

CURRICULUM VITAE

Craig W. Stevens, Ph.D.

Professor of Pharmacology

Chair, Department of Pharmacology & Physiology

OSU-Center for Health Sciences, College of Osteopathic Medicine

1111 W. 17th Street

Tulsa, OK 74107-1898

Ph. (918) 561-8234 FAX (918) 561-8276

email: cw.stevens@okstate.edu



PROFESSIONAL APPOINTMENTS

- 2007- present **Chair**, Dept. of Pharmacology/Physiology, OSU-CHS, Tulsa, OK
2000- present **Professor of Pharmacology**, Dept. of Pharmacology/Physiology, OSU-CHS, Tulsa, OK
1993-1999 **Associate Professor of Pharmacology**, Dept. of Pharmacology/Physiology, OSU-CHS, Tulsa, OK
1990-1993 **Assistant Professor of Pharmacology**, Dept. of Pharmacology/Physiology, OSU-CHS, Tulsa, OK
1989-1990 **Development Manager**, Minnesota Academy of Science, St. Paul, MN
1984-1986 **President** (*founding*), Mayo Graduate Students Association, Mayo Grad. Schl Med., Rochester MN

EDUCATION AND TRAINING

- 1988-1990 **Postdoctoral Research Fellow**, Dept. of Cell Biology and Neuroanatomy, Univ. of Minnesota, Minneapolis, MN. Supervisor: *Dr. Virginia Seybold*
1984-1988 Mayo Graduate School of Medicine, Rochester, MN, **Ph.D. in Pharmacology**. Thesis: *Behavioral and Biochemical Characteristics of Opioid Tolerance in Rat Spinal Cord*. Supervisor: *Dr. Tony L. Yaksh*
1981-1984 University of Illinois, Chicago, IL; **M.S. in Biological Sciences**. Thesis: *Endogenous Opioid Systems in Amphibians*. Supervisor: *Dr. Paul D. Pezalla*
1978-1981 **American Peace Corps** in Nepal; Science/Math Instructor, *Katmandu, NEPAL*
1974-1978 Augustana College, Rock Is., IL; **B.A. in Biology, cum laude**

TEACHING EXPERIENCE

- 1990-present Lecturer, *Medical Pharmacology I-II*, (Course-Coordinator since '97) OSU-CHS, COM, Tulsa, OK
1997-present Instructor, *Neuropharmacology* (graduate course, alternate years) OSU-CHS, COM, Tulsa, OK
1991-present Facilitator, *Medical Information Systems Course*, OSU-CHS, COM, Tulsa, OK
2000-2004 Visiting Professor, Neuroscience Lab Course, U of MN Medical School, Minneapolis, MN
1998-2001 Adjunct Professor of Pharmacology, University of Tulsa Nursing School, Tulsa, OK
1989-1990 Lecturer, *Pharmacology for Nurse Anesthetists*, University of Minnesota, Minneapolis, MN
1989-1990 Lecturer, *Neuropharmacology Course*, Dept. of Neurology, Univ. of MN, Minneapolis, MN
1984-1987 Community Education, *Juggling Instructor*, Rochester, MN
1984-1987 IBM-PC Instructor, *Microcomputer Education Cntr.*, Mayo Clinic, Rochester, MN
1981-1983 Teaching Assistant; *Dept. of Biological Sciences*, University of IL at Chicago, IL

ACADEMIC COMMITTEES

- 2004 *Member*, Research and Creative Activities Task Force, OSU-System, appt. by OSU-System President Schmidly
2003 *Member*, Search Committee for VP Health Affairs OSU/Dean OSU-COM
2002-2003 *President*, Faculty Senate
2002-2003 *Member*, Board of Directors for Academic Health Center, joint affiliation of TRMC and OSU-CHS
2001-2002 *Vice-President* Faculty Senate
1994-2001 *Founding Member & Chair (2000-2001)*, Biomedical Sciences Graduate Committee
1996-2001 *Chair*, Hazardous Materials and Equipment
1994, 2000-2008 *Member, Chair (02-04; 07-08)* OSU-CHS Promotion and Tenure Committee
1996-1998 *Senator*, Faculty Senate
1991-2000, 2006 *Member, (Chair)* Research Committee
1991-92, 2002-04 *Member, (Chair)* Academic Appeals Board
1991-1992 *Member*, Learning Resources Committee
1990-1999 *Chair ('90-'93), Member ('94-'99)*, Animal Use Committee (IACUC)

PROFESSIONAL AFFILIATIONS

- American Society for Pharmacology and Experimental Therapeutics (ASPET)
International Narcotics Research Conference (INRC) (*INRC Information Officer since 1997*)
Society for Neuroscience (SFN)
American Association for the Advancement of Science (AAAS)
Scientists Center for Animal Welfare (SCAW)

EXTRAMURAL FUNDING

- 2007-2010 "Functional Evolution of Opioid Receptors", NIH NIDA AREA Grant, R15DA12448, C.W. Stevens (PI), \$150,000 (direct costs)
- 2004-2007 "Functional Evolution of Opioid Receptors", NIH NIDA AREA Grant, R15DA12448, C.W. Stevens (PI), \$100,000 (direct costs)
- 2002-2004 "Sequence and Pharmacology of Novel Opioid Receptors", Oklahoma Center for the Advancement of Science and Technology (OCAST) C.W. Stevens, (PI), \$68,264 (direct costs)
- 2001-2003 "Functional Evolution of Opioid Receptors", NIH NIDA AREA (Academic Research Enhancement Award) Grant, R15DA12448, C.W. Stevens (PI), \$100,000 (direct costs)
- 1999-2001 "Functional Evolution of Opioid Receptors", NIH NIDA AREA (Academic Research Enhancement Award) Grant, R15DA12448, C.W. Stevens (PI), \$69,605 (total direct costs)
- 1998-1999 "Testing and Comparison of Analgesic Agents", American College of Laboratory Animal Medicine (ACLAM), C.W. Stevens (PI), \$11,555 (total direct costs)
- 1995-1997 "Graduate Student Research", Gardner Spring, Co., Tulsa, OK (\$4,000)
- 1994-1996 NRSA postdoctoral grant for Dr. Stan Willenbring, C.W. Stevens (sponsor).
- 1992-1997 "Studies of Opioid Analgesia in Amphibians", NIH-NIDA First Award (DA07326), C.W. Stevens, Principal Investigator (PI), \$418,000. (direct costs)
- 1992-1995 "Spinal Sites of Endogenous Opioid Action in Amphibians", Research Grant, Whitehall Foundation, C.W. Stevens, PI, \$70,785.
- 1991-1992 "Nociceptive Processing in the Amphibian Spinal Cord", Grants-In-Aid, Whitehall Foundation Research Fund, C. W. Stevens, PI, \$10,375.
- 1988-1990 "NIDA Neuroscience Training Grant", Postdoctoral position (*salary only*), University of Minnesota Medical School, Minneapolis, MN
- 1987-1988 "Issues related to tolerance development and tissue toxicology of chronically administered 4-anilino piperidines", T.L. Yaksh (PI) and C.W. Stevens (Co-I). Janssen Pharm., \$46,000.
- 1985-1986 "Effects of capsaicinoid agents on peptide levels and behavioral function", T.L. Yaksh (PI) and C.W. Stevens (Co-I). Procter and Gamble Co., \$25,000.
- 1985-1986 "Effects of drugs on the shock titration threshold in the primate", T.L. Yaksh (PI) and C.W. Stevens (Co-I). \$10,000, Sterling Winthrop Pharmaceuticals.

