



References on the Administration of NMDA Agonists
Using ALZET® Osmotic Pumps

Aspartic Acid

P7453: M. Domercq, *et al.* Excitotoxic oligodendrocyte death and axonal damage induced by glutamate transporter inhibition. *Glia* 2005;52(1):36-46

ALZET Comments: Oligonucleotide, antisense; oligonucleotide sense; kainate, dihydro-; aspartic acid, DL-threo-B-benzyloxy-; Saline, sterile; CSF/CNS (optic nerve); Rabbit; 1003D; 3 days; Controls received mp w/ vehicle, or contralateral nerves; antisense (glutamate transporters GLAST + GLT-1); animal info (adult, male, white New Zealand).

P6888: J. Darman, *et al.* Viral-induced spinal motor neuron death is non-cell-autonomous and involves glutamate excitotoxicity. *Journal of Neuroscience* 2004;24(34):7566-7575

ALZET Comments: Aspartic acid, dl-threo-B-hydroxy; spermine, 1-naphthyl acetyl; CSF/CNS (intrathecal, subarachnoid space); Rat; 1007D; 7 days; Controls received mp w/ saline; enzyme inhibitors (GLT-1, GluR2).

P3908: A. Hirata, *et al.* AMPA receptor-mediated slow neuronal death in the rat spinal cord induced by long-term blockade of glutamate transporters with THA. *Brain Research* 1997;771(37-44)

ALZET Comments: Aspartic acid, dl-threo-B-hydroxy; Glutamate, l-; CSF, artificial; CSF/CNS (subarachnoid space, intrathecal); Rat; 2ML1; no duration posted; dose-response; cannula position verified.

P0289: R. M. Mangano, *et al.* Chronic infusion of endogenous excitatory amino acids into rat striatum and hippocampus. *Brain Res. Bull* 1983;10(47-51)

ALZET Comments: Aminobutyric acid, Y-; Aspartic acid, dl-threo-B-hydroxy; Aspartic acid, l-; Cysteine sulfinic acid; Glutamic acid, l-; Radio-isotopes; 3H tracer; Acetate; Saline; CSF/CNS (corpus striatum); CSF/CNS (hippocampus); Rat; 2002; 2 weeks; comparison of injec. vs. mp infusion; amino acids infused separately & simultaneously.

Cysteinesulfinic Acid

P0289: R. M. Mangano, *et al.* Chronic infusion of endogenous excitatory amino acids into rat striatum and hippocampus. *Brain Res. Bull* 1983;10(47-51)

ALZET Comments: Aminobutyric acid, Y-; Aspartic acid, dl-threo-B-hydroxy; Aspartic acid, l-; Cysteine sulfinic acid; Glutamic acid, l-; Radio-isotopes; 3H tracer; Acetate; Saline; CSF/CNS (corpus striatum); CSF/CNS (hippocampus); Rat; 2002; 2 weeks; comparison of injec. vs. mp infusion; amino acids infused separately & simultaneously.

Ibotenic Acid

Q6857: P. Pompei, *et al.* Regulation of Preprotachykinin-A Gene Expression in an Animal Model of Alzheimer's Disease. *The Journal of Histochemistry & Cytochemistry* 2001;49(11):1469-1470

ALZET Comments: Amyloid protein, Beta (1-40); ibotenic acid; Saline; CSF/CNS (hippocampus); Rat; Dose (B-amyloid (0.075, 0.15, or 0.224 µg/µl); ibotenic acid (0.01875, 0.15, or 0.0562 µg/µl)); Controls received mp w/ vehicle; animal info (Twenty male Albino Wistar rats weighing ~340 g); B-amyloid and ibotenic acid are neurotoxins; neurodegenerative (Alzheimer's);

P2571: H. Kaneda, *et al.* Alteration in regional brain neuropeptides following intracerebroventricular infusion of excitotoxins in rats. *Biol. Psychiatry* 1994;36(103-109)

ALZET Comments: Ibotenic acid; Kainic acid; Quinolinic acid; PBS; CSF/CNS; Rat; 2002; 14 days; controls received mp w/ vehicle.

P1682: M. R. Dursteler, *et al.* Directional pursuit deficits following lesions of the foveal representation within the superior temporal sulcus of the macaque monkey. *J. Neurophysiol* 1987;57(5):1262-1286



ALZET Comments: Ibotenic acid; CSF/CNS (middle temporal area); monkey; 2001; 3 days; 23 hours; no comment posted.

