

# CURRICULUM VITAE

**JIM EDMOND RIVIERE, DVM, PhD, DSc(hon), ATS**

**Burroughs Wellcome Fund Distinguished Professor of Pharmacology  
Alumni Distinguished Graduate Professor**

**Academic Address:**

Director, Center for Chemical Toxicology Research  
and Pharmacokinetics (CCTRP)  
Department of Population Health and Pathobiology  
College of Veterinary Medicine  
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North Carolina State University  
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Homepage: HTTP://www.cvm.ncsu.edu/cctrp/

**A. PERSONAL DATA**

Born: New Bedford, MA; March 3, 1953  
Marital Status: Married, Nancy Ann Monteiro, PhD, 1976  
Children: Christopher, Brian, and Jessica

**B. EDUCATION**

| <u>Institution/Location</u>         | <u>Dates</u> | <u>Degree</u>   |
|-------------------------------------|--------------|---|
| High School, New Bedford, MA        | '68-71       |   |
| Boston College, Chestnuthill, MA    | '71-76       | B.S. Biology ( <i>Summa Cum Laude</i> )<br>M.S. Endocrinology ( <i>with Distinction</i> ) |
| Purdue University, W. Lafayette, IN | '76-80       | D.V.M.<br>Ph.D. Pharmacology  |
|                                     | '07          | D. Sc. ( <i>honoris causa</i> )   |

**C. LICENSURE / CERTIFICATION:**

Veterinary Medicine License: Massachusetts (#2437), Indiana (# 240041100)  
Fellow, Academy of Toxicological Sciences, 2001; Recertified 2006.  
Diplomate, American Board of Forensic Medicine (#38); American Board of Forensic Examiners (#976)  
Certificate in Finance, Kaplan College, Davanport, IA; 2002; Registered Financial Consultant, IARFC

**D. PROFESSIONAL EXPERIENCE**

1974-76: Director, Buttonwood Park Zoo, New Bedford, MA  
1974-75: Author "What's Zooing"- Newspaper column in New Bedford Standard Times

- Purdue University, West Lafayette, IN:

1977-79: Teaching Assistant, Veterinary Pharmacology  
1979: Extern, Toxicology Division, Section of Biochemical Toxicology, Eli Lilly Research Lab., Greenfield, IN  
1980-81: Postdoctoral Research Associate, Department of Veterinary Physiology and Pharmacology  
Resident in Veterinary Toxicology, Toxicology Service, Animal Disease Diagnostic Laboratory.

- North Carolina State University, Raleigh, NC:

1981-84: **Assistant Professor of Pharmacology and Toxicology;** Department of Anatomy, Physiological Sciences and Radiology, School of Veterinary Medicine.  
1981-1990: Member of Graduate Toxicology Faculty, Interdepartmental Toxicology Program

1990 - 2004 Associate Member, Department of Toxicology, College of Agriculture and Life Sciences  
 1981 → Co-founder, Co-Director, National Coordinator; Food Animal Residue Avoidance Databank (FARAD), a program which achieved permanent authorization by Congress in 1998 (*Public Law 105-185*).  
 1982-92: Member of Graduate Faculty, School of Pharmacy, University of North Carolina, Chapel Hill, NC.  
 1984-88: **Associate Professor of Pharmacology and Toxicology**, School of Veterinary Medicine.  
 1988-92: **Professor of Pharmacology and Toxicology**, College of Veterinary Medicine.  
 1989 → Founding Director, NCSU Cutaneous Pharmacology and Toxicology Center ⇒ Center for Cutaneous Toxicology and Residue Pharmacology ⇒ Center for Chemical Toxicology Research and Pharmacokinetics.  
 1992 → **Burroughs Wellcome Fund Distinguished Professor of Pharmacology**  
 1997→ Co-Founder and Co-Director, global Food Animal Residue Avoidance Databank (gFARAD), an organization recognized in 2001 by the Food and Agricultural Organization (FAO) of the United Nations.  
 1999→ Member, Biomathematics Graduate Program, College of Physical and Mathematical Sciences  
 2000→ Department of Population Health and Pathobiology, College of Veterinary Medicine; Coordinator – Pharmacology and Risk Assessment Section.  
 2000→ Member, Food Safety Science Graduate Faculty, College of Agriculture and Life Sciences  
 2005-2007 Director, Biomathematics Graduate Program, College of Physical and Mathematical Sciences  
 2010→ **Alumni Distinguished Graduate Professor**

**E. ELECTED POSITIONS IN PROFESSIONAL SOCIETIES, MEMBERSHIP ON BOARDS AND COMMITTEES, CONSULTANCIES AND ADVISORY SERVICES**

National Academy of Science / Institute of Medicine (IOM): *Elected Member*, 2003  
 IOM Committee on Strengthening Regulatory Systems in Developing Countries, *Chair*, 2011  
 Food and Nutrition Board, 2006-2012  
 Planning Meeting on Nanotechnology in Food and Agriculture, *Moderator*, July 9, 2007  
 National Research Council (NRC)  
 Standing Committee on Use of Public Health Data in FSIS Food Safety Programs, *Chair*, 2008 -2009  
 Committee on Safety of Dietary Supplements for Horses, Dogs and Cats, *Chair*, 2007-2008  
 Committee on Review of the Use of Scientific Criteria and Performance Standards for Safe Food, 2002 - 2003  
 NRC / IOM Report Peer Reviewer:  
 Review of Use of Process Indicators in FSIS Public Health Risk-based Inspection System, *Report Coordinator*, 2009  
 Nutrigenomics and Beyond: Informing the Future, *Report Coordinator*, 2007  
 Assessment of Industrial Hygiene Standards and Practices at Tooele Chemical Agent Disposal Facility, 2006  
 DHHS / National Institutes of Health  
 Board of Scientific Councilors, National Toxicology Program, 2007-2009  
 Technical Review Report Subcommittee (2009)  
 DHHS / Food and Drug Administration (FDA):  
 Science Board to the FDA, *Member*, 2002 → 2005  
 Subcommittee on Review of the Center for Veterinary Medicine (CVM) Research Programs, 2009  
 Subcommittee on Review of the National Center for Toxicological Research (NCTR) Research Programs, 2008  
 Subcommittee on Science and Technology, “FDA Science and Mission at Risk” 2006 – 2007  
 Subgroup on Center for Veterinary Medicine, *Chair*  
 Subgroup on Center for Food Safety and Applied Nutrition (CFSAN)  
 Subgroup on NCTR  
 Subcommittee on Review of National Antimicrobial Resistance Monitoring System (NARMS), 2006 - 2007  
 Subcommittee on CFSAN Research Program, 1999  
 Subcommittee on FDA Research (Korn Committee), 1996  
 Quality of Animal Drug Submission (QUADS) CRADA, *Director*, 2001-2003  
 Senior Biomedical Research Service (SBRS) Credentials Reviewer, 1995 - 2002  
 Consultant (SGE) on pharmacokinetics, 1993- 99; Involved in drafting guidelines for bioequivalence, interspecies extrapolations, extralabel drug use, flexible labeling, minor species pharmacokinetics.  
 Association of Official Agricultural Chemists (AOAC)  
 Steering Committee on Veterinary Drug Residues in Food Animal Products (GEMM), August, 2008  
 Stakeholder Panel on Veterinary Drug Residues in Food Animal Products (GEMM), October, 2008

