

CURRICULUM VITAE

FRANK PORRECA, PH.D.

Professor
Departments of Pharmacology and Anesthesiology
College of Medicine
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EDUCATION:

1975 B.S., General Science (Honors), Villanova University, Villanova, PA
1979 M.S., Biomedical Engineering, Drexel University, Philadelphia, PA
1982 Ph.D., Pharmacology, Temple University, School of Medicine, Philadelphia, PA
1982-1984 Merck Postdoctoral Research Associate, University of Arizona, Tucson, AZ

PROFESSIONAL AND ACADEMIC APPOINTMENTS:

2006-2009 Director, Theme for Medical Neuroscience, College of Medicine
2005-present Associate Department Head, Department of Pharmacology, College of Medicine, University of Arizona, Tucson, AZ
2005-present Member, Arizona Cancer Center, University of Arizona, Tucson, AZ
2002-2003 Acting Department Head, Department of Pharmacology, College of Medicine, University of Arizona, Tucson, AZ
1995- present Professor of Pharmacology and Anesthesiology, College of Medicine, University of Arizona, Tucson, AZ
1991 - 1995 Professor of Pharmacology, College of Medicine, University of Arizona, Tucson, AZ
1988 - 1991 Associate Professor of Pharmacology (tenured), College of Medicine, University of Arizona, Tucson, AZ
1988-present Faculty Member, Program in Neuroscience, University of Arizona, Tucson, AZ
1985 - 1988 Assistant Professor of Pharmacology, College of Medicine, University of Arizona, Tucson, Arizona
1984 - 1985 Assistant Professor of Pharmacology, Hahnemann University Medical School, Philadelphia, PA
1982 - 1984 Merck Postdoctoral Research Associate (Dr. Thomas F. Burks), Department of Pharmacology, College of Medicine, University of Arizona, Tucson, AZ

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SCHOLARLY ACTIVITIES

RESEARCH HIGHLIGHTS AT THE UNIVERSITY OF ARIZONA

My laboratory studies mechanisms that underlie chronic pain and headache with the goal of understanding pathophysiology and contributing to the discovery of new therapies for these conditions. Several themes are found in my research including (a) the role of descending modulatory circuits in pain and headache; (b) the intersection between pain and reward pathways; (c) the mechanisms by which opioids and stress engage these circuits and (d) the discovery of molecules that can act within these circuits to provide initial research tools that will allow preclinical validation of mechanism that may be ultimately translated to clinical application.

We, and others in the field have come to the realization that in spite of our advances in understanding of the neurobiology of pain, this information has not led to many novel therapies. We have recently attempted to address one part of this problem by emphasizing research that may have increased relevance to the human pain experience. Specifically, we have attempted to capture and mechanistically evaluate affective dimensions of pain, i.e., the unpleasant or aversiveness that is a fundamental component of all pain experiences. Our approach has emphasized the motivational drive resulting from the unpleasantness of pain and the understanding that relief of pain is a reward. This principle has guided a series of experiments that have allowed us to address the mechanisms by which “pain relief” occurs. We have validated this approach using both clinically effective, and clinically ineffective treatments (i.e., reverse translation) and have confirmed that relief of pain engages the classical mesocorticolimbic reward circuit only in the presence of ongoing pain. This approach has been developed so that it may serve as a platform for discovery of new medications (forward translation) for treatment of pain and headache.

Throughout these studies, we have emphasized the role of descending modulatory pathways in chronic pain and headache. One outcome has been to begin to understand why chronic pain happens relatively rarely after an injury in humans. We have not limited our studies to one “type” of pain and have explored acute, inflammatory, osteoarthritic, visceral, neuropathic and headache. Our questions are guided from observations made by our clinical colleagues through their interactions with patients. This is the basis of our translational strategy and the basis for choosing molecular targets for drug discovery. Our laboratory has worked with colleagues in chemistry for nearly 30 years and our efforts have discovered molecules that have been important research tools. We have recently emphasized the discovery of molecules with multifunctional features that can act simultaneously at more than one type of receptor in order to maximize efficacy while diminishing side effects. A potentially increased therapeutic window may result in medications that can treat pain and headache in specific patient populations while maximizing quality of life.

My laboratory has been continuously NIH funded since 1982. H-index is 78.

EDUCATIONAL ACTIVITIES AT THE UNIVERSITY OF ARIZONA

Education has been an important component of my academic life at the University of Arizona. I have served as Director, or Co-Director of the Human Neuroscience course for Medical Students from 1994-2000, a course continuously identified as the best basic science course in the College of Medicine by

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year one Medical Students during that period. I have taught extensively in the Medical Pharmacology course for year two Medical Students and have been Director of numerous graduate courses in the Program in Pharmacology. I have organized clinical electives for medical students to promote information relevant to their medical education. I have conducted a course on drugs of abuse for undergraduate students and regularly participate in undergraduate teaching for ethics. As a member of the former Interdisciplinary Program in Pharmacology and Toxicology, I have fostered graduate education by serving as the Director of an NIH sponsored Training Grant that supported both pre- and post-doctoral students. Such support of education has benefitted faculty and students in the Colleges of Medicine and Pharmacy as well as related faculty in the multidisciplinary graduate programs in Pharmacology and Toxicology and Neuroscience.

As a part of my educational activities, I have served as the primary mentor to 20 students for their Ph.D., 8 students for their M.S. and the mentor for 23 post-doctoral fellows. I have also continuously sponsored undergraduate students in my laboratory. We have 13 undergraduates pursuing research in my laboratory in 2012-2013 as well as two visiting overseas scholars.

SERVICE ACTIVITIES

Service activities have included local intramural, and both national and international extramural activities aimed at citizenship within the College of Medicine at the University of Arizona and to the scientific disciplines of Pharmacology and Neuroscience. Some highlights of these activities include:

President of the Western Pharmacology Society in 2000. The WPS is an international society comprised of scientists from United States, Canada, Mexico and Southeastern Asia established in 1947. As President, I organized and hosted the meeting in Tucson. The meeting was extremely successful and featured world-renowned speakers including Dr. Alfred Gilman, Nobel Prize winner, Dr. Floyd Bloom, former Editor of Science, Dr. Marc Caron and Dr. Thomas F. Burks.

Member of the Board of Directors of the College on Problems of Drug Dependence, an organization that fosters research into mechanisms of drug addiction and dependence.

Founder and Scientific organizer of the Spring Pain Research Conference. This is a premier conference that attracts the members of the world's best pain laboratories in both academia and in industry that is held every two years. This meeting is attended by most of the world's senior pain scientists and is widely regarded as one of the best conference in the field.

Editor in Chief, Life Sciences (2008-2012)

Section Editor, Pain (2000-2012)

Editorial boards of many other journals (Journal of Pain, Journal of Neuroscience).

Member of the Executive Council for the Committee on Neuroscience at the University of Arizona.

Member of the Dean's Research Council at the University of Arizona.

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Chair of the Promotions and Tenure Committee of the College of Medicine, University of Arizona;

Member of many other College and University Committees.