NMDA

P3074: D. W. Zochodne, *et al.* A segmental chronic pain syndrome in rats associated with intrathecal infusion of NMDA: evidence for selective action in the dorsal horn. *Can. J. Neurol. Sci* 1994;21(24-28)

ALZET Comments: NMDA; Magnesium sulfate; PBS; CSF/CNS (intrathecal); Rat; 2002; 4-8 weeks; controls received mp with PBS; long-term study, pumps replaced every 2 weeks; NMDA given with MgSO4.

P3663: S. Nag, *et al.* Spinal neuronal pathology associated with continuous intrathecal infusion of N-methyl-D-aspartate in the rat. *Acta Neuropathologica* 1990;81(7-13)

ALZET Comments: NMDA; Glycine; Magnesium sulfate; APV; PBS; CSF/CNS (intrathecal); Rat; 1, 2, or 4 weeks; controls received no agent or mp w/ .1MPBS alone or w/ .15M glycine in .1MPBS; 0.2 and 0.5M NMDA for 1-2 weeks poorly tolerated; .15M for 2 & 4 weeks better; NMDA and other agents infused in pairs.

Quinolinic Acid

Q7258: A. Rahman, *et al.* Intraventricular infusion of quinolinic acid impairs spatial learning and memory in young rats: a novel mechanism of lead-induced neurotoxicity. *J Neuroinflammation* 2018;15(1):263

ALZET Comments: Quinolinic Acid; Saline; CSF/CNS (right lateral ventricle); Rat; 1007D; 7 days; Dose (9 mM); animal info (Wistar rat pups 21-day old); behavioral testing (MWM test); ALZET brain infusion kit used; ALZET brain infusion kit used; neurotoxicity (spatial learning and memory);.

Q7001: A. Rahman, *et al.* Intraventricular infusion of quinolinic acid impairs spatial learning and memory in young rats: a novel mechanism of lead-induced neurotoxicity. *J Neuroinflammation* 2018;15(1):263

ALZET Comments: Quinolinic acid; Saline; CSF/CNS (right lateral ventricle); Rat (neonate); 1007D; 7 days; Dose (9 mM); Controls received mp w/ vehicle; animal info (21-day old Wistar rat pups); behavioral testing (Spatial learning and memory test); ALZET brain infusion kit used; Brain coordinates (anteroposterior—3 mm behind bregma; lateral—3.6 mm from midline; and depth—3.8 mm from skull surface);.

Q5843: B. Kalaska, *et al.* Serum metabolic fingerprinting after exposure of rats to quinolinic acid. *J Pharm Biomed Anal* 2016;131(175-182)

ALZET Comments: Quinolinic acid; DMSO; IP; Rat; 2006; 28 days; Controls received mp w/ vehicle; animal info (weight: 151.5g); 10% DMSO; Therapeutic indication (Metabolic fingerprinting); Dose (0.3 mg/day, 1 mg/day);.

P8905: J. R. Yates, *et al.* 4-Chloro-3-hydroxyanthranilate reduces local quinolinic acid synthesis, improves functional recovery, and preserves white matter after spinal cord injury. *Journal of Neurotrauma* 2006;23(6):866-881

ALZET Comments: Quinolinic acid, ¹³C₇-; Saline, physiological; IP; Guinea pig; 1007D; 5 days; Brain tissue distribution; animal info (female, Hartley, adult, 300-480 g.); lateral compression of the spinal cord (spinal cord injury; SCI); nephrology; behavioral testing (motor testing, CTM reflex/sensory testing);.

R0207: T. W. Stone. Kynurenines in the CNS: from endogenous obscurity to therapeutic importance. *Progress in Neurobiology* 2001;64(185-218)

ALZET Comments: Quinolinic acid; CSF/CNS; Rat; 14 days;

P3815: K. E. Beagles, *et al.* Quinolinic acid in vivo synthesis rates, extracellular concentrations, and intercompartmental distributions in normal and immune-activated brain as determined by multiple-isotope microdialysis. *J. Neurochem* 1998;70(281-291)

ALZET Comments: Quinolinic acid; Saline; 3H tracer; Radio-isotopes; SC; gerbil; 1007D; no duration posted; no comment posted.



P3973: K. Maeda, *et al.* Neurochemical and metabolic consequences of elevated cerebrospinal fluid quinolinic acid concentrations in rat brain. *Neurosci. Res* 1997;29(303-309)

ALZET Comments: Quinolinic acid; PBS; CSF/CNS; Rat; 2002; 14 days; controls received mp w/saline; comparison of ICV injections vs. mp; no stress (see pg. 305); stress/adverse reaction only in animals receiving ICV injections (pg.305).