Environmental Protection Agency (EPA)

Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) Scientific Advisory Panel Subcommittees:

Dimethoate – Issues Related to Hazard and Dose Response Assessment, *Report Coordinator*, 2004

Use of Pharmacokinetic Data to Refine Carbaryl Risk Assessments for Oral and Dermal Exposure, 2004

Risk Assessment of CCA treated wood, December, 2003

Peer Reviewer, Provisional Toxicity Values: 2,4,5 trichlorophenol, April, 2007; 2-nitrophenol, May, 2007; n-propylbenzene, Sept, 2008.

National Exposure Research Laboratory (NERL), Dermal Exposure Workshop, 1998

Workshop on Acceptability and Interpretation of Dermal Developmental Toxicity Studies, 1988.

Dermal Bioassay Workshop, 1988.

Scientific Advisory Board, Food Safety Pod, MARS, Inc., McClean, VA, 2009 →

Kansas City Area Life Sciences Institute (KCALSI), 2006 →

nanoTOX, Inc., Houston, TX, 2006 →

BIOCHEMICS, Inc., Danvers, MA, 2003- 2008

CELLEGY Pharmaceuticals, Inc., Foster City, CA, 1996 - 2000

DE NOVO, Inc., Menlo Park, CA, 1994 - 95

PHARMETRIX, Inc., Menlo Park, CA, 1993 -94.

Review Team, USDA-NRSP-7 Minor Use Animal Drug Program, 2009.

Centre for Applied Biosciences International (CABI), Wallingford, UK, Development Consortium member, 2002 →

Committee on Publication Ethics (COPE), London, 2008 →

Board of Directors, ADDS, Inc. (Agricultural Databases for Decision Support), 2000-2001

CDC/ATSDR, Review of Diazinon Toxicological Profile, 2006

United States Pharmacopeia (USP)

Solubility Criteria for Veterinary Drugs Expert panel, 2010-2011

General Committee on Revision, 1995-2000

Drug Standards Division: Expert Committee on Veterinary Drugs, *Vice Chair*, 2000-2005

Subcommittee on Antibiotics; 1995-2000

Ad Hoc Subcommittee on Nomenclature of Veterinary Preparations, 1998

Drug Information Division: Expert Committee on Veterinary Medicine, 2000-2005

Expert Advisory Panel on Veterinary Medicine; 1995-2000

Ad Hoc Reviewer, 1994-95

Consultant: Abbott, Chemical Industries Institute of Toxicology, Duke University, Eli Lilly/Elanco, Federal Trade Commission, Fort

Dodge/Wyeth Ayerst/ American Cyanamid, IDEXX, ImmuneRegen, InterVet, IVAX/DVM, IVX, Johnson and Johnson,

Makhteshim AG, Mars, Meriel, Merck, Novartis/Ciba Geigy, Pfizer, Skin Sciences, Virbac.

Society of Toxicology: Comparative and Veterinary Toxicology Specialty Section, *President*, 2008-09, *Vice President- VP Elect*, 2006-2008, *Secretary/Treasurer*, 1999-2001;

Dermal Toxicology Specialty Section, *President*, 2002-03, *Vice President – VP Elect*, 2000-02.

Continuing Education Speaker Bureau, 2000-2002

Animals in Research Committee, 1996-1998

Controlled Release Society, Veterinary Program Chair, 2010

American Academy of Veterinary Pharmacology and Therapeutics:

Council - 1988-91; Examination Committee - 1982-84, *Chair* - 1985-87

Scientific Organizing Committees:

4<sup>th</sup> International Congress on Antimicrobial Agents in Veterinary Medicine, Prague, Czech Republic, 2008

3<sup>rd</sup> International Congress on Antimicrobial Agents in Veterinary Medicine, Orlando, FL, 2006

2<sup>nd</sup> International Congress on Antimicrobial Agents in Veterinary Medicine, Ottawa, Canada, 2004

International Congress on Antimicrobial Agents in Veterinary Medicine, Helsinki, Finland, 2002

8<sup>th</sup> International Congress, European Association Veterinary Pharmacology and Toxicology, Jerusalem, Israel. 2000.

7<sup>th</sup> International Congress, European Association Veterinary Pharmacology and Toxicology, Madrid, 1997

6<sup>th</sup> International Congress, European Association Veterinary Pharmacology and Toxicology, Edinburgh, 1994.

11<sup>th</sup> Biennial American Academy of Veterinary Pharmacology and Therapeutics Symposium, Asilomar, CA, 1998

Gordon Research Conference on Barrier Properties of Mammalian Skin, 1995.

*Chair*, Symposium on Skin Pharmacology, XI<sup>th</sup> International Congress of Pharmacology of the International Union of Pharmacology (IUPHAR), Amsterdam, July, 1990.

Research Quality Assessment Panel, University of Queensland School of Veterinary Sciences, 2006.  
Royal Society of Canada / The Canadian Academy of The Sciences and Humanities, Expert Panel on Carbadox, 2002 (*not convened*).  
CIIT/CMA Exposure Assessment Research Workshop, 1999.  
AAVPT Role of Veterinary Therapeutics in Bacterial Resistance Development Task Force 1998.  
Organisation for Economic Cooperation and Development (OECD) Expert Panel: *In Vitro* Methods - Percutaneous Absorption, 1997.  
CDC/ATSDR Panel on Methylparathion Risk Assessment, 1997  
No. Dakota State University, Reviewer for “Researcher of the Year”, 2003, 2004  
Texas Higher Education Coordinating Board, External Doctoral Program Reviewer, 1990.  
International Biographical Centre Advisory Council, 1989  
Research Board of Advisors, American Biographical Institute, 1992  
External Promotion Evaluator: Colorado State University, Johns Hopkins University, University of Michigan, Mississippi State University, Oklahoma State University, The Hebrew University of Jerusalem, University of Kentucky, University of Illinois, University of Melbourne, University of Queensland, University of Tennessee, University of Wisconsin

