



	Joint Appointment Department of Anesthesiology and Neuroscience Program, University of Arizona, Tucson, AZ
2000 – 2003	Assistant Professor, Department of Anesthesiology, College of Medicine, University of Arizona, Tucson, AZ
1997 – 2000	Group Leader of Pharmacology, Ferring Research Institute Inc. San Diego, California and Health Sciences Center, University of Arizona, Tucson, AZ
1997 - 2000	Research Assistant Professor, Department of Pharmacology, Health Sciences Center, University of Arizona, Tucson, AZ
1996 - 1997	Post-doctoral Fellow, Department of Pharmacology, Health Sciences Center, University of Colorado, Denver, CO
1995 - 1996	Post-doctoral Fellow, Department of Pharmacology College of Medicine, University of Arizona, Tucson, AZ

### **Honors and Awards**

Lifetime Achievement Award for Teaching, University of Arizona, COM 2013  
 Representative to the AAMC Council of Faculty and Academic Societies (CFAS) 2013.  
 Outstanding Teacher in the Neuroscience Block Year I Medical School, 2009, 2010, 2011, 2012, 2013  
 AMES Block Award for the Neuroscience Block Year I Medical School, 2012, 2013.  
 Academy of Medical Education Scholars. 2010-present.  
 Teaching Award, Human Neuroscience, Best Basic Science Course, Medical Students, Fall 2004 – 2006, 2012, 2013.  
 Learning to Lead, University of Arizona COM 2010-2011.  
 Better-Than-Ever Award in Breast Cancer Research 2009-2010.  
 Top Ten most cited manuscripts for the Journal of *Pain* (122) 2006, 2006-2008.  
 Dean's List for Excellence in Teaching in the Basic Sciences, Selected by Students, 2006-2009.  
 Highlighted Faculty Achievement, University of Arizona, COM, 2008  
 Furrow Teaching Award, Excellence in Basic Science Teaching for Medical Students, Selected by Peers, 2006.  
 AACC Outstanding Speaker Award (2007-2008) Continuing Educations Program.  
 American Pain Society SIG Chair 2006-2009.  
 Academic Keys Who's Who in Medical Sciences Education (WWMSE) 2005.  
 Teaching Award, Human Neuroscience, Medical Students, Fall 2003.  
 Univ. of Arizona Graduate College Fellowship Fall 1991, Spring 1992, Fall 1992.  
 Honors, Graduate School GPA 4.0, Univ. of Arizona, 1991-1995.  
 Honorable Mention, National Science Foundation, 1992.  
 INRC/CPDD Travel Award, 1992.  
 INRC Travel Award 1994-1996.  
 ASPET Travel Award, 1991.  
 Eugene Pulliman Scholarship, 1986-1990.  
 Honorable Mention, 4.0 Years, Univ. of Arizona, 1990, 1991.  
 Honors Program, University of Arizona, 1988-1989.  
 President's List of Scholars, Honors Program, Phoenix College, 1986-1987.

### Drug Discovery

Group leader of *in vivo* biology/pharmacology for an oxytocin antagonist (FE 200440; “atosiban”) to prevent preterm-birth. On the market in Europe & currently in clinical trials in the U.S. Ferring Research Institute Inc., San Diego, 1997-1999.

Group leader of *in vivo* biology/pharmacology for a novel highly selective kappa opioid agonist (FE 200665/FE 200666) for somatic and inflammatory pain. Currently in toxicology studies. Ferring Research Institute Inc., San Diego, 1997-2001. Co-authorship on Patent #...

Group leader of *in vivo* biology/pharmacology for a novel cannabinoid agonist for somatic and inflammatory pain. Currently in basic research studies. Ferring Research Institute Inc., San Diego, 1999-2002.

### **Service Activities**

#### Reviewing for the National Institutes of Health

##### Study Section

NIH/ ZRG1 ETTN-M, STTR/SBIR Study Section, June 20-21, 2013-present.

NIH/ZRG1-IFCN-B-03M, Special Emphasis Panel: Pain and Chemosensory Neuroscience, August 27-28, 2013.

NIH/IFCNI SCS Somatosensory and Chemosensory Systems Study Section, Member June 2008-2012.

NIH/ZRG1 IFCN-N (02) Special Emphasis Panel/Scientific Review Group, March 21, 2012.

NIH/ZDA1-JXR-D(10) Medication Development for Substance Related Disorders Ad Hoc July 7-8, 2010.

NIH/IFCNI SCS Somatosensory and Chemosensory Systems Study Section, Ad Hoc 2006-2008.

ZRG1 BDCN-A(90)S NIH/NINDS Special Emphasis Panel, Brain Disorders and Clinical Neuroscience IRG, Ad Hoc June 15-16<sup>th</sup>, October 5<sup>th</sup>-6<sup>th</sup>, 2006.

#### Reviewing for National and International Grants

Cancer Research UK, Cancer Research and Medical Science Grants, England and Wales, 2012.

Austrian Science Fund (FWF), Biological and Medical Sciences, Austrian Science Fund Vienna, Austria, 2011.

Johns Hopkins University, Brain Science Institute (BSi) (<http://www.brainscienceinstitute.org/>). “Mechanisms Underlying Acute and Chronic Pain”, August 15, 2011.

#### Contract Review

Lecture at NIH “Overview of NIH-FDA Consensus Meeting Preclinical Session” September 24<sup>th</sup>-25<sup>th</sup>, 2003.

#### Scientific Meetings and Journals

Organize and Manage International Scientific Meeting, Spring Pain, Grand Cayman Islands, 1998-2010 (over 250 participants in 2008).

American Pain Society, SIG chair 2006-2009 and organized the Basic Science Dinner symposium 2008, Tampa, FL.

### Editorial Board

Associate Editor: Brain Research (2010-2011)

Section Editor: Life Sciences (2003-present)

Section Editor: Journal of Chronic Pain & Symptom Palliation (2007-present)

Editorial Board: Journal of Pain (2009-2012)

Editorial Board: Journal of Biomedicine and Biotechnology (2008-present)

### Reviewing for Refereed Journals

British Journal of Pharmacology

Current Pharmaceutical Design

Journal of Pain

Journal of Pharmacology and Experimental Therapeutics

Journal of Neuroscience

Life Sciences

Molecular Pharmacology

Neuroscience Letters

Nature

Nature Neuroscience

Pain

Pharmacology, Biochemistry & Behavior

Psychopharmacology

### University Services

#### Departmental Committees

Interim Chair, Department of Pharmacology (2011-present)

Native American Cancer Prevention, Discover Program –UBRP (2013-present)

Chair-Graduate Medical Pharmacology Program (2010-2012)

Chair-Post-tenure Pharmacology Departmental Review Committee (2008-2011)

Post-tenure Pharmacology Departmental Review Committee, member (2006-2011)

Pharmacology Graduate Student Review (2000-present)

Chair-Department of Pharmacology Curriculum Committee (2005-present)

Executive Committee Department of Pharmacology (2004-present)

Chair-Administrator Review Committee (2010)

Administrator Review Committee (2005)

#### College of Medicine

Chair for LCME subcommittee on Faculty Affairs 2012-2013

Chair for the Tucson Curriculum Management Subcommittee (TCMS) 2012-2013

Committee member on Immunobiology Chair 5-year review (2013-2014)

Chair-Search Committee for Associate Dean, Student Affairs & Admissions (2012)

Medical Radiation Safety Committee (2011-present)

Block Director Nervous System 825, COM (2011-present)

Dean's Council on Faculty Affairs (2010-present)

Dean's Council for Leadership (2008-present)

Dean's Ad-Hoc Committee for COM Graduate Programs (2010-present)

OB/GYN UofA Internal Department Review Committee (2012)

Medical Student Interviews (2001-2012)

Continuing Medical Education Review Committee (2006-2011)

Co-Block Director of Human Neuroscience 825, COM (2008-2011)

Chair-Space Committee of the Dean's Research Council (2010-2011)

Space Committee of the Dean's Research Council (2008-2011)

Chair-Administrator of Pharmacology Review Committee (2010)

Medical Pharmacology Review Committee (2001-2002)

Faculty Subcommittee for LCME (2005)

"Learning Team" on the re-Design of the Medical Student Curriculum (2004-2005)