Member of the Focused Excellence Study Team for Cognitive and Neuroscience Research at the request of Provost.

Member of the Dean's Cabinet (Keith Joiner, Dean).

HONORS, AWARDS AND HONORARY SERVICE

Institute of Medicine, National Academy of Sciences, 2011

McGill Pain Day Speaker, 2012

Benson Lecturship, Johns Hopkins University, Baltimore, MD, 2011

Blaustein Lecture, Johns Hopkins University, Baltimore, MD, 2011

Distinguished Pain Professor, Mayo Clinic Rochester, 2004

Founder's Day Speaker, University of Arizona, 2001

President, Western Pharmacology Society, 2000

F.W. Kerr Award, American Pain Society, 2000

Benjamin Covino Pain Professor, Harvard University, 2000

Sterling Visiting Professor, Albany Medical College, 2000

Research Fellow, American Association for the Advancement of Science

Multiple plenary lectures at meetings worldwide each year

Scientific Organizer, Spring Pain Research Conference

Board of Directors, Committee on Problems of Drug Dependence (past member)

Board of Directors, Spring Brain Conference

Program Committee, International Association for the Study of Pain

Nominating Committee, American Society for Pharmacology and Experimental Therapeutics

Councilor, Western Pharmacology Society

Chair, CPDD Awards Committee

Chair, Awards Committee, American Pain Society

Program Committee, American Pain Society

Member, Somatosensory and Chemosensory Study Section

Member, IFCN Study Section

Member, NIDA Study Section

Joseph Cochin Young Investigator Award, 1988, CPDD

Merck Research Associateship, University of Arizona

Honors Program, Villanova University

PROFESSIONAL SOCIETIES:

International Association for the Study of Pain (IASP)

American Pain Society (APS)

Society for Neuroscience

American Society of Pharmacology and Experimental Therapeutics (ASPET)

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International Narcotics Research Conference (INRC)
Western Pharmacology Society

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RESEARCH SUPPORT (CURRENT)

National Institutes of Health - Current Funding as Principal Investigator (Direct costs – Top 100 faculty in US per NIH data at Medical Schools from the Blue Ridge Institute of Medical Research: http://www.brimr.org/NIH_Awards/2012/NIH_Awards_2012.htm.)

“Mechanisms of spontaneous neuropathic pain” Frank Porreca, PI, NIH/NINDS (R01NS/066958) 2010-2015, \$218,750 per year.

“Mechanism of Medication Overuse Headache and Chronic Migraine Pain” Frank Porreca, PI, NIH/NINDS, (R01NS/069572), 2010-2015, \$438,401 per year.

“Brain Reward Circuits and Relief of Ongoing Pain”, Frank Porreca, PI, NIH/NIDA, (R01 DA034975-01), 2013-2018, \$567,918 per year.

Pending: “Central endogenous opioids in relief of acute and chronic post surgical pain”, Frank Porreca, PI, NIH/NIDA, (R01 DA036781), 2014-2019, \$765,644 per year.

National Institutes of Health – Current Funding as Co-Investigator:

“New Modalities for Treatment of Pain and Drug Abuse” Victor J. Hruby, NIH/NIDA (PO1) 2009-2014, \$820,992, Project D, Porreca, PI, \$212,000 per year.

“Novel non-peptide opioid ligands for pain”, NIH/NIDA (R01) V.J. Hruby, PI (F. Porreca, Co-PI), 2010-2015, \$331,211 per year.

“Cannabinoid CB2 Agonists for Treatment of Breast Cancer Induced Bone Pain”, T. Vanderah, NIH/NIDA, 2009-2015, \$207,500.

“High School Student Neuroresearch Program”, NIH/NINDS, 2011-2016, \$90,177 per year (Witte/ Porreca)

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INDUSTRY SUPPORT (CURRENT DIRECT COSTS)

Current industry support is extensive including research agreements with NeurAxon, MedImmune, Grunenthal, Adynxx, MAP, Genzyme, Eli Lilly, and Ferring. Industry support is granted with full indirect costs and totals approximately \$1,230,468 in direct costs in 2012.

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RESEARCH FUNDING (NONCURRENT)

FEDERAL

National Institutes of Health-Principal Investigator:

- "Bifunctional CCK-opioid ligands for pain", National Institute on Drug Abuse (R37 DA12394), 1999-2008, \$169,060/year - MERIT Award.
- "NPY and Nerve Injury-Induced Tactile Hypersensitivity", National Institute on Neurological Disorders and Stroke (R01 NS046785), 2003-2008, \$237,500 per year.
- "Therapeutic Profiles of Opioid Delta Receptors: New Modalities" Program Project P01DA06284, "New Modalities of Pain and Drug Abuse", Victor J. Hruby, Program Director, Frank Porreca, Project Director, 2003-2008, \$207,463 per year.
- "Opioid and non-opioid actions of dynorphin in pain", National Institute on Drug Abuse (R01DA11823), 1998-2006, \$387,320/year.
- "Non-peptidic and Peptidomimetic Selective Delta Ligands", Program Director, Program Project PO1 DA 08657, 1994-1999, \$530,089
- "Opioid delta receptor subtypes: correlation *in vitro* and *in vivo*", National Institute on Drug Abuse (KO2 DA00185-01), 1992-1997, Research Scientist Development Award, \$83,000/year.
- "Spinal and Supraspinal Opioid Control of Gut Motility," National Institute of Neural and Communicative Diseases and Stroke (NINCDS)(1R23 NS 2113), 1984-1987, \$37,804/year.
- "Neuropeptide Regulation of Urinary Bladder Activity," part of the Program Project entitled "Gastrointestinal Control by Neuropeptides," National Institute of Digestive Diseases and Kidney (NIDDK)(PO1-AM-36289), 1986-1988, \$54,823/year.
- "Chronic Pain: Agents Given Cerebrally and Spinally," National Institute on Drug Abuse (NIDA)(DA 03945), Dr. Alan Cowan, Co-PI, 1987-1990, \$42,890/year.
- "Opioid Receptor Constants *in vitro*: Temperature Effects," National Institute on Drug Abuse (NIDA) (DA 04285), 1988-1991, \$85,864/year.
- "Spinal and Brain Modulation of Gut Motility," National Institute of Digestive Diseases and Kidney (NIDDK)(RO1 AM 33547) 1984-1987, \$87,932/year; renewed 1987-1992, 91,762/year.
- "Gastrointestinal Control by Neuropeptides", National Institute of Digestive Diseases and Kidney (DK36289-07), 1991-1994, \$43,500/year.
- "SOD mimics for pain", SBIR grant with Metaphore Corporation, \$212,000, 7/1/00 through 12/31/00.
- "Training in Pharmacology of Drug Abuse", National Institute on Drug Abuse (T32DA 07295), 1996-2001, \$182,000/year.
- "Opioid Receptor Specific Peptides," National Institute on Drug Abuse (NIDA)(DA 04248), Drs. Victor J. Hruby and Henry I. Yamamura, Co-PI's, 1997-2000, \$140,000/year.