HONORS AND AWARDS

- 2006 Regents Research Award, Inaugural awardee for OSU-Center for Health Sciences
- 1992 Young Investigator Travel Award, American Pain Society, San Diego, CA
- 1992 NIDA Travel Award, International Narcotics Res. Comm. (INRC), Keystone, CO
- 1991 Young Investigator Travel Award, American Pain Society, New Orleans, LA
- 1991 Young Scientist Travel Award, ASPET Annual Meeting, San Diego, CA
- 1990 Fulbright Scholarship for Research & Teaching in India (*declined to accept faculty position*)
- 1990 CPDD Travel Award, CPDD Annual Meeting, Keystone, CO
- 1989 NIDA Travel Award, CPDD Annual Meeting, Keystone, CO
- 1987 Upjohn Travel Award, ASPET Annual Meeting, Honolulu, HA
- 1987 NIDA Training Grant, Gordon Research Conference, "Mode of Action of Opiates", CA
- 1983 UIC Research Assistantship, University of Illinois, Chicago, IL
- 1983 NIH Training Grant, "Neural Systems & Behavior", MBL Summer course, Woods Hole, MA
- 1982 UIC Research Board Travel Grant, "Strategies for studying the role of peptides in neuronal function", Society for Neuroscience Short Course, Minneapolis, MN

GRADUATE TRAINING ACTIVITIES

- 1997-2000 Major Advisor for Leslie C. Newman. Dissertation title: "Behavioral and binding characteristics of opioids in *Rana pipiens*", Ph.D. in Biomedical Sciences-Pharmacology, awarded 8/2000 with university-wide honors.
- 1998-2005 Member, Advisory Committee for John Paulson (Ph.D. student, completed Ph.D. 8/2005)
- 2001-2005 Chair, Advisory Committee for Eva Garringer (Ph.D. student, completed Ph.D. 5/2005)
- 2002-2004 Member, Advisory Committee for Randy Benton (M.S. student; completed 5/2004)
- 2002-2004 Member, Advisory Committee for Raju N. Kacham (M.S. student at OSU-CVM, Stillwater; completed 5/2004)
- 2001-2007 Major Advisor to Kristin K. Martin (M.S. student; completed 5/2007)
- 2003-2008 Major Advisor to Christopher M. Brasel (Ph.D. completed 5/2008)
- 2004- Major Advisor to Shekher Mohan (Ph.D. student)
- 2005- Major Advisor to Julie Duffey (Ph.D. student)
- 2006- Member, Advisory Committee for Neda Saffarian-Toussi (Ph.D. student)
- 2007- Member, Advisory Committee for Arunkumar Thangaraju (Ph.D. student)
- 2007- Member, Advisory Committee for Danielle Armstrong (Ph.D. student)

PEER-REVIEWED PRIMARY PUBLICATIONS

1. Stevens, C.W. and Pezalla, P.D., A spinal site mediates opiate analgesia in frogs. *Life Sci.* 33: 2097-2013, 1983.
2. Stevens, C.W. and Pezalla, P.D., Naloxone blocks the analgesic action of levorphanol but not dextrorphan in the leopard frog. *Brain Research* 301: 171-174, 1984.
3. Pezalla, P.D., and Stevens, C.W., Behavioral effects of morphine, levorphanol, dextrorphan, and naloxone in *Rana pipiens*. *Pharm. Biochem. Behavior* 21: 213-217, 1984.
4. Yaksh, T.L., and Stevens, C.W., Simple catheter preparation permitting bolus intrathecal administration during chronic intrathecal infusion. *Pharmacology, Biochemistry and Behavior*, 25: 483-485, 1986.
5. Stevens, C.W. and Yaksh, T.L., Spinal action of dermorphin an extremely potent opioid peptide from frog skin, *Brain Research*, 385: 300-304, 1986.
6. Stevens, C.W. and Yaksh, T.L., Dynorphin A and related peptides administered intrathecally in the rat: A search for putative kappa opiate receptor activity. *J. Pharmacol. Exp. Ther.*, 238: 833-838, 1986.
7. Stevens, C.W. Pezalla, P.D., and Yaksh, T.L., Spinal antinociceptive action of three representative opioids in frogs. *Brain Research*, 402: 201-203, 1987.
8. Stevens, C.W., Weinger, M.B. and Yaksh, T.L., Intrathecal dynorphins suppress hindlimb electromyographic activity in rats. *Eur. J. Pharmacol.*, 138: 299-302, 1987.
9. Stevens, C.W. and Yaksh, T.L., Chronic antagonist infusion does not increase morphine antinociception in rat spinal cord. *Brain Research*, 425: 388-390, 1987.
10. Stevens, C.W., Monasky M.S. and Yaksh, T.L., Spinal infusion of opiate and alpha-2 agonists in rats: Tolerance and cross-tolerance studies, *J. Pharmacol. Exp. Ther.* 244: 63-70, 1988.
11. Schick, R.R., Stevens, C.W., Yaksh, T.L. and Go, V.L.W., Chronic intraventricular administration of CCK octapeptide suppresses feeding in rats. *Brain Research*, 448:294-298, 1988.
12. Stevens, C.W., and Yaksh, T.L., Potency of infused spinal antinociceptive agents is inversely related to magnitude of tolerance after continuous infusion. *J. Pharmacol. Exp. Ther.* 250: 1-8, 1989.
13. Sosnowski, M., Stevens, C.W., and Yaksh, T.L., Assessment of the role of A1/A2 adenosine receptors mediating the purine antinociceptive, motor, and autonomic function in rat spinal cord. *J. Pharmacol. Exp. Ther.* 250: 915-922, 1989.
14. Stevens, C.W., and Yaksh, T.L., Time course characteristics of tolerance development to continuously infused antinociceptive agents in rat spinal cord. *J. Pharmacol. Exp. Ther.* 251: 216-233, 1989.
15. Stevens, C.W., and Yaksh, T.L., Magnitude of opioid dependence after continuous intrathecal infusion of mu and delta opioids in the rat. *Eur. J. Pharmacol.* 166: 467-472, 1989.
16. Morón, M.A., Stevens, C.W., and Yaksh, T.L., Diltiazem enhances and flunarizine inhibits nimodipine's antiseizure effects. *Eur. J. Pharmacol.* 163: 299-307, 1989.
17. Stevens, C.W. and Pezalla, P.D., Endogenous opioid system down-regulation during hibernation in amphibians. *Brain Research*, 494: 227-231, 1989.
18. Yanez, A., Sabbe, M.B., Stevens, C.W., and Yaksh, T.L., Interaction of midazolam and morphine in the rat spinal cord. *Neuropharmacology* 29: 359-364, 1990.
19. Morón, M.A., Stevens, C.W., and Yaksh, T.L., The antiseizure activity of dihydropyridine calcium channel antagonists in the conscious rat. *J. Pharmacol. Exp. Ther.* 252: 1150-1155, 1990.
20. Monasky, M., Zinsmeister, A., Stevens, C.W., and Yaksh, T.L., The interaction of intrathecal morphine and ST-91 on antinociception in the rat. *J. Pharmacol. Exp. Ther.* 254: 383-392, 1990.
21. Stevens, C.W., Lacey, C.B., Miller, K.E., Elde, R.P., and Seybold, V.S., Biochemical characterization and regional quantification of mu, delta, and kappa opioid binding sites in rat spinal cord. *Brain Research* 550: 77-85, 1991.
22. Stevens, C.W., Kajander, K.C., Bennett, G.J., and Seybold, V.S., Bilateral and differential changes in spinal mu, delta and kappa opioid binding in rats with a painful, unilateral neuropathy. *Pain* 46: 315-326, 1991.
23. Stevens, C.W. and Yaksh, T.L., Studies of morphine and DADLE cross-tolerance after continuous intrathecal infusion in the rat. *Anesthesiology* 76: 596-603, 1992.
24. Stevens, C.W. and Kirkendall, K., Time course and magnitude of tolerance to the analgesic effects of systemic morphine in amphibians, *Life Sciences* 52: PL111-116, 1993.
25. Stevens, C.W., Alan J. Klopp, and J. Anthony Facello, Analgesic potency of mu and kappa opioids after systemic administration in amphibians. *J. Pharmacol. Exp. Ther.* 269: 1086-1093, 1994.
26. Brenner, G.M., Deason, L. L, Klopp, A.J., and Stevens, C.W., Analgesic potency of alpha-adrenergic agents after systemic administration in amphibians *J. Pharmacol. Exp. Ther.* 270: 540-545, 1994.

PEER-REVIEWED PRIMARY PUBLICATIONS (CONT.)