Student Affairs Committee (2001-2004)  
College of Medicine, Students Appeal Committee (2005)

#### University Committees

Arizona Assurance, Undergraduate Mentorship Program (2010-present)  
Speech and Hearing Academic Department Review Committee 2013  
Annual Program Review Committee Department of Obstetrics and Gynecology (April 2012).  
Executive Committee Interdisciplinary Graduate Program in Neuroscience (2006-2008)  
Chair- Graduate Student Recruitment, Program in Neuroscience (2007-2008)  
"Brain Zoo" Teaching Elementary Children about the brain, Flandrau Center (2005)  
Institutional Animal Care and Use Committee (2003-2006)  
NIH Disadvantaged High School Student and K-12 Science Teacher Research Program (2002-Present)

#### Local/Community Services

Vice President-Southwest Pain Foundation (2010-present)  
Board Member of the Southwest Pain Foundation (2006-present)  
McNair Achievement Program Summer Research Mentor (2006-present)  
MARC Program Summer Research Mentor (2006-present)  
Outside Reviewer for P&T, Barrow Neurological Institute, Dr. Paul Whiteaker (2012)  
Sponsor of the BioME (Ironwood Ridge High School) teaching biological sciences (2011-2012)  
U of A Graduate College Minority Health Disparities Summer Research Program (MHD/SROP) (2005-2008)  
Board Member and Coach Canyon View Little League (2000-2007)  
Outreach to middle schools and high schools in Tucson on drug abuse (2005-2007)

#### **Memberships in Professional Societies**

American Pain Society (APS)  
International Association for the Study of Pain (IASP)  
Society for Neuroscience (SFN)  
American Society of Pharmacology and Experimental Therapeutics (ASPET)  
Western Pharmacology Society (WPS)

**Publications - Refereed Journal Articles** (citations as of 12/1/11; 22 publications with over 100 citations, H-index 49; \*work as a graduate student)

#### **1991**

\*1. Mattia, A., **Vanderah, T.W.**, Mosberg, H.I., Omnaas, J.R., Bowen, W.D. and Porreca, F.: Pharmacological Characterization of [D-Ala<sup>2</sup>, Leu<sup>5</sup>, Ser<sup>6</sup>]-enkephalin (DALES): Antinociceptive actions at the opioid delta non-complexed opioid receptor. *European J Pharmacol*, **192**: 371-375, 1991. (18 citations)

\*2. Wild, K.D., **Vanderah, T.W.**, Mosberg, H.I. and Porreca, F.: Opioid delta receptor subtypes are associated with different potassium channels. *European J Pharmacol* (Rapid Communication), **193**: 135-136, 1991. (76 citations)

\*3. Mattia, A., **Vanderah, T.W.**, Mosberg, H.I. and Porreca, F.: Lack of Antinociceptive cross-tolerance between [D-Pen<sup>2</sup>, D-Pen<sup>5</sup>]enkephalin (DPDPE) and [D-Ala<sup>2</sup>]deltorphin II: Evidence for delta receptor subtypes. *J Pharmacol and Exper Therap* **258**: 583-587, 1991. (258 citations)

#### **1992**

\*4. **Vanderah, T.W.**, Wild, K., Takemori, A., Sultana, M., Portoghese, P., Bowen, W., Mosberg, H.I. and Porreca, F.: Mediation of Swim-Stress Antinociception by Opioid Delta-2 Receptors in

the Mouse. *J Pharmacol and Exper Therap*, **262**: 190-197, 1992. (51 citations)

### **1993**

\*5. Mattia, A., **Vanderah, T.W.**, Raffa, B., Vaught, J.L., Tallarida, R.J. and Porreca, F.: Characterization of the Unusual Antinociception Profile of Tramadol in Mice. *Drug Development Res*, **28**: 176-182, 1993. (13 citations)

\*6. **Vanderah, T.W.**, Wild, K.D., Takemori, A.E., Sultana, M., Portoghese, P.S., Bowen, W.D., Hruby, V.J., Mosberg, H.I. and Porreca, F.: Modulation of Morphine Antinociception by Swim-Stress in the Mouse: Involvement of Supraspinal Opioid Delta-2 Receptors. *J Pharmacol and Exper Therap*, **267**: 449-455, 1993. (32 citations)

\*7. Wild, K.D., McCormick, J., Bilsky E.J., **Vanderah, T.W.**, McNutt, R.W., Chang, K.-J. and Porreca, F.: Antinociception actions of BW373U86 in the mouse. *J Pharmacol and Exper Therap*, **267**: 858-865, 1993. (50 citations)

### **1994**

\*8. **Vanderah, T.W.**, Takemori, A.E., Sultana, M., Portoghese, P.S., Mosberg, H.I., Hruby, V.J., Hasseth, R.C., Matsunaga, T.O. and Porreca, F.: Interaction of [D-Pen<sup>2</sup>, D-Pen<sup>5</sup>]enkephalin and [D-Ala<sup>2</sup>, Glu<sup>4</sup>]deltorphin with Opioid Delta Receptor Subtypes *In Vivo*. *European J Pharmacol*, **252**: 133-137, 1994. (49 citations)

\*9. Sora, I., Richman, J., Santoro, G., Wei, H., Wang, Y., **Vanderah, T.W.**, Horvath, R., Nguyen, M., Roeske, W.R. and Yamamura, H.I.: The Cloning and Expression of a Human Creatine Transporter. *Biochem Biophys Res Comm*, **204**: 419-427, 1994. (70 citations)

\*10. Ossipov, M.H., Kovelowski, C.J., **Vanderah, T.W.** and Porreca, F.: Naltrindole, an Opioid  $\square$  Antagonist, Blocks the Enhancement of Morphine-Antinociception Induced by a CCK<sub>B</sub> Antagonist in the Rat. *Neuroscience Letters*, **181**: 9-12, 1994. (30 citations)

\*11. **Vanderah, T.W.**, Lai, J., Yamamura, H.I. and Porreca, F.: Antisense Oligodeoxynucleotide to the CCK<sub>B</sub> Receptor Produces Naltrindole- and [Leu<sup>5</sup>]enkephalin Antiserum-Sensitive Enhancement of Morphine Antinociception. *NeuroReport*, **5**: 2601-2605, 1994. (33 citations)

### **1995**

12. **Vanderah, T.W.**, Bernstein, R.N., Lai, J. and Porreca, F.: Production of Naltrindole-Sensitive Antinociception by a Cholecystikinin (CCK) Antagonist and Thiorphan: Evidence for Tonic Inhibition of Enkephalin Release by CCK. *Analgesia*, **1**: 4-6, 1995. (2 citations)

13. Rao, R.K., Lopez, Y., **Vanderah, T.W.**, Lai, J. and Porreca, F.: Attenuation of gastrin-induced gastric acid secretion by treatment with antisense oligonucleotide to the CCK<sub>B</sub>/gastrin receptor. *NeuroReport*, **6**: 2373-2377, 1995. (4 citations)

### **1996**

14. Edsall, S.A., Knapp, R.J., **Vanderah, T.W.**, Roeske, W.R., Consroe, P. and Yamamura, H.I.: Antisense Oligodeoxynucleotide Treatment to the Brain Cannabinoid Receptor Inhibits Antinociception. *NeuroReport*, **7**: 593-596, 1996. (30 citations)

15. **Vanderah, T.W.**, Bernstein, R.N., Yamamura, H.I., Hruby, V.J. and Porreca, F.: Enhancement of Morphine Antinociception by a CCK<sub>B</sub> antagonist in mice is Mediated via Opioid Delta Receptors. *J Pharmacol and Exper Therap*, **278**: 212-219, 1996. (24 citations)

16. **Vanderah, T.W.**, Laughlin, T., Lashbrook, J.M., Nichols, M.L., Ossipov, M.H., Wilcox, G.L. and Porreca, F.: A Single Intrathecal Injection of Dynorphin A or *des*-TYR-dynorphins Produce

Long-Lasting Tactile Allodynia in Rats: Blockade by MK-801 but Not Naloxone. *Pain*, **68**: 275-281, 1996. (151 citations)

### **1997**

17. Laughlin, T., **Vanderah, T.W.**, Lashbrook, J.M., Nichols, M.L., Ossipov, M.H., Porreca, F. and Wilcox, G.L.: Spinally Administered Dynorphin A Produces long-lasting allodynia: Involvement of NMDA but Not Opioid Receptors. *Pain*, **72(1-2)**: 253-260 1997. (134 citations)

