**Recent References (2017-2020) on the Administration of Leptin Using ALZET® Osmotic Pumps**

**Agents:** leptin, recomb. rat; **Vehicle:** PBS; **Route:** SC; **Species:** Rat; **Pump:** 2001; **Duration:** 14 days;  
**ALZET Comments:** Dose (1.29 mg/ml); Controls received mp w/ vehicle; animal info (Male Sprague-Dawley rats (130–190 g)); dependence;

**Agents:** Leptin; **Vehicle:** Saline; **Route:** IP; **Species:** Mice; **Pump:** 1007D; 1002; **Duration:** 7 days; 14 days;  
**ALZET Comments:** Dose (4 ug/kg/min); animal info (6–17 wk of age, male and female mice); cardiovascular;

**Q8364:** S. Pereira, *et al.* Metabolic effects of leptin receptor knockdown or reconstitution in adipose tissues. Sci Rep 2019;9(1):3307  
**Agents:** Recombinant Murine Leptin; **Vehicle:** Not stated; **Route:** SC; **Species:** Mice; **Pump:** Not stated; **Duration:** 8 days;  
**ALZET Comments:** Dose (20 ug/day); Controls received mp w/ vehicle; animal info (8-12 weeks old); diabetes;

**Q7524:** R. B. S. Harris. Low-dose infusions of leptin into the nucleus of the solitary tract increase sensitivity to third ventricle leptin. American Journal of Physiology Endocrinology and Metabolism 2019;316(5):E719-E728  
**Agents:** Leptin; **Vehicle:** Saline; **Route:** CSF/CNS; **Species:** Rat; **Pump:** 1004; **Duration:** 14 days;  
**ALZET Comments:** Dose (5, 10 ng/day); 0.9% saline used; animal info (Male, Sprague-Dawley, 275-300 g); bilateral cannula used; dependence;

**Q8021:** M. T. Hackl, *et al.* Brain leptin reduces liver lipids by increasing hepatic triglyceride secretion and lowering lipogenesis. Nat Commun 2019;10(1):2717  
**Agents:** Leptin; LpR **Vehicle:** Saline; CSF, artificial; **Route:** IP; CSF/CNS (third ventricle); **Species:** Rat; **Pump:** 2004; **Duration:** 2 weeks;  
**ALZET Comments:** Dose (0.3 ug/day); 0.9% used; Controls received mp w/ vehicle; animal info (10 weeks old, Male, Sprague Dawley); dependence; LpR AKA Leptin Receptor Antagonist;

**Q7976:** O. S. Dallner, *et al.* Dysregulation of a long noncoding RNA reduces leptin leading to a leptin-responsive form of obesity. Nat Med 2019;25(3):507-516  
**Agents:** Leptin **Vehicle:** PBS; **Route:** SC; **Species:** Mice; **Pump:** Not stated; **Duration:** 14 days;  
**ALZET Comments:** Dose (0.5 μg/h); Controls received mp w/ vehicle; animal info (12 weeks, female, C57BL/J6 Lep(ob)/Lep(ob)); replacement therapy (leptin);

**Q6983:** C. Caballero-Eraso, *et al.* Leptin acts in the carotid bodies to increase minute ventilation during wakefulness and sleep and augment the hypoxic ventilatory response. J Physiol 2019;597(1):151-172  
**Agents:** Leptin **Vehicle:** Saline; **Route:** SC; **Species:** Mice; **Pump:** Not Stated; **Duration:** 2 days;  
**ALZET Comments:** Dose (120 μg/day); Controls received mp w/ vehicle;

**Q6878:** D. M. Arble, *et al.* Vertical sleeve gastrectomy improves ventilatory drive through a leptin-dependent mechanism. JCI Insight 2019;4(1):  
**Agents:** Leptin **Vehicle:** Water; **Route:** SC; **Species:** Mice; **Pump:** Not Stated; **Duration:** 6 weeks;  
**ALZET Comments:** Dose (10µg/day); Controls received mp w/ vehicle; animal info (C57BL6/J WT and ob/ob male mice, 6-8 weeks of age);

**Q7849:** Y. Ravussin, *et al.* Evidence for a Non-leptin System that Defends against Weight Gain in Overfeeding. Cell Metabolism 2018;28(2):289-299 e5  
**Agents:** leptin, recomb. mouse **Vehicle:** Saline, buffered; **Route:** SC; **Species:** Mice; **Pump:** 2006; **Duration:** 33 days;
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Bibliography

ALZET Comments: Dose (150 ng/hr); saline (pH 8) used; Controls were WT and received mp w/ agent; animal info (4 weeks, male, C57BL/6J(Lepob/ob)); Resultant plasma level (1.8 ± 1.4 ng/mL); replacement therapy (leptin); good methods (detailed pump placement on page e3);