**-North Carolina State University-**

Alumni Distinguished Professor Selection Committee, 2011  
University Radiation Safety Committee, 1997-2004; 2008-2010; *Chair*, 2000-2002; 2009-2011.  
Occupational Safety and Health Council, 2000-2002, 2009-2010  
Task Force on Interdisciplinary / Interdepartmental Programs, 2007.  
Cooke Scholarship Review Committee, 2005  
Drexel Distinguished Professorship Committee, 2004  
Faculty Hearing Committee, 2003-2005  
University Research Committee, 2000-2005; *Chair*, 2003-2004  
University Alumni Outstanding Research Award Committee, 2004  
International Employment Policy Advisory Committee, 2004  
Sigma Xi Research Awards Committee (2000-2002; 2004-2006); *Chair*, 2001  
Graduate Student Support Plan Task Force, 2000  
CALs Toxicology Head Search Committee, 1996  
University Committee on the Protection of the Rights of Human Subjects, 1987-91.  
Committee on Hazardous Materials, 1987-90  
University Safety Council, 1982-87.  
Committee on the Use of Toxic Chemicals in Research, 1984-87  
Faculty Advisory Committee on Copyrighting Computer Software, 1984-85

**-North Carolina State University/College of Veterinary Medicine-**

Distinguished Professor Nominating Committee, 2009  
Reappointment, Promotion and Tenure Committee, 2008-2009  
DVM/PhD Program Steering Committee, 2006 →  
Research Committee, 1993-1994, 2000-2002.  
Graduate and Residency Program Committee, 1985-90, *Chair*, 1988-90.  
Laboratory Animal Resources Committee, 1982-84, *Chair*, 1983-84.  
Elections-Credentials Committee, 1982-84, *Chair*, 1982.  
Computer Committee, 1984-1992.  
FAHRM Head Search Committee, 1999-2000  
Associate Dean for Research Search Committee, 2000, 2007  
APR, CASS Departmental and Toxicology Program Faculty Search Committees  
Misc. Ad Hoc Study, Planning and Award Committees/Task Forces

**-North Carolina State University/College of Physical and Mathematical Sciences**

Director of Biomathematics Graduate Program, 2005 - 2007  
Graduate Academic Advisors Committee, 2005 – 2007

## **F. EDITORIAL RESPONSIBILITIES / GRANT REVIEW PANELS**

Editor: Journal of Veterinary Pharmacology and Therapeutics (Including Veterinary Toxicology) 1989-92, 1999→

Editorial Board:

Toxicology and Applied Pharmacology, 2002-2011

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Skin Pharmacology and Applied Skin Physiology, 1995 - 2007

Journal of Pharmaceutical Sciences, 1998 – 2001

Journal of Pharmacy and Pharmacology, 1998 – 2001

Pharmacy and Pharmacology Communications, 1998 -2000

Pharmaceutical Research, 1995-2000

Fundamental and Applied Toxicology 1986-92.

Journal of Veterinary Pharmacology and Therapeutics 1986-88.

American Journal of Veterinary Research 1984-86.

Manuscript Reviewer: Biochemical Toxicology, Carbon, Chemical Biological Interactions, Comparative Biochemistry and Physiology, Drug Metabolism and Disposition, Drug Metabolism Reviews, Environmental Health Perspectives, Food and Chemical Toxicology, Food Additives and Contaminants, International Journal of Pharmaceutics, International Pig Veterinary Society, In Vitro Toxicology, Journal of the American Veterinary Medical Association, Journal of Controlled Release, Journal of Investigative Dermatology, Journal of Occupational and Environmental Medicine, Journal of Pharmacology and Experimental Therapeutics, Journal of Zoo and Wildlife Medicine, Life Sciences, Mathematical Biosciences, NanoLetters, Nature Biotechnology, Pesticide Biochemistry and Physiology, Regulatory Pharmacology and Toxicology, Research in Veterinary Science, Risk Analysis, SAR and QSAR in Environmental Research, Toxicology and Applied Pharmacology, Toxicological Sciences, Toxicology Letters, Trends in Biotechnology, Turkish Journal of Veterinary and Animal Sciences, Veterinary Research Communications.

Book Referee: Kluwer Academic Publishers, CRC Press, Blackwell.

Research Grant Reviewer:

PHS/NIH: Biomedical Computing and Health Informatics (BCHI) Study Section [*formerly SS9*], 1993 - 97, 2001-05,  
ZRG1-HDM-6: 2009

NCCR, 2000; NIEHS, 1990; CDC/NIOSH, 2006

Louisiana EPSCOR, 2011

Defense Threat Reduction Agency (DTRA) Joint Science and Technology Office, Biological Modeling and Computational Methods Area, 2009.

Army Research Office, 2007

National Science and Engineering Research Council of Canada (NSERC), 2007

U.S. AirForce Academy, 2006

UNC-CH Center for Environmental Health and Susceptibility, 2006

John Simon Guggenheim Memorial Foundation, 2004, 2005

Department of State, Science Center Program / Civilian Research and Development Foundation (CRDF), 2002

National Sciences and Engineering Research Council of Canada (NSERC), 2002

American Institute of Biological Sciences (AIBS), 2001

EPA/Office of Research and Development, 1996 → 2000

Memorial University of New Foundland, 1998

United States-Israel Binational Science Foundation, 1997

North Dakota EPSCoR, 1995

NSF; 1990.

Veterans Administration; 1988, 89.

FDA/CVM; 1984, 85.

## **G. HONORS AND AWARDS**

*The Lloyd E. Davis Award*, American Academy of Veterinary Pharmacology and Therapeutics, Madison, WI, May, 2011.

*Alumni Distinguished Graduate Professor*, 2010

Awarded by NCSU Alumni Association for exceptional record of graduate training and teaching

Doctor of Science (*honoris causa*), Purdue University, May 12, 2007.

*Lifetime Achievement Award*, European Association of Veterinary Pharmacology and Toxicology,

Presented at the 10<sup>th</sup> EAVPT Congress, Turin, Italy, September, 2006.

