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**Curriculum Vitae**


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**Forrest L. Smith, Ph.D.**  
**Associate Dean for Academic Affairs**

**Phone:** 501-279-5507

Harding University  
 College of Pharmacy  
 HU12230  
 Searcy, AR 72149

**Citizenship:** USA  
**Place of Birth:** Denver, CO  
**Email:** fsmith1@harding.edu

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**Professional Positions:**

- 2007- **Associate Dean for Academic Affairs**, Harding University College of Pharmacy, Searcy, AR
  - 2007- **Professor** – Department of Pharmaceutical Sciences, Harding University College of Pharmacy, Searcy, AR
  - 2007- **Affiliate Professor** - Department of Pharmacology and Toxicology, Virginia Commonwealth University Medical Center, Richmond, VA
  - 1999-2007 Associate Professor - Department of Pharmacology and Toxicology, Virginia Commonwealth University Medical Center, Richmond, VA
  - 1996-2007 Affiliate Professor - Dental School, VCU Medical Center, Richmond, VA
  - 1998-2007 Affiliate Professor - Institute for Drug and Alcohol Studies, VCU Medical Center, Richmond, VA
  - 1993-1999 Assistant Professor - Pharmacology and Toxicology, Virginia Commonwealth University Medical Center, Richmond, VA
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**Professional Education:**

- 1990-1993 **Postdoctoral Scholar** (Pharmacology) – Dept. of Pharmacology and Toxicology, Medical College of Virginia
  - 1984-1989 **Ph.D.** (Pharmacology) - Dept. of Pharmacology, Texas Tech University Health Sciences Center, Lubbock, TX
  - 1978-1983 **B.S.** (Biology) - Abilene Christian University, Abilene, TX
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**Significant Pharmaceutical Industry Experience:**

- 2007-2008 Consultant, KAI Pharmaceuticals, Inc.
  - 2006-2007 Consultant and Study Director, Corgentech, Inc.
  - 2005-2007 Consultant and Study Director, TyRx Pharmaceuticals, Inc.
  - 2003-2007 Consultant and Study Director, Purdue Pharma L.P.
  - 2004-2005 Consultant and Study Director, AlgoRx Pharmaceuticals, Inc.
  - 1991-2002 Consultant and Study Director, Purdue Frederick Research Center, Yonkers, NY
  - 1999-2002 Consultant and Study Director Southern BioSystems, Birmingham, AL
  - 2000-2002 Consultant and Study Director, Guilford Pharmaceuticals, Baltimore, MD
  - 1988-1989 Clinical Consultant, The Pain Center, Dept. of Anesthesiology, Texas Tech University Health Sciences Center, Lubbock Texas
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**Research Support:**
**Current Grants**
**Grant#/Title**

R01-DA-020836 *Role of Protein Kinase C in Opioid Tolerance*

Role: Co-PI with Drs. Dewey (VCU), G. Henderson and C. Bailey (U. Bristol, United Kingdom)

International Research Collaboration on Drug Addiction grant

Dates/Amounts: 7/01/06-6/30/11 Total Costs: \$1,638,530

Percent effort: 25%

T32-DA-07032 *Training in the Pharmacology of Abused Drugs*

Co-sponsor with W.L. Dewey

Role: Executive Committee in matters of program policy, pre- and postdoctoral trainee selection, curriculum and fiscal management

Dates/Amounts: 7/1/06 to 6/30/11 Total Costs \$4,277,838

Percent effort: 5%

**Prior Grants Submitted/Completed****Grant#/Title**R01-DA-016470-25 *Enkephalins: Neuropharmacology and abuse potential*

Role: Co-Principal Investigator with Drs. Dewey, S.P. Welch, D. Selley, L. Sim-Selley

Dates/Amounts: 3/1/02 to 2/29/07 Total Costs \$1,139,645

Status: Completed

P32-DA-09789 Program Project: *Endogenous Cannabinoids and Brain/Immune Function* (PI: Billy R. Martin)

Role: Co-PI with Drs. S.P. Welch, W.L. Dewey:

Project 4 Cellular Systems in the Acute and Chronic Effects of Cannabinoids

Dates/Amounts: 7/1/02 to 6/30/07 Total Costs: \$452,886

Status: Completed

T32-NIGMS *Graduate Education in Pharmacological Sciences*

Role: Administrative committee: program policy and implementation, pre-doctoral trainee selection, curriculum and fiscal management

Dates/Amounts: 7/01/07-0/30/12 Total Costs: \$1,767,284

Status: unfunded

R01-GM-06157 *Local anesthetic behavior & signal transduction*

Role: Principal Investigator 12/1/02 to 11/30/07 Total costs \$1,117,500

Status: unfunded

R01-DA-013592 *Buprenorphine substitution in opioid dependent neonates*

Role: Principal Investigator 12/1/00 to 11/30/05 Total costs \$906,250

Status: unfunded

P50-DA-05274 Center Grant: *Evaluation of opioid tolerance/dependence in neonatal rats.*

Role: Principal Investigator 8/1/96 to 7/31/01 Total Costs \$519,684.

Status: Completed

R01-DA-016470-25 *Enkephalins: Neuropharmacology and abuse potential*

Role: Co-PI with William L. Dewey 4/1/96 to 3/31/01 Total Costs \$1,139,645

Status: Completed

R29-DA06175 FIRST, *Role of Calcium in Morphine tolerance*

Dates/Amounts: 7/1/95 to 6/31/00 Total Costs \$625,000

Status: unfunded

F32-DA05415, National Research Service Award (NRSA)