18. Wegert, S., Ossipov, M.H., Nichols, M.L., Bian, D., **Vanderah, T.W.**, Malan, T.P.Jr. and Porreca, F.: Differential activities of intrathecal MK-801 or morphine to alter responses to thermal and mechanical stimuli in normal or nerve-injured rats. *Pain*, **71**: 57-64 1997. (87 citations)

19. Minami, K., **Vanderah, T.W.**, Minami, M. and Harris, R.A.: Inhibitory effects of anesthetics and ethanol on muscarinic receptors expressed in *Xenopus* oocytes. *European J Pharmacol*, **339**: 237-244, 1997. (51 citations)

### **1998**

20. **Vanderah, T.W.**, Raffa, R.B., Lashbrook, J.M., Burritt, A, Hruby, V. and Porreca, F.: Orphanin-FQ/nociceptin: lack of antinociceptive, hyperalgesic or allodynic effects in acute thermal or mechanical tests following intracerebroventricular or intrathecal administration to mice or rats. *European J Pain*, **2**: 267-280, 1998. (20 citations)

### **2000**

21. Hosohata, Y, **Vanderah, T.W.**, Burkey, T.H., Ossipov, M.H., Kovelowski, C.J., Ichiro, S., Uhl, G.R., Zhang, X., Rice, K.C., Roeske, W.R., Hruby, V.J., Yamamura, H.I., Lai, J., and Porreca, F.:  $\mu$ -Opioid receptor agonists produce antinociception and [35S]GTP $\gamma$ S binding in : receptor knockout mice. *European J Pharmacol*, **388**: 241-248, 2000. (34 citations)

22. Hosohata, K., Logan, J.K., Varga, E., Burkey, T.H., **Vanderah, T.W.**, Porreca, P., Hruby, V.J., Roeske, W.R. and Yamamura, H.I.: The role of G protein  $\beta 2$  subunit in opioid antinociception in mice. *European J Pharmacol*, **392**: R9-R11, 2000. (4 citations)

23. **Vanderah, T.W.**, Gardell, L.R., Burgess, S.E., Ibrahim, M., Zhong, C-M., Ossipov, M.H., Lai, J., Malan, Jr. T.P. and Porreca, F.: Repeated Spinal Opioid Administration Produces Abnormal Pain and Antinociceptive Tolerance which is Reversed by Dynorphin Antiserum. *J Neuroscience*, **20(18)**: 7074-7079, 2000. (173 citations)

### **2001**

24. **Vanderah, T.W.**, Suenaga N.M.H., Ossipov, M.H., Malan Jr., T.P., Lai, J. and Porreca, F. Tonic Descending Facilitation From The Rostral Ventromedial Medulla Mediates Opioid-Induced Abnormal Pain and Antinociceptive Tolerance. *J Neuroscience*, **21(1)**: 279-286, 2001. (162 citations)

25. Wang, Z., Gardell, L.R., Ossipov, M.H., **Vanderah, T.W.**, Brennan, M.B., Hochgeschwender, U., Hruby V.J., Malan Jr., T.P., Lai, J. and Porreca, F. Pronociceptive actions of dynorphin maintain chronic neuropathic pain. *J Neuroscience*, **21(5)**: 1779-1786, 2001. (166 citations)

26. Simoneau, I.I., Hamza, M.S., Mata, H.P., Siegel, E.M., **Vanderah, T.W.**, Porreca, F., Makriyannis, A., and Malan, Jr. T.P.: The Cannabinoid Agonist Win55,212-2 Suppresses Opioid-induced Emesis in Ferrets. *Anesthesiology*, **94(5)**: 882-887, 2001. (52 citations)

27. **Vanderah, T.W.**, Ossipov, M.H., Lai, J., Malan Jr., T.P. and Porreca, F. Mechanisms of Opioid-induced Pain and Antinociceptive Tolerance: Descending Facilitation and Spinal Dynorphin. *Pain*, **92**: 5-9, 2001. (137 citations)



28. Porreca, F., Burgess, S.E., Gardell, L.R., **Vanderah, T.W.**, Malan Jr., T.P., Ossipov, M.H., Lappi, D.A. and Lai, J.: Inhibition of Neuropathic Pain by Selective Ablation of Brainstem Medullary Cells Expressing the u-Opioid Receptor. *J Neuroscience*, **21**(14):5281-5288, 2001. (139 citations)

29. Malan, Jr., T.P., Ibrahim, M.M., Deng, H., Mata, H.P., **Vanderah, T.W.**, Porreca, F. And Makriyannis, A. CB<sub>2</sub> Cannabinoid Receptor-Mediated Peripheral Antinociception. *Pain*, **93**: 239-245, 2001. (227 citations)

30. Lai, J., Ossipov, M.H., **Vanderah, T.W.**, Malan Jr., T.P. and Porreca, F. Neuropathic Pain: The Paradox of Dynorphin. *Molecular Interventions Review*, **1**(2): 22-29, 2001. ( citations)

31. Rasband, S.N., Park, E.W., **Vanderah, T.W.**, Lai, J., Porreca, F. and Trimmer, J.S. Distinct Potassium Channels on Pain-Sensing Neurons. *Proc Natl Acad Science*, **98**(23): 13373-78, 2001. (125 citations)

## **2002**

32. Burgess, S., Gardell, L., Ossipov, M.H., Malan, T.P.Jr., **Vanderah, T.W.**, Lai, J. and Porreca, F., Time-Dependent Descending Facilitation from the Rostral Ventromedial Medulla Maintains, but does not Initiate, Neuropathic Pain, *J Neuroscience*, **22**(12): 5129-36, 2002. (164 citations)

33. Gardell, L.R., Wang, R., Burgess, S.E., Ossipov, M.H., **Vanderah, T.W.**, Malan, Jr. T.P., Lai, J. and Porreca: Sustained Morphine Exposure Induces a Spinal Dynorphin-Dependent Enhancement of Excitatory Transmitter Release from Primary Afferent Fibers. *J Neuroscience*, **22**(15): 6747-55, 2002. (130 citations)

34. Malan, Jr. T.P., Ibrahim, M., **Vanderah, T.W.**, Makriyannis, A. and Porreca, F.: Inhibition of Pain Responses by Activation of CB<sub>2</sub> Cannabinoid Receptors. *Chemistry and Physics Symposium of Lipids*, **121**(1-2): 191-200, 2002. (53 citations)

35. Gardell, L.R. Ossipov, M.H. **Vanderah, T.W.**, Lai, J. and Porreca, F.: Dynorphin-independent spinal cannabinoid antinociception. *Pain*. **100**(3):243-248, 2002. (14 citations)

## **2003**

36. Malan, Jr. T.P., Ibrahim, M., **Vanderah, T.W.**, Makriyannis, A. and Porreca, F.: CB<sub>2</sub> Cannabinoid Receptor Agonists: Pain Relief Without Psychoactive Effects. *Current Opinion in Pharmacol*, **3**: 1-6, 2003. (100 citations)

37. Hosohata, K., Varga, E., Alfaro-Lopez, J., Tang, X., **Vanderah, T.W.**, Porreca, P., Hruby, V.J., Roeske, W.R. and Yamamura, H.I.: (2S,3R)TMT-L-Tic-OH is a potent, selective delta opioids receptor antagonist in mouse brain. *J Pharmacol and Exper Therap*, **304**(2): 683-688, 2003. (5 citations)

38. Wessells, H., Hruby V.J., Hackett, J., Han, G., Balse-Srinivasan, P. and **Vanderah, T.W.**: MT-II Induces Penile Erection via Brain and Spinal Melanocortin Receptors. *Neuroscience*, **118**: 755-762, 2003. (39 citations)

39. Hruby V.J., Agnes, R.S., Davis, P., Ma, S.-W., Lee, Y.S., **Vanderah, T.W.**, Lai, J. and Porreca, F.: Design of Novel Peptide Ligands which have opioid agonist activity and CCK antagonist activity for the treatment of pain. *Life Sciences*, **73**: 699-704, 2003. (20 citations)