Elected member of the *Institute of Medicine of the National Academies*, October, 2003  
The *O. Max Gardner Award*, Board of Governors, Consolidated University of North Carolina, 1999  
Highest honor awarded to an individual faculty member of the 16-campus UNC system  
The *Harvey W. Wiley Medal* and Commissioner's Special Citation, Food and Drug Administration, 1997  
*Outstanding Research Award*, NCSU Alumni Association, 1993  
The *Ebert Prize*, Established in 1873 by the American Pharmaceutical Association, 1991  
Awarded for a Physiologically Relevant Pharmacokinetic Model of Dermal Absorption  
*NCSU Outstanding Extension Service Award*, 1984-85

*Highly cited author*, Toxicology Letters, 2007, 2008, 2009, 2010, Food and Chemical Toxicology, 2010.  
*Distinguished Fellow*, American Academy of Veterinary Pharmacology and Therapeutics, June, 2009.  
Research papers archived in NCSU Library Special Collections Research Center, Collection #MC 369, 2006→  
*2005 Elanco Distinguished Lecturer*, Elanco/ Eli Lilly, Indianapolis, IN, November, 2005.  
*10<sup>th</sup> Annual Clarenburg Lecturer*, Kansas State University, September, 2004.  
*Ruth L. and Ned E. Huffman Leadership Award*, NC Veterinary Medical Foundation, 2000  
Inducted as a Charter Member, *Academy of Outstanding Faculty Engaged in Extension*, NCSU, 2000.  
Selected member of Speakers Bureau, Society of Toxicology, 2000-2002  
Research identified by NCSU University News Services as 2 of the 100 greatest NCSU Achievements of the 20<sup>th</sup> Century.  
Distinguished Scholarly Achievement, NCSU University Honors Convocation, 1999  
Guest Lecture, *Phi Zeta Research Day*, Mississippi State University, 1999  
First American Academy of Veterinary Pharmacology and Therapeutics *Research Award*, 1998  
Distinguished Scholarly Achievement, NCSU University Honors Convocation, 1992  
*Distinguished Alumnus Award*, Purdue University, 1991  
*Basler Taler Coin for Outstanding Research in Animal Health*, Ciba Geigy AG, Basel Switzerland, 1991  
*Beecham Award for Research Excellence*, 1986  
Sigma Xi, NCSU *Outstanding Young Faculty Research Award*, 1985  
Sigma Xi, 1980  
Phi Zeta, 1980  
Phi Zeta Student Research Award, Purdue University, 1979  
Phi Beta Kappa, 1975

#### Bibliographical Listings:

Who's Who in America, 59<sup>th</sup> Ed., 2004; 60<sup>th</sup> Ed., 2005; 61<sup>st</sup> Ed., 2007; 62<sup>nd</sup> Ed., 2008; 63<sup>rd</sup> Ed., 2009, 64<sup>th</sup> Ed., 2010, 65<sup>th</sup> Ed., 2011.  
Cambridge Who's Who among Executives, Professional and Entrepreneurs, 2008  
Madison's Who's Who Among Executives and Professional, 2006-2007  
Listed in Thomson-Gale's "Contemporary Authors", 2003, 2005; Writer's Directory, 2009, 2010.  
Guide to America's Top Veterinarians, 1<sup>st</sup> Ed., 2006  
Who's Who in the World, 13<sup>th</sup> Ed., 15<sup>th</sup> Ed., 2010 Ed.  
Who's Who in Science and Engineering, 3<sup>rd</sup> Ed., Millenium Ed., 6<sup>th</sup> Ed. (2002-2003), 11<sup>th</sup> Ed., 2011-2012  
Who's Who in American Education, 7<sup>th</sup> Ed., 2006, 8<sup>th</sup> Ed., 2007  
Who's Who in Medicine and Health Care, 1<sup>st</sup> Ed., 5<sup>th</sup> Ed., 6<sup>th</sup> Ed, 7<sup>th</sup> Ed (2009-10)  
Who's Who in the Midwest, 18th Edition; South and Southwest, 24<sup>th</sup> – 34<sup>th</sup> Editions  
Who's Who in Frontiers of Science and Technology, 2<sup>nd</sup> Ed.  
Who's Who in Veterinary Science and Medicine, 1<sup>st</sup> & 2<sup>nd</sup> Ed.  
Personalities of America, 4<sup>th</sup> Ed.; Lexington's Who's Who Millenium Edition, 2001-2002  
Dictionary of International Biography, 20<sup>th</sup> and 21<sup>st</sup> Ed.  
American Men and Women of Science, 18<sup>th</sup>, 19<sup>th</sup>, 20<sup>th</sup> and 21<sup>st</sup> Ed.

## **H. PROFESSIONAL SOCIETIES**

Society of Toxicology (SOT)  
American Association of Pharmaceutical Scientists (AAPS)  
American Academy of Veterinary Pharmacology and Therapeutics (AAVPT), Distinguished Fellow  
American Veterinary Medical Association (AVMA)  
American Association for the Advancement of Science (AAAS)