27. Stevens, C.W., Sangha S. and Ogg, B., Analgesia produced by immobilization stress and an enkephalinase-inhibitor in amphibians. *Pharm. Biochem. Behav.* 50: 675-680, 1995.
28. Stevens, C.W. and Seybold, V.S., Changes of opioid binding density in the rat spinal cord following unilateral dorsal rhizotomy, *Brain Research* 687: 53-62, 1995.
29. Willenbring, B. and Stevens, C.W., Thermal, mechanical, and chemical peripheral sensation in amphibians: opioid and adrenergic effects. *Life Sciences* 58: 125-133, 1996.
30. Stevens, C.W. Relative analgesic potency of *mu*, *delta*, and *kappa* opioids after spinal administration in amphibians. *J. Pharmacol. Exp. Ther.* 276: 440-448, 1996.
31. Stevens, C.W. and Brenner, G.M., Spinal administration of adrenergic agents produces analgesia in amphibians, *Eur. J. Pharmacol.*, 316: 205-210, 1996.
32. Stevens, C.W., and Rothe, K.S., Supraspinal administration of opioids with selectivity for μ -, δ - and κ -opioid receptors produces analgesia in amphibians, *European Journal of Pharmacology*, 331: 15-21, 1997.
33. Willenbring, B. and Stevens, C.W., Spinal *mu*, *delta*, and *kappa* opioids alter chemical, mechanical and thermal sensitivities in amphibians *Life Sciences* 61: 2167-2176, 1997.
34. Stevens, C.W., and Newman, L.C., Spinal administration of selective opioid antagonists in amphibians: evidence for an opioid unireceptor. *Life Sciences-Pharmacology Letters* 64: PL125-130, 1999
35. Newman, L. C., Wallace D.R. and Stevens, C.W., Characterization of [3H]-diprenorphine binding in *Rana pipiens*: observations of filter binding enhanced by naltrexone. *J. Pharmacol. Toxicol. Meth.* 41: 43-48, 1999.
36. Newman, L. C., Wallace D.R. and Stevens, C.W., Selective opioid agonist and antagonists displacement of [3H]-naloxone binding in amphibian brain, *European Journal of Pharmacology*, 397: 255-262, 2000.
37. Newman, L. C., Wallace D.R. and Stevens, C.W., Selective opioid agonist and antagonists competition for [3H]-naloxone binding in amphibian spinal cord, *Brain Research*, 884: 184-191, 2000.
38. Stevens, C.W., MacIver, D. N., Newman, L.C., Testing and comparison of non-opioid analgesics in amphibians, *Cont. Topics in Lab. Animal Sciences* 40: 47-51, 2001.
39. Newman, L. C., Sands, S.S., Wallace D.R. and Stevens, C.W., Characterization of selective μ , κ , and δ opioid radioligand binding in amphibian brain. *Journal of Pharmacology and Experimental Therapeutics* 301:364-370, 2002.
40. Mohan, S. and Stevens, C.W., Systemic and spinal administration of the *mu* opioid, remifentanyl, produces antinociception in amphibians, *European Journal of Pharmacology*, 534: 89-94, 2006.
41. Stevens, C.W., Toth G., Borsodi A., Benyhe S., Xendorphin B1, a novel opioid-like peptide determined from a *Xenopus laevis* brain cDNA library, produces opioid antinociception after spinal administration in amphibians. *Brain Res Bulletin.*, 71:628-632, 2007.
42. Stevens, C.W., Brasel, C.M. and Mohan, S.K., Cloning and bioinformatics of amphibian *mu*, *delta*, *kappa*, and nociceptin opioid receptors expressed in brain tissue: evidence for opioid receptor divergence in mammals. *Neuroscience Letters*, 419: 189-194, 2007
43. Davis, R.L., Buck, D.J., Saffarian, N. and Stevens, C.W., The opioid antagonist, β -funaltrexamine, inhibits chemokine expression in human astroglial cells. *Journal of Neuroimmunology* 186: 141-149, 2007.
44. Davis, R.L., Buck, D.J., Saffarian, N., Mohan, S.K., Desilva, U., Fernando, S.C., Stevens, C.W., β -funaltrexamine inhibits inducible nitric-oxide synthase expression in human astroglial cells. *J. Neuroimmune Pharm.* 3: 150-153, 2008.
45. Brasel, C.M., Sawyer, G.W. and Stevens, C.W., A pharmacological comparison of the cloned frog and human *mu* opioid receptors reveals differences in affinity and selectivity. *Eur J Pharmacol*, 2008 (*in press*)
46. Stevens, C.W., Martin, K.K. and Stahlheber, B.W., Nociceptin produces antinociception after spinal administration in amphibians. *Pharm Biochem Behav*, 2008 (*in press*).

BOOKS, BOOK CHAPTERS, REVIEWS & CONFERENCE PROCEEDINGS

1. Yaksh, T.L., Durant, P., Onofrio, B. and Stevens, C.W., The effect of spinally administered agents on pain transmission in man and animals. In: *Spinal Opioids and the Relief of Pain*, J.M. Besson and J. Lazorthes (Eds.), INSERM 127: 317-332, 1984.
2. Yaksh, T.L., Durant, P.A.C., Gaumann, D.M., Stevens, C.W. and Mjanger, E., The use of receptor-selective agents as analgesics in the spinal cord: Trends and possibilities. *J. Pain Sympt. Manag.*, 2: 129-138, 1987.
3. Stevens, C.W. and Yaksh, T.L., Opioid and adrenergic spinal receptor systems and pain control, In: *Problems of Drug Dependence 1987*, Harris, L.S. (Ed.), NIDA Research Monograph, 81: 343-352, 1988.
4. Yaksh, T.L., Durant, P.A.C., Monasky, M.S., Stevens, C.W. and Schick, R.R., Spinal pharmacology of agents which alter pain transmission and muscle tone. In: *Local-Spinal Therapy of Spasticity*, H. Müller, J. Zierski, R.D. Penn, (Eds.), Springer-Verlag, Berlin, pp. 19-36, 1988
5. Yaksh, T.L., Stevens, C.W., Gaumann, D.M., and Mjanger, E., Receptors in the dorsal horn and intrathecal drug administration. In: *Neurological applications of implanted drug pumps*, Ann. NY Acad. Science 531: 90-107, 1988.

BOOKS, BOOK CHAPTERS, REVIEWS & CONFERENCE PROCEEDINGS (CONT.)