Role: Principal Investigator Dates/Amounts: 12/1/91 to 11/30/94, \$94,500

Status: Completed

**Private funding**

<b>Company</b>	<b>Project</b>	<b>Years</b>	<b>Amount</b>
Purdue Pharma L.P., Ardsley, NY	lipoygenase inhibitors local anesthetic microspheres	1991-2000	\$4,429,455
Southern BioSystems, Birmingham, AL	Evaluation of novel local anesthetic delivery systems	1999-2002	\$253,838
Guilford Pharmaceuticals, Inc., Baltimore, MD	Evaluation of local anesthetic microspheres	2001	\$127,000
Purdue Pharma L.P. Ardsley, NY	Oxycodone-naloxone, oxy-naltrexone combinations	2004-2006	\$206,981
AlgoRx Pharmaceuticals, Inc., Secaucus, NJ	Topical LAC-34 and its enantiomers vs. topical commercial local anesthetics	2005	\$404,022

TyRx Pharmaceuticals, Inc., Monmouth Junction, NJ	Behavioral and Pharmacokinetic Properties of Bupivacaine in Tyrosine Polyarylate Mesh	2005	\$116,700
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## Teaching

### Courses-Lectures Taught at Harding University

2007	Marriage-Family Counseling  Licensed Professional Counselors	MHC-633 Psychopharmacology	Introduction to Pharmacology Literature Review and Evaluation Antipsychotic Drug Therapy Treatment of Bipolar Disorder Antidepressant Therapies Anti-Anxiety-Hypnotic Drugs Treatment of Attention Deficit-Hyperactivity Disorder Treatment of Eating Disorders Management of Headache-Migraine Drugs of Abuse Management of Organic Brain Syndromes Treatment of Acute and Chronic Pain
2007	Physician Assistant	PAS-622 Clinical Pharmacology	Treatment of Nausea and Vomiting Treatment of Headache-Migraine Chronic Pain and Its Management Constipation, Diarrhea, and Irritable Bowel Syndrome (IBS)
2008	Pharmacy	PHAR325 Intro to Pharmaceutical Sciences	Ligands and Receptors Mechanisms of Drug Action Dose-Response Relationships
2009	Pharmacy	PHAR431 Pharmacology & Chemistry	Nitrates and Nitrites Angina Myocardial Infarction Heart Failure Arrhythmias Stroke, Deep Vein Thrombosis, DIC

### Lectures Taught at the Virginia Commonwealth University Medical Center

From	School	Course	Lectures
		<b><i>Course Director</i></b>	
1997- 2002	Medicine	PHTX-548 Director Drug Dependence	Organizing 13 faculty to present lectures during semester, arranging syllabus (i.e., lectures of all faculty) for transmittal to students on Blackboard, preparing exams , proctoring and grading exams, evaluating teaching faculty, advising students
1996- 2007	Dental	PHTX-609, 611 Co-Director, Dental Pharmacology and Pain Control	Organizing 18 faculty to present lectures during semester, arranging syllabus (i.e., lectures of all faculty) for transmittal to students on Blackboard, preparing exams , proctoring and grading exams, evaluating teaching faculty, advising students
		<b><i>Professor in Course</i></b>	
2002- 2007	Pharmacy	PHTX-603, Pharmacology	--Pharmacologic management of peptic ulcer disease --Drugs used to treat nausea and vomiting --Gastrokinetic drugs/diarrhea/laxatives --Emetic and anti-emetic drugs --Pharmacologic management of inflammatory bowel disease
1992- 2007	Medicine	PHTX-400 Drugs and Their Action	--Undergraduate pharmacology course for pre-professional students --Pharmacology of the autonomic nervous system

			--Pharmacology of the respiratory system—treatment of asthma, allergens and reactive airway diseases
1993-2007	Medicine	PHTX-537 Principles of Pharmacology	--Pharmacology of muscarinic receptors—agonists/antagonists --Nicotinic receptor agonists/antagonists --Pharmacology of the autonomic ganglia
1997-2007	Medicine	PHTX-548, Drug Dependence	--Overview of the CNS --Pharmacokinetics/pharmacodynamics --Drugs of Abuse
2002-2007	Medicine	MII Pharmacology, Medical Students	--Pharmacologic management of peptic ulcer disease --Drugs used to treat nausea and vomiting --Gastrokinetic drugs/diarrhea/laxatives --Emetic and anti-emetic drugs --Pharmacologic management of inflammatory bowel disease
1994-2007	Medicine	PHTX-691, Research Design and Methods	--Experimental research design --Utilization of graded and quantal analysis for determination of effective dose-50 values (ED50) --Determination of potency-ratio values, 95% confidence limits --Utilization of area under the curve analysis for research studies of time-course data --Determination of maximum efficacy
1996-2007	Dental	PHTX-609, Dental Pharmacology and Pain Control	--Pharmacology of the autonomic nervous system --Muscarinic agonists, antagonists, anticholinesterase agents --Nicotinic receptor agonists, antagonists, ganglionic blockers --Adrenergic receptor agonists, antagonists, indirect agonists --Pharmacology of the renal system—diuretic and anti-diuretic drugs --Pharmacology of the respiratory system—treatment of asthma, allergens and reactive airway diseases --Pharmacology of the gastrointestinal system
1999-2007	Dental	PHTX-611, Dental Pharmacology and Pain Control	--Treatment of cocaine abusers in dentistry --Treatment of methamphetamine abusers in dentistry
1990-2007	Dental	PMC-441 Pharmacology and Pain Control for Dental Hygienists	--Introduction to the autonomic nervous system --Pharmacology of the sympathetic nervous system --Pharmacology of the parasympathetic nervous system --Nicotinic receptor agonists and blockers --Introduction to the cardiovascular system --Pharmacologic management of angina --Pharmacologic management of congestive heart failure --Treatment of arrhythmias --Pharmacologic treatment of hypertension --Treatment of shock and anemia --Pharmacology of the renal system—diuretic and anti-diuretic agents --Pharmacology of the gastrointestinal system
1995-2007	Nursing	PMC-516 Pharmacology for Nurse Anesthetists	--Pharmacologic management of peptic ulcer disease --Emetic and anti-emetic drugs --Introduction to the cardiovascular system --Inotropic agents --Pharmacologic treatment of arrhythmias --Pharmacologic treatment of angina --Pharmacologic treatment of hypertension --Diuretic and anti-diuretic agents