**I. INVITED PRESENTATIONS / CHAIR OF MEETING SESSIONS**

1. Applied Pharmacokinetics. 1982 Meeting American Association Veterinary Physiologists and Pharmacologists. Logan, UT.
2. Aminoglycoside pharmacokinetics and nephrotoxicity in dogs with renal disease. Schering Corp. Bloomfield, NJ, March, 1982.
3. Gentamicin nephrotoxicity in horses: Clinical and experimental evidence. 1982 Annual Meeting, Section on Equine Medicine, American Veterinary Medical Association. Salt Lake City, UT.
4. Effects of systemic disease on antibiotic pharmacokinetics. Symposium on Dose Determination of Animal Drugs. Co-sponsored by Food and Drug Administration and the American Academy of Veterinary Pharmacology and Therapeutics, Alexandria, VA, November, 1983.
5. Calculation of dosage regimens of antimicrobial drugs in cases of pre-existing renal and hepatic dysfunction. American Veterinary Medical Association Colloquium on Recent Advances in the Therapy of Infectious Diseases, Schaumburg, IL, May, 1984.
6. Effects of pre-existing renal disease on aminoglycoside nephrotoxicity in dogs and rats. Second International Symposium on Nephrotoxicity, Surrey, England, August, 1984.
7. Clinical applications of aminoglycosides. Clinical Symposium. Eastern States Veterinary Conference, Orlando, FL, January, 1985.
8. Renal Toxicology. Symposium: Correlation of data from isolated systems and intact animals in toxicological research. North Carolina Chapter of Society of Toxicology Research Triangle Park, NC, February, 1985.
9. Workshop on Pharmacokinetics, PHS Food and Drug Administration (CVM), July and November, 1985, Rockville, MD, (Co-Instructor with GD Koritz).
10. Food Animal Residue Avoidance Databank (FARAD). USDA National Workshop to Summarize Residue Avoidance Program (RAP). Manhattan, KS, October, 1985.
11. Food Animal Residue Avoidance Databank (FARAD). Food Science Symposium VII: Assuring Meat Wholesomeness, The Residue Avoidance Issue. Manhattan, KS, October, 1985.
12. *Chair*, Renal Toxicology Session, 24th Annual Meeting of the Society of Toxicology, San Diego, CA, March, 1985.
13. Antibiotics: The right choice - Designing antimicrobial dosage regimens. Eastern States Veterinary Conference, Orlando, FL, January, 1986; Western States Veterinary Conference, Las Vegas, NV, Feb., 1986.
14. The use of FARAD in clinical pharmacology and residue avoidance, 26th Annual Panhandle Veterinary Conference, Oklahoma City, IL, March, 1986.
15. Research methods in percutaneous absorption. 1986 Annual Meeting, Section on Research, American Veterinary Medical Association, Atlanta, Georgia, 1986.
16. Research methods for percutaneous absorption, North Carolina Chapter, Society of Toxicology, Raleigh, October, 1986.
17. Residue avoidance in food animals. NC Veterinary Medical Association Annual Meeting, Raleigh, January, 1987.
18. Drug metabolism and toxicokinetics. 26th Annual Meeting of the Society of Toxicology, Washington, DC, February, 1987.
19. *Chair*, Pesticide Toxicology Platform Session, 26th Annual Meeting of the Society of Toxicology, Washington, DC, February, 1987.
20. Research overview; NCSU-NIH Centennial Mini Symposium, Raleigh, NC, 1987.
21. Comparative anatomy and physiology of swine used in biomedical research: Dermatological models. American Association for Laboratory Animal Science Regional Meeting, District 4, Raleigh, March, 1987.
22. Use of controlled drug infusions in toxicokinetic studies, Section on Research, Annual Meeting of the American Veterinary Medical Association, Chicago, July, 1987.
23. Clinical pharmacokinetics of aminoglycosides in renal disease, Pharmacology Seminar Series, Cornell University, Ithaca, NY, May, 1987.
24. Thermochemotherapy for localized tumors: Pharmacokinetics, Radiation Research Society / North American Hyperthermia Group, Philadelphia, PA, April, 1988.
25. Development of an in vitro isolated perfused skin flap model for transdermal drug delivery studies, Workshop on Transdermal Delivery of Drugs, NIH/NICHD, Bethesda, MD, May, 1988.
26. Development of automated clinical pharmacokinetic program for therapeutic drug monitoring in veterinary medicine. 6th Biennial Symposium of the Amer. Acad. of Vet. Pharmacol. Therap., Blacksburg, June, 1988.
27. Development of perfused skin models for assessing percutaneous absorption. Burroughs Wellcome Symposium, Raleigh, NC, March, 1988.
28. Coordinating pharmacology research with graduate studies, 6th Biennial Symposium of the American Academy of Veterinary Pharmacology and Therapeutics, Blacksburg, June, 1988.

29. A new skin model for percutaneous absorption, Miami Valley Laboratories, Procter and Gamble Company, Cincinnati, OH, July, 1988.
30. Transdermal lidocaine iontophoresis in isolated perfused porcine skin, "The 6th Symposium on Cutaneous Toxicity," American Academy of Dermatology, Washington, DC. September, 1988.
31. Workshop on Pharmacokinetics, USDA Food Safety Inspection Service, May, 1989, Washington, DC, (Co-Instructor with GD Koritz).
32. *Chair*, Dermal/Ocular: Hypersensitivity, Phototoxicity Platform Session, 28th Annual Meeting of the Society of Toxicology, Atlanta, GA, March, 1989.
33. Percutaneous absorption of pesticides in the isolated perfused porcine skin flap, First World Congress of Veterinary Dermatology, Dijon, France, September, 1989.
34. Grafted skin and skin flaps, In Vivo Percutaneous Penetration/Absorption Workshop, AAPS/FDA/AAD/SPS, Washington, DC, May, 1989.
35. Pharmacologic principles of residue avoidance for the practitioner, Symposium on Prevention of Unwanted Drug Residues, Annual meeting of the American Veterinary Medical Association, Orlando, FL, July, 1989.
36. Pharmacokinetic modelling of drug percutaneous absorption using isolated perfused porcine skin. Intercollege Pharmacology Colloquia, Ohio State University, Columbus, OH, April 18, 1989.
37. Species differences in pharmacology, PMA/FDA Interspecies Bioequivalence Workshop, Washington, DC, June, 1989.
38. Perspectives on the information needs of the agricultural researcher of the 21st century. I.T. Littleton Seminar, NCSU Library Centennial Anniversary, Raleigh, October, 1989.
39. Porcine skin flap model for predicting skin permeation. Pharmaceutics and Drug Delivery Symposium. Fourth Annual Meeting of the American Association of Pharmaceutical Scientists, Atlanta, October 25, 1989.
40. Pharmacokinetic considerations of cancer chemotherapy. 9th Annual Veterinary Cancer Society Meeting, Raleigh, October 15, 1989.
41. Dermatopharmacokinetics Forum, 48th Annual Mtg, American Academy of Dermatology, San Francisco, December, 1989.
42. Transdermal penetration and metabolism of organophosphates. Symposium on Organophosphates: Chemistry, Fate and Effects, 199th National Meeting of the American Chemical Society, Boston, April, 1990.
43. Development of an isolated perfused porcine skin flap model for skin pharmacology, Symposium on Skin Pharmacology, XIth International Congress of Pharmacology of IUPHAR, Amsterdam, July, 1990.
44. Dermal effects and penetration. Conference on Agricultural Chemical Utilization and Human Health, NIEHS, Research Triangle Park, NC, July, 1990.
45. Role of veterinary pharmacologists in academia. Seventh Biennial Symposium of the American Academy of Veterinary Pharmacology and Therapeutics, Raleigh, NC, June, 1990.
46. Transdermal drug delivery. Plenary lecture, Fifth Annual Meeting of the American Association of Pharmaceutical Scientists, Las Vegas, November, 1990.
47. In vitro techniques for assessing percutaneous absorption. Eleventh Annual Meeting. Society of Environmental Toxicology and Chemistry, Arlington, VA November, 1990.
48. The isolated perfused porcine skin flap, Schools of Pharmacy and Medicine, UCSF, January, 1991.
49. Use of isolated perfused skin for predicting transdermal drug delivery. First AAPS Southeast Regional Meeting, Charleston, SC, April, 1991.
50. The use of isolated perfused porcine skin to quantitate the percutaneous absorption of topically applied chemicals. Environmental Health Center, Ottawa, Canada, May, 1991.
51. Dermal absorption and metabolism of xenobiotics, Symposium on the Metabolism of Xenobiotics in Food Producing Animals, American Chemical Society, New York, NY, August, 1991.
52. The prediction of in vivo percutaneous absorption using isolated perfused skin: Pharmacokinetic strategies. Gordon Research Conference on Barrier Function of Mammalian Skin, Plymouth, NH, August, 1991.
53. Predicting percutaneous absorption. International Symposium on Topical Administration of Drugs, Swedish Academy of Pharmaceutical Sciences, Stockholm, Sweden, January, 1992.
54. Dermatopharmacokinetics. Sixteenth Hawaii Dermatology Seminar, Maui, Hawaii, February, 1992.
55. The use of isolated perfused skin models for quantitating transdermal drug delivery. Second Nichiban-Cygnus Transdermal Delivery Symposium, Tokyo, July, 1992.
56. Iontophoretic drug delivery using the isolated perfused porcine skin flap, Science Lecture Series, Wyeth-Ayerst, Rouses Point, NY, February, 1993.
57. Unique problems associated with the determination of veterinary product bioequivalence. FDA Veterinary Drug Bioequivalence Workshop, Rockville, MD, March 1993.