National Institutes of Health - Co Principal Investigator:

- "Mixed Opioid Agonists/Cholecystokinin Antagonists for the Treatment of Pain" NIH/NINDS, U01 NS055940, Dr. Ed Roberts, Scripps Research Institute, (F. Porreca, Co-PI) 2007-2009, \$173,203 per year.
- "RVM CCK, Pain, and Opioid Tolerance", National Institute on Drug Abuse (R01 DA 15205), Dr. Todd W. Vanderah, (F. Porreca, Co-PI), 2002-2007, 2008-1 year no cost extension. \$175,000 per year.

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"RVM CCK and Neuropathic Pain", National Institute of Dental and Craniofacial Research (R01 DE016458), Dr. Josephine Lai (F. Porreca, Co-PI), 2004-2008, \$237,500 per year.

"Effects of Sustained Opiates on Bone Metastasis and Pain" National Institute on Drug Abuse (R21 DA019877), Dr. Tamara King, (F. Porreca, Co-PI), 2005-2007, 2008-1 year no cost extension. \$150,000 and \$125,000 per year.

"Conformation-selectivity relations of opioid peptides" National Institute on Drug Abuse (DA 03910), 1992-1997, \$46,000/year.

"TTX-Resistant Sodium Channels and Neuropathic Pain" (NS38771), Dr. J. Lai, PI, 1999-2002, \$200,960/year.

"Spinal dynorphin and opioid tolerance", National Institute on Drug Abuse (R01 DA 12656), 1999-2004, \$177,098/year.

"Glycopeptides as Analgesics: Non-Toxic Alternatives to Morphine for Combat Casualty Care", Office of Naval Research - Co-Investigator: (N00014-02-1-0471) Dr. Robin Polt, P.I., 2002-2005, \$226,410 per year.

"Non-Addicting Cannabinoid Medications", National Institute on Drug Abuse (R01 DA15866), T.P. Malan, PI (F. Porreca, Co-PI) 2003-2006, \$225,000 per year.

"Ontogeny of spinal glutamate receptors in nociception", National Institute on Drug Abuse (K01-DA016431), Dr. Tamara King, (F. Porreca, Mentor), 2002-2007, \$113,890 per year.

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Flinn Foundation:

"Pharmacology of Chronic Pain in the Rat," 1987, \$16,400.

Arizona Disease Control Research Commission - Co Investigator:

"Fentanyl Induced Paradoxical Pain: Antinociceptive Tolerance and Receptor Down Regulation", Dr. Michael H. Ossipov, P.I. (F. Porreca Co-Investigator) 2002-2005, 175,000 per year.

"Prostate Cancer Model of Bone Metastasis, Pain and Phenotype", Dr. Tamara King, P.I. (F. Porreca, Co-Principal Investigator) Arizona Disease Control Research Commission, 2004-2007, 164,500 per year.

INDUSTRY (Non-current)

Past industry support has included research agreements from Burroughs-Wellcome Company, Merrell-Dow Laboratories, The Robert Wood Johnson Pharmaceutical Research Institute, Jouveinal Research Institute, Knoll Pharmaceutical, NPS Pharmaceuticals, Ferring Research Institute, Roche Biosciences, and Laboratories Fournier.

PATENTS

"Use of Delta Opioid Receptor Antagonists to Treat Cocaine Abuse" - U.S. Patent No. 5,411,965

"Pyridomorphinans, Pyridazinomorphinans and Use Thereof" - Rothman, RB., Bilsky, E.J. and Porreca, F.

"Methods of Modeling Migraine Pain and Identifying Candidate Compounds for the Treatment of Migraine" – Canadian Patent Application No. 2,649,454

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INVENTIONS

UA01-037 "Use of Neuroblastin for Treatment of Neuropathic Pain"

Inventors: Frank Porreca, Luis Gardell, Dinah Sah

Sponsorship: NIH-DA11823 (100%)

UA05-23 "p38 Inhibitors in the Treatment of Pain"

Inventors: Frank Porreca, Josephine Lai and Tamara King

SERVICE ACTIVITIES (INTRAMURAL)

UNIVERSITY OF ARIZONA COLLEGE OF MEDICINE

Nominations Committee, 1992 - 1993

Student Progress Committee, 1987 - 1993

Committee on Graduate Study, 1988 - 1993

Committee on Neuroscience, 1987 - present

Seminar Coordinator, Pharmacology-Pharmacology/Toxicology, 1989 - 1993

Organized the Otto Krayler Lecture (W.W. Fleming) & B.B. Brodie Lecture (J. Axelrod)-1989

Department of Anesthesiology Review Committee, 1990, 1993

Course Director: Medicine 495A "Introduction to Neural Sciences," Fall 1986

Course Director: Medicine 495B "Clinical Application of Neural Sciences", Spring, 1987

Chair, Committee on Medical Education; Management Team Member, Department of Pharmacology, 1994

Steering Committee, Department of Pharmacology, 1992

Chair, Faculty Recruitment Committee, 1995

Chair, Faculty Search Committee, 1995-1996

Executive Council, Program in Pharmacology and Toxicology, 1994-1997

Intramural Review Committee, Pharmacology and Toxicology, 1996

Post-tenure Review Committee, 1997

College of Medicine Promotions and Tenure Committee, 1997-2001

Chair of the College Promotions and Tenure Committee, 1999-2000

Dean's Research Council, 1997-1999

Medical Student Research Committee 1998-2001

Founder's Day Committee, 1999-2000

Focused Excellence Committee on Cognitive Sciences and Neurosciences, 2003

Dean's Cabinet, 2004-2009

Chair, Neurosciences and Neurological Sciences Working Group, 2004-present

Chair, Search Committee for Head of Physiology, 2004-2008

Committee of 10, 2011-present

TEACHING

1997, 1998 & 1999 MED 502 "Human Neuroscience" received the Outstanding Achievement in Teaching a Course in the Basic Sciences Award - Overall 4.1 average (out of possible 5) score in student evaluations.

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1998 PHCL 501/801 "Medical Pharmacology" received the Outstanding Achievement in Teaching a Course in the Basic Sciences Award.

Co-Director, "Human Neuroscience" (MED 502), University of Arizona College of Medicine, Tucson, AZ, 1996; co-director, 1994-present, average enrollment 120.

Director, Pharmacology 620/520/420, "Principles of Pharmacology," University of Arizona College of Medicine, Tucson, AZ, 1991-2000, 2010-present, average enrollment 25.

Lecturer, Pharmacology 595B, "Scientific Writing, Strategies, Skills and Ethics", 2001-present, average 25 enrolled.

Lecturer, Pharmacy 695, "Research Conference" 2001, average 25 enrolled.

Lecturer, Neuroscience 695E "Science, Society & Ethics" average enrollment 6.

Co-Director, Pharmacology 653 "Neurobiology of Drugs of Abuse", University of Arizona College of Medicine, Tucson, AZ, 1994, 1995 average enrollment 6.

Co-Director, "Drugs of Abuse", (PHCL 445) University of Arizona College of Medicine, Tucson, AZ, 1997, average enrollment 30.