## Student Training

### Graduate Student Training at Virginia Commonwealth University:

Dates	Individual	Degree Sought	Department
2000-2004	Dawn Stoller	Ph.D. completed <sup>2</sup>	Pharmacology
2000-2004	Ruby R. Jarved	Ph.D. completed <sup>3</sup>	Pharmacology
2000-2002	Richard Carter	M.S. Completed	Pharmacology
1999-2000	Torrey Hawley	M.S. completed	Nurse Anesthesia
1998-1999	Richard Davis	M.S. Completed	Nurse Anesthesia
1998-1999	Raymond J. Lindsay	M.S. Completed	Nurse Anesthesia
1997-1999	Cassie Choe	M.S. Completed	Pharmacology
1995-1997	Suzanne Thornton	Ph.D. Completed <sup>1</sup>	Pharmacology

<sup>1</sup> Food and Drug Administration, Division of Anesthetics, Critical Care and Addiction Drug Products HFD-170, 5600 Fishers Lane, Rm. 9B-45, Rockville, MD 20857

<sup>2</sup> Postdoctoral Fellow, Robert Delorenzo, Department of Neurology, Virginia Commonwealth University Medical Center, Richmond, VA 23298

<sup>3</sup> National Medical Services, 33701 Welsh Road Willow Grove, PA 19090

### Postdoctoral Fellow Training at Virginia Commonwealth University:

Dates	Postdoctoral Fellow	Current Position
2005-2008	Bichoy Gabra, Ph.D.	Pharmacist, Detroit, MI
2000-2004	Krista Scoggins, DVM	Research Associate, VCU
1999-2000	Simone Heyliger, Ph.D.	Associate Professor, Hampton University School of Pharmacy, Hampton, VA
2001-2004	Jason Schechter, Ph.D.	Postdoctoral Fellow, Frank Porreca, Dept. Pharmacology, U. of Arizona, Tucson, AZ

### Graduate Student Committee Memberships at Virginia Commonwealth University:

Dates	Individual	Degree Sought	Department
2005-2009	Michelle Hoot	Ph.D.	Neuroscience, VCU
2005-2009t	Lynn Hull	Ph.D.	Pharmacology, VCU
2003-2005	George Dalton	Ph.D. completed	Pharmacology, VCU
2003-2005	Paul Smith	M.S. completed	Biology, VCU
1997-2002	Robert A. Nicholson	Ph.D. completed	Psychology, VCU
1997-2002	Diana Cichewicz	Ph.D. completed	Pharmacology, VCU
1999-2001	Vera Campbell	Ph.D. completed	Pharmacology, VCU
1997-2001	David M. Wilson	Ph.D. completed	Pharmacology, VCU
1995-1998	David Mason	Ph.D. completed	Pharmacology, VCU
1997-1998	Alka Bhargava	M.S. completed	Pharmacology, VCU
1996-1997	Robert A. Nicholson	M.S. completed	Psychology, VCU
1994-1997	Daniel Dombrowski	M.S. completed	Biology, VCU

### Other Student Training at Virginia Commonwealth University:

Marcia Redwood	2004 Med-1 student VCU Medical Center, AD Williams Student Summer Research Awardee Research project: <i>Role of signal transduction pathways in the mechanism of morphine analgesic tolerance</i>
Lesley Stewart	2000, University of West England Exchange Program with VCU; Research project: <i>Chronic morphine-induced regulation of the mu-opioid receptor</i>
Amet Kukar	1999, Med-1 student VCU School of Medicine, AD Williams Student Summer Research Awardee Research project: <i>Use of adjuvant drugs to enhance the potency and duration of action of bupivacaine.</i>
Eugene Lee	1998, Dental-1 student VCU Dental School, AD Williams Student Summer Research Awardee Research project: <i>Use of adjuvant drugs to enhance the potency and duration of action of lidocaine</i> 1999 Travel award recipient to International Association for Dental Research

	Conference, Vancouver, British Columbia, Canada
Vinita Mohan	2002, Medical Student researcher
Alecia K. Wang, M.S.	Dental Student, University of Pennsylvania at Philadelphia, PA Summer researcher on neonatal morphine tolerance
1993-1996	NIDA Minority Research Mentorship Program, VCU, Richmond, VA Stephanie Pope, HS student (1996) Martha Cook, HS teacher (1994 to 1997) Carolyn Waller, HS teacher (1993)

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### Memberships in-Scientific and Professional Societies; Journal Peer Reviews

#### **Professional Organization Memberships:**

2006- American Association of Colleges of Pharmacy (AACP)  
 2005-2009 College on Problems of Drug Dependence (CPDD)  
 1997-2008 International Narcotic Research Conference (INRC)  
 1995-2003 International Cannabinoid Research Society (ICRS)  
 1993-2004 Virginia Society for Neuroscience

#### **Ad Hoc Reviewer for the Following Journals:**

<i>Brain Research</i>	<i>European J. Pharmacology</i>
<i>Brain Research Bulletin</i>	<i>Neuroscience Letters</i>
<i>Journal of Pharmacol and Exp. Ther.</i>	<i>Neuroscience</i>
<i>Pharmacology Biochemistry Behavior</i>	<i>Neuropharmacology</i>
<i>Life Sciences</i>	<i>Molecular Pharmacology</i>
<i>Pain</i>	

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### Major Committee and University Service:

#### **Harding University Committees:**

2007-- University Assessment Committee  
 2007- University Assessment Committee  
 2007 Academic Leaders Committee  
 2007 Graduate Academic Leaders Committee

#### **Harding University College of Pharmacy Committees:**

2007- Executive Committee  
 2007-2009 Curriculum & Assessment Committee--Chair  
 2009- Curriculum Committee—ex officio  
 2009- Assessment Committee—ex officio  
 2008- Spiritual Life Committee

#### **Virginia Commonwealth University Committees/Service:**

1997-2007 Ad hoc Review Committee for the Drug Abuse Small Grants Program for the NIDA Drug Abuse Research Center at VCU  
 1997-2007 Dean's Representative for M.S. thesis defenses, and Ph.D. comprehensive examinations and dissertation defenses.

