategy using an Alzet osmotic pump to deliver a continuous supply of the nano RNAi combination..." pg E6151;

Q5091: X. Wang*, et al.* Affinity-controlled protein encapsulation into sub-30 nm telodendrimer nanocarriers by multivalent and synergistic interactions. Biomaterials 2016;101(258-71
Agents: Telodendrimer nanoparticles, peptide-incorporated **Vehicle:** Not Stated; **Route:** CSF/CNS (Intratumoral); **Species:** Mice (nude); **Pump:** Not Stated; **Duration:** 7 days;
ALZET Comments: Controls received mp w/ free peptide; animal info (female, athymic nude NCRU-Sp/Sp, 8 weeks old); cancer (glioblastoma U87); tissue perfusion (intratumoral); pumps primed overnight at 37C; Dose (0.5 ug/h); Brain coordinates (0.5 mm anterior to bregma and 2.5 mm lateral of midline);

Q6614: D. Markowitz*, et al.* Pharmacological Inhibition of the Protein Kinase MRK/ZAK Radiosensitizes Medulloblastoma. Mol Cancer Ther 2016;15(8):1799-808
Agents: M443 **Vehicle:** PBS; DMSO; **Route:** CSF/CNS (intratumoral); **Species:** Mice (nude); **Pump:** Not Stated; **Duration:** 2 weeks;
ALZET Comments: 0.01% DMSO used; animal info (4 week old female athymic mice); enzyme inhibitor (MRK); Brain coordinates (2 mm to the right and 1 mm posterior to the lambda); cancer (Medulloblastoma); Industry authored (Fatimo Innovation LLC);

Q5861: I. V. Guzhova*, et al.* HSP70-based anti-cancer immunotherapy. Hum Vaccin Immunother 2016;12(10):2529-2535
Agents: HSP70, human recomb. **Vehicle:** Not Stated; **Route:** CSF/CNS (intratumoral); **Species:** Rat; **Pump:** Not Stated; **Duration:** Not Stated;
ALZET Comments: comparison of intracranial injections vs mp; cancer (Glioma); peptides; "Such injections, particularly those done using an
osmotic pump, caused a significant delay in tumor growth and increase the survival of tumor-bearing animals." pg 2532; Therapeutic indication (Cancer, Glioma);

Q4673: M. Zamykal*, et al.* Inhibition of intracerebral glioblastoma growth by targeting the insulin-like growth factor 1 receptor involves different context-dependent mechanisms. NEURO-ONCOLOGY 2015;17(1076-1085
Agents: IMC-A12 **Vehicle:** Saline; **Route:** CSF/CNS (intratumoral); **Species:** Mice; **Pump:** 2004; **Duration:** 3 weeks; 4 weeks;
ALZET Comments: Controls received mp w/ vehicle; animal info (Foxn1nu, 6-8 weeks old); cancer (glioblastoma); tissue perfusion (glioblastoma); IMC-A12 aka cixutumumab;

Q4636: W. J. Wang*, et al.* Effects of convection-enhanced delivery of bevacizumab on survival of glioma-bearing animals. Neurosurgical Focus 2015;38(U112-U119
Agents: Bevacizumab **Vehicle:** Saline; **Route:** CSF/CNS (intratumoral); **Species:** Mice (nude); **Pump:** 1004; **Duration:** 28 days;
ALZET Comments: 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;

Q4290: K. Rolon-Reyes*, et al.* Microglia Activate Migration of Glioma Cells through a Pyk2 Intracellular Pathway. PLoS One 2015;10(U2306-U2323
Agents: Ganciclovir **Vehicle:** Not Stated; **Route:** CSF/CNS (intratumoral); **Species:** Mice (transgenic); **Pump:** 2004; **Duration:** 7 days;
ALZET Comments: Controls received mp w/ saline, normal; animal info (male, CD11b-HSVTK trangenic); ALZET brain infusion kit used; cancer (glioma GL261);

Q3780: R. Hiramatsu*, et al.* Tetrakis(p-Carboranylthio-Tetrafluorophenyl)Chlorin (TPFC): Application for Photodynamic Therapy and Boron Neutron Capture Therapy. Journal of Pharmaceutical Sciences 2015;104(962-970

Agents: Tetrakis (pcarboranylthiotetrafluorophenyl) Chlorin **Vehicle:** Not Stated; **Route:** CSF/CNS (intratumoral); **Species:** Rat; **Pump:** 2001D; **Duration:** Not Stated;
ALZET Comments: Animal info (male, 200-250 g, F344 Fischer); ALZET brain infusion kit 2 used; TPFC, also known as Tetrakis(p-Carboranylthio-Tetrafluorophenyl)Chlorin, is a carboranyl-containing chlorin of high boron content; cancer (glioma); tissue perfusion; convection-enhanced delivery