40. Ibrahim, M.M., Deng, H., Zvonok, A., Cockayne, D.A., Kwan, J., Mata, H.P., **Vanderah, T.W.**, Lai, J., Porreca, F., Makriyannis, A. and Malan Jr.T.P.: Activation of CB<sub>2</sub> cannabinoid



receptors by AM1241 inhibits experimental neuropathic pain: Pain inhibition by receptors not present in the CNS. *Proc Natl Acad Science*, **100**(18): 10529-10533, 2003. (241 citations)

41. Gardell, L.R., Ehrenfels, C., Ossipov, M.H., Rossomando, A.J., Miller, S., Cai, C., Walus, L., Carmillo, P., Tse, A., Worley, D., Pepinsky, B., Cate, R., **Vanderah, T.W.**, Lai, J., Sah, D.W.Y. and Porreca, F.: Normalization of Experimental Neuropathic Pain by Systemic Artemin. *Nature Medicine*, **9**(11): 1383-9, 2003. (64 citations)

42. Wessells, H., Hruby, V.J., Hackett, J., Han, G., Balse-Srinivasan, P. and **Vanderah, T.W.**: MT-II Induces Penile Erection via Brain and Spinal Mechanisms. *Annals New York Acad Sciences*, **994**: 90-95, 2003. (13 citations)

43. Wang, R., Guo, W., Ossipov, M.H., **Vanderah, T.W.**, Porreca, F. and Lai, J.: Glial cell line-derived neurotrophic factor normalizes neurochemical changes in injured dorsal root ganglion neurons and prevents the expression of experimental neuropathic pain. *Neuroscience*, **121**: 815-824, 2003. (54 citations)

44. Quartilho, A., Mata, H.P., Ibrahim, M.M., **Vanderah, T.W.**, Porreca, F., Makriyannis, A. and Malan, T.P. Jr.: Inhibition of inflammatory hyperalgesia by activation of peripheral CB2 cannabinoid receptors. *Anesthesiology*, **99**(4): 955-60, 2003. (106 citations)

45. Gardell, L.R., **Vanderah, T.W.**, Gardell, S.E., Wang, R., Ossipov, M.H., Lai, J. and Porreca, F.: Enhanced evoked excitatory transmitter release in experimental neuropathy requires descending facilitation. *J Neuroscience*, **23**(23): 8370-8379, 2003. (38 citations)

46. Ossipov MH, Lai J, **Vanderah TW**, Porreca F. Induction of pain facilitation by sustained opioid exposure: relationship to opioid antinociceptive tolerance. *Life Sciences*, **73**(6): 783-800, 2003. (62 citations)

## **2004**

47. **Vanderah, T.W.**, Schteingart, C., Trojnar, J., Junien, J-L., Lai, J. and Riviere, P.J-M.: FE200041, A Peripheral Efficacious Kappa Opioid Agonist with Unprecedented Selectivity. *J Pharmacol and Exper Therap*, **310**(1): 326-333, 2004. (16 citations)

48. **Vanderah, T.W.**: Chronic Pain and the Role of Cholecystokinin. *J Neuropathic Pain & Symptom Palliation*, **45**(1): 2004. (4 citations)

49. Chen, Q., King, T., **Vanderah, T.W.**, Ossipov, M.H., Malan, T.P.Jr., Lai, J. and Porreca, F: Differential blockade of nerve injury-induced thermal and tactile hypersensitivity by systemically administered brain-penetrating and peripherally restricted local anesthetics. *J. Pain*, **5**(5): 281-289, 2004. (12 citations)

50. Gavva, N.R., Klionsky, L., Qu, Y., Shi, L., Tamir, R., Edenson, S., Zhang, T.J., Viswanadhan, V., Toth, A., **Vanderah, T.W.**, Porreca, F., Blumberg, P.M., Lile, J., Sun, K., Louis, J.-C. and Treanor, J.J.S., Molecular determinants of vanilloid sensitivity in TRPV1 *J Biol Chem*, **279**(19): 20283-20295, 2004. (142 citations)

51. Quartilho, A., Mata, H.P., Ibrahim, M.M., **Vanderah, T.W.**, Ossipov, M.H., Lai, J., Porreca, F. and Malan, T.P., Jr., Production of Paradoxical Sensory Hypersensitivity by Alpha 2-Adrenoreceptor Agonists *Anesthesiology*, **100**: 1538-1544, 2004. (16 citations)

52. Ossipov, M.H., Lai, J., King, T., **Vanderah, T.W.**, Malan, T.P., Jr., Hruby, V.J. and Porreca, F., Antinociceptive and Nociceptive Actions of Opioids *J Neurobiology*, **61**(1): 126-148, 2004. (84 citations)

## **2005**

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## **2008**

5. Howard S. Smith, **Todd W. Vanderah** and Gary McClean, Opioids for pain, Pain and Chemical Dependency, Editors; Howard S. Smith and Steven D. Passik, Oxford Univ Press, Chapter 24, 183-202, 2008.

6. Beatriz Fiorvanti and **Todd W. Vanderah**, The Modulation of TRPV1 channels by cannabinoid1 receptors. Ch. 23 *In*, Innovative Drug Development for Headache Disorders Oxford University Press Volume 16 Eds. Jes Olsen and Nabih Ramadan, pgs. 195-203, 2008.

## **2009**

7. Beatriz Fiorvanti and **Todd W. Vanderah**, The Chemistry and Pharmacology of Delta Opioid Antagonists. Ch. 7 *In*, Opiate Receptors and Antagonists; From Bench to Clinic, Humana Press, Edited by Reginald Dean, Edward J. Bilsky and S. Stevens Negus pgs.119-136, 2009.

8. Lindsay H. Burns, **Todd W. Vanderah** and Hoau-Yan Wang, Ultra-Low-Dose Opioid Antagonists Enhance Opioid Analgesia and Reduce Tolerance. Ch. 1 *In*, Opiate Receptors and Antagonists; From Bench to Clinic, Humana Press, Edited by Reginald Dean, Edward J. Bilsky and S. Stevens Negus, pgs.3-17, 2009.

## **2010**

9. King T, Porreca F and **Vanderah TW**, Opioid-Induced Hyperalgesia and Cancer Pain: Effects on Tumor Growth and Disease Progression. *In*, Cancer Pain: From Molecules to Suffering. IASP Press Seattle, Edited by Paice JA, Bell RF, Kalso EA and Soyannwo OA, pgs. 101-120, 2010.

10. Katherine E. Hanlon and **Todd W. Vanderah**, Constitutive Activity at the Cannabinoid CB1 Receptor and Behavioral Responses. *In* Methods in Enzymology, Edited by P. Michael Conn, 484:3-30, 2010. PMID: 21036224

## **2011**

11. Alysia N Lozano- Ondoua and **Todd W Vanderah**, Emerging analgesics and future directions: targeting neuroplasticity *Future Medicine*, Chapter 1, pg. 2-9, 2011.

## **2012**

12. AM. Symons-Liguori, TW. Vanderah, *The Delta Opioid Receptor*, ACS Books  
Book title: "Research and Development of Opioid-Related Analgesics"  
Manuscript ID: bk-2012-00548p.R1

## **2013**

13. AM. Symons-Liguori, AN. Lozano- Ondoua and **TW. Vanderah**, Cannabinoids and bone cancer pain, in preparation, 2013.

## **Abstracts at Scientific Meetings**

Abstracts include 181 national and international meetings

## **Scholarly Presentations – (68 total)**

### **1996**

Guest lecture at *International Narcotics Research Conference*, Long Beach, California, July 21-26, 1996, titled: Orphanin FQ/Nociceptin (OFQ/N) and Sensory Thresholds in Mice or Rats.

### **1998**

Guest lecture at *College on Problems of Drug Dependence*, Scottsdale, AZ, June 13-18, 1998, titled: Effects of Opioid Delta Agonists in Mu "Knock-Out" Mice.

### **1999**

Guest lecture at *College on Problems of Drug Dependence*, Acapulco, Mexico, June 12-17, 1999, titled: Agents Which Enhance Opiate Action of Retard Tolerance/Dependence.

Invited Lecture at *College on Problems of Drug Dependence*, Acapulco, Mexico, June 12-17, 1999, titled: Spinal and Supraspinal delta Opioid Receptors in Pain.