#### **Virginia Commonwealth University Departmental Committees:**

2006-2007 Departmental Space Committee, Move and consolidation of departmental faculty to new facilities in MSB I and MSBII in 2008 at VCU  
 1997-1998 Chairman, Curriculum Committee, Pharmacology and Toxicology, VCU  
 1995-1997 Member, Curriculum Committee, Pharmacology and Toxicology, VCU

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**Membership in Community Organizations and National Service**

- 2004-2006 Virginia Junior Academy of Sciences, Judge projects of middle and high school students from the Commonwealth of VA
- 1997-2006 Metro Richmond Science Fair, Judge of projects presented in the annual Science Fair
- 1996-2006 Metro Richmond Science Fair, Screening Judge to determine which projects will be presented in the annual Science Fair
- 1993-1997 Instructor for Pharmacology/Toxicology Open House/Career Day for the Southside Virginia Governor School Program
- 1995-1996 4 hr. teaching on Pharmacology of the Autonomic Nervous System, Chesterfield County Mathematics and Science Renaissance Program at Clover Hill High School, Richmond, VA
- 1994-1996 Medication provision and consultation to physicians who treat children living in the Zhitomir, Ukraine District that is heavily contaminated with radiation from Chernobyl.
- 1994 Research seminar presented to faculty and students of the Zhitomir Pharmacological Institute, Zhitomir, Ukraine

**Awards, Fellowships and Other Honors**

- 2006 Fruchaud Prize at 3<sup>rd</sup> International Meeting of Hernia Congress, Boston, MA
- 1998 Alza wrote a feature article on our development of a model to chronically administer fentanyl to neonatal rats using Alzet 1003D osmotic minipumps. *Overcoming Challenges in Neonatal Drug Delivery*. Alzet Special Delivery June 20(1): 7, 1998.
- 1997- Developed a Microsoft Excel computer-based program for calculating effective dose-50 (ED<sub>50</sub>) values and potency-ratio values used widely by universities, Industry and government
- 1997 Travel award to attend International Narcotics Research Conference in Hong Kong, China.
- 1996 Dental School, Virginia Commonwealth University, Travel award and VCU Dental School representative at *Over-the-Counter Dental Drugs and Products* Meeting, University of the Pacific School of Dentistry, San Francisco, CA.
- 1993- National Institute on Drug Abuse Travel Award to attend the Committee on Drug Abuse Research meeting, Toronto, Canada.
- 1988 American Society for Pharmacology and Experimental Therapeutics Student Travel Award to attend annual meeting in Montreal, Canada.
- 1985-1988 State of Texas, Tarbox Parkinson's Disease Fellowship (stipend and supply money)

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**Invited Lectures/Presentations/Symposia**

- 1990 American Society for Pharmacology and Experimental Therapeutics, Milwaukee, WI. Research symposium presentation on intrathecal calcium elicits a robust antinociceptive response in spinal mice in
- 1995 Purdue Pharma L.P., Ardsley, NY. Local anesthetic potency and efficacy of bupivacaine microspheres injected by perisciatic injection using STIMEX-needle nerve stimulator delivery.
- 1998 Guilford Pharmaceuticals, Baltimore, MD. Methodological approaches to the evaluation of local anesthetic sustained release microsphere delivery in rat models.
- 1996 College on Problems of Drug Dependence San Juan, PR. Research symposium presentation on Analgesic tolerance in neonatal rats continuously receiving fentanyl by osmotic minipump in
- 2004 College on Problems of Drug Dependence, San Juan, PR. Chair of research symposium and presenter on Reversion of morphine tolerant mice into a non-tolerant state with PKC and PKA inhibitors.

- 2007 Invited speaker to University of Arkansas for Medical Sciences, College of Pharmacy, Little Rock, AR. Research seminar on: Identification of Several Signal Transduction Mechanisms Mediating Pain and Opioid Tolerance.
- 2008 ACPE Continuing Education 004-999-08-22-L01-P for the American Association of Hospital Pharmacists (AAHP), Chronic Pain: Treatment with Narcotic Analgesics, Tunica, MS.
- 2008 Continuing Education for UAMS Area Health Education Center (AHEC), Pain Management: A Pharmacologist's Perspective, Batesville, AR.

## BIBLIOGRAPHY

### Peer Reviewed Articles:

(for complete list of publications, see smith-fl

<http://www.ncbi.nlm.nih.gov/sites/entrez?db-PubMed>

*ISI Author Citation Index = 13.8 (average citations/article)*

### \* = Corresponding Author

1. Yu, D.S.L., **Smith, F.L.**, Smith, D.G. and Lyness, W.H.: Fluoxetine induced attenuation of amphetamine self-administration in rats. *Life Sci.* **39**: 1383-1388, 1986.
2. **Smith, F.L.**, Yu, D.S.L., Smith, D.G., Leccese, A.P. and Lyness, W.H.: Dietary tryptophan supplements attenuate amphetamine self-administration in the rat. *Pharmacol. Biochem. Behav.* **25**: 849-855, 1986.
3. Geis, L.S., Smith, D.G., **Smith, F.L.**, Yu, D.S.L. and Lyness, W.H.: Tyrosine influence on amphetamine self-administration and brain catecholamines in the rat. *Pharmacol. Biochem. Behav.* **25**: 1027-1033, 1986.
4. **Smith, F.L.\***, St John, C., Yang, T.F.T. and Lyness, W.H.: The role of specific dopamine receptor subtypes in amphetamine discrimination. *Psychopharmacol.* **97**: 501-506, 1989.
5. Lyness, W.L., **Smith, F.L.**, Iocono, C.U., Garvin, R.D. and Heavner, J.E.: Morphine self-administration in the rat during adjuvant-induced arthritis. *Life Sci.* **45**: 2217-2224, 1989.
6. Welch, S.P., **Smith, F.L.**, Saxon, M., Dewey, W.L.: Effects of endogenous calcium regulating peptides on opiate actions. *NIDA Res. Monograph* **119**: 39-43, 1991.
7. Lyness, W.H. and **Smith, F.L.\***: Influence of dopaminergic and serotonergic neurons on intravenous ethanol self-administration in the rat. *Pharmacol. Biochem. Behav.* **41**: 187-192, 1992.
8. **Smith, F.L.\*** and Dewey, W.L.: Evidence that endogenous opioids mediate the antinociceptive effects of intrathecally administered calcium in mice. *J. Pharmacol. Exp. Ther.* **262**: 995-1003, 1992.
9. **Smith, F.L.\*** and Dewey, W.L.: Dynorphin modulates calcium-mediated antinociception in mice. *Pharmacol. Biochem. Behav.* **45**: 383-391, 1993.