Agents: Leptin Vehicle: PBS; Route: SC; Species: Rat; Pump: 2001; Duration: 1 week;
ALZET Comments: Dose (0.6 mg/Kg-weight); 200 μL of 10 mM used; Controls received mp w/ vehicle; Controls received mp w/ vehicle;

Agents: Leptin Vehicle: Saline; Route: CSF/CNS (lateral ventricle); Species: Mice; Pump: Not stated; Duration: Not stated;
ALZET Comments: Dose (1 ug/day); animal info (Male, LepRbCCK KO); Brain coordinates (0.7mm posterior to bregma, 1.3 mm lateral, and 2.3 mm below the skull); bilateral cannula used; dependence;

Agents: PrRP palmitoylated analogs, Leptin, Amylin, Cyclic AC253, Exendin 4 Vehicle: Not Stated; Route: SC, CSF/CNS (lateral ventricle); Species: Mice; Pump: Not Stated; Duration: 2 months; 28 days; 5 weeks, 5 months, 16 weeks;
ALZET Comments: Dose: Palm11-PrRP (5 mg/kg/day), Leptin (2.4 nmol/day), Amylin (0.24 mg/kg/day), Exendin-4 (3.5 pmol/kg/min); animal info (7 month old THY-Tau22 mice; 5 month old APP/PS1 mice; 6 month old AMP8 mice ); behavioral testing (Y-maze); neurodegenerative (Alzheimer’s); This review summarizes current information on the potential neuroprotective properties of food intake-lowering (anorexigenic) peptides that have been tested in experimental models of AD-like pathology.

Q8099: V. Lopez, et al. Food Restriction is Required to Preserve the Antisteatotic Effects of Central Leptin in the Liver of Middle-Aged Rats. Obesity (Silver Spring) 2018;26(5):877-884
Agents: Leptin Vehicle: Saline; Route: CSF/CNS (lateral ventricle); Species: Rat; Pump: Not stated; Duration: 7 days;
ALZET Comments: Dose (0.2 ug/day); Controls received mp w/ vehicle; animal info (3 or 7 month old, Male, Wistar); bilateral cannula used; dependence;

Agents: Recombinant Leptin Vehicle: Saline; Route: SC; Species: Mice; Pump: Not stated; Duration: 4 weeks;
ALZET Comments: Dose (1 ug/g/day); Controls received mp w/ vehicle; animal info (C57BL/6, 8 weeks old); cardiovascular;

Agents: Leptin Vehicle: Saline; Route: SC; Species: Mice; Pump: 1004; Duration: 4 weeks;
ALZET Comments: animal info (Male, 7 weeks old, C57BL/6J); ALZET brain infusion kit 1 used; Brain coordinates (0.6mm caudal to bregma, 1mm right to the sagittal sinus, and 2.0mm ventral to the sagittal sinus); bilateral cannula used; dependence;

Agents: Leptin Vehicle: Saline; Route: SC; Species: Rat; Pump: 2ML1; Duration: 7 days;
ALZET Comments: Dose (10 ul/hr); Controls received mp w/ vehicle; animal info (Male, Wistar, 11-12 weeks old); Leptin aka recombinant rat leptin protein ; dependence;

Q7778: E. Burgos-Ramos, et al. The increase in fiber size in male rat gastrocnemius after chronic central leptin infusion is related to activation of insulin signaling. Mol Cell Endocrinol 2018;470:48-59

Agents: Leptin
Vehicle: Saline; Route: CSF/CNS (right cerebral ventricle); Species: Rat; Pump: Not Stated; Duration: 14 days;
ALZET Comments: Dose (12 ug/day); Controls received mp w/ vehicle; animal info (Male, Wistar, 240-260 g); Brain coordinates (0.3 mm anteroposterior, 1.1 mm lateral from Bregma); dependence;


Agents: Leptin, SHU-9119
Vehicle: PBS; Route: SC; CSF/CNS; Species: Mice; Pump: 2004; Duration: 12 weeks, 7 days;
ALZET Comments: Controls received mp w/ vehicle; animal info (leptin-deficient ob/ob mice); long-term study; pumps replaced every 28 days; SHU-9119 is a MC4R antagonist; Leptin dissolved in PBS and delivered SC for 12 weeks; SHU-9119 dissolved in saline and delivered ICV for 7 days; Pumps model incorrectly listed as Model 2001D. It should be Model 2004 based on description.