### **2000**

Invited Lecture at *College on Problems of Drug Dependence*, San Juan, Puerto Rico, June 17-22, 2000, titled: Descending facilitation in opioid tolerance: neurotoxin developments.

Director of seminar series on *Pain Research* for the Departments of Anesthesiology and Pharmacology, 2000-2001.

### **2001**

Invited Lecture at Ferring Research Institute Inc., San Diego, CA, May 22-23, 2001, titled: Cannabinoids and Pain.

Invited Lecture at NeuroMed Tech., Vancouver, Canada, July 11-12, 2001, titled: Animal Models for Testing Pain.

Invited Lecture at The University of New Mexico, Albuquerque, NM, September 12-13, 2001, titled: Mechanisms of Opioid-Induced Pain and Antinociceptive Tolerance.

### **2002**

Invited Lecture at *Western Pharmacology Society*, Mazatlan, Mexico, January 26-31, 2002, titled: Opioid Tolerance and Descending Pathways.

Invited Lecture at *American Pain Society*, Baltimore, MD, March 14-17, 2002, titled: CCK as an endogenous Mediator of Opioid-Induced Paradoxical Pain and Antinociceptive Tolerance.

Invited Lecture at the *World Congress of Pain ,IASP*, San Diego, CA, August 17-22, 2002, titled: CCK and Opioid Interactions.

Invited Lecture at *Mexican National Congress of Physiology*, Colima, Mexico, September 7-11, 2002, titled: Mechanisms of Pain.

Invited Lecture Ferring Research Institute Inc., San Diego, CA, November 11-12, 2002, titled: Cannabinoids as a Therapeutic Target.

Invited Lecture Amgen Inc., Thousand Oaks, CA, November 19-20, 2002, titled: Cannabinoids, VR1 and Pain.

### **2003**

Invited Lecture at *American Pain Society*, Chicago, IL, March 20-23, 2003, titled: CCK as an endogenous Mediator of Neuropathic Pain.

Invited Lecture at The University of Arizona, Program Project Grant Depts of Chemistry and Pharmacology April 14<sup>th</sup>, 2003, titled: The *in vivo* Pharmacology of Compounds Designed for the Pathology of Pain.

Invited Lecture American Dental Society of Anesthesiology, Tucson, Arizona Ventana Canyon Resort, May 1-4, 2003, titled: Chronic Pain.

Invited Lecture at The University of Arizona, Program Project Grant Depts of Chemistry and Pharmacology June 2<sup>nd</sup> 2003, titled: The modulation of the capsaicin sensitive vanilloid channel via G-protein coupled receptors.

Invited Lecture at the NIH and FDA in Baltimore, MD, September 24<sup>th</sup> 2003, titled: "Re-engineering the Analgesic Drug Development Process".

Invited Lecture at The University of New England, Maine, September 26<sup>th</sup> 2003, titled: Peripheral Cannabinoids and the inhibition of Pain.

Invited Lecture at the Post-Graduate Assembly of Anesthesiology (PGA) Symposium, New York, New York, December 14<sup>th</sup> 2003, titled: Pain pathways and the mechanism of opioid analgesics.

### **2004**

Invited Lecture at The University of Arizona, Program Project Grant Depts of Chemistry and Pharmacology February 2<sup>nd</sup> 2004, titled: Cannabinoids and Pain.

Invited Lecture at Postoperative Epidural Analgesics, Scientific Foundations and Recent Developments, The St. Regis, New York, NY, September 18<sup>th</sup> 2004.

Invited Lecture at Postoperative Epidural Analgesics, Scientific Foundations and Recent Developments, Chicago, IL, October 9<sup>th</sup> 2004.

### **2005**

Invited Lecture at *American Pain Society*, titled: Cholecystokinin Antagonist: From the Animal Evidence to Human Application in Clinical Pain Management, Boston, MA, March 30 - April 2, 2005.

Invited Lecture at *American Pain Society*, titled: Where Are the New Pain Drugs? The Challenge of Developing Novel Analgesics, Boston, MA, March 30 - April 2, 2005.

Invited Lecture at *American Pain Society*, titled: Basic Science forum, How CB1 Receptors May Regulate the Sensitized State of the TRPV1 Channel, Boston, MA, March 30 - April 2, 2005.

Invited Lecture at *XXXV International Congress of Physiological Sciences & (ASPET)*, titled: Role of Neuroinflammation in Neuropathic Pain, San Diego, CA, March 31 – April 5, 2005.

Invited Lecture at The University of Arizona, Program Project Grant Depts of Chemistry and Pharmacology May 2<sup>nd</sup> 2005, titled: Update on the Biphalin Project

Invited Lecture at the University of Minnesota, Neuroscience Program titled: Pain Modulation by Descending Supraspinal Systems, St.Paul/Minn, MN, May 20, 2005.

Invited Lecture at the University of Minnesota, Midwest Pain Interest Group, **Plenary Speaker** titled: Opioids in Neuropathic Pain: How to circumvent their Drawbacks, St.Paul/Minn, MN, May 21, 2005.

Invited Lecture at Cancer Pain 2005 Satellite Symposium of the 11<sup>th</sup> World Congress on Pain, titled: Controversies in Cancer Pain, Cairns, Australia, August 18-19, 2005.

## **2006**

Invited Lecture at Spring Pain, titled: Interactions between TRPV1 and CB1 receptors, Grand Cayman Islands BWI, April 22-29, 2006.

Invited Lecture at *American Pain Society*, Basic Science Dinner Speaker, titled: Translating Animal Models to the Clinic, San Antonio, TX, May 3 - May 6, 2006.

Invited Lecture 6<sup>th</sup> Annual Bioscience Research Symposium, titled: Research in Pain at the University of Arizona, Phoenix, AZ, June 12-13<sup>th</sup>, 2006.

Invited Lecture New Zealand Pain Society, **Keynote Speaker**, titled Neuropathic pain and descending pain systems, Dunedin, New Zealand, October 25<sup>th</sup>-27<sup>th</sup>, 2006.

Invited Lecture New Zealand Pain Society, Plenary Session, titled Novel Opioid treatments, Dunedin, New Zealand, October 25<sup>th</sup>-27<sup>th</sup>, 2006.

## **2007**

Invited Lecture at International Headache research Seminar, titled: Behavioral model of migraine pain, Copenhagen, Denmark, March 23rd-25th, 2007.

Invited Lecture at *American Pain Society*, titled: Bridging the gap between preclinical pain models and clinical efficacy in pain, Washington DC, May 2nd - May 5th, 2007.

Invited Lecture at 4<sup>th</sup> world Congress, World Institute of Pain, Symposium Organizer titled: Opioid-induced hyperalgesia, Budapest, Hungary, September 25<sup>th</sup>-28<sup>th</sup>, 2007

Invited Lecture at 4<sup>th</sup> world Congress, World Institute of Pain, titled: Role of dynorphin expression in opioid induced hyperalgesia Budapest, Hungary, September 25<sup>th</sup>-28<sup>th</sup>, 2007

## **2008**

Invited Lecture at Endopharmaceuticals for novel drug targets, titled: Delta and Kappa Opioid Receptors as Suitable Drug Targets for Pain. Philadelphia, PA April 12<sup>th</sup>, 2008.

Invited Lecture at Spring Pain, titled: NGF-Dependent Mechanisms of Opioid-Induced Hyperalgesia, Grand Cayman Islands BWI, April 26<sup>th</sup>- May 3<sup>rd</sup>, 2008.

Invited Lecture University of New England, 8<sup>th</sup> Annual UNECOM Spring Symposium, titled: Practice Dilemmas: Headache and Head Pain. University of New England, Biddeford Maine, May 21-22, 2008.

Invited Lecture at International Association for the Study of Pain (IASP), 12<sup>th</sup> World Congress on Pain, titled: The Need For Individualized Opioid Therapy, Delta and Kappa Opioid Receptors as Suitable Drug Targets for Pain. Glasgow, Scotland, United Kingdom, August 18<sup>th</sup> –August 22, 2008.

Invited Lecture Society of Forensic Toxicologists (SOFT), Titled: pain pathways and the actions of opioids. Plenary Session, Phoenix Arizona, October 27<sup>th</sup>-28<sup>th</sup>, 2008.