6. Yaksh, T.L. and Stevens, C.W., Properties of the modulation by receptor-selective agents of spinal nociceptive processing. In: *Proceedings of the 5th World Congress of Pain*, R. Dubner, G.F. Gebhart, M.R. Bond (Eds.), Elsevier Science Publishers, Amsterdam, pp. 417-435, 1988.
7. Yaksh, T.L., Mjanger, E., and Stevens, C.W., Pharmacology of the analgesic effects of opioid and non-opioid receptor selective agents in the spinal cord. *J. Anest. Reanim.*, pp. 221-242, 1988.
8. Stevens, C.W., Opioid antinociception in amphibians, *Brain Research Bulletin*, 21: 959-962, 1988.
9. Stevens, C.W. and Yaksh, T.L., Opioid dependence after continuous intrathecal infusion of mu and delta opioids in the rat. In: *Problems of Drug Depend. '88*, Harris, L.S., (Ed.), NIDA Res. Mongr. 95:544-545, 1989.
10. Stevens, C.W., Kajander, K.C., Bennett, G.J., and Seybold, V.S., Differential regulation of opioid binding sites in an experimental model of chronic pain. In: *Proceedings of the 6th World Congress of Pain*, M.R. Bond, J.E. Charlton, C.J. Woolf (Eds.), Elsevier Science Publishers, Amsterdam, 283-289, 1991.
11. Stevens, C.W., Intraspinal opioids in frogs: a new behavioral model for the assessment of opioid action. In: *Problems of Drug Dependence 1990*, Harris, L.S., (Ed.), NIDA Research Monograph 105: 561-562, 1991.
12. Stevens, C.W., Alternatives to the use of mammals for pain research. *Life Sciences* 50: 901-912, 1992.
13. Adams, J.U., Izenwasser, S., Kramer, T.H., Stevens, C.W., Tiseo, P.J., and Unterwald, E.M., Tolerance and sensitization to opioids and cocaine. In: *Problems of Drug Dependence 1993*, Harris, L.S., (Ed.), NIDA Research Monograph 140: 69-73, 1994.
14. Stevens, C.W., Environmental factors influencing pain physiology in amphibians. In: *Environment and Physiology: 38th Annual Conference of the Association of Physiologists and Pharmacologists of India*, Mallick, B.N. and Singh, R. (Eds.), Narosa Publishing House, New Delhi, pps. 54-61, 1994.
15. Stevens, C.W., Perspectives on opioid tolerance from basic research: behavioral studies after spinal administration in rodents. In: *Cancer Surveys: Palliative Medicine Volume 21*, Banks, G.W. (Ed.), Cold Spring Harbour Laboratory Press, London, pps. 25-47, 1994.
16. Stevens, C.W. Relative analgesic potency of mu and kappa opioids in amphibians: a unique assay for kappa opioid action? In: *Problems of Drug Dependence 1994*, Harris, L.S., (Ed.), NIDA Research Monograph 152: 446, 1995.
17. Stevens, C.W., An amphibian model for pain research, *Lab Animal*: 24: 32-36, 1995.
18. Stevens, C.W. An amphibian model for the assessment of opioid analgesia: systemic and spinal studies. Proc. International Narcotics Research Conference, *Analgesia* 1: 766-769, 1995.
19. Rothe-Skinner, K.S. and Stevens, C.W., Distribution of opioid-expressing neurons in the frog: an *in situ* hybridization study. Proc. International Narcotics Research Conference, *Analgesia* 1: 683-686, 1995.
20. Stevens, C.W. and Paul, D.J. Opioid analgesia after spinal administration in amphibians: binding and behavioral studies, In: *Problems of Drug Dependence 1995*, Harris, L.S., (Ed.), NIDA Research Mon., 162: p 222, 1996.
21. Stevens, C.W. An alternative model for testing opioid analgesics and pain research using amphibians, In: van Zutphen, L.F.M., and Balls, M. (eds) *Animal Alternatives, Welfare and Ethics*, Elsevier Science Publishers, Amsterdam, pp. 247-251, 1997
22. Stevens, C.W. and Willenbring, S., Pain sensation and analgesia in amphibians and reptiles, In: *The Biology, Husbandry and Health Care of Reptiles and Amphibians Vols. I,II,III*. Ackerman, L. (Ed.), T.F.H. Publications, Neptune City, New Jersey, pp. 309-324, 1997.
23. Stevens, C.W., A whole-animal, alternative model for pain research. *Animal Welfare Information Center (AWIC) Newsletter*, Volume 8: 3-5, 1998.
24. Stevens, C.W., An amphibian model for investigation of opioid analgesia and pain-processing. In: *Proceedings of the Mayday Conference: A Cross-Species Approach to Pain and Analgesia - 2002*, Ludders J.W., Paul-Murphy J., Robertson S., Gaynor J., Hellyer P.W., Wong P. and Barakatt C. (Eds.). International Veterinary Information Service, Ithaca NY (www.ivis.org), 2002; P0512.1202.
25. Stevens, C.W., Opioid research in amphibians: a unique perspective on mechanisms of opioid analgesia and the evolution of opioid receptors. *Reviews in Analgesia* 7: 69-82, 2003.
26. Stevens, C.W., Opioid research in amphibians: an alternative pain model yielding insights on the evolution of opioid receptors. *Brain Res Brain Res Rev.* 46:204-15, 2004.
27. Stevens, C.W., Molecular evolution of vertebrate opioid receptor proteins: a preview. In: *Recent Developments in Pain Research, 2005*, pps. 13-29, Ed. Capasso, A., Research Signpost, Kerala, India, 2005.
28. Brenner, G.M. and Stevens, C.W., *Pharmacology*, 2/e. Pharmacology textbook for medical and health professional students, Elsevier, London, March, 2006.
29. Stevens, C.W., Non-Mammalian Models for the Study of Pain, in *Sourcebook of Models for Biomedical Research*, Ed. Conn, M, Humana Press, Towata, NJ, USA, pp. 341-352, 2008.

GRANT STUDY SECTIONS

Grant consultant for the AAAS, Univ of Michigan, Centers of Research Excellence project (2003)
 Reviewer for NIH grants, Special Emphasis Pain Study Sections (1998-present)
 Grant Reviewer for National Science Foundation (1996-2002)
 Grant Reviewer for the Veterans Administration (1995- present)
 Chair (1999), Member (1997) Biological Sciences Panel, Texas State Granting Program-Advanced Research Proposals
 Grant Reviewer (2008) for Neuroscience and Mental Health Grants, The Wellcome Trust

EDITORIAL & ADVISORY BOARDS/PEER-REVIEWER FOR THE FOLLOWING SCIENTIFIC JOURNALS

J. Pharmacol. Exp. Ther., *Brain Research*, *Life Sciences*, *Neuroscience Letters*, *Eur. J. Pharmacology*,
J. Neuroscience, *Pain*, *American Journal of Physiology*, *Journal of Pain*
 Editorial Advisory Board, *Pharmacology Online* (Italy), Editor: Anna Capasso.
 Editorial Advisory Board, *Computational Biology and Chemistry: Advances and Applications*, Editor: Bruno Villoutreix
 Advisory Board Member, Tobacco-Free Zone, Tulsa, OK
 Consultant, Reuters News Service, Insight Service

LITIGATION CONSULTANT/EXPERT WITNESS

Researched, wrote litigation report, and testified in Federal Circuit Court on the classification of opioids and other CNS depressants with regard to federal mandatory drug sentencing guidelines while working as consultant for Monroe and Associates, Tulsa, OK.
 Researched and wrote litigation report on antihistamines for Riggs, Abney, Neal, Turpen, Orbison & Lewis, P.C., Tulsa, OK.
 Researched, wrote litigation report, and was deposed on sedatives interactions in elderly for Pinkerton & Finn, Tulsa, OK.
 Researched, wrote report, and testified in preliminary hearing and in jury trial on tramadol effects for the DA, LeFlore Co., Poteau, OK.
 Researched and wrote litigation report on venlafaxine and zolpidem for the DA's office, Le Flore County, Poteau, OK.
 Researched and wrote litigation report on pain medications for Sneed Lang, P.C., Tulsa, OK.
 Researched and consulted on marijuana intoxication for Brewster & De Angelis, P.L.L.C., Tulsa, OK
 Researched, wrote litigation report, and testified in court on alcohol neurotoxicity for Benjamin Faulkner law firm, Tulsa, OK
 Researched, wrote litigation report on venlafaxine and effects on driving for DA's office, Le Flore County, Poteau, OK.
 Researched, wrote litigation report on alprazolam and alcohol and behavioral disinhibition for Kurt Glassco Law Firm, Tulsa, OK
 Researched, was deposed, and testified in court on CNS effects of oxycontin for Matt Devlin Law Firm, Stillwater, OK
 Researched, wrote litigation report on combined propoxyphene and zolpidem use on driving, DA's Office, LeFlore County, OK

COMPUTER CONSULTING

SigmaPlot for Windows, β -tester, Jandel Scientific, CA., 1992-1999.
 Reference Manager for Windows, β -tester, Research Information Systems, Inc., CA., 1993-1999.
 Institute for Scientific Information (ISI), focus group meeting, San Francisco, CA, April, 1998.
 Knowledge Acquisition Consultant for Ingenuity.com (2001).
 β -tester for JPET Online Review and Submission website, (2001)

COMMUNITY SCIENCE INITIATIVES

Science Fair Judge at School (Carver and Elliot) and Regional (Tulsa County) Level, 1990-present
 Institutional Representative for the Tulsa Biological and Clinical Research Alliance (TBCRA), 1998-2001
 Science Enrichment for University of Tulsa- Gifted School, 1998-present, also at Trinity Episcopalian Day School.
 Faculty Participant in High School Ambassador Program at OSU-CHS, 1994-2000

VISITING SCIENTIST/RESEARCH CONSULTANT/OUTSIDE COLLABORATION

1994 Laboratory of Tony L. Yaksh, Ph.D., Vice Chair for Research, Dept. of Anesthesiology, UCSD, La Jolla, CA.
 Project entailed characterization of met-enkephalin extended sequences in *Rana pipiens* and presentation to research group.
 1996 Laboratory of George Wilcox, Ph.D., Professor of Pharmacology, University of Minnesota Medical School, Minneapolis, MN. Training of intrathecal catheterization to research group and general lab QC.
 1999 Laboratory of Howard Gutstein, M.D./Ph.D., Director of Research, Dept. of Anesthesiology, MD Anderson Cancer Center, Houston, TX. Training of intrathecal catheterization and analgesic modeling techniques to research group.
 2000 Research consultant for Ligand Pharmaceuticals, San Diego, CA.
 2000 Laboratory of Dr. Sandra Roerig, Professor of Pharmacology/Associate Dean for Research, LSU Medical Center, Shreveport, LA. Training of intrathecal catheterization and analgesic modeling techniques to research group.
 2000 Laboratory of Dr. James Zadina, Professor of Pharmacology/ Director of Neurosciences Program, Tulane University School of Medicine, New Orleans, LA. Training of intrathecal catheterization to research group.