10. **Smith F.L.\***, Dombrowski, D.S., Welch, S.P. and Dewey, W.L.: The role of endogenous opioids as mediators of the hypothermic effects of intrathecally administered calcium and calcitonin gene-related peptide in mice. *J. Pharmacol. Exp. Ther.*, **266**: 1407-1415, 1993.
11. Lichtman, A.H., **Smith, F.L.** and Martin, B.R.: Evidence that the antinociceptive tail-flick response is produced independently from changes in either tail-skin or core temperature. *Pain*, **55**: 283-295, 1993.
12. **Smith, F.L.\***, Dombrowski, D.S., Brase, D.A. and Dewey, W.L.: Endogenous opioids released by suspending mice by the tail selectively enhance spinal *mu* opioid analgesia. *J. Pharmacol. Exp. Ther.*, **270**: 1177-1185, 1994.
13. Saxen, M.A., **Smith, F.L.**, Dunlow, D., Dombrowski, D.S., and Welch, S.P.: Intrathecal injection of CGRP (8-37) produces hypothermic and antinociceptive effects in mice. *Life Sci.*, **55**: 1665-1674, 1994.
14. **Smith, F.L.\***, Stevens, D.L.: Calcium-induced modulation of morphine analgesia: Role of calcium channels and intracellular pool calcium. *J. Pharmacol. Exp. Ther.*, **272**: 290-299, 1995.
15. **Smith, F.L.\***: Cutaneous Regional differences in the duration of bupivacaine local anesthesia in mice. *Life Sciences*, **60**: 1613-1621, 1997.
16. Thornton, S.R. and **Smith, F.L.\***: Characterization of neonatal rat fentanyl tolerance and dependence. *J. Pharmacol. Exp. Therap.* **281**: 514-521, 1997.
17. Welch, S.P., **Smith, F.L.** and Dewey, W.L.: Morphine tolerance-induced modulation of [3H]-glyburide binding to mouse brain and spinal cord. *Drug Alcohol Dep.* **45**: 47-53, 1997.
18. Thornton, S.R., Wang, A.K. and **Smith, F.L.\***: Characterization of neonatal rat morphine tolerance and dependence. *Eur. J. Pharmacol.* **340 (2-3)**: 161-167, 1997.
19. Thornton, S.R., Compton, D.R. and **Smith, F.L.\***: Ontogeny of *mu* opiate agonist antinociception in neonatal rats. *Devel. Brain Res.* **105(2)**: 269-276, 1998.
20. **Smith, F.L.\***, Fujimori, K. and Welch, S.P.: Characterization of delta-9-tetrahydrocannabinol and anandamide antinociception in non-arthritis and arthritis rats. *Pharmacol. Biochem. Beh.* **60**: 183-191, 1998.
21. **Smith, F.L.\***, Cichewicz, D., Martin, Z.L. and Welch, S.P.: The enhancement of morphine antinociception in mice by *delta-9* tetrahydrocannabinol. *Pharmacol. Biochem. Behav.* **60**: 559-566, 1998.
22. Thornton, S.R. and **Smith, F.L.\***: Long-term alterations in opioid antinociception resulting from infant fentanyl tolerance and dependence. *Eur. J. Pharmacol.* **363**: 113-119, 1998.
23. **Smith, F.L.\***, Dombrowski, D.S., and Dewey, W.L.: Involvement of intracellular calcium in morphine tolerance in mice. *Pharmacol. Biochem. Behav.* **62**: 381-388, 1999.
24. Cichewicz, D.L, Martin, Z.L., **Smith, F.L.**, and Welch, S.P.: Enhancement of *mu* opioid antinociception by oral  $\Delta$ 9-tetrahydrocannabinol: Dose-response analysis and receptor identification. *J. Pharmacol. Exp. Therap.* **289**: 859-867, 1999.