## **2009**

Invited Roundtable Discussant at *American Pain Society*, titled: Successful Grant writing and Funding Opportunities in Pain Research; San Diego, CA, May 7<sup>th</sup> - May 9<sup>th</sup>, 2009.

Invited Lecture IASP Research Symposium, A Global Problem: Cancer Pain from The Laboratory to the Bedside, Chicago, IL, June 4<sup>th</sup>- June 5<sup>th</sup>, 2009.

Data Blitz, Neuroscience Graduate Program, titled: Behavioral model of migraine and cortical spreading depression, Botanical Gardens, August 25<sup>th</sup>, 2009.

Invited Lecture, Frontiers in Medical Research (FMR) series, titled: CB<sub>2</sub> agonists and breast-induced bone cancer pain, Kiewit, Tucson, Arizona, September 22, 2009.

## **2010**

Lecture Spring Pain Conference, title: CB<sub>2</sub> and breast cancer induced bone pain. Grand Cayman Islands BWI, April 17<sup>th</sup>-April 24<sup>th</sup>, 2010.

Symposium Chair and Lecture at International Association for the Study of Pain (IASP), 13<sup>th</sup> World Congress on Pain, titled: Mechanisms that Promote Cancer Pain and Novel Treatments. Montreal Canada, August 29<sup>th</sup> - September 2<sup>nd</sup>, 2010.

Invited lecture Lilly Pharmaceuticals Inc., title: CB<sub>2</sub> and breast cancer induced bone pain. Indianapolis, Indiana, September 29<sup>th</sup>- September 30<sup>th</sup>, 2010.

Invited Lecture Allergan, title: Pain pathways and migraine/facial pain. Irvine CA. October 7<sup>th</sup>-October 8<sup>th</sup>, 2010.

Invited Speaker Mexico Pain Congress, Mexico City, Mexico, Two talks titled: A non-addictive opioid agonist. #2 titled cannabinoids and bone cancer pain. November 10<sup>th</sup>-13<sup>th</sup>, 2010.

Invited Lecture University of San Francisco, California, titled: Cannabinoids as disease modifying drugs for bone cancer pain, December 2<sup>nd</sup>, 2010.

Invited Lecture CPMC Research Institute, San Francisco, California, titled: Cannabinoids as disease modifying drugs for bone cancer pain, December 3<sup>rd</sup>, 2010.

## **2011**

Invited Lecture Spring Brain Conference, title: Cortical Spreading Depression and Migraine. La Paloma Tucson AZ, March, 2011.

Invited Lecture Neurology Grand Rounds University of Arizona, title: Pathophysiology of Migraine. Tucson AZ, April 15<sup>th</sup>, 2011.

Invited Lecture American Pain Society Meeting, title: CB2 agonists and breast cancer induced pain. Austin TX. May 18<sup>th</sup>- May 22<sup>nd</sup>, 2011.

Invited talk Neurosurgery Grand Rounds University of Arizona, title: Opioid Tolerance and Hypersensitivity. Tucson AZ. September 14<sup>th</sup>, 2011.

Invited Symposium Speaker American Academy of Physical Medicine and Rehabilitation, titled Mechanisms and Pathophysiology of Acute and Chronic Pain. Orlando, FL. November 17-20<sup>th</sup>, 2011.

## **2012**

Invited Lecture at The University of New England, Maine, January 9<sup>th</sup> 2012, titled: Cannabinoids and the inhibition of Breast Cancer Proliferation.

Invited Lecture at Barrows Neurological Institute and Saint Joseph's Hospital and Medical Center, Phoenix, AZ, March 12-13<sup>th</sup> 2012, titled: Cannabinoid CB2 agonists in Bone Cancer Pain.

Invited Lecture at The University of Arizona, Collaborative Cancer Grand Rounds for CME, April 6, 2012, titled: Novel Pharmaceutical Targets for Chronic Pain.

## **2013**

Invited Keynote Speaker, Oregon Health Sciences University, Portland, Oregon, For PAIN DAY at OHSU, February 28<sup>th</sup> 2013, titled: Opioid-Induced Hyperalgesia.

Invited Lecture, Oregon Health Sciences University, Portland, Oregon, February 29<sup>th</sup> 2013, titled: Cortical Spreading Depression and Migraine.

Invited Speaker and Symposium Moderator, American Pain Society Meeting, New Orleans LO, May 8-11<sup>th</sup>, 2013 titled: Causes of bone cancer pain and CB2 agonists.

Invited Speaker, University of St. Louis, St. Louis MO, June 11, 2013, titled: Causes of bone Cancer Pain and CB2 agonists.

Invited Speaker, Center for Toxicology Pharmacology Education and Research; Scientific Aspects of Medical Marijuana, The Scottsdale Resort & Conference Center, Scottsdale Arizona, June 14<sup>th</sup>, titled: Pain Pathways and the Actions of Cannabinoids.

Invited Speaker, University of New England, Biddeford, ME, September 3, 2013, titled: Developing a non-addictive narcotic for chronic pain.

Invited Speaker, Arizona Association of School Psychologists (AASP) Annual Conference, Phoenix AZ, October 24-25<sup>th</sup>, 2013; titled: "Child Psychotropic Medication"

## **Teaching Responsibilities**



Director 2011-present, Human Neuroscience 825, Co-Director 2008-2010 – Lecturer (2003-present) & Director (2005)– College of Medicine, University of Arizona, Tucson, AZ 85724, 2003-2004. (Lecture hours 15; facilitated 15 small groups; class room hours attended 63; directorship of 5 Team Learning, Gross lab 9 hours, tutorials and meetings hours 30) (Awarded best basic science course by first year medical students 2003-2011).

Foundations Block 1st year Medical School Students, (2005-present) Principles of Pharmacology, Pharmacokinetics & Dose Response Curves (Lecture hours 4, directorship of 1 TL).

Skeletal and Muscle Block 1<sup>st</sup> year Medical School Students Lecture on drugs for back pain 2010-present) (2007-2008 CBI facilitator).

Advanced Topics 2<sup>nd</sup> year Medical School Students (2008-present) Pharmacology and Neuropharmacology review (Lecture hours 3).

Transition and Intersessions, 3<sup>rd</sup> year medical students, Clinical Pain, drugs for RA and OA (2009-present) (5 lecture meetings per year).

Principles of Pharmacology 420/520 Course Director (1999-2002 and 2009-2011) – Lecturer (1997 to present) - Department of Pharmacology, University of Arizona Health Sciences Center, Tucson, AZ 85724, 1995-2004.

Sensation and Perception Psych329, November 2011, Lecture on pain. University of Arizona Undergraduates (teaching 1hr 15min).

Chemistry 436/536 or Religious Studies 436/536. "Scientific and Ethical Aspects of Modifying Human Behavior." Spring, 2006-present (teaching 3hr).

Scientific Writing, Strategy & Skills 595B – Lecture on Writing With-in a Pharmaceutical Company, Lecture on “How NIH Study Section functions” (2 hrs total) Fall 2002-present.

Neuropharmacology (PCOL 653) - Department of Pharmacology, University of Arizona Health Sciences Center, (3 hrs total, Lecture), 2000-present.

Systems Neuroscience NRSC 560 – IDGP Neuroscience, University of Arizona, (2.5 hrs lecture) Spring 2012-present.

Anesthesiology Resident Lectures (15), “Principles of Pharmacology”, “Drug Targets”, “Opioids as Anesthetics” & “Synaptic Transmission” University of Arizona, 2001-present.

Neurology Residents and Medical Students year III/IV Lectures-25, Fall and Spring 2009-present.

Surgery Resident Lectures (2), “Neuropharmacology” UofA / UMC, May 6th, 13<sup>th</sup>, 2009.

Neurosurgery Resident Lectures (1), “Neuropharmacology” UofA / UMC, June 24th, 2009.

Digestive, Metabolism & Hormone Block 2<sup>nd</sup> Year Medical students (2005-2007) Gastrointestinal drugs.

Principles of Neuroanatomy PSYC 502 – Lecture (2005-2007) – Department of Anatomy and Cell Biology, University of Arizona Health Sciences Center, Tucson, AZ 85724.

Molecular Pharmacology 551a – Lecturer (2005 to 2007) – Department of Pharmacology, University of Arizona Health Sciences Center, Tucson, AZ 85724, (5 lectures, 6hrs).