Faculty Participant, Pharmacology 620, "Principles of Pharmacology," University of Arizona College of Medicine, Tucson, AZ, 1988,1989,1990

Faculty Participant, Pharmacology 501/801, "Medical Pharmacology," University of Arizona College of Medicine, Tucson, AZ, 1984, 1985, 1986-1989, 1994-present

Faculty Participant, "Neuropharmacology," University of Arizona College of Medicine, Tucson, AZ, 1984, 1986-1994

Course Director, Medicine 495A, 495B, "Introduction to Neural Sciences," University of Arizona College of Medicine, Tucson, AZ, 1986-1987

Lecturer, PCOL 372B, "Applied Pharmacology," University of Arizona College of Medicine, Tucson, AZ, 1983

Lecturer, PCOL 654, "Psychopharmacology," University of Arizona College of Medicine, Tucson, AZ, 1983

Faculty Participant, Pharmacology 0226-400, "Medical Pharmacology," Hahnemann University Medical School, Philadelphia, PA, 1985

Faculty Participant, Pharmacology 505, "Drug Actions and Uses II - Pharmacology for Physicians' Assistants," Hahnemann University Medical School, Philadelphia, PA, 1985

Faculty Participant, Pharmacology 302, "Pharmacology for Respiratory Therapists," Hahnemann University Medical School, Philadelphia, PA, 1985

Visiting Lecturer, P504, "Mathematics for Biomedical Science" and P563 "Pharmacology," Drexel University, Philadelphia, PA, 1980, 1985, 1987

Lecturer, Medical College of Pennsylvania Education Programs (MCPEP), for Smith Kline Beckman Corp., 1985-1987

Instructor, "Introduction to Pharmacology", Graduate Student Teaching, Department of Pharmacology, Temple University School of Medicine, Philadelphia PA, 1979-1981.

ADVISING GRADUATE STUDENTS

NAME	DEGREE (YEAR)	PRESENT POSITION
Julius Heyman	Ph.D. (1988)	Physician (Anesthesiology)
Qi Jiang	M.S./Ph.D. (1988/1991)	Physician (Anesthesiology)
Kenneth D. Wild	Ph.D. (1993)	Senior Scientist, Amgen
Todd Vanderah	Ph.D. (1995)	Professor, University of Arizona

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Edward J. Bilsky	Ph.D. (1996)	Professor, University of New England, Biddeford, Maine
Tong Wong	M.S. (1996)	Laboratory technician, UCLA
Peg Davis	M.S. (1996)	Research Specialist Senior
Michael Nichols	Ph.D. (1999)	Phylogeny, Inc.
Jason Lashbrook	M.S.	Pharmacist
Brian Levine	Graduate Medical Student	MD, St. Mary's Hospital, Phoenix
Steven Morrissey	M.D., Ph.D. Grad Student	MD, University of Arizona
Dana Baker	Graduate Student	High School Science Teacher, Tucson
Qingbo Tang	Ph.D. (2000)	Postdoctoral Fellow, University of San Diego
Luis Gardell	Ph.D. (2002)	Associate Director of Pharmacology, Cara Therapeutics
Kun Kun Ren	M.S. (2001)	Merck Pharmaceuticals, San Diego, CA
Hong Sun	M.S. (2000)	Merck Pharmaceuticals, Philadelphia, PA
Sandra Wegert	Ph.D.	Patent Office, Washington, D.C.
Carl Kovelowski	Ph.D. (2001)	Medical University of the Americas, Nevis
Mohab Ibrahim	Ph.D., M.D. (Malan)	Resident, Bringham and Women's, Harvard
Di Bian	Ph.D. (2000)	Senior Scientist, Vertex, San Diego
Qingmin Chen	Ph.D. Student (2007)	Scientist, ALNYLAM
Wenghong Guo	M.S. (2003)	Scientist, Amgen, Boston, MA
Yanhua Xie	Ph.D. Student	Assistant Research Scientist U of A
Ruizhong Wang	Ph.D. (2005)	Scientist, NIDA, Baltimore, MD
Rebecca Edelmayer	Ph.D. (2009)	Post-doctoral Fellow, University of Arizona
Milena DeFelice	Ph.D. (2008)	Post-Doc, University of Arizona
Priti Akare	M.S. Student (2006)	University of Illinois, Champagne, Illinois
Anna Vardanyan	Ph.D. (2007)	Scientist, Genzyme
Marina Vardanyan	Ph.D. (2007)	Post-Doc, University of Arizona
Jiyang Ren	M.Sc. (2009)	Scientist, Canberra, Australia
Ramon Mercado	M.Sc. (2009)	Research, Indiana University
Tally Largent	Ph.D. (2010 - Vanderah)	Oregon Health Sciences University
Jill Roberts	Ph.D. (2010)	Post-Doc, Texas Tech University
Hamid Bagdhishi	M.S. (2011)	
Alec Okun	Ph.D. (2012)	Post-Doc, Eli Lilly
Devki Sukhtankar	Ph.D. (2010)	
Beatriz Fioravanti	Ph.D. (2009 – Vanderah)	Scientist, Ferring
Diana Meske	M.Sc. Student (current)	
Pengfei Gu	M.S. (2012)	
Bethany Remeniuk	Ph.D. Student (current)	

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ADVISING POSTDOCTORAL FELLOWS

NAME	TRAINING PERIOD	PRESENT POSITION
LEE YEON SUN	2009-PRESENT	
CHAOLING QU	2009-PRESENT	
Edita Navratilova	2009-present	
Jennifer Xie	2005-present	
Melina DeFelice	2005-present	
Juliana G. Chichorro	2006-2009	Faculty, University of Florianopolis, Brazil
Ruizhong Wang	2006-2010	Scientist, NIH
Luis Vera-Portocarrero	2003-2010	Scientist, Medtronics
Tamara King	2002-2003	Research Assistant Professor
Anders Nylen	2002-2003	Scientist, Sweden
Zaijie Wang	1998-2002	Assistant Professor, University of Illinois, Chicago, IL
Qingmin Zhong	1998-2002	Abbott Laboratories, Chicago, Illinois
En-Tan Zhang	2001-2009	College of Medicine, Phoenix
Edward Bilsky	1996-1997	Associate Provost for Research and Scholarship, Professor, University of New England
Nathalie Castex	1996-1999	Scientist, Sanofi
Rebecca J. Craft	1991-1993	Associate Professor, Washington State University
Peter J. Horan	1990-1993	Scientist, University of North Dakota
Robert Horvath	1994-1997	Anesthesiologist, private practice, Tucson, AZ
Randy J. Koslo		Section Head, Bristol-Myers Products, Hillside NJ
Yvan Lopez	1993-1995	Research Scientist, Sanofi-Synthelabo, Inc.
Antonia Mattia	1990-1992	Scientist, Food and Drug Administration, Washington D.C
Michael Ossipov	1994-1996	Professor, University of Arizona
Rhadakrisna Rao	1991-1994	Professor, University of Tennessee
Pierre Riviere	1988-1990	Research Director, Pharmacology-Biology, Ferring Research Institute Inc., San Diego, CA.
Russell J. Sheldon	1986-1988	Senior Research Scientist, Procter and Gamble Co., Cincinnati, OH