25. **Smith, F.L.\***, Lohman, A.B. and Dewey, W.L.: Influence of phospholipid signal transduction pathways in morphine tolerance in mice. *Br. J. Pharmacol.* **128**: 220-226, 1999.
26. Thornton, S.R., Lohmann, A.B., Nicholson, R.A. and **Smith, F.L.\***: Fentanyl self-administration in juvenile rats that were tolerant and dependent to fentanyl as infants. *Pharmacol. Biochem. Behav.* **65**: 563-570, 2000.
27. Choe, C. and **Smith, F.L.\***: Sedative tolerance accompanies tolerance to the antinociceptive effects of fentanyl in infant rats. *Pediatric Res.* **47**: 727-735, 2000.
28. **Smith, F.L.\***, Welch, S.P. and Dewey, W.L.: Effects of acute and chronic opiates on signal transduction events. *NIDA Res. Monograph* **181**: 38-39, 2000.
29. Lohmann, A.B. and **Smith, F.L.\***: Buprenorphine substitution ameliorates spontaneous withdrawal in fentanyl-dependent infant rats. *Pediatric Res.* **49**: 50-55, 2001.
30. **Smith, F.L.\***, Davis, R.W. and Carter, R.: Influence of voltage-sensitive Ca<sup>++</sup> channel drugs on bupivacaine infiltration anesthesia. *Anesthesiology* **95**: 11-98-1205, 2001
31. Stiene-Martin, A., Knapp, P.E., Martin, K., Gurwell, J.A., S.R. Thornton, S.R., **Smith, F.L.** and Hauser, K.F.: Opioid system and glial development: Cellular localization of opioid receptors in astroglia and oligodendroglia and opioid regulation of DNA synthesis *in vivo*. *Glia* **36**: 78-88, 2001.
32. Stoller, D.C., Thornton, S.R. and **Smith, F.L.\***: Loss of antinociceptive efficacy in rat pups infused with morphine from osmotic minipumps. *Pharmacology* **66**: 11-18, 2002.
33. **Smith, F.L.\***, Javed, R., Elzey, M.J., Welch, S.P., Selley, D., Sim-Selley, L. and Dewey, W.L.: Prolonged reversal of morphine tolerance with no reversal of dependence by protein kinase C inhibitors. *Brain Res* **985**(1): 28-35, 2002.
34. **Smith, F.L.\*** and Lindsay R.J.: Paradoxical enhancement of bupivacaine anesthesia in mice by drugs that open sodium channels. *Pharmacology* **67**: 90-98, 2003.
35. Welch, S.P., Lee, M.C., **Smith, F.L.**, Stevens, D.L.: The role of several kinases in mice tolerant to delta-9-tetrahydrocannabinol. *J. Pharmacol. Exp. Therap.* **305**: 593-599, 2003.
36. **Smith, F.L.\***, Javed, R., Elzey, M.J., and Dewey, W.L.: The expression of a high level of morphine antinociceptive tolerance in mice involves both PKC and PKA. *Brain Res.* **985**:78-88, 2003.
37. **Smith, F.L.\***, LeBlanc, S.J. and Carter, R.: Influence of intracellular Ca<sup>++</sup> release modulating drugs on bupivacaine infiltration anesthesia in mice. *Eur. J. Pain* **8**:153-161, 2004
38. Javed, R.R., Dewey, W.L., Smith, P.A. and **Smith, F.L.\***: PKC and PKA inhibitors reverse tolerance to morphine-induced hypothermia and supraspinal analgesia in mice. *Eur. J. Pharmacol* **492**: 149-157, 2004.
39. **Smith, F.L.\***, Smith, P.A., Dewey, W.L., Javed, R.R.: Effects of mGlu1 and mGlu5 metabotropic glutamate antagonists to reverse morphine tolerance in mice. *Eur. J. Pharmacol.* **492**: 137-142, 2004.

40. Stoller, D.S. and **Smith, F.L.\***: Buprenorphine blocks withdrawal in morphine-dependent rat pups. *Paediatric Anaesthesia* **14**: 642-649, 2004.
41. Dalton G, **Smith FL**, Smith P, and Dewey, W.L.: Morphine tolerance reversal and alterations in brain protein kinase A activity by two fragments of native protein kinase A inhibitor peptide (PKI). *Neuropsychopharmacol.* **29**: S178-S179, 2004
42. **Smith FL\***, Javed R, Dalton G, and Dewey, W.L.: Reversal of morphine tolerant mice to an acute morphine state by the acute injection of PKC and PKA inhibitors. *Neuropsychopharmacol.* **29**: S187-S188, 2004
43. Wiley, J.L., **Smith, F.L.**, Razdan, R.K., and Dewey, W.L.: Task specificity of cross tolerance between  $\Delta^9$ -tetrahydrocannabinol and anandamide analogs in mice. *Eur. J. Pharmacol.* **510**: 59-68, 2005.
44. Dalton, G.W., **Smith, F.L. \*** and Dewey, W.L.: Alterations in brain Protein Kinase A activity and reversal of morphine tolerance by two fragments of native Protein Kinase A inhibitor peptide (PKI). *Neuropharmacology* **48(5)**: 648-657, 2005.
45. Dalton G.D., **Smith, F.L.**, Smith, P.A., Dewey, W.L.: Chronic  $\Delta^9$ -tetrahydrocannabinol treatment produces antinociceptive tolerance in mice without altering Protein Kinase A activity in mouse brain. *Biochem. Pharmacol.* **70(1)**: 152-160, 2005.
46. Dalton, G.W., **Smith, F.L.**, Smith, P.A. and Dewey, W.L.: Protein Kinase A activity is increased in mouse lumbar spinal cord but not brain following morphine antinociceptive tolerance for fifteen days. *Pharmacol. Res.* **52**: 204-210, 2005.
47. Cichewicz, D.L., **Smith, F.L.\*** and Welch, S.P.: Enhancement of transdermal fentanyl and buprenorphine antinociception by transdermal  $\Delta^9$ -THC. *Eur. J. Pharmacol.* **525**: 74-82, 2005.
48. Martin, B.R., Beletakaza, I., Sim-Selly, L.M., **Smith, F.L.**, Dewey, W.L.: Pharmacological characterization of novel water-soluble cannabinoids *J. Pharmacol. Exp. Therap.* **318**: 1230-9, 2006.
49. Bailey, C.P., **Smith, F.L.**, Kelly, E., Dewey, W.L., Henderson, G., How important is protein kinase C in  $\mu$ -opioid receptor (MOR) desensitisation and morphine tolerance? *Trends in Pharmacol. Sci.* **27**: 558-565, 2006.
50. **Smith, F.L.\***, Javed, R.R., Smith, P.A., Dewey, W.L. and Gabra, B.H.: PKC and PKA inhibitors reinstate morphine-induced behaviors in morphine tolerant mice. *Pharmacol Res.* **54**: 474-480, 2006.
51. **Smith, F.L.\*** Gabra, B.H., Redwood, M.C. and Dewey, W.L.: Determination of the role of conventional, novel and atypical PKC isoforms in the expression of morphine tolerance in mice. *Pain*, **127**:129-39, 2006.
52. **Smith, F.L.\*** and Lindsay, R.J.: Enhancement of bupivacaine local anesthesia with the potassium channel blocker (IKr) ibutilide. *Eur. J. Pain* **11**: 551-556, 2007.
53. Stoller, D.C., Sim-Selley, L.J. and **Smith, F.L.\***: Role of kappa and delta opioid receptors in mediating the antinociceptive effects of morphine in morphine tolerant infant rats. *Brain Res.* **1142**: 28-36, 2007.