Interdisciplinary Seminars, 3<sup>rd</sup> year medical students “Journal Review Basics” September 2<sup>nd</sup>, 2005 from 1-4pm. University of Arizona, College of Medicine (3 hrs).

Human Neuroanatomy PSYC 597H – Lab Practical (2004-2007) – Department of Anatomy and Cell Biology, University of Arizona Health Sciences Center, Tucson, AZ 85724.

Physiology Student Forum PSIO 696c– Lecture on Life in Industry vs Academics, February 13, 2004.

Medical Pharmacology 501/801 - Lecture on Pharmacology of Gastrointestinal Drugs, 1999-2005.

Lecture on Principles of Pharmacology & Dose Response, 2002-2005.

Human Neuroscience 625/825 - Small Group Facilitator, 2002-2006.

Medical Pharmacology 501/801 - Small Group Facilitator, 2000-2006.

Neuropharmacology Lecture on Peptide processing, February 14<sup>th</sup>, 2006.

Anesthesiology Grand Rounds, “Descending Facilitation from the RVM Mediates Opioid-induced Pain and Antinociceptive Tolerance” University of Arizona, March 7<sup>th</sup>, 2001.

Anesthesiology Grand Rounds, “Mechanisms of Opioid Action” September 15, 2004 & Pain Pathways and Synaptic Transmission” November 17, 2004, University of Arizona.

Pain lectures including basic research for the Pain Clinic, University of Arizona, 2000-2001.

Opioid Pharmacology Lecture for *Tucson Pain Management Explorers*, Health South, Tucson, AZ, May, 2001.

Nursing Pain Course (PCOL 477/577) - Opioid Pharmacology, University of Arizona, 1999-2002.

Early Outreach, Academic Preparation for Excellence Program (APEX) University of Arizona, 1997-2003.

Neuroscience Resident Lectures for the Department of Neurology, University of Arizona, 1999.

Neurobiology of Drugs of Abuse (PHCL 450) - Depart of Pharmacology, University of Arizona, 1995-1998.

Science Teacher, 5th & 6th Grade, First Southern Christian School, 1991, Speedway Blvd. Tucson, AZ .

Organic Chemistry Laboratory, 1989-1990, Department of Chemistry, University of Arizona, Tucson, AZ.

## **Training Graduate Students**

**Advisor for graduate students: (7 Ph.D. students graduated; 2 M.S. students graduated)**

- 1) Advisor for M.S. Student, Ms. Nova Suenaga-Sain: M.S. program in Pharmacology, University of Arizona, 2000-2003 (Graduated May 2003). Currently at Old Dominion University, Center for Bioelectrics.
- 2) Advisor for M.S. Student, Ms. Madhavi Pai: M.S. program in Pharmacology, University of

- Arizona, 2000-2003 (Graduated November 2003). Currently at Abott Inc.
- 3) Advisor for Ph.D. Student, Mr. David Herman: Ph.D. program in Neuroscience, University of Arizona, 2000-2006 (graduated May of 2006). Currently at Cephalon Inc.
  - 4) Advisor for Ph.D. Student, Mr. Tim Marshall: Ph.D. program in Medical Pharmacology, University of Arizona, 2004-2008 (graduated May 2008). Currently teaching at Pima CC
  - 5) Co-advisor for Ph.D. Student, Dr. Marina Vardanyan: Ph.D./M.D. program in Medical Pharmacology, University of Arizona, 2004-2008 (graduated February 2008). Director of Comprehensive Center for Chronic Pancreatitis University of Arizona, transitioning to Research Professor Position at University of Wisconsin.
  - 6) Advisor for Ph.D. Student, Ms. Beatriz Fioravanti: Ph.D. program in Medical Pharmacology, University of Arizona, 2004-2009 (graduated April 2009) Currently Research Scientist at Ferring Inc.
  - 7) Advisor for Ph.D. Student, Ms. Tally Largent: Ph.D. program in Medical Pharmacology, University of Arizona, 2005-2010. Post Doc Fellowship with Sue Aicher and Mike Andresen at OHSU, Portland Oregon. Has achieved an NRSA for her work at OHSU.
  - 8) Advisor for Ph.D. Student, Katherine Hanlon: Current in Ph.D. program in Medical Pharmacology, University of Arizona, 2008-2012. Post Doc Fellowship with Joshua Brody at Mt. Sinai, New York, NY.
  - 9) Advisor for Ph.D. Student, Alysia Lozano-Ondoua: Ph.D. program in Medical Pharmacology, University of Arizona, 2009-2013. Ventana Medical Systems, Roche Tucson AZ.
  - 10) Advisor for Ph.D. Student, David Skinner: M.D./Ph.D. program in Medical Pharmacology, University of Arizona, 2010-present.
  - 11) Advisor for Ph.D. Student, Ashley M. Symons: Ph.D. program in Medical Pharmacology, University of Arizona, 2011-present.
  - 12) Advisor for M.S. student Mr. Alex Sandweiss: M.S. program in Medical Pharmacology, University of Arizona, 2011-present.
  - 13) Advisor for Ph.D. Student, Shaness Grenald: Ph.D. program in Medical Pharmacology, University of Arizona, 2012-present.
  - 14) Advisor for M.S. Student Mrs. Lynn Bui: M.S. program in Medical Pharmacology, University of Arizona, 2012-present.

Graduate Advisory and Examination Committees:

- 1) Mrs. Whenhong Guo, M.S. program in Pharmacology, University of Arizona, 2000-2003.
- 2) Mrs. Qingmen Zhang, M.S. program in Pharmacology, University of Arizona, 2001-2004.
- 3) Mr. Vincent Hau, Ph.D. program in Pharmacology and Toxicology, 1999-2004.
- 4) Ms. Elizabeth Renken, M.S. program in Applied Biosciences, 2000-2003.
- 5) Ms. Sharon Hom, Ph.D. program in Physiology, University of Arizona, 2000-2006.
- 6) Mrs. Jennifer Xie, Ph.D. program in Pharmacology and Toxicology, 2000-2005.
- 7) Mrs. Shannon Bourget, Ph.D. program in Physiology, 2001-2007.
- 8) Mrs. Zhou "Joe" Wan, Ph.D. program in Medical Pharmacology, 2001-2006.
- 9) Ms. Lei Fung Xu, Ph.D. program in Pharmacology and Toxicology, 2002-2007.
- 10) Mr. Wenjun Zhang, Ph.D. program in Pharmacology and Toxicology, 2002-2006.
- 11) Mr. Ruizhong Wang, Ph.D. program in Medical Pharmacology, 2003-2006.
- 12) Mrs. Melissa Byrum, Ph.D. program in Pharmacology and Toxicology, 2004-2007.
- 13) Ms. Adonna Rometo, Ph.D. program in Physiology, 2004-2007.
- 14) Ms. Anna Vardanyan, Ph.D. program in Medical Pharmacology, 2004-2007.
- 15) Mr. Jeff Lockhead, Ph.D. program in Neuroscience, 2004-present
- 16) Mr. Michael Levario, M.S. Program in Medical Pharmacology, 2006-2008.
- 17) Mr. Anthony Hutchinson, Ph.D. program in Neuroscience, 2004-2009.
- 18) Ms. Jill Roberts, Ph.D. program in Neuroscience, 2003-2009.
- 19) Mr. Chris Campos, Ph.D. program in Medical Pharmacology, 2004-2009.
- 20) Ms. Becky Edelmayer, program in Medical Pharmacology, 2004-2009.
- 21) Mr. Braxton Norwood, Program in Medical Pharmacology, 2004-2010.
- 22) Mr. Justin Kowal, M.S. Program in Medical Pharmacology, 2005-2008.
- 23) Mr. Ricky Chang, M.S. Program in Medical Pharmacology, 2006-2008.