P3489: M. P. Heyes, *et al.* Quantification of local de novo synthesis versus blood contributions to quinolinic acid concentrations in brain and systemic tissues. *J. Neurochem* 1997;68(280-288)

ALZET Comments: Quinolinic acid; Saline; 13C tracer; Radio-isotopes; SC; gerbil; 1007D; 7 days; controls received saline; functionality of mp verified by in vitro assay, in vivo assays on blood and tissue samples; 13C-QUIN (labeled) used; analyzed fluid & tissue distribution of labeled quinolinic acid.

P3492: T. Bazzett, *et al.* The neuronal NOS inhibitor L-MIN, but not 7-NINA, reduces neurotoxic effects of chronic intrastriatal administration of quinolinic acid. *Brain Research* 1997;775(229-232)

ALZET Comments: Quinolinic acid; Nitroindazole, 7-, sodium salt; thiocitrulline dihydrochloride, methyl-; PBS; CSF/CNS (striatum); Rat; 2002; no duration posted; dose-response; microdialysis; quinolinic acid administered alone or w/1 other agent in same pump; enzyme inhibitor; nitric oxide synthase inhibitor;

P3423: M. Misztal, *et al.* Subchronic intraventricular infusion of quinolinic acid produces working memory impairment - a model of progressive excitotoxicity. *Neuropharmacology* 1996;35(4):449-458

ALZET Comments: Quinolinic acid; CSF/CNS; Rat; 2002; 3, 14 days; ALZET brain infusion kit used; after 3 or 14 days, pumps were removed, infusion tubing sealed and left in place and behavioral testing was conducted.

P3479: M. Misztal, *et al.* Learning deficits induced by chronic intraventricular infusion of quinolinic acid - protection by MK-801 and memantine. *Eur. J. Pharmacol* 1996;296(1-8)

ALZET Comments: Quinolinic acid; Memantine; MK-801; Saline; SC; CSF/CNS; Rat; 2002; 2ML2; 2 weeks; ALZET brain infusion kit used; animals were given ICV quinolinic acid concurrently w/ subcutaneous NMDA antagonists.

P2571: H. Kaneda, *et al.* Alteration in regional brain neuropeptides following intracerebroventricular infusion of excitotoxins in rats. *Biol. Psychiatry* 1994;36(103-109)

ALZET Comments: Ibotenic acid; Kainic acid; Quinolinic acid; PBS; CSF/CNS; Rat; 2002; 14 days; controls received mp w/ vehicle.

P2787: B. E. Kalisch, *et al.* Picolinic acid protects against quinolinic acid-induced depletion of NADPH diaphorase containing neurons in the rat striatum. *Brain Research* 1994;668(1-8)

ALZET Comments: Quinolinic acid; Picolinic acid; Saline; CSF/CNS (striatum); Rat; 2002; 1-7 days, 7 days; controls received mp w/ saline; agents infused alone or concomitantly.

P2180: T. J. Bazzett, *et al.* Chronic intrastriatal dialytic administration of quinolinic acid produces selective neural degeneration. *Exp. Neurol* 1993;120(177-185)

ALZET Comments: Quinolinic acid; PBS; CSF/CNS (striatum); Rat; 2002; 18 days; controls received mp w/phosphate buffered saline; microdialysis; pump attached to dialysis probe anchored via guide cannula; stylet maintained patency of 8 mm cannula.

P1997: T. J. Bazzett, *et al.* A novel device for chronic intracranial drug delivery via microdialysis. *J. Neurosci. Methods* 1991;40(1-8)

ALZET Comments: Quinolinic acid; CSF/CNS (striatum); Rat; 2002; 14-17 days; functionality of mp verified in vitro for 22 days; detailed methods; excitotoxin; pumps used in a microdialysis infusion apparatus; detailed schematic on p. 2.

P3084: K. Yamada, *et al.* Neurotoxicity induced by continuous infusion of quinolinic acid into the lateral ventricle in rats. *Neurosci. Lett* 1990;118(128-131)

ALZET Comments: Quinolinic acid; PBS; CSF/CNS; Rat; 2002; 7,14,21 days; controls received mp with vehicle; comparison of striatal injections vs. mp.



P3025: A. Vezzani, *et al.* Neurodegenerative effects induced by chronic infusion of quinolinic acid in rat striatum and hippocampus. *Eur. J. Neurosci* 1990;3(40-46)

ALZET Comments: Quinolinic acid; Nicotinic acid; AP7; Kynurenic acid; Radio-isotopes; 3H tracer; NaOH; PBS; HCl; CSF/CNS (striatum); CSF/CNS (hippocampus); Rat; 2002; 15 hours - 2 weeks; Controls received mp with nicotinic acid; functionality of mp verified by measurement of radioactivity; dose response; neurodegenerative.