ADDITIONAL THESIS AND DISSERTATION COMMITTEES

NAME	DEGREE (YEAR)	DEPARTMENT
David Clark	Ph.D. (1993)	Pharmacology/Toxicology
Mary Oakes	Ph.D. (1995)	Pharmacology/Toxicology
Margaret Davis	M.S. (1996)	Pharmacology/Toxicology
James Bourland	Ph.D. (1997)	Pharmacology/Toxicology
Art Reigel	M.S. (1997)	Pharmacology/Toxicology

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Qingbo Tang	Ph.D. Candidate	Pharmacology/Toxicology
Xiaofang Wu	M.S. Candidate	Pharmacology/Toxicology
Shannon Burgess	Ph.D. (2003)	Pharmacology/Toxicology
Brian Harvey	Ph.D. Candidate	Neuroscience
Madhavi Pai	M.S. (2003)	Abbott Laboratories, Chicago, Illinois
Yuan-yuan Huang	M.S. Candidate	Medical Pharmacology
Wenjun Zhang	Ph.D. Candidate	Pharmacology/Toxicology
Rowena Campbell	Ph.D. Candidate	Medical Pharmacology
Mohab Ibrahim	Ph.D. (2003)	Pharmacology/Toxicology
Nova Sain	M.S. (2002)	Pharmacology/Toxicology
David Herman	Ph.D. Candidate	Neuroscience
Nicola Day Stagg	Ph.D. Candidate	Medical Pharmacology
Tim Marshall	Ph.D. Candidate	Medical Pharmacology
Ohannes Melemedjian	Ph.D. Candidate	Molecular and Cell Biology
Beatriz Fioravanti	Ph.D. Candidate	Medical Pharmacology
Tally Largent Milnes	Ph.D. Candidate	Medical Pharmacology
Justin Kowal	Ph.D. Candidate	Medical Pharmacology
Penny Letts	Ph.D. Candidate	Neuroscience
Argyle Bumanglag	Ph.D. Candidate	Neuroscience

SCIENCE SERVICE ACTIVITIES - ADVISING OF HIGH SCHOOL STUDENTS AND TEACHERS

Veronica Gutierrez	Salpointe High School
Rosalie Cox	Salpointe High School
Carol Dittmer	Teacher at Flowing Wells

SERVICE ACTIVITIES (EXTRAMURAL)

NATIONAL AND INTERNATIONAL COMMITTEES

American Society of Pharmacology and Experimental Therapeutics

Committee on Substance Abuse, 1985-1991
Executive Committee of the Division for Neuropharmacology, 1991-1994
Executive Committee of the Division for Gastrointestinal Pharmacology, 1991-1994
Nominating Committee, 1996-1998
Program Committee, 1997-2001

International Narcotics Research Conference

Executive Committee, 1990-1993

American Pain Society

Professional Development Courses Subcommittee
Scientific Program Committee

Western Pharmacology Society

Councilor, 1996-2001
President, 2000

Spring Brain Conference

Board of Directors, 1996-present

College on Problems of Drug Dependence

Board of Directors, 1996-2000
NIDA Study Section, 1996-1999

Spring Pain Research Conference

Founder and Scientific Director, 1996-2010

University of California Center for Medicinal Cannabis Research

Scientific Review Board, 2000-present

Canada Research Chairs Program

College of Reviewers, 2000-present

Italian Research Council

Referee, CNR, Agenzia 2001-present
Member 2002-present

Faculty of 1000 Medicine

Anesthesiology and Pain Management Evaluation Board
Pain Management: Basic Science Section
Faculty Member, 2004-present

EDITORSHIPS

Editor, *Pharmacology of Pain*, 2010
Editor-in-Chief, *Life Sciences*, 2009-2012
Editor, *Analgesia (past Editor)*
Editor, *Pharmacology Letters (past Editor)*
Associate Editor, *Life Sciences*

Section Editor, *Pain*, 1999-present

Field Editor, Analgesia and Drug Abuse Section, *Journal of Pharmacology and Experimental Therapeutics* (1/92-1/96)

Field Editor, Gastrointestinal Pharmacology, *Journal of Pharmacology and Experimental Therapeutics* (1/90-1/92)

Guest Editor - Bombesin: Physiology and Pharmacology, *ASPET, Life Sci* vol. 37

Guest Editor - Proceedings of the International Narcotics Research Conference, *Life Sci* vol. 33, Sup.1

Guest Editor - Gastrointestinal Drug Receptors, *FASEB, Life Sci* vol 43, 2169

Editorial Board Member, *Pain Research and Clinical Management*

REVIEWING FOR REFEREED JOURNALS

American Journal of Physiology

Anesthesiology

Biochemistry & Behavior

Brain Research

British Journal of Pharmacology

European Journal of Pain

European Journal of Pharmacology

European Journal of Neuroscience

Gastroenterology

International Journal of Peptide & Protein Research

Journal of the Autonomic Nervous System

Journal of Clinical Investigation

Journal of Medicinal Chemistry

Journal of Neurophysiology

Journal of Neuroscience

Journal of Pain

Journal of Pharmacology and Experimental Therapeutics

Analgesia and Drug Abuse, Field Editor (1992-1996)

Gastrointestinal Pharmacology (1990-1992)

Life Sciences, Associate Editor

Nature

Nature Neuroscience

Nature Medicine

Neuron

Neuropeptides

Neuroscience

Pain

Peptides

Pharmacological Research Communications

Pharmacology

Pharmacology Letters

Physiological Psychology

Psychopharmacology

Regulatory Peptides

Science

Science Translational Medicine

Trends in Neuroscience

Trends in Pharmacological Sciences (TiPS)

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9. **Porreca, F.** Central and Peripheral Gastrointestinal Motility Effects of Bombesin. Proc. of the International Symposium on Bombesin-like Peptides in Health and Disease. Annals of the New York Academy of Science 1988.

8. Sheldon, R. J. and **Porreca, F.** Mu Receptor Mediated Inhibition of Rat Urinary Bladder Motility: Differential Antagonism by Kappa Agonists. Proceedings of the Western Pharmacology Society **30**: 357-360, 1987.

7. Davis, T.P., Shook, J.E., Gillespie, T.J., Culling-Berglund, A.J., Papietro, H.M., and **Porreca, F.** The Proenkephalin A Fragment Peptide E Is Metabolized Centrally to a Novel Peptide with Opioid Activity. Proceedings of the Western Pharmacology Society **30**:211-212, 1987.

6. Heyman, J.S. and **Porreca F.** Intrathecal-Funaltrexamine (-FNA) Is a Long Acting Agonist in the Mouse Abdominal Stretch Test. Proceedings of the Western Pharmacology Society **30**: 209-210, 1987.

5. Heyman, J.S., Mosberg, H.I. and **Porreca, F.** Evidence for Delta Receptor Mediation of DPDPE Analgesia in Mice. NIDA Research Monographs **75**: 442-445, 1986.

