References on Using ALZET® Osmotic Pumps in Space

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
Agents: Nettle powder **Vehicle:** Water, spring; **Route:** In vitro; **Species:** Toad (tadpole); **Pump:** 2ML2; **Duration:** 12 days;
ALZET Comments: Animal info (Xenopus laevis); teratology; spaceflight;

P4282: G. R. Adams, *et al.* Effects of spaceflight and thyroid deficiency on hindlimb development. I. Muscle mass and IGF-I expression. J. Appl. Physiol 2000;88(894-903
Agents: Propylthiouracil **Vehicle:** Not Stated; **Route:** IP; **Species:** Rat (lactating); **Pump:** 2ML4; **Duration:** 16 days;
ALZET Comments: Teratology; Propythiouracil was delivered to neonates via dam's milk; pilot studies showed that this resulted in similar depression in plasma T3 and T4 to direct PTU injection to neonates; Propylthiouracil is an antihyperthyroid that blocks the conversion of L-thyroxine T4 to T3; spaceflight

P4138: R. T. Turner. Effects of short-term spaceflight and recombinant human growth hormone (rhGH) on bone growth in young rats. Aerospace Medicine and Human Performance 1995;66(763-769
Agents: Growth hormone, recomb. human **Vehicle:** Phosphate; F68 detergent; **Route:** SC; **Species:** Rat; **Pump:** Not Stated;
Duration: 5 days;
ALZET Comments: controls received mp w/vehicle; peptides; spaceflight

P3604: G. Lorenzi, *et al.* Cultivation of hamster kidney cells in a dynamic cell culture system in space (spacelab IML-1 mission). Microgravity Sci. Technol 1993;VI/1(34-38
Agents: NaHCO3; Glucose; HEPES; DMEM; Serum, fetal calf; Gentamicin **Vehicle:** Not Stated; **Route:** in vitro (cell culture);
Species: Not Stated; **Pump:** 2001; **Duration:** no duration posted;
ALZET Comments: mp connected to cell culture chamber; "...the osmotic pump delivered sufficient fresh medium to support cell growth in the perfusion chambers." p. 37; spaceflight

P3289: B. Jiang, *et al.* Absence of a growth hormone effect on rat soleus atrophy during a 4-day spaceflight. Am. Physiol. Soc 1993;74(2):527-531
Agents: Growth hormone, recomb. human **Vehicle:** Phosphate; F-68; **Route:** SC; **Species:** Rat; **Pump:** Not Stated; **Duration:** 4 days;
ALZET Comments: controls received mp w/ vehicle; functionality of mp verified by immunoassay; stability verified by HPLC; musculoskeletal; spaceflight

P2163: M. Cronin, *et al.* Delivery of recombinant human growth hormone to rats during exposure to microgravity on NASA space shuttle discovery. Physiologist 1992;35(1):S51-S52
Agents: Growth hormone, recomb. human **Vehicle:** F68 detergent; Phosphate; **Route:** SC; **Species:** Rat; **Pump:** Not Stated;
Duration: 5 days;
ALZET Comments: functionality of mp verified upon removal by immunoassay; peptides; mp performed well in microgravity; spaceflight

P4504: O. Rasmussen, *et al.* Plant protoplast development on "Biokosmos 9". ESA 1990;307(527-530
Agents: Growth medium **Vehicle:** Not Stated; **Route:** In vitro (cell culture); **Species:** Not Stated; **Pump:** Not Stated; **Duration:** 14 days;
ALZET Comments: mp used to deliver growth medium to protoplasts during spaceflight

P3948: F. K. Gmunder, *et al.* Mammalian cell cultivation in space. Advances in Space Research 1989;9(11):119-127
Agents: Culture media **Vehicle:** Glucose; Fetal calf serum; HEPES buffer; Gentamycin;; **Route:** in vitro (cell culture); **Species:** Not Stated; **Pump:** 2001; 2002; **Duration:** Not Stated;
ALZET Comments: diagram of dynamic cell culture system on page 123; in vitro; spaceflight

P1382: F. K. Gmunder, *et al.* Dynamic cell culture system: a new cell cultivation instrument for biological experiments in space. J. Biotechnol 1988;7(217-228
Agents: Culture media, DMEM; HEPES; Serum, fetal calf; Gentamicin; Glucose **Vehicle:** Not Stated; **Route:** in vitro (cell culture); **Species:** Not Stated; **Pump:** 2001; **Duration:** 7 days;
ALZET Comments: Mp connected to cell culture chamber; cytotoxicity described; spaceflight