58. Percutaneous absorption of lindane. 37th meeting of the FDA Dermatologic Drugs Advisory Committee, Rockville, MD, May 1993.
59. Influence of compounding on bioavailability. Symposium on Compounding in veterinary medicine, Arlington, VA, September, 1993.
60. *Chair*, Skin Absorption, Disposition and Irritation Session, 1994 Annual Meeting, Society of Toxicology, Dallas, TX March, 1994.
61. *Chair*, Pharmacokinetics Session, 6th International Congress, European Association for Veterinary Pharmacology and Toxicology, Edinburgh, August, 1994.
62. On the public's perception of risk and biotechnology, Ciba Seeds, Greensborough, NC, September, 1994.
63. *Chair*, Skin Toxicology Session, 1995 Annual Meeting, Society of Toxicology, Baltimore, MD, March, 1995.
64. Perspective on the utility of flexible drug labeling; AAVPT/FDA/AHI/AVMA Workshop: Professional Flexible Labeling, An Interactive Workshop of First Principles, Gaithersburg, MD, April, 1995.
65. The new FARAD database, North Carolina Swine Veterinarians, Raleigh, April, 1995.
66. Pharmacology of drug compounding. Am. Assoc. Avian Practitioners Symposium on Drugs and Therapeutics for Poultry, 1995 AVMA Meeting, Pittsburg, PA, July, 1995.
67. Milk and meat withholding times for drugs used extra label. Is it possible to make predictions? 1995 AVMA Meeting, Pittsburg, PA, July, 1995.
68. Iontophoretic transdermal drug delivery - What is possible and what is not? Johnson and Johnson's 8th Annual Symposium on Drug Delivery Technology, Princeton, NJ, October, 1995.
69. Bases farmacológicas de la mezcla de fármacos, Papel del veterinario en la prevención de residuos en tejidos animales. Obregon, Guadalajara, Torreon, and Celaya, Mexico; November, 1995.
70. A vision for drug information database interactions; and Session Moderator; Second Workshop on Professional Flexible Labeling, Food and Drug Administration, Rockville, MD, December, 1995.
71. Stop worrying and eat your salad, Keynote Address, Risk and Reality: Examining New Links in the Human Food Chain, St. Louis, MO, February, 1996.
72. Molecular pathogenesis of sulfur mustard vesication in skin (with Monteiro-Riviere NA, Zhang Z, Inman AO, Brooks JD) Chemical Industry Institute of Toxicology Anniversary Symposium. 1996.
73. Research overview; AFOSR Dermal Focus Group Meeting, Wright Patterson Air Force Base, August, 1996.
74. Comparison of *in vivo*, *ex vivo* and *in vitro* dermal absorption models: Pentachlorophenol (PCP) studies with multiple media (with G.L.Qiao). Annual Meeting of the Society for Risk Analysis, New Orleans, LA, Dec. 1996.
75. The use of mechanistically defined chemical mixtures to quantitate parameters of chemical percutaneous absorption using a biologically relevant experimental and mathematical modelling paradigm. Table Ronde Roussel UCLAF n<sup>o</sup> 85 on Passage of Drugs Across Physiological Barriers: Cellular Models and Targeting Strategies, Institute Scientifique Roussel, Paris, France, December, 1996.
76. Animal Medicinal Drug Use Clarification Act (AMDUCA) satellite teleconference studio participant, Rockville, MD, February 1997.
77. Modeling the penetration of toxicants through the skin. Workshop on Measuring Local Doses in Portal of Entry Epithelia, 1997 Society of Toxicology Meeting, Cincinnati, OH, March, 1997.
78. Perfusion models for percutaneous absorption. Fifth International Conference on Perspectives in Percutaneous Penetration, La Grande Motte, Languedoc, France, April, 1997.
79. *Chair*, Clinical Pharmacology and Therapeutics Session, 7th International Congress of the European Association of Veterinary Pharmacology and Toxicology, Madrid, Spain, July, 1997.
80. Novel models for assessing percutaneous absorption. NIOSH/ Health Effects Laboratory Division, Morgantown, WV, August, 1997.
81. *Debate leader*: "Validity of *in vitro* models". Gordon Research Conference on Mammalian Barrier Function, August, 1997.
82. Food Animal Residue Avoidance Databank. USDA/FSIS/AVMA, Washington, DC, September-October, 1997, 1998.
83. Dermal biology relevant to percutaneous absorption of xenobiotics. Occupational Toxicology Roundtable '97, Chapel Hill, NC, October 21, 1997.
84. *Moderator*, Symposium on the Role of Veterinary Therapeutics in Bacterial Resistance Development, American Academy of Veterinary Pharmacology and Therapeutics, College Park, MD, January, 1998.
85. *Co-Chair*, Dermatotoxicity Session, 1998 Annual Meeting, Society of Toxicology, Seattle, WA, March, 1998.
86. *Co-Chairperson and Co-organizer*, *In vitro* and *in vivo* assessment of cutaneous toxicity, Continuing Education Course, 1998 Society of Toxicology Meeting, Seattle, WA, March, 1998.
87. Integration of toxicity and absorption data, 1998 Society of Toxicology Meeting, Seattle, WA, March, 1998.