4. Burks, T.F., Hruby, V.J. Galligan, J.J. and **Porreca, F.** Opioids and CNS Control of the Gut. Japanese Journal of Smooth Muscle Research **21**: Suppl.: 101-102, 1985.

3. Fulginiti, J.T., **Porreca, F.** and Burks, T.F. Centrally Administered Bombesin Stimulates Intestinal Motility. Proceedings of the Western Pharmacology Society **27**: 140-141, 1984.

2. **Porreca, F.** and Burks, T.F. Use of the Novel Irreversible Opiate Antagonist, Beta-Chlornaltrexamine, in the Estimation of the Normorphine Affinity Constant in Naive and Morphine-Tolerant Guinea-Pig Isolated Ilea. Proceedings of the Western Pharmacology Society **26**: 295-297, 1983.

1. **Porreca, F.**, Fulginiti, J.T., Burks, T.F., Viswanatha, V., Srivastava, K.S.L., Groginsky, C.M. and Barstow, L.E. Cross-Tolerance Between a Vasopressin Analog DesaminoLysine8-N-(Gly3)-Vasopressin (DLVP) and Morphine in the Mouse Writhing Test. Proceedings of the Eighth American Peptide Symposium Pierce Chemical Company, 1983.

Abstracts

Records of abstracts are available from 1979-1991 but were not kept after that date.

INVITED SCHOLARLY PRESENTATIONS (SELECTED):

FASEB, Anaheim, CA, 1985
McNeil Pharmaceuticals, 1986
Temple University Medical School, Philadelphia, PA, 1986
Hahnemann University Medical School, Philadelphia, PA, 1986
University of Pittsburgh School of Medicine, Pittsburgh, PA, 1986
American Pharmaceutical Association, Chicago, IL, March 1987
4th International Conference on Neuronal Control of Bodily Function (Plenary), Trier, West Germany, Temple University Medical School, Philadelphia, PA, May, 1988
Walter Reed Army Institute of Research, Washington, D.C., June 1988
Burroughs-Wellcome Company, Research Triangle Park, North Carolina, September 1988
American Society of Pharmacology & Experimental Therapeutics, Montreal, Canada, October 1988
American Pain Society, Phoenix, AZ, October, 1989
Temple University, Philadelphia, PA, June, 1989
Anaquest, BOC Group, November, 1989
CDRI, Lucknow, India, March, 1990 (Indo-U.S. Government Scientific Exchange)
G.D. Searle Co., Skokie, Ill, May, 1990
University of Michigan, Ann Arbor, MI, May, 1990
Burroughs-Wellcome Company, Research Triangle Park, NC, May, 1990
International Narcotic Research Conference, Noordwijkerhooft, The Netherlands, July, 1990
International Society of Psychoneuroendocrinology, Buffalo, NY, September, 1990
American Pain Society, (Plenary) St. Louis, MO, October, 1990
Louisiana State University, New Orleans, LA, February 26, 1991
The University of Iowa, Iowa City, IA, March 27, 1991
Ohio State University, Columbus, OH, May 23, 1991
Barrow Neurological Institute, Phoenix, AZ, May 30, 1991
International Narcotics Research Conference, Copper Mountain, CO, July 4, 1991
National Dairy Council, Chicago, IL, July 18, 1991
New York Academy of Sciences, New York, NY, December 5, 1991
Cornell University Medical School, New York, NY, February, 1992
Addiction Research Center, Baltimore, MD, February, 1992
Jouveinal Laboratories, Paris, France, June, 1992
College on Problems of Drug Dependence, Keystone, Colorado, July, 1992
International Narcotics Research Conference, Keystone, Colorado, July, 1992
American Pain Society, San Diego, CA, October, 1992
University of California, San Francisco, November, 1992
Astra Pain Research Unit (Plenary), Interlaken, Switzerland, February, 1995
American Chemical Society (Plenary), Anaheim, CA, April, 1995
Astra Pain Research Unit, Montreal, Canada, June, 1993
College on Problems of Drug Dependence, Scottsdale, AZ, June, 1995
International Narcotics Research Conference, St. Andrews, Scotland, July, 1995
Syntex Institute of Pharmacology, Palo Alto, CA, April, 1995
American Pain Society, Los Angeles, CA,, November 1995
Michigan State University, East Lansing, MI, March, 1996

The R.W. Johnson Pharmaceutical Research Institute, Spring House, PA, April, 1996
University of Illinois, College of Medicine at Peoria, May, 1996
8th World Congress on Pain (Plenary), Vancouver, BC, Canada, August, 1996
University of California San Francisco, CA, January, 1997
American Academy of Pain Medicine, Scottsdale, AZ, February, 1997
Spring Brain Conference, Sedona, AZ, March, 1997
Grunenthal Pharmaceuticals, Aachen, Germany, April, 1997
North Carolina Chapter of Society for Neuroscience, Winston-Salem, NC, May, 1997
College on Problems of Drug Dependence, Nashville, TN, June, 1997
Summer Neuropeptide Conference, Key West, FL, June, 1997
Allelix Pharmaceuticals, Toronto, Canada, June, 1997
University of Iowa, Iowa City, October, 1997
National Minority Research Symposium, New Orleans, October, 1997
Ferring, Inc., San Diego, November, 1997
Grunenthal, GmbH, Aachen, Germany, November, 1997
Astra Research Centre, Montreal, Canada, November, 1997
American Association for the Advancement of Science, Philadelphia, PA, February, 1998
Spring Pain Research Conference, Grand Cayman, April, 1998
MCGH Conference on Pain, Annapolis, MD, May, 1998
Adolor Corporation, Malvern, PA, June 1998
International Narcotics Research Conference, Garmisch, Germany, July, 1998
University of California, San Diego, November, 1998
Conference on Neuropathic Pain Mechanisms (Plenary), Helsinki, Finland, November, 1998
National Academy of Science Conference on Pain, Irvine, CA, December, 1998
Winter Conference on Brain Research, Snowmass, CO, January, 1999
Sidney Archer Memorial Lecture, Albany Medical College, Albany, NY, September, 1999
Grunenthal GmbH, Aachen, Germany, January, 1999
Amgen, Thousand Oaks, CA, February, 1999
Oregon Health Sciences University, Portland, Oregon, March, 1999
Spring Brain Research Conference, Sedona, AZ, March 1999
University of Iowa, Iowa City, IA, May, 1999
College on Problems of Drug Dependence, Acapulco, Mexico, June, 1999
International Narcotics Research Conference, Saratoga Springs, NY, July, 1999
International Association for the Study of Pain (Plenary), Kloster Seeon Neuropathic Pain Conference, August, 1999
International Association for the Study of Pain, Vienna, August, 1999
Mechanisms of Neuropathic Pain (Plenary), Lake Como, Italy, August, 1999
American Association for Pharmacology and Experimental Therapeutics, Ray Fuller Symposium, Albany Medical School, Sidney Archer Conference, September, 1999
Grunenthal GmbH, Aachen, Germany, December, 1999
University of Arizona, Department of Pharmacology, Tucson, AZ, September, 1999
University of Arizona, Department of Neurology, Tucson, AZ, January, 2000
Marine Biomedical Institute, Galveston, TX, February, 2000
Biogen, Boston, MA, February, 2000
University of Maryland, Baltimore, MD, February, 2000