54. Gabra, B.H., Kessler, F.K., Ritter, R.K., Dewey, W.L. and **Smith, F.L.**: Decrease in NMDAR-NR2B subunit levels by intrathecal shRNA blocks group I mGluR-mediated hyperalgesia. *J. Pharmacol. Exp. Therap.* **322**: 186-194, 2007.
55. Sim-Selley, LJ, Scoggins, KL, Smith, L.A., Dewey, WL **Smith, FL**, Selley, DE: Region-dependent attenuation of mu opioid receptor-mediated G-protein activation in mouse CNS as a function of morphine tolerance. *Br J. Pharmacol.* 151:1324-1333, 2007.
56. Carrol, F.I., Kotturi, S.V., Navarro, H.A., Mascarella, S.W., Gilmore, B.A., **Smith, F.L.**, Gabra, B.H. and Dewey, W.L. Synthesis and Pharmacological Evaluation of Phenylethynyl[1,2,4]methyltriazines as analogues of 3-Methyl-6-(phenylethynyl)pyridine *J. Med. Chem.* **50**:3388-3391, 2007.
57. Gabra, B.H., Bailey, C.P., Kelly, E., Sanders, A.V., Henderson, G., **Smith, F.L.**, Dewey, W.L., Evidence for an important role of protein phosphatases in the mechanism of morphine tolerance. *Brain Res.* 1159:86-93, 2007.
58. Gabra, B.H. **Smith, F.L.**, Navarro, H.A., Carroll, F.I. and Dewey, W.L.: mGluR5 antagonists that block calcium mobilization in vitro also reverse (S)-3,5-DHPG-induced hyperalgesia and morphine antinociceptive tolerance in vivo. *Brain Res* 1187:58-66, 2008.
59. Gabra, B.H., Bailey, C.P., Kelly, E., **Smith, F.L.**, Henderson, G. and William L. Dewey, W.L. Pre-treatment with PKC and PKA inhibitors prevents the development of morphine tolerance but not morphine physical dependence in mice. *Brain Res.* 1217: 70-77, 2008.
60. Bailey CP, Llorente J, Gabra BH, **Smith FL**, Dewey WL, Kelly E, Henderson G. Role of protein kinase C and mu-opioid receptor (MOPr) desensitization in tolerance to morphine in rat locus coeruleus neurons. *Eur J Neurosci.* 29(2):307-18, 2009.
61. Bailey CP, Oldfield S, Llorente J, Caunt CJ, Teschemacher AG, Roberts L, McArdle CA, **Smith FL**, Dewey WL, Kelly E, Henderson G., Involvement of PKC $\alpha$  and G-protein-coupled receptor kinase 2 in agonist-selective desensitization of micro-opioid receptors in mature brain neurons., *Br J Pharmacol.* 2009 Mar 20. [Epub ahead of print]

## 12.2 Abstracts

- Smith, F.L. and W.H. Lyness: d-Amphetamine discrimination is not altered by L-tryptophan or fluoxetine pretreatment. *Soc. Neurosci. Abstr.* **13**: 219, 1987.
- Smith, F.L. and W.H. Lyness: The role of specific dopamine receptor subtypes in amphetamine discrimination. *Soc. Neurosci. Abstr.* **14**: 807, 1988.
- Smith, F.L., J.E. Heavner and W.H. Lyness: Morphine self-administration during adjuvant-induced arthritis in rats. *The Pharmacologist* **39**: 115, 1988.
- Lyness, W.H. and F.L. Smith: Influence of dopaminergic and serotonergic neurons in intravenous ethanol self-administration in the rat. *The Pharmacologist* **41**: 130, 1990.
- Smith, F.L. and W.L. Dewey: Intrathecal calcium elicits a robust antinociceptive response in spinal mice. *The Pharmacologist* **32**: 116, 1990.

- Lyness, W.H. and F.L. Smith: Influence of dopaminergic and serotonergic neurons on intravenous ethanol self-administration in the rat. *The Pharmacologist* **32**: 130, 1990.
- Smith, F.L. and W.L. Dewey: The involvement of a descending anti-analgesic system in modulating the antinociceptive properties of intrathecal calcium. *FASEB J.* **5**: A858, 1991.
- Smith, F.L., S.P. Welch, D.S. Dombrowski and W.L. Dewey: Role of opioids in calcium and calcitonin gene-related peptide (CGRP) induced hypothermia in mice. *NIDA Res. Monograph* **119**: 296, 1991.
- Smith, F.L. and W.L. Dewey: A dynorphin-containing antianalgesic system modulates intrathecal calcium-mediated antinociception. *The Pharmacologist* **33**: 137, 1991.
- Smith, F.L. and W.L. Dewey: Evidence that intracerebroventricular (i.c.v.) calcium stimulates spinal dynorphin release to inhibit morphine analgesia in mice. *NIDA Res. Monograph* **132**, 412, 1992
- Smith, F.L., D.S. Dombrowski, D.A. Brase and W.L. Dewey: Analgesia, but not distribution, of an intrathecally administered  $\mu$  opioid agonist peptide (DAMGO) is affected by methods of handling mice. *The Pharmacologist* **34**: 172, 1992.
- Smith, F.L., D.L. Stevens and W.L. Dewey: Calcium modulation of morphine analgesia: Role of calcium channels and intracellular pool calcium. *NIDA Res. Monograph* **141**: 131, 1993.
- Welch, S.P. and F.L. Smith: The effects of chronic administration of morphine on naloxone- and CGRP-induced changes in the levels of free intracellular calcium ( $[Ca]_i$ ) in dorsal root ganglia cells. *NIDA Res. Monograph* **141**: 132, 1993.
- Welch, S.P., L.D. Dunlow, and F.L. Smith: Characterization of endogenous opioid/neurokinin processing of nociceptive stimuli in the spinal cord. *NIDA Res. Monograph* (in press, 1995).
- Smith, F.L. and S.R. Thornton: Analgesic tolerance in neonatal rats continuously receiving fentanyl by osmotic minipump. CPDD, San Juan, PR, 1996.
- Smith, F.L. and S.R. Thornton: Utilization of tissue opioid levels as a tool for developing a model of neonatal rat tolerance/dependence. INRC, San Diego, CA, 1996.
- Thornton, S.R. and F.L. Smith: Characterization of a neonatal rat model of opioid tolerance and dependence. INRC, San Diego, CA, 1996.
- Smith, F.L., A.F. Wang, and S.R. Thornton: Characterization of neonatal rat morphine tolerance and dependence. INRC, Hong Kong, China, 1997.
- Thornton, S.R. and F.L. Smith: Neonatal rat fentanyl tolerance and dependence: Long-term consequences on antinociception. INRC, Hong Kong, China, 1997.
- Smith, F.L., D.L. Dombrowski and W.L. Dewey: Role of neuronal Calcium in morphine tolerance in mice. *NIDA Res. Monogr.* **179**: 123, 1998.
- Dewey, W.L., D.L. Dombrowski and F.L. Smith: Role of the phosphatidylinositol system in morphine tolerance in mice. CPDD, Scottsdale, Az., 1998.