88. Strategies for assessing the percutaneous absorption of chemical mixtures containing JP-8 jet fuel components. First International Conference on the Environmental Health and Safety of Jet Fuels, San Antonio, TX, April, 1998.
89. Experimental models useful to assess the percutaneous absorption of methyl parathion relevant to exposure scenarios. CDC/ATSDR, Atlanta, GA, April, 1998.
90. Pharmacokinetics: A tool for understanding and guiding studies on drugs. 16<sup>th</sup> Annual American College of Veterinary Internal medicine Forum, San Diego, CA, may, 1998.
91. Pharmacokinetics for the clinician. 16<sup>th</sup> Annual American College of Veterinary Internal Medicine Forum, San Diego, CA, May, 1998.
92. Population pharmacokinetics in veterinary medicine: Introduction and overview. 11<sup>th</sup> Biennial Meeting, American Academy of Veterinary Pharmacology and Therapeutics, Asimolar, CA, June, 1998.
93. Interspecies extrapolations of data to predict drug effects. Advances in Veterinary Medicine, 135<sup>th</sup> Annual AVMA Convention, Baltimore, MD, July, 1998.
94. Dermal absorption, distribution and toxicity of topically dosed jet fuels Jet A, JP-8 and JP-8(100). AFOSR JP-8 Jet Fuel Toxicology Workshop, Tucson AZ, December, 1998.
95. O. Max Gardner Award Address. University of North Carolina-Greensborough, April, 1999; NCSU General faculty Meeting, November, 1999.
96. Global Food Animal Residue Avoidance Databank; London, UK and Nantes, France, July, 1999.
97. Modelling penetration of drugs and chemicals through skin. Phi Zeta Lecture, Mississippi State University, October, 1999.
98. Percutaneous absorption, and cutaneous toxicity of topically applied Jet A, JP-8 and JP-8(100). AFOSR JP-8 Jet Fuel Toxicology Workshop, Tucson AZ, December, 1999.
99. Basic toxicokinetics: Principles and methodology. 2000 Society of Toxicology Meeting, Philadelphia, PA, March, 2000.
100. Problems in Dealing with Dioxin in Animal Production. Interagency Committee on Animal Production and Food Safety, Washington, DC, June, 2000.
101. Veterinary Pharmacokinetics in the 21<sup>st</sup> Century, Keynote Address, 8<sup>th</sup> International Congress of the European Association of Veterinary Pharmacology and Toxicology, Jerusalem, July-August, 2000.
102. *Co-Chair*, Pharmacokinetics Session A1 and Member of the Pharmacokinetic Analysis Roundtable, 8<sup>th</sup> International Congress of the European Association of Veterinary Pharmacology and Toxicology, Jerusalem, July-August, 2000.
103. Dermal reservoirs of aliphatic hydrocarbons after topical exposure to jet fuels, Skin Reservoir Workshop, Research Institute for Fragrance Materials, Imperial College, London, September, 2000.
104. Physiological factors affecting absorption of oral dosage forms across a variety of target animal species, Advanced Training Workshop, Center for Veterinary Medicine, Food and Drug Administration, Rockville, Md, September, 2000.
105. Update on the dermatotoxicity and disposition of topically applied jet fuels. AFOSR JP-8 Jet Fuel Toxicology Workshop. Tucson, AZ, January, January, 2001.
106. *Co-Chair*, Toxicology of Skin II, 2001 Society of Toxicology Meeting, San Francisco, CA, March, 2001.
107. Dermal toxicology, American Chemical Society "State of the Art Course." Toxicology – Principles and Applications, San Francisco, CA, May, 2002; Indianapolis, IN, October, 2002; Arlington, VA, October, 2002.
108. Dermal absorption and toxicity of jet fuel and its components. AFOSR JP-8 Jet Fuel Toxicology Workshop, Tucson, AZ, May, 2002.
109. Global Food Animal Residue Avoidance Databank, Food and Agricultural Organization of the United Nations, Rome, Italy, July, 2002.
110. Residues in Food Animals, XIIIth Int. Mtg Association for Gnotobiotics, Raleigh, NC, June, 2002.
111. Pharmacokinetic considerations in optimizing efficacy and safety of antimicrobial dosage regimens in food producing animals, Keynote Lecture. International Conference on Antimicrobial Agents in Veterinary Medicine (AAVM), Helsinki, Finland, August, 2002.
112. *Chair*, Pharmacokinetics/Pharmacodynamics Session, International Conference on Antimicrobial Agents in Veterinary Medicine (AAVM), Helsinki, Finland, August, 2002.
113. Host, AFOSR JP-8 Jet Fuel Toxicokinetic Mini-Workshop, Raleigh, NC.
114. *Chair*, Skin Session, 2003 Society of Toxicology Meeting, Salt Lake City, UT, March, 2003.
115. Dermal toxicology, American Chemical Society "State of the Art Course." Toxicology – Principles and Applications," San Francisco, CA, May, 2003; Philadelphia, PA, November, 2003.
116. JP-8 interactions with the skin: absorption of hydrocarbon components, a novel membrane coated fiber (MCF) technique for fuel component clustering / QSAR analysis, and the effects of inhibitors (including substance p) on dermal toxicity. AFOSR JP-8 Jet Fuel Toxicology Workshop. Tucson, AZ, May, 2003.