NPS Pharmaceuticals, Salt Lake City, UT, March, 2000
Albany Medical College, Albany, NY, April 2000
Dartmouth College, Hanover, NH, April 2000
Spring Pain Research Conference, Grand Cayman, BWI, May, 2000
University of California San Francisco, San Francisco, CA, May, 2000
AstraZeneca, Montreal, Canada, June 2000
International Narcotics Research Conference, Seattle, WA, July 2000
Ferring Research Institute, San Diego, CA, July, 2000
Pharmacia, Skokie, IL, August, 2000
Neuromics, Minneapolis, MN, August, 2000
Harvard Medical School (Covino Lecture at Brigham and Women's), Cambridge, MA, November, 2000
American Pain Society (F.W. Kerr Award Lecture), Atlanta, GA, November 2000
Metaphore, St. Louis, MO, November, 2000
Pacifichem 2000, Honolulu, Hawaii, December, 2000
Amgen, Thousand Oaks, California, January, 2001
ICAgen, Durham, North Carolina, "Ion channels in pain". March, 2001
Spring Brain Research Conference, Sedona, AZ, March, 2001
American Academy of Orofacial Pain, Washington, DC, March, 2001
Laboratories Fournier, Dijon, France, April, 2001
American Pain Society, Phoenix, AZ, April, 2001
Pharmacia, Skokie, IL, April, 2001
Ferring Research Institute, San Diego, CA, May, 2001
University of Texas, San Antonio, San Antonio, TX, May, 2001
OSI Pharmaceuticals, Tarrytown, NY, June, 2001
Esteve Pharmaceuticals, Barcelona, Spain, July, 2001
International Narcotics Research Conference, Helsinki, Finland, July, 2001
Biogen, Boston, MA, July 2001
Peptide Receptors Conference, Montreal, Canada, July 2001
AstraZeneca, Montreal, Canada, July 2001
Wyeth-Ayerst Pharmaceuticals, Princeton, NJ, August 2001
Metaphore, St. Louis, MO, August 2001
NIDA Cannabinoid Conference, Bethesda, MD, August 2001
Abbott Laboratories, Chicago, IL, August 2001
Grunenthal, GmbH, Aachen, Germany, September 2001
4th International Conference on Mechanisms and Treatment of Neuropathic Pain (Plenary), San Francisco, CA, September 2001
University of Minnesota, Minneapolis, MN, September 2001
Merck, San Diego, CA, November 2001
University of Minnesota, Minneapolis, MN, January 2002
Schering-Plough Laboratories, Kenilworth, NJ, April 2002
Fournier Laboratories, Dijon, France, April 2002
University of Minnesota, Minneapolis, MN, May 2002
University of Texas Medical Branch, Galveston, TX, May 2002
Danish Pain Symposium (Plenary), Copenhagen, Denmark, May 2002
IBSN, Capri, Italy, June, 2002

IUPHAR, San Francisco, CA, July, 2002
IASP World Congress on Pain, San Diego, CA, August, 2002
Mexican Physiological Society (Plenary), Colima City, MX, September 2002
University of Washington, Seattle, WA, October, 2002
University of California, San Francisco, October, 2002
Schering-Plough Research Institute, Milan, Italy, October, 2002
Laboratories Fournier, Dijon, France, October, 2002
Washington University, St. Louis, December, 2002
University of New England, Biddeford, ME, December, 2002
Grunenthal, GmbH, Aachen, Germany, January, 2003
Entropin, Boston, Massachusetts, February, 2003
Laboratories Fournier, Dijon, France, March, 2003
Pharmacia, Chicago, Illinois, April, 2003
Baylor College of Medicine, Division of Neuroscience, Houston, Texas, May, 2003
NeuroMed Technologies, Vancouver, BC, Canada, May, 2003
AstraZeneca R & D Montreal, Montreal, Canada, May 2003
Ferring Research Institute, San Diego, California, July, 2003
6th International Conference on the Mechanisms and Treatment of Neuropathic Pain (Plenary), San Francisco, CA, September, 2003
American Society of Regional Anesthesia and Pain Medicine, San Diego, CA, November, 2003
University of Wisconsin, Madison, WI, November, 2003
University of Iowa, Iowa City, IA, December, 2003
American Headache Society (Plenary), Cancun, Mexico, January, 2004
Merck Research Laboratories, West Point, PA, March, 2004
Wyeth Laboratories, Princeton, NJ, March, 2004
Health Management Solutions, Inc., Orlando, FL, March, 2004
GlaxoSmithKline, San Francisco, CA, March, 2004
Rehabilitation Institute of Michigan, Detroit, MI, March 2004
ICOS Corporation, Bothell, WA, April, 2004
Aventis, Pain Advisory Board, New York, NY, April, 2004
Wake Forest University School of Medicine, Winston-Salem, NC, May, 2004
American Headache Society, Vancouver, BC, Canada, June, 2004
University of Maryland, Baltimore, MD, June, 2004
Peptide Receptors Conference (Plenary), Montreal, CA, July 2004
Glaxo Smith-Kline Research Conference, San Francisco, CA, August 2004
Merck Pharmaceuticals Pain Conference, Philadelphia, November, 2004
Abbott Laboratories, Abbott Park, IL, January, 2005
Alnylam Pharmaceuticals, Cambridge, MA, January 2005
GlaxoSmithKline, Durham, NC, March 2005
University of Arizona, Dean' Research Seminar Series, Tucson, AZ, April 2005
Biorexis, Philadelphia, PA, June 2005
INRC Plenary Lecture, Washington DC, July 2005
BiogenIdec, San Francisco, CA, July 2005
Metaphore, San Francisco, CA August 2005
IASP World Congress on Pain, (3 lectures) Sydney, Australia, August 2005