VISITING SCIENTIST/RESEARCH CONSULTANT/OUTSIDE COLLABORATION (CONT.)

- 2001 Visiting Professor, Neuroscience Lab Course, Dr. George Wilcox, co-director, University of Minnesota Neuroscience Program. Amphibian model for testing analgesics used in a live laboratory course (also subsequent years).
- 2001 Laboratory of Ken McCarron, Ph.D., Associate Professor of Pharmacology, University of Kansas Medical Center, Kansas City, KS. Training and collaboration on vanilloid-like receptor function in *Rana pipiens*.
- 2002 Laboratory of Paul Prather, Ph.D., Associate Professor of Pharmacology. University of Arkansas for Medical Sciences, Little Rock, AR. Collaboration on transfection of frog opioid receptors in cell lines.
- 2002 Visiting Professor, Dept. of Neuroscience, University of Minnesota Medical School, March 12-14, 2002.
- 2003 Visiting Professor, Dept. of Neuroscience, University of Minnesota Medical School, April 8 to 10, 2003.
- 2003 Visiting Professor, Dept. of Medicinal Chemistry, University of Mississippi, Oxford, MI, May 7-9, 2003.
- 2004 Visiting Professor, Dept. of Neuroscience, University of Minnesota Medical School, April 12-15, 2004.
- 2005 Visiting Professor, Dept. of Neuroscience, University of Minnesota Medical School, April 11-13, 2005.

INVITED TALKS/SEMINARS/KEYNOTE PRESENTATIONS

1. "*Opioid antinociception in amphibians*", Satellite Symposium: Behavioral Biology of Nociception: Comparative, Developmental, and Sexual Aspect, Society for Neuroscience, New Orleans, LA, November, 1987.
2. "*An amphibian model for the assessment of opioid action*", Annual Meeting of the College on Problems in Drug Dependence (CPDD), Richmond, VA, June, 1989.
3. "*Alternatives to the use of mammals for pain research*", OSU College of Veterinary Sciences, Annual Research Symposium, Stillwater OK, May 1991.
4. "*An amphibian model for pain research*", Northeastern State University, Science and Technology Seminar Series, Tahlequah OK, October, 1991.
5. "*An amphibian model for pain research*", Children's Medical Center, Chapman Research Institute Seminar Series, Tulsa OK, November, 1991.
6. "*An amphibian model for pain research*", Oklahoma State University, Dept. of Zoology Seminar Series, Stillwater OK, January, 1992.
7. "*Alternatives to the use of mammals for opioid research*", OSU College of Veterinary Sciences, Annual Research Symposium, Stillwater OK, May 1992.
8. "*An amphibian pain model for opioid research*", University of Tulsa Biology Department Colloquium, Tulsa, OK, September 1992.
9. "*An amphibian pain model for opioid research*", University of Oklahoma Health Sciences Center, Dept. of Anatomy, Oklahoma City, OK, October, 1992.
10. "*Studies of opioid tolerance in an amphibian pain model*", 1st Annual Young Investigators Symposium, College on Problems in Drug Dependence (CPDD), Toronto, June, 1993.
11. "*Relative analgesic potency of mu and kappa opioids in amphibians: a unique assay for kappa opioid action?*", College on Problems of Drug Dependence (CPDD), Palm Beach, FL, 1994.
12. "*An amphibian pain model for opioid research*", UCSD, Anesthesiology Research Lab Group, April, 1994.
13. "*An amphibian model for pain research*", Pharmacology Dept., LSU Med Center, New Orleans, 9/27/94.
14. "*Alternatives to the use of mammals for pain research*", NIH/OPPR/LSU sponsored workshop, New Orleans, September 29-30, 1994.
15. "*Alternatives to the use of mammals for pain research: an amphibian model*", SCAW/CCAC Conference, Toronto, Canada, September 28, 1995.
16. "*An amphibian model for studies of opioid action*", University of Minnesota Medical School, Dept. of Pharmacology Seminar Series, Minneapolis, MN, January 19, 1996.
17. "*An alternative model for testing of opioid analgesics and pain research using amphibians*", 2nd World Congress on Alternatives and Animal Use in the Life Sciences, Utrecht, Netherlands, October 21, 1996.
18. "*From Pond to Pain: An Amphibian Model for Opioid Analgesia*", Anatomy/Physiology Seminar Series, University of Oklahoma Health Sciences Center, Oklahoma City, OK, May 20, 1997.
19. "*From Pond to Pain: An Amphibian Model for Opioid Analgesia*", invited Symposium speaker, Annual Meeting of the Midwest Pain Interest Group (PIG), Medical College of Wisconsin, Milwaukee, WI, June 6, 1997.
20. "*Studies of selective mu opioid antagonism after spinal administration of beta-FNA in amphibians*", invited Symposium speaker, College on Drug Dependence (CPDD) Annual Meeting, Nashville, TN, June 16, 1997.
21. "*The unireceptor hypothesis of opioid antinociception in amphibians: implications for the evolution of opioid receptors*", invited Symposium speaker for the International Narcotics Research Conference (INRC), Germany, July 20-25, 1998.
22. "*An Amphibian Whole-Animal Alternative for the Study of Pain*", invited participant for symposium, All Creatures Weird and Wonderful: Revolutionary Approaches to Medical Discovery, AAAS Meeting, Anaheim, CA, Jan, 23, 1999.
23. "*Perspectives on Opioid Tolerance from Basic Research*", M.D. Anderson- University of Texas Medical Center, Dept. of Anesthesiology and Critical Care, November 18, 1999.
24. "*An Alternative Model for Pain and Analgesia Research Using Amphibians*", invited Symposium speaker, Scientists Center for Animal Welfare (SCAW), Spring Meeting, Baltimore, MD, May 19, 2000.

INVITED TALKS/SEMINARS/KEYNOTE PRESENTATIONS (CONT.)