Agents: Leptin, recomb. mouse
Vehicle: Saline; Route: SC; Species: Mice; Pump: Not Stated; Duration: 1 week; 4 weeks;
ALZET Comments: Dose (4.8 µg/day); Controls received mp w/ vehicle; animal info (AnimalsMale C57BL/6J mice and ob/ob mice (5-week and 8-week old));


Agents: Leptin
Vehicle: Saline; Route: SC; Species: Mice; Pump: 1002; Duration: 12 days;
ALZET Comments: Controls received mp w/ vehicle; animal info (8 weeks old); Therapeutic indication (Metabolic syndrome, Syndrome X);
Dose (10 ug/day);


Agents: Leptin
Vehicle: Not Stated; Route: SC; Species: Mice; Pump: 1002; Duration: 12 days;
ALZET Comments: Dose (0, 4, 12, 40, or 400 ng/h); dose-response (Fig 2; Page 16); animal info (6-week-old female ob/ob mice); Therapeutic indication (obesity);


Agents: Leptin
Vehicle: Saline; Route: SC; Species: Mice; Pump: 1004; Duration: 2 weeks, 14 days;
ALZET Comments: Controls received mp w/ vehicle; animal info (8 weeks old); diabetes;
Therapeutic indication (diabetic ketoacidosis); Dose (0.624 ug/hr);


Agents: Leptin
Vehicle: Not Stated; Route: SC; Species: Mice; Pump: Not Stated; Duration: 24 weeks;
ALZET Comments: Dose (5 mg/day; 10 mg/day); Controls received mp w/ vehicle; animal info (10-week-old male ObOb and strain-matched control mice); pumps replaced every 12 weeks; Multiple pumps per animal (2); long-term study;

**Agents:** Antibody, leptin neutralizing; leptin, recombinant mouse  
**Vehicle:** PBS;  
**Route:** CSF/CNS (intrathecal);  
**Species:** Mice;  
**Pump:** 1007D, 1002;  
**Duration:** Not Stated;  
**ALZET Comments:** Controls received mp w/ vehicle; animal info (7-8 weeks old); ALZET brain infusion kit used; neurodegenerative (Demyelination); Therapeutic indication (Demyelination); Dose ((12 μg/kg body weight per day, 10 μg/kg of body weight per day));

**Agents:** Leptin  
**Vehicle:** Not Stated;  
**Route:** CSF/CNS (fourth ventricle);  
**Species:** Rat;  
**Pump:** 2004;  
**Duration:** 11 days; 13 days;  
**ALZET Comments:** Dose (0.01, 0.1, 0.3, or 0.6 μg/24 h); Controls received mp w/ vehicle; animal info (rats weighing ~280 g);

**Agents:** Leptin, recomb. murine  
**Vehicle:** HCl; Saline;  
**Route:** SC;  
**Species:** Mice;  
**Pump:** 2004;  
**Duration:** 4 weeks;  
**ALZET Comments:** Dose (2.5 mg/ml); animal info (6-8 week old C57BL/6 and NOS2/-/- mice);

**Agents:** Leptin  
**Vehicle:** Saline;  
**Route:** CSF/CNS;  
**Species:** Rat; Mice;  
**Pump:** Not Stated;  
**Duration:** 14 days;  
**ALZET Comments:** animal info (male Wistar rats; Eight-week-old male and female POMC-lKO and WT mice); Brain coordinates (0.8 mm posterior to bregma; 1.5 mm lateral to the sagittal suture, and 3.6 mm below the skull surface);

**Agents:** Leptin  
**Vehicle:** PBS;  
**Route:** CSF/CNS;  
**Species:** Rat; Mice;  
**Pump:** Not Stated;  
**Duration:** 14 days;  
**ALZET Comments:** Dose (4 mg/kg/min); Controls received mp w/ vehicle; animal info (22 week old Male wild-type (WT) C57BL/6J mice); cardiovascular;

**Agents:** Leptin  
**Vehicle:** Saline;  
**Route:** SC;  
**Species:** Mice;  
**Pump:** 1007D;  
**Duration:** 7 days;  
**ALZET Comments:** Dose (4 mg/kg/min); Controls received mp w/ vehicle; animal info (22 week old Male wild-type (WT) C57BL/6J mice); cardiovascular;

**Agents:** Leptin, Hexamethonium  
**Vehicle:** Saline;  
**Route:** CSF/CNS (lateral ventricle);  
**Species:** Rat;  
**Pump:** 2002;  
**Duration:** 12 days;  
**ALZET Comments:** Controls received mp w/ vehicle; animal info (360-420g); diabetes; Therapeutic indication (Diabetes); Dose (Hexamethonium: 15 mg/kg);

**Q6006:** K. T. Chang, et al. Leptin is essential for microglial activation and neuropathic pain after preganglionic cervical root avulsion. Life Sci 2017;187(31-41
Agents: Leptin  
Vehicle: PBS;  
Route: CSF/CNS (Cervical);  
Species: Mice;  
Pump: 2004;  
Duration: 28 days;  

ALZET Comments: Controls received mp w/ vehicle; animal info (male and female, C57B/6 J (B6) and Ob); Therapeutic indication (Obesity, Neuropathic pain); Dose (1 ug/day);  

Agents: Leptin  
Vehicle: Not Stated;  
Route: SC;  
Species: Mice;  
Pump: 2002;  
Duration: 10 days;  

ALZET Comments: Dose (450 ng/hr); Controls received mp w/ vehicle; animal info (ob/ob mice); Therapeutic indication (Obesity);