GlaxoSmithKline, Dallas, TX, October 2005
Alnylam Pharmaceuticals, Cambridge, MA, December 2005
Neurocrine Pharmaceuticals, January 2006
University College, London, London Pain Consortium, February 2006
Grunenthal GmbH, Aachen, February, May 2006
St. Louis University, Brain Awareness Day, March 2006
GlaxoSmithKline, March 2006
Lilly Pharmaceuticals, March 2006
McGill University, Opioid induced hyperalgesia and cancer pain, March, 2006
Spring Pain Research Conference, April 2006
Psychogenics, May 2006
Keystone Pain Meeting (Plenary – OA pain), June 2006
DRIVE Continuing Medical Education Lectures, Boston, Miami, Atlanta, Philadelphia, New York City and Dearborn, January - June 2006
Neuropathic Pain Conference (Mechanisms lecture, San Francisco), November, 2006
Grunenthal SAB lecture (Descending modulation), December 2006
University of Pittsburgh Pain Center, Artemin and neural regeneration, January, 2007
Genzyme Corp, Mechanisms of OA pain, January 2007
M.D. Anderson, Houston, TX, Opioid-induced Hyperalgesia, April, 2007
Schering-Plough Corp, Newark, NJ, Mechanisms of Neuropathic Pain, April 2007
NIH Pain Consortium, Bethesda, MD, Descending modulation and opioid-induced hyperalgesia, April 2007
Barrow Neurological Institute, Phoenix, AZ, Opioid-induced hyperalgesia, May 2007
University of Texas, San Antonio, TX, Mechanisms of neuropathic pain, May 2007
Abbott SAB, Chicago, IL, Opportunities for new therapies for pain, May 2007
Johnson and Johnson SAB meeting, Philadelphia, PA, August 2007
American Headache Society Boston, MA, (Plenary) Mechanisms of medication overuse headache, November 2007
Grunenthal SAB, Aachen, DE, December 2007
Schering Plough SAB, Philadelphia, PA, January 2008
Eli Lilly SAB, Indianapolis, IN, January 2008
Esteve SAB, Barcelona, Spain, Translation of therapy for pain, February 2008
University of Kentucky, Lexington, KY, Artemin and neural regeneration, February 2008
Tulane University, New Orleans, LA, Mechanisms of cancer pain, February 2008
London Pain Consortium, Opioids and cancer pain, July 2007
Scripps Institute, Florida, Mechanisms of Pain: New therapies, March 2008
Merck SAB, West Point, PA, June 2008
American Headache Symposium (Presidential Lecture), Medication Overuse Headache, June 2008
Neuropathic Pain Conference, Bermuda, Mechanisms of neuropathic pain, June 2008
NeuPSIG, London, Neuropathic Pain, August 2008
Sir James Black Conference, St. Andrews, Translation of neurobiology for pain, August 2008
IASP Glasgow, Opioid hyperalgesia, August 2008
International Headache Conference, London, Descending modulation and headache, September 2008
University of California San Francisco, Descending modulation and chronic pain, October, 2008
Menarini Conference on Pain, Florence, Italy, Artemin and peripheral regeneration, November, 2008

University of Florence, Florence, Italy, Neural regeneration and neuropathic pain, November, 2008
Arena Pharmaceuticals, San Diego, Mechanisms of pain, November 2008
Keystone Pain Symposium, Santa Fe, NM, Descending modulation in chronic pain, February 2009
GSK SAB, Dallas, Mechanisms of headache pain, February, 2009
International Headache Research Society, Copenhagen, Models of headache pain, March 2009
Grunenthal SAB, Aachen, March 2009
Temple University, Philadelphia, PA, Mechanisms of Neuropathic Pain, April 2009
Esteve Foundation, S'Agaro, Spain, Mechanisms of Migraine Headache, July 2009
GSK, Raleigh-Durham, NC, Headache pain, August 2009
Eli Lilly, SAB, Earls Wood, UK, September 2009
Endo SAB, Philadelphia, PA, Validation of targets for pain, September 2009
Supportive Oncology Conference, Chicago, IL, Opioid induced hyperalgesia and cancer pain, September 2009
National Headache Foundation Symposium, Chicago, IL, Headache pain mechanisms, October 2009
Neuropeptide Conference, Chicago, IL, Dynorphin and neuropathic pain, October 2009
Neuropsychopharmacology Conference, Tucson, AZ, New Therapies for Pain, February 2010
Grunenthal SAB, London, March 2010
Eli Lilly SAB, Indianapolis, IN, Mechanisms of cancer pain, April 2010
Spring Pain Research Conference, Measurement of spontaneous pain, April 2010
University of Louisville, Louisville, KY, Neuropathic pain, May 2010
International Nitric Oxide Symposium, Toronto, CA, NO and headache pain, May 2010
Antal-J, Pain Conference, Paris, FR, Plenary, Mechanisms of pain, June 2010
American Headache Society, Los Angeles (Plenary) Mechanisms of Medication Overuse Headache, June 2010
IASP Montreal, Mechanisms of Opioid-induced Hyperalgesia, August 2010
Angiochem SAB, August 2010
ENDO SAB, Descending modulation and pain, September 2010
Center for Substance Abuse Research, Temple University, Philadelphia, PA, Mechanisms of pain, November 2010
Astra-Zeneca, Montreal, CA, Measurement of spontaneous pain, December 2010
Banff Neuroinflammation Society, Keynote address, Mechanisms of Pain, January 2011
Grunenthal SAB, Rome, IT, Tapentadol and descending modulation, January 2011
University of New England, Biddeford, ME, Translation of therapy for pain, January 2011
London Pain Consortium, London, UK, Translation of therapy for pain, March 2011
Institute of Medicine, Irvine, California, March, 2011
Amgen, Los Angeles, California, April, 2011
Barcelona Hospital Sostenibles, Mechanisms driving cancer pain, May 2011
Esteve Foundation Symposium, S'Agaro, Spain, Memory of Pain, May 2011
American Pain Society, Austin, TX, Plenary Lecture: Measurement of Affective Dimensions of Pain, May 2011
Dalhousie University, Pain Speaker Series, Mechanisms of Cancer Pain, June 2011
Dalhousie University, Department of Pharmacology, Translation of mechanism to therapy, June 2011
New York Academy of Sciences Pain Symposium, New York, NY, Measurement and mechanisms of affective dimensions of pain, June 2011

Pain Therapeutics World Conference, Keynote Address, Philadelphia, PA, Increasing translation of therapy for pain, June 2011

Johns Hopkins University, Baltimore, MD, Benson Lecture, Descending modulatory circuits in pain, June 2011

Johns Hopkins University, Baltimore, MD, Blaustein Lecture, Capturing affective dimensions of pain preclinically, June 2011

University of Utah, Salt Lake City, Utah, Preclinical assessment of affective dimensions of pain, July 2011

Midwest Pain Society, Keynote Address, Chicago, IL, Translation of therapy for pain, July 2011

Pain Therapeutics Summit, San Francisco, CA, Mechanisms and measurement of chronic pain, September, 2011

University of California, San Francisco, CA, Measurement and mechanisms of affective dimensions of pain, September 2011

NIH Pain Consortium, Bethesda, MD, Preclinical barriers to discovery of pain therapeutics, May 2012

FDA Meeting, Bethesda, MD, Efficacy of opioids for chronic non-malignant pain, May 2012

Cornell University, Weil Medical College, Evaluation of pain preclinically to speed discovery, July 2012

IASP World Congress on Pain, Milan, Refresher Course on Pain, August 2012

IASP World Congress on Pain, Milan, Mechanism of spontaneous neuropathic pain, August 2012

BiogenIdec, Boston, Disease modifying actions of systemic artemin, September, 2012

Neurobiology of Disease Workshop, Society for Neurosciences, Descending pain modulation, October 2012

ACTION Preclinical Pain Consortium, FDA, Silver Spring, MD, Preclinical translational strategies for pain, October, 2012

Brazilian Pharmacological Society, Iguassu Falls, Brazil, Capturing and mechanistic investigation of affective dimensions of pain to speed discovery – Plenary Lecture, October 2012

Université Laval, Québec, Québec, Canada. Hurdles to drug discovery for pain, November, 2012

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