25. "From Pond to Pain: Investigating Mechanisms of Opioid Analgesia Using Amphibians", OSU, Zoology, Stillwater, OK, 9/22/00.
26. "Investigating Mechanisms of Opioid Analgesia in Amphibians", LSU-Medical Center, Dept. of Pharmacology, Shreveport, LA, December 5, 2000.
27. "An Amphibian Model for the Study of Opioid Analgesics", University of Kansas Medical Center, Dept. of Pharmacology, Toxicology and Therapeutics, Kansas City, KS, September 11, 2001. (re-scheduled and presented on December 11, 2001)
28. "An Amphibian Model for Analgesia Testing", Univ. of Oklahoma Dental School, Student Research Society Annual Banquet, Myriad Convention Center, Oklahoma City, OK, April 12, 2002.
29. "Mechanisms of Opioid Analgesia in Amphibians", Dept. of Neuroscience, Univ. of MN, Minneapolis, MN, April 16, 2002.
30. "An Amphibian Model for Investigation of Opioid Analgesia and Pain-processing", at the Cross-Species Approach to Pain and Analgesia conference, sponsor: Mayday Fund, Airlie Conference Center, Warenton, VA, Sept. 19, 2002.
31. "An Amphibian Model for Opioid Research", Dept. of Pharmacology and Toxicology, University of Arkansas for Medical Sciences, Little Rock, AR, October 16, 2002.
32. "Opioid research using amphibians and the evolution of opioid receptors", Dept. of Medicinal Chemistry, University of Mississippi, Oxford, MI, May 8, 2003.
33. "Opioid research using amphibians and the evolution of opioid receptors", invited Symposium speaker, British Society for Experimental Biology, Edinburgh, Scotland, April 2, 2004.
34. "Opioid research using amphibians and the evolution of opioid receptors", invited Symposium speaker, European Opioid Conference, Budapest, Hungary, April 8, 2004.
35. "Opioid research using amphibians: a unique perspective on the evolution of vertebrate opioid receptors", Seminar for the Center for Pain Research, University of Minnesota, Minneapolis, MN, April 15, 2004.
36. "An Evolutionary Approach to Understanding Vertebrate Opioid Receptors", Veterinary Biomedical Sciences Seminar Series, OSU-College of Veterinary Medicine, Stillwater, OK, January 27, 2005.
37. "Opioid research using amphibians: An Evolutionary Approach to Understanding Vertebrate Opioid Receptors", Seminar for the Department of Neuroscience, University of Minnesota Medical School, Minneapolis, MN, April 12, 2005.
38. "Opioid analgesia research in amphibians: from behavioral assay to cloning opioid receptor genes", Keynote speaker, Annual meeting of the Association of Reptile and Amphibian Veterinarians, Baltimore, MD, April 23-26, 2006
39. "Insights on the Molecular Evolution of Vertebrate Opioid Receptors: From Frog to Man", Physiology Seminar Series, University of Oklahoma Health Sciences Center, Oklahoma City, OK, January 25, 2007.
40. "Evolution of opioid receptors: why the mu opioid receptor would make Darwin proud" INRC Annual Meeting, Charleston, SC, USA, July 15, 2008.

SCIENTIFIC PRESS

1. Stevens, C.W., "No Pain, Some Gain: A New Model for Neuropathic Pain", Journal of NIH Research, News Note, May, 1990, p.33.
2. Stevens, C.W., "Funding for Young Investigators", Letters to the Editor, Science, Vol. 255, p. 142, 1992.
3. Stevens, C.W., Response to "Letters from the Editor", Lab Animal, Vol. 25, p. 42, 1996.
4. Stevens, C.W.: Response to Protocol Review Column, Lab Animal, Vol. 26, p 23-24, October, 1997.
5. Stevens, C.W., "Evolution and Faith: Empathy Is Misplaced", Letters to the Editor, Science, Vol. 320, p. 745, 9 May 2008.

MEDIA ARTICLES/INTERVIEWS/PRESS CONFERENCES

1. "Northern grass frog helps Tulsa gig research grants", Tulsa World Newspaper, August 21, 1992.
2. "Research Grants", op-ed page, Tulsa World Newspaper, September 7, 1992 (*Animal rights response*).
3. "Get Priorities Straight", op-ed page, Tulsa World Newspaper, September 20, 1992. (*support of research*)
4. "Animal Research Needed", op-ed page, Tulsa World Newspaper, September 20, 1992. (*support*)
5. "Who Suffers? Children or the Frogs?", op-ed page, Tulsa World Newspaper, September 27, 1992. (*support*)
6. "The Frogman", Tulsa People Magazine, March, 1994. (*profile*)
7. "Success by Six" Interview on brain activity in children, KGRH, Tulsa 6pm Evening News, August 10, 1996
8. "State's Share of Funds Short, Researchers Say", interviewed & (mis)quoted, The Daily Oklahoman, January 11, 1999.
9. "State's Research Fund Malnourished", interviewed & (mis)quoted, Tulsa World, Jan. 15, 1999, p A10
10. "All Creatures Weird and Wonderful: Revolutionary Approaches to Medical Discovery", Press Conference, American Association for the Advancement of Sciences (AAAS) Anaheim, CA, Jan 23, 1999.
11. "Animals Hold Key to Cures: Medical Science Plumbs Secrets of Scorpions, Fish, Frogs" San Francisco Examiner, Jan. 25, 1999.
12. "What will ease the pain? Ask a frog", Science News, Vol. 155, p. 91, February 6, 1999.
13. "Painful Choices", New Scientist Online Conference Reports, Feb. 6, 1999.
14. "Notebook: Frog Simplicity", The Scientist, Vol. 13 (4), p. 32, February 15, 1999.
15. "Suffer the little amphibians", The London Times- Higher Education Supplement, Issue 1379, pp. 22-23, April 9, 1999.
16. "Heat, Some Medicines Don't Mix", Tulsa World Newspaper, p A-9, August 4, 1999.
17. "OSU grant allows pain medicine study", The Daily Oklahoman, p. 3-B, August 27, 2001
18. "Research frogs may lead to medical leaps and bounds", The Tulsa World, Sept. 5, 2001.
19. "OSU researchers to study pain relief", The Tulsa World, p. D-7, Aug. 22, 2002.
20. "Of Frogs and Pain – Weird Lab Recognized", Tulsa Business Journal, Vol 12 (#36), p. 10, Sept 6-12, 2002.
21. "Oklahoma Innovations Radio Show", invited guest to talk about OSU-CHS and OCAST-funded research, 3/4/03.
22. "Oklahoma Scientists and the Human Genome", article about the Stevens' lab, Oklahoma Magazine, Oct. , 2003.

MEDIA ARTICLES/INTERVIEWS/PRESS CONFERENCES (CONT.)

23. "OSU Professor Receives Grant", The Daily O'Collegian, OSU Newspaper, September 8, 2004.
24. "The Other O.C. (Oxycontin)", The Tulsa World Newspaper, Feb, 17, 2005, D-1 (cont. D-6). CWS is the "voice of reason".
25. "Do Boiling Lobsters Feel Pain?" interviewed for ABC news special series on pain, May 10, 2005. Available at: <http://abcnews.go.com/Health/PainManagement/story?id=722163>