- Smith, F.L., Javed, R., and Dewey, W.L.: Ca<sup>++</sup>-dependent and cAMP-dependent protein kinases in the expression of high morphine antinociceptive tolerance in mice. CPDD, Bal Harbor, FL, 2003.
- Javed, R.R. Smith, F.L., Dewey, W.L.: Evidence for co-activation of PKC and PKA during the expression of a high level of morphine tolerance in mice. INRC, Perpignan, France, 2003.
- Stoller, D.C., Smith, F.L.: Characterization of opioid receptor subtypes in morphine tolerant rat pups. INRC, Perpignan, France, 2003.
- Smith, F.L., Smith, P.A., Javed R.R.: Reversal of morphine antinociceptive tolerance in mice with mGlu1 and mGlu5 receptor antagonists. INRC, Perpignan, France, 2003.
- Dewey, W.L., Javed, R.R., Smith, F.L.: Differences in reversal of morphine tolerance to pain induced by thermal versus mechanical stimuli. INRC, Perpignan, France, 2003.
- Smith, F.L., Smith, P.A. and Dewey, W.L.: Reversal of morphine tolerance in mice with PKC pseudosubstrate inhibitors. CPDD, San Juan, PR, 2004.
- Dalton, G.D., Smith, F.L. and Dewey, W.L.: Effects of chronic morphine administration on PKA kinetic activity in mouse brain. CPDD, San Juan, PR, 2004.
- Dewey, W.L., Smith, P.A. and Smith, F.L.: Reversion of morphine tolerant mice into a non-tolerant state with PKC and PKA inhibitors. CPDD, San Juan, PR, 2004.
- Smith, F.L., Seager, E., Scoggins, K. and Dewey, W.L.: Effects of chronic cannabinoid treatment on the phosphatidylinositol cascade in mouse brain. ICRS, Paestum, Italy, 2004.
- Dalton, G.D., Smith, F.L. and Dewey, W.L.: Effects of chronic cannabinoid treatment on signal transduction systems in the mouse brain. ICRS, Paestum, Italy, 2004.
- Smith, F.L., Smith, P.A. and Dewey, W.L.: Reversal of morphine tolerant mice to an acute morphine state by the acute injection of PKC or PKA inhibitors. American College of Neuropsychopharmacology, San Juan, PR, 2004.
- Smith, F.L., Dalton, G.D., Smith, P.A., Dewey W.L. Potential Diminishing Role for PKC in the Expression of Morphine Tolerance During Prolonged Exposure to Morphine. CPDD, San Juan, PR, 2005.
- Scoggins, K.L., Hoot, M. Smith, F.L., Dewey, W.L.: The Effects of Cholinergic Agonists on Mu-Opioid Binding to Mouse Brain Homogenates. CPDD, San Juan, PR, 2005.
- Bailey, C.P., Smith, F.L., Dewey W.L., Henderson, G.: Morphine tolerance is dependent upon protein kinase C activation at the level of the  $\mu$ -opioid receptor. INRC, Annapolis, MD, 2005.
- Dalton, G.D., Smith, F.L., Dewey W.L. Alterations in protein kinase A activity in mouse brain and spinal cord is dependent on the level and the duration of morphine antinociceptive tolerance. INRC, Annapolis, MD., 2005
- G.R. Ross, F.L. Smith, W. Dewey and H.I. Akbarali: Opiate dependence manifests in the murine ileum but not distal colon. Digestive Diseases Week Fairmont Banff Springs Hotel - Banff, AB. , 2007.

G.R. Ross, F.L. Smith, W. Dewey and H.I. Akbarali: Opiate tolerance develops in the mouse ileum but not distal colon circular muscle. Digestive Diseases Week Fairmont Banff Springs Hotel - Banff, AB., 2007.

L.C. Hull, B.H. Gabra, F.L. Smith, W.L. Dewey, PKC and PKA inhibitors reverse acute tolerance to low- and moderate- but not high-efficacy mu-opioid agonists. Federation of American Scientists for Experimental Biology, San Diego, CA, 2008.

B.H. Gabra, F.L. Smith, and W.L. Dewey, Pre-treatment with PKC and PKA inhibitors prevents the development of morphine tolerance but not physical dependence in mice, College on Problems of Drug Dependence, San Juan, PR, 2008

Smith, F.L., Grace, S. and Kell, C.: How GPA will reshape our evaluation of admission criteria to pharmacy school., Arkansas Assessment Expo, UALR, Little Rock, AR., 2008

Smith, F.L., Grace, S.M. and Kell, C.J.: Use of Non-Traditional Assessments to Reveal the Relative Value of PCAT Versus GPA for Admissions. AACCP, Boston, MA, 2009.