- 24) Ms. Devki Sukhtankar, Ph.D. Program in Cancer Biology, 2006-2009.
- 25) Ms. Suneeta Tumati, Ph.D. Program in Medical Pharmacology, 2004-2009.
- 26) Mr. Anthony Platis, M.S. Program in Medical Pharmacology, 2007-2009.
- 27) Mr. Derek Moore, M.S. Program in Medical Pharmacology, 2007-2009.
- 28) Mrs. Lindsay Highstrom, Ph.D. Program in Medical Pharmacology, 2006-2011.
- 29) Ms. Marina Asiedu, Ph.D. Program in Medical Pharmacology, 2007-2012.
- 30) Ms. Jin Yan, Ph.D. Program in Medical Pharmacology, 2007-2011.
- 31) Ms. Lucy Sanchez-Covarrubias, Ph.D. Program in Medical Pharmacology, 2007-2013
- 32) Ms. Mindy M. Wie, M.S. Program in Neuroscience, 2006-2010.
- 33) Mr. David Aguilar, Ph.D. Program in Medical Pharmacology, 2007-2012.
- 34) Mr. Lucas A Schroedl, M.S. Program in Medical Pharmacology, 2009-2010.
- 35) Ms. Supannikar Tawinwung, Ph.D. Program in Medical Pharmacology, 2008-present
- 36) Mrs. Kristy Lee, Ph.D. Program in Cancer Biology, 2008-present.
- 37) Mr. Isuru Kumarasinghe, Ph.D. Program in Biochemistry, 2005-2010.
- 38) Mrs. Xiaomei Wei, Ph.D. Program in Medical Pharmacology, 2008-present
- 39) Mr. Alec Okun, Ph.D. Program in Medical Pharmacology, 2009-2012.
- 40) Ms. Adia Shy, Ph.D. Program in Medical Pharmacology, 2010-present
- 41) Mr. Joshua Strom, Ph.D. Program in Medical Pharmacology, 2010-present
- 42) Mrs. Diane Gansert, M.S. Program in Medical Pharmacology, 2010-2012.
- 43) Ms. Molly Oldeen, M.S. Program in Medical Pharmacology, 2010-2012.
- 44) Mrs. Laura Roeder, M.S. Program in Medical Pharmacology, 2010-2012.
- 45) Mr. Aaron Bloom, M.S. Program in Medical Pharmacology, 2010-2012.
- 46) Mr. Ben , M.S. Program in Medical Pharmacology, 2011-2012.
- 47) Mr. Keith Olson, Ph.D. Program in Chemistry and Biochemistry, 2011-present.
- 48) Mrs, Dipti Tillu, Ph.D. Program in Medical Pharmacology, 2010-present.
- 49) Mrs. Lauren Slotsky, Ph.D. Program in Medical Pharmacology, 2011-present.
- 50) Mr. Brandon Thompson, Ph.D. Program in Physiology, 2011-present.
- 51) Mrs. Ji-Young Ph.D. Program in Medical Pharmacology, 2011-present.

Mentor for postdoctoral trainees:

- 1) Dr. Chengmin Zhong, Department of Pharmacology, University of Arizona, Tucson, AZ 1997-2001.
- 2) Dr. Qinzhi Gong, Department of Anesthesiology, University of Arizona, Tucson, AZ 2002-2003.
- 3) Dr. Dongqin Zhang, Department of Pharmacology, University of Arizona, Tucson, AZ 2000-present.
- 4) Dr. Marina Vardanya, Department of Pharmacology, University of Arizona, Tucson, AZ 2000-2004.
- 5) Anupama Chandramouli, Department of Pharmacology, University of Arizona, Tucson, AZ 2009-present.
- 6) 6) Dr. William Staats, Department of Pharmacology, University of Arizona, Tucson, AZ, 2013-present.

**Grants**

Current Federal

- NIH/NCI R01-CA142115-01, **(PI) Todd W. Vanderah** **3/2010-2/2015**  
 “Cannabinoid CB2 agonists for treatment of breast cancer-induced bone pain”  
 \$1,864,000
- NIH/NCI R01-CA142115-01Sup1, **(PI) Todd W. Vanderah, Shaness Grenald** **4/2013-3/2014**  
 “Synergistic effects of Cannabinoid CB2 and morphine agonists for treatment of breast cancer-induced bone pain”

NIH/NIDA, P01-DA06284, **(PI)–Victor Hruby, (PI of biochemical Core)–Todd W. Vanderah**  
“New Modalities for treatment of pain and drug abuse”, 2009-2014 total \$6,296,106

NIH/NIDA, R01-DA013449, **(PI) -Hruby, (Co-Inv) Vanderah 10% effort**  
“Novel Non-peptide Opioid Ligands for Pain” 2010-2014. Total \$3,500,000

NIH 4R37-NS023970, **(PI)-Patrick Mantyh, (Co-Inv)-Todd W. Vanderah 8% effort**  
“ Peripheral Nociceptors in Persistent Pain”, 2009-2014, \$1,887,500

NIH/NINDS R01-NS066958, **(PI)-Frank Porreca, (Co-Inv)-Todd W. Vanderah 5% effort**  
Titled “Mechanisms of Spontaneous Neuropathic Pain” 2010-2015 \$327,500/year.  
To investigate alternative behavioral methods of chronic pain. The goal is to understand the supraspinal circuits that promotes the sensation of pain. No overlap with the current proposal.

NIH/NINDS R01-NS069572-01A1**(PI)-Frank Porreca, (Co-Inv) Todd W. Vanderah 5% effort**  
Titled “Mechanisms of Medication Overuse Headache and Chronic Migraine Pain” 2010-2015, \$327,500/year. To investigate the neuronal mechanisms that drive migraine pain and Cortical Spreading Depression. No overlap with the current proposal.

#### Pending Federal Funding

NIH/R01, **(PI) Vanderah** **8/2012 - 8/2017**  
“Radiation Therapy and the inhibition of Advanced Breast Cancer Pain”  
\$1,250,000

DOD CDMR, **(PI) Vanderah** **10/2012 - 09/2014**  
Non-Psychotropic Cannabinoid-2 Receptor Agonists and the Inhibition of Breast Cancer Proliferation and Metastases.  
\$561,624.00

#### Expired funding

NIH - NIDA R01 DA15205-01, **(PI)–Todd W. Vanderah** "RVM CCK and Opioid Tolerance"  
Priority Score 170 (15.7%) funded on first submission, May 1, 2002 to 2007, \$1,344,445. One year extension, May 2008.

NIH-NIDA K02 Independent Scientist Award PA-95-050, **(PI)–Todd W. Vanderah 2005-2010**  
“Brain Stem Mechanisms of Opioid Induced Pain”, \$636,755

1R21DA027786-01 (PI) - **Varga, EV (Co-Inv) - Todd W. Vanderah 10% effort**  
“A novel pharmacological target to prevent sustained-morphine-mediated pain sensitization” 2009-2011, Total \$125,000/year

NIH-STTR 1 R41 NS 47807-01, Pain Therapeutics INC “Opioid Antagonists with Morphine for Neuropathic Pain” Funded on first submission, May 1, 2004 to April 30, 2005, \$100,000.

Pain Therapeutics INC. 030189A, “Assessment of Neuropathic Pain in L5/L6 Nerve Injured Rats” May 1, 2003 to Nov 30, 2003, \$10,060.

NIH/NIDA R01-DA023513, **(PI)-Frank Porreca, (Co-Inv)-Todd W. Vanderah 5% effort**  
“NGF-Dependent Sensitization of Nociceptors by Opiates”, 2008 –2013, \$2,389,612

NIH - NIAAA Postdoctoral Fellowship, "The Action of Ethanol on Opioid Receptor Signaling"

Grant funded, but had to be turned down do to job acceptance at Ferring Research Institute/University of Arizona.

NIH - NIDA Predoctoral Fellowship, "Cloning and Expression of a Mouse Delta Opioid Receptor Subtype" 1994-1995.

Internal

Better than Ever (UofA, Cancer Center) **Todd W. Vanderah**, Mark Nelson, Patrick W. Mantyh  
Cannabinoids and Breast Cancer, 2010-2011, \$60,000.

University of Arizona, College of Medicine, Dean's Research Council Grant, "Modulation of Neurotransmitter Release by CB1 Receptors" \$15,000, 2000-2002.

**List of Collaborators on Grants and Publications from the Last Five Years**

Frank Porreca  
Victor Hruby  
Josephine Lai  
Patrick Mantyh  
Mark Nelson  
Eva Varga  
Michael Ossipov  
Tamara King

This is a true and accurate statement of my activities and accomplishments. I understand that misrepresentation in securing promotion and tenure may lead to dismissal or suspension under ABOR Policy 6-201 J.1.b.

Todd W. Vanderah, Ph.D.

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