CONFERENCE ABSTRACTS

1. Stevens, C.W. and Pezalla, P.D., Antinociceptive activity of intraspinal morphine and naloxone attenuation in *Rana pipiens*, Chicago Chapter Soc. Neuroscience, 1983.
2. Stevens, C.W. and Pezalla, P.D., Dextrorphan analgesia in *Rana pipiens*, Committee on Neuroscience, University of Illinois, 1984.
3. Pezalla, P.D., Stevens, C.W. and Dicig, M., Opioid and non-opioid pain control systems in an amphibian, Chicago Chapter Society for Neuroscience, 1984.
4. Stevens, C.W. and Yaksh, T.L., Is intrathecal dynorphin A a *kappa* ligand in rats ?, Society for Neuroscience Annual Meeting, Dallas, Texas, Oct. 20-25, 1985.
5. Stevens, C.W. and Yaksh, T.L., Studies of opiate tolerance in spinal catheterized rats, Society for Neuroscience Annual Meeting, Washington, DC, Nov. 9-14, 1986.
6. Stevens, C.W. and Yaksh, T.L., Time course of tolerance development in rat spinal cord, American Society of Pharmacology and Experimental Therapeutics (ASPET), Honolulu, HA, 1987.
7. Stevens, C.W. and Yaksh, T.L., Time course of tolerance development to antinociceptive agents in rat spinal cord, Society for Neuroscience Annual Meeting, New Orleans, Louisiana, Nov. 16-21, 1987.
8. Morón, M.A., Yaksh, T.L., and Stevens, C.W., Further studies on the anticonvulsant activity of nimodipine. Workshop: Pre-clinical Studies with Nimodipine. Miles Pharmaceutical, 1988.
9. Morón, M.A., Yaksh, T.L., and Stevens, C.W. The anti-epileptic activity of eight dihydropyridine calcium channel antagonists: mechanism of action. ASPET, 1988.
10. Morón, M.A., Yaksh, T.L., and Stevens, C.W., Diltiazem enhances and flunarizine suppresses nimodipine's anti-epileptic actions: a reflection of allosteric binding interactions at the dihydropyridine binding site?, Society for Neuroscience Annual Meeting, Toronto, Canada, Nov. 13-18, 1988.
11. Sabbe, M., Yanez-Gonzalez, A., Stevens, C.W., and Yaksh, T.L., Society for Neuroscience Annual Meeting, Toronto, Canada, Nov. 13-18, 1988.
12. Sosnowski, M., Stevens, C.W., and Yaksh, T.L., Effects of intrathecal adenosine receptor agonists on the nociceptive, motor, and bladder function in the rat, Society for Neuroscience Annual Meeting, Toronto, Canada, Nov. 13-18, 1988.
13. Stevens, C.W., and Yaksh, T.L., Infusion potency is inversely related to the magnitude of spinal antinociceptive tolerance, Society for Neuroscience Annual Meeting, Toronto, Canada, Nov. 13-18, 1988.
14. Stevens, C.W., and Yaksh, T.L., Opioid dependence after continuous intrathecal infusion of mu and delta opioids in the rat. College on Problems of Drug Dependence, 1989.
15. Stevens, C.W., Kajander, K.C., Bennett, G.J., and Seybold, V.S., Analysis of mu, delta, and kappa opioid binding sites in the spinal cord of rats in a model of neuropathic pain. Society for Neuroscience Annual Meeting, Phoenix, Arizona, Oct. 29-Nov. 3, 1989.
16. Stevens, C.W., Kajander, K.C., Bennett, G.J., and Seybold, V.S., Differential regulation of opioid binding sites in the spinal cord of rats in an experimental model of chronic pain. International Association for the Study of Pain, 1990.
17. Stevens, C.W. and Seybold, V.S., Distribution of mu, delta, and kappa opioid receptors in rat spinal cord after unilateral dorsal rhizotomy. Society for Neuroscience Annual Meeting, St. Louis, Missouri, Oct. 28-Nov. 2, 1990.
18. Stevens, C.W., Spinal analgesia in frogs: studies with highly-selective opioid agents. American Society for Pharmacology and Experimental Therapeutics, 1991.
19. Kirkendall, K. and Stevens, C.W., Studies of morphine tolerance in amphibians, Oklahoma Academy of Science Annual Meeting, Durant, OK, 1991.
20. Stevens, C.W., Spinal analgesia in frogs: studies with highly-selective opioid agents. Society for Neuroscience Annual Meeting, New Orleans, Louisiana, Nov. 10-15, 1991.
21. Stevens, C.W., Relative potency of systemic opioids and morphine tolerance in an amphibian pain model. Joint meeting of International Narcotics Res. Comm. (INRC) and College on Problems of Drug Dependence (CPDD), Keystone, CO, 1992.
22. Stevens, C.W., and Klopp, A.J., Opioid analgesia after systemic administration of eight opioid agents in amphibians, Society for Neuroscience Annual Meeting, Anaheim, California, Oct. 25-30, 1992.
23. Mitchell, M.A., Stevens, C.W., and Klopp, A.J., Sedative-induced analgesia in a non-mammalian vertebrate pain model, American Osteopathic Association Meeting, San Diego, CA, 1992.
24. Stevens, C.W., Brenner, G.M., Deason, L.L., and Klopp, A.J., Studies of opioid and alpha-2 analgesia and morphine tolerance in amphibians. Inaugural Symposium of the Oklahoma Center for Neuroscience, 1992.
25. Stevens, C.W., Studies of morphine tolerance in an amphibian pain model. College on Problems of Drug Dependence (CPDD), Toronto, Canada, 1993.
26. Stevens, C.W., Opioid analgesia after systemic administration of eight opioid agents in amphibians, 7th World Congress, International Association for the Study of Pain (IASP), Paris, France, 1993.

CONFERENCE ABSTRACTS (CONT.)

27. Deason, L.L., Brenner, G.M., and Stevens, C.W., Alpha₂-analgesia after systemic administration of adrenergic agents in amphibians, Society for Neuroscience Annual Meeting, Washington, DC, Nov. 7-12, 1993.
28. Stevens, C.W., Deason, L.L., and Brenner, G.M., Analgesic action of intraspinal adrenergic agents in amphibians, Society for Neuroscience Annual Meeting, Washington, DC, Nov. 7-12, 1993.
29. Stevens, C.W., Brenner, G.M., Analgesic action of opioid and adrenergic agents in amphibians. FASEB (Exp Biol.), 1994
30. Stevens, C.W., Relative analgesic potency of *mu* and *kappa* opioids in amphibians: a unique assay for kappa opioid action?, College on Problems of Drug Dependence (CPDD), Palm Beach, FL, 1994.
31. Stevens, C.W., Studies of dynorphin and *kappa* opioid agents after spinal administration in amphibians, Society for Neuroscience Annual Meeting, Miami Beach, Florida, Nov. 13-18, 1994.
32. Rothe-Skinner, K. S. and Stevens, C.W., Dynorphin expression in amphibian brain and spinal cord: *in situ* hybridization studies, Society for Neuroscience Annual Meeting, Miami Beach, Florida, Nov. 13-18, 1994.
33. Stevens, C.W., Analgesic action of spinal *mu*, *delta*, and *kappa* opioids in amphibians. FASEB (Exp Biol.), 1995
34. Stevens, C.W. and Paul, D.J. Opioid analgesia after spinal administration in amphibians: binding and behavioral studies, College on Problems of Drug Dependence (CPDD), Scottsdale, AZ, 1995.
35. Stevens, C.W. An amphibian model for the assessment of opioid analgesia: systemic and spinal studies. International Narcotics Research Committee, 1995.
36. Rothe-Skinner, K.S. and Stevens, C.W., Distribution of opioid-expressing neurons in the frog: an *in situ* hybridization study International Narcotics Research Committee, 1995.
37. Willenbring, B.S. and Stevens, C.W. Somatic hypersensitivity following peripheral nerve injury in frogs: a novel model for studying neuropathic pain, American Pain Society, 1995.
38. Willenbring, B.S. and Stevens, C.W. Effects of morphine or nerve injury on mechanical and chemical response thresholds in frogs, Society for Neuroscience Annual Meeting, San Diego, California, Nov. 11-16, 1995.
39. Stevens, C.W. and Brenner, G.M. Studies of opioid and alpha₂ analgesia after spinal administration in amphibians, Society for Neuroscience Annual Meeting, San Diego, California, Nov. 11-16, 1995.
40. Rothe-Skinner, K.S. and Stevens, C.W., Analgesia produced by intracerebroventricular injection of morphine in amphibians, CPDD, San Juan, Puerto Rico, 1996.
41. Stevens, C.W., Deason, L., and Rothe-Skinner, K.S., Analgesia after icv injection of mu, delta, and kappa opioids in amphibians. International Narcotics Research Conference, Long Beach, CA, July, 1996.
42. Stevens, C.W., An alternative model for the testing of opioids and pain research using amphibians. 2nd World Congress on Animal Alternatives and Use in the Life Sciences, Utrecht, Netherlands, October, 1996.
43. Stevens, C.W., and Deason, L.L., Seasonal variation in analgesic thresholds to morphine and melatonin analgesia in amphibians, Society for Neuroscience Annual Meeting, Washington, DC, Nov. 16-21, 1996.
44. Willenbring, S. and Stevens, C.W., Spinal opioid pharmacology in the frog: chemical, thermal and mechanical sensitivities, Society for Neuroscience Annual Meeting, Washington, DC, Nov. 16-21, 1996.
45. Stevens, C.W. and Newman, L.C., Studies of selective mu opioid antagonism after spinal administration of β-FNA in amphibians, CPDD, Nashville, TN, June, 12-18, 1997.
46. Hamamoto, D.T., Willenbring, S., Stevens, C.W., and Kajander, K.C., Changes in tissue pH and responses of cutaneous receptors to acetic acid application in the frog. Society for Neuroscience Annual Meeting, New Orleans, Louisiana, Oct. 25-30, 1997.
47. Willenbring, S. and Stevens, C.W., Glycinergic mechanisms in amphibian peripheral sensitivity. Society for Neuroscience Annual Meeting, New Orleans, Louisiana, Oct. 25-30, 1997.
48. Stevens, C.W. and Newman, L.C., Selective opioid antagonists and spinal opioid analgesia in amphibians. Society for Neuroscience Annual Meeting, New Orleans, LA, October 27, 1997.
49. Stevens, C.W. and Newman, L.C., The unireceptor hypothesis of opioid antinociception in amphibians. Exp. Biology (FASEB), San Francisco, April, 1998.
50. Stevens, C.W. Newman, L.C., and D.R Wallace, The unireceptor hypothesis of opioid antinociception in amphibians: Implications for the functional evolution of opioid receptors. International Narcotics Research Conference (INRC) Garmisch-Partenkirchen, Germany, July 1998.
51. Stevens, C.W. and Newman, L.C., Evolution of opioid receptors: the unireceptor hypothesis of opioid antinociception in amphibians, International Union of Pharmacology (IUPHAR) Munich, Germany, July, 1998.
52. Stevens, C.W. and Newman, L.C., The unireceptor hypothesis of opioid antinociception in amphibians, Society for Neuroscience Annual Meeting, Los Angeles, CA, November 7-12, 1998.
53. Stevens, C.W., Newman, L.C., and Wallace D.R., Binding and behavioral studies of the opioid unireceptor in amphibians, International Narcotics Research Conference (INRC) Annual Meeting, Saratoga Springs, NY, July 10-15, 1999.
54. Stevens, C.W. and Newman, L.C., The unireceptor hypothesis of opioid antinociception in amphibians: behavioral studies, Society for Neuroscience Annual Meeting, Miami Beach, FL, October 23-28, 1999.
55. Newman, L.C., Wallace, D.R., and Stevens, C.W., The unireceptor hypothesis of opioid antinociception in amphibians: binding studies, Society for Neuroscience Annual Meeting, Miami Beach, FL, October 23-28, 1999.
56. Stevens, C.W., Maciver D., and Newman, L.C., Testing and comparison of non-opioid analgesics in amphibians, American College of Laboratory Animal Medicine (ACLAM) Annual Meeting, Fort Myers, FL, May 21-24, 2000.

CONFERENCE ABSTRACTS (CONT.)

57. Stevens, C.W., Newman, L.C., Wallace, D.R., From pond to pain: From pond to pain: Amphibian opioid unireceptors and speculations on the divergence of mammalian mu, kappa, and delta opioid receptor types, Committee on Problems of Drug Dependence (CPDD) Annual Meeting, San Juan, Puerto Rico, June 17-22, 2000.
58. Stevens, C.W., Newman, L.C., and Wallace, D.R., Mu, kappa, and delta opioid radioligand binding in amphibian brain, International Narcotics Research Conference (INRC) Annual Meeting, Seattle, WA, July 15-20, 2000.
59. Stevens, C.W., Newman, L.C., and Wallace, D.R., Amphibian opioid receptors: characterization of mu, kappa, and delta opioid ligand binding, Society for Neuroscience Annual Meeting, New Orleans, LA, November 4-9, 2000.
60. Stevens, C.W., Newman, L.C., and Wallace, D.R., Opioid receptors in amphibian brain: radioligand binding studies, ASPET Annual Meeting (Experimental Biology '01) Orlando, FL, March 30-April 4, 2001.
61. Sands, S.S., Wallace, D.R., and C.W. Stevens, Chronic opioid agonist regulation of a novel opioid receptor in amphibians, International Narcotics Research Conference (INRC) Annual Meeting, Helsinki, Finland, July 14-20, 2001.
62. Sands, S.S., Wallace, D.R., and C.W. Stevens, Chronic morphine regulation of an opioid receptors in amphibian brain, Society for Neuroscience Annual Meeting, San Diego, CA, November 10-15, 2001
63. C.W. Stevens and C.M. Brasel, Cloning of an *mu* opioid-like receptor in an amphibian, *Rana pipiens*, Committee on Problems of Drug Dependence (CPDD) Annual Meeting, Quebec City, Canada, June 8-13, 2002. Drug and Alcohol Dependence 66 (2002) S172
64. Sands, S.S. and C.W. Stevens, Characterization of opioid receptor types in amphibian spinal cord, International Narcotics Research Conference (INRC) Annual Meeting, Pacific Grove, CA, July 9-14, 2002.
65. C.W. Stevens and C.M. Brasel, Sequence and homology of a *mu* opioid-like receptor in an amphibian, International Narcotics Research Conference (INRC) Annual Meeting, Pacific Grove, CA, July 9-14, 2002.
66. Martin, K.K. and C.W. Stevens, Nociceptin analgesia after spinal administration in amphibians, Society for Neuroscience Annual Meeting, Orlando, FL, November 2-7, 2002.
67. C.W. Stevens and C.M. Brasel, Cloning and homology of a *mu* opioid-like receptor from amphibian brain tissue, Society for Neuroscience Annual Meeting, Orlando, FL, November 2-7, 2002.
68. C.W. Stevens and C.M. Brasel, Evolution of opioid receptors: insights from the cloning of opioid-like receptors in amphibians, ASPET Annual Meeting (Experimental Biology, FASEB), San Diego, CA, April 11-15, 2003.
69. C.M. Brasel and C.W. Stevens, Cloning and homology of an ORL1/nociceptin-like receptor from amphibian brain and spinal cord, International Narcotics Research Conference (INRC) Annual Meeting, Perpignan, France, July 6-11, 2003.
70. C.W. Stevens and C.M. Brasel, Cloning of opioid-like receptors in amphibians: insights on the evolution of opioid receptors, International Narcotics Research Conference (INRC) Annual Meeting, Perpignan, France, July 6-11, 2003.
71. Martin, K.K. and C.W. Stevens, Nociceptin analgesia after spinal administration in amphibians, Society for Neuroscience Annual Meeting, New Orleans, LA, November 8-12, 2003.
72. C.M. Brasel and C.W. Stevens, Cloning and homology of an ORL1/nociceptin-like receptor from amphibian brain and spinal cord, Society for Neuroscience Annual Meeting, New Orleans, LA, November 8-12, 2003.
73. C.W. Stevens and C.M. Brasel, Cloning of opioid-like receptors in amphibians: insights on the evolution of opioid receptors, Society for Neuroscience Annual Meeting, New Orleans, LA, November 8-12, 2003.
74. C.W. Stevens, Opioid research in amphibians: an alternative pain model yielding insights on the evolution of opioid receptors, British Society for Experimental Biology (SEB), Annual Meeting, Edinburgh, Scotland, April 2-5, 2004.
75. C.W. Stevens, Opioid research in amphibians: behavioral and molecular studies on the evolution of opioid receptors, European Opioid Conference (EOC), Visegrad, Hungary, April 6-9, 2004.
76. C.M. Brasel, K.K. Martin, and C.W. Stevens, An amphibian *ORL1* receptor suggests pattern of vertebrate opioid receptor evolution, International Narcotics Research Conference (INRC), Kyoto, Japan, July 18-23, 2004.
77. C.W. Stevens and C.M. Brasel, Molecular evolution of vertebrate opioid receptors: the amphibian contribution, International Narcotics Research Conference (INRC), Kyoto, Japan, July 18-23, 2004.
78. C.M. Brasel and C.W. Stevens, Phylogenetic analysis vertebrate opioid receptors, Society for Neuroscience, San Diego, CA, Oct. 23-27, 2004.
79. C.W. Stevens, Opioid receptors in vertebrates: evolution of ligand type-selectivity, ASPET Annual Meeting (Experimental Biology, FASEB), San Diego, CA, April 1-6, 2005.
80. C.W. Stevens and T. B. Summers, From one to four: gene duplications and the evolution of mu, delta, and kappa type-selectivity of vertebrate opioid receptors, International Narcotics Research Conference (INRC) Annual Meeting, Annapolis, MD, July 10-15, 2005.
81. Mohan, S.K. and C.W. Stevens, Studies of remifentanyl in amphibians. Society for Neuroscience, Washington DC, November 12-16, 2005.
82. Brasel, C.M. and C.W. Stevens, Opioid receptors in vertebrates: evolution of ligand type-selectivity. Society for Neuroscience, Washington DC, November 12-16, 2005.
83. Davis, R.A. and C.W. Stevens, Effects of fentanyl and beta-FNA on cytokine release in human microglia cells, INRC, St. Paul, MN, July 9-14, 2006
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