117. Mechanism of skin absorption, Keynote Lecture, 9<sup>th</sup> International Congress of the European Association of Veterinary Pharmacology and Toxicology, Lisbon, July, 2003.
118. Organizer, Veterinary and Comparative Pharmacokinetic Workshop, Raleigh, NC, October, 2003.
119. A novel approach to quantitate drug and chemical exposure in food producing animals, FDA/CVM Staff College Seminar, Laurel, MD, December, 2003.
120. Species specific pharmacokinetics, Veterinary Drug Development Workshop, Center for Business Intelligence Seminar Series, Research Triangle Park, NC, February, 2004; Somerset, NJ, April, 2004; Chicago, IL, May, 2004.
121. Approaches to and significance of species differences in antimicrobial pharmacokinetics. Keynote Lecture. 2<sup>nd</sup> International Conference on Antimicrobial Agents in Veterinary Medicine (AAVM), Ottawa, Canada, June, 2004.
122. *Organizer*, Veterinary and Comparative Pharmacokinetic Workshop, Raleigh, NC, October, 2004.
123. Skin: A barrier to environmental contaminants or a portal of entry for topical drugs? *and* The absorption of complex chemical mixtures across the skin. Clarenburg Lectures, Kansas State University, Manhattan, KS, Sept., 2004.
124. Continuing studies on the interaction of JP-8 and its constituent hydrocarbons with the skin. AFOSR JP-8 Jet Fuel Toxicology Workshop, Tucson, AZ, October 2004.
125. Characterization of physicochemical properties of jet fuel hydrocarbon constituents. American Petroleum Institute Toxicology Task Force, CIIT Centers for Health Research, Research Triangle Park, NC April, 2005.
126. Pharmacokinetic and allometric techniques used by FARAD to estimate extended withdrawal times. Plenary lecture, 14<sup>th</sup> Biennial Symposium, American Academy of Veterinary Pharmacology and Therapeutics, Rockville, MD, May, 2005; and 2005 Elanco Distinguished Lecturer, Indianapolis, IN, Nov. 2005.
127. Dermal Toxicology, American Chemical Society "State of the Art Course." Toxicology- Principles and Applications, San Francisco, CA, May, 2005; Philadelphia, PA, Oct., 2005.
128. Food Animal Residue Avoidance Databank, CABI Consortium Workshop, Wallingford, UK, Sept. 2005.
129. *Organizer*, Veterinary and Comparative Pharmacokinetic Workshop, Raleigh, NC, October, 2005.
130. Overview of JP-8 constituent hydrocarbon interactions with skin: Determination of physical-chemical properties used to predict dermal absorption and continued studies on hydrocarbon-induced epidermal toxicity. AFOSR JP-8 Jet Fuel Toxicology Workshop, Tucson, AZ, Nov. 2005.
131. *Chair*, Dermatotoxicology Session, 2006 Society of Toxicology Meeting, San Diego, CA, March 2006.
132. *Organizer*, Veterinary and Comparative Pharmacokinetic Workshop, CVM / FDA, Rockville, MD, February, 2006; Raleigh, NC, October, 2006.
133. Dermal Toxicology, American Chemical Society "State of the Art Course." Toxicology- Principles and Applications, San Francisco, CA, May, 2006
134. Prediction of dermal absorption from complex chemical mixtures: incorporation of vehicle effects and interactions into a qspr framework. 12<sup>th</sup> Int. Workshop on Quantitative Structure Activity Relationships in Environmental Toxicology. Lyons, France, May, 2006.
135. Pharmacokinetic modeling of dermal absorption, and Chair, Pharmacokinetics Session III, 10<sup>th</sup> Int. Congress European Association of Veterinary Pharmacology and Toxicology, Turin, Italy, Sept. 2006.
136. General principles of toxicology and animal toxicity testing; Dermal toxicology; American Chemical Society "State of the Art Course." Toxicology- Principles and Applications, Philadelphia, PA, Sept. 2006.
137. Barriers to drug absorption – species differences, 2<sup>nd</sup> Joint AAPS/AAVPT/CRS Workshop, San Antonio, TX, Oct. 2006.
138. International Workshop on Uncertainty and Variability in Physiologically based Pharmacokinetics (PBPK) Models. Invited Participant. Environmental Protection Agency, Research Triangle Park, NC, October, 2006.
139. Determination of biologically relevant physical chemical parameters of jp-8 hydrocarbons using the membrane coated fiber array, AFOSR Jet Fuel Toxicology Workshop, Tucson, AZ, Jan. 2007.
140. Mathematical modeling of chemical residues in livestock. Roundtable on Novel Computational Strategies for Reducing Chemical Residues in Food of Animal Origin. 46<sup>th</sup> Annual Meeting of the Society of Toxicology, Charlotte, NC, March, 2007.
141. Pharmacokinetic modeling of Quantum Dot nanoparticle diodistribution in isolated perfused skin. 2<sup>nd</sup> Nanotoxicology Conference, Venice, Italy, April, 2007.
142. General principles of toxicology and animal toxicity testing; Dermal toxicology; American Chemical Society "State of the Art Course." Toxicology- Principles and Applications, San Francisco, CA, May 2007; Philadelphia, PA, Sept. 2007.
143. *Organizer*, Veterinary and Comparative Pharmacokinetic Workshop, CVM / FDA, Rockville, MD, June 2007; Raleigh, NC, October, 2007.
144. Veterinary Dermal Absorption Workshop, Novartis, Inc., Basel, Switzerland, June, 2007
145. Mixed solvents and skin permeability. Hot Topics Session: Gordon Research Conference on Barrier Function of Mammalian Skin, Newport, RI, August 2007.

146. Physiologically based skin pharmacokinetics. Trailblazing the Skin Fronteir. ISP/PPP Workshop. Washington, DC, August, 2007.
147. Basic principles of veterinary pharmacokinetics and their implication for tissue residues and human food safety. 10<sup>th</sup> Anniversary Seminar, Merial, Inc., North Brunswick, NJ, October, 2007.
148. Quantitative prediction of dermal absorption from complex chemical mixtures (e.g. formulations). Merial, Inc., North Brunswick, NJ, October, 2007.
149. Food Animal Residue Avoidance Databank, CABI Compendium Programme Development Consortium Workshop, Wallingford, UK, October, 2007.
150. Opportunities for better regulation. Global Animal Health Conference, London, UK, November, 2007.
151. Population and physiological based pharmacokinetics in veterinary drug development, Pfizer Modeling and Simulation Summit, Kalamazoo, MI, March, 2008.
152. *Co-Chair*, The 2007 Pet Food Related Toxic Nephropathy in Dogs and Cats Rountable. 47<sup>th</sup> Society of Toxicology Annual Meeting, Seattle, WA, March, 2008.
153. Pharmacokinetics and pharmacokinetic modeling of quantum dots in skin. Symposium on Nanomaterial Pharmacokinetics. 47<sup>th</sup> Society of Toxicology Annual Meeting, Seattle, WA, March, 2008.
154. Pharmacokinetic modeling and implications of periodicity in arterial extraction of quantum dot nanomaterials. Nanoparticles: Cellular and Organ Disposition Platform Session, 47<sup>th</sup> Society of Toxicology Annual Meeting, Seattle, WA, March, 2008.
155. Predicting chemical absorption from complex chemical mixtures. Atlantic Coast Symposium on the Mathematical Sciences in Biology and Biomedicine. Raleigh, NC, April, 2008.
156. General principles of toxicology and animal toxicity testing; Dermal toxicology; American Chemical Society “State of the Art Course.” Toxicology- Principles and Applications, San Francisco, CA, April, 2008; Research Triangle Park, NC, Sept. 2008.
157. *Organizer*, Veterinary and Comparative Pharmacokinetic Workshop, CVM / FDA, Rockville, MD, May, 2008.
158. Comparative aspects of drug absorption across skin: barrier or portal? Pfizer Forum on Noninvasive Delivery technologies. Kalamazoo, MI, June, 2008.
159. Comparative aspects of topical delivery, Plenary Presentation, Skin Forum, London, UK, June, 2008.
160. Comparative species differences in dermal absorption: Exploiting the similarities and differences for veterinary and human health applications. 35<sup>th</sup> Annual Meeting of the Controlled Release Society, New York, NY, July, 2008.
161. Animal model selection for dermal drug delivery. Young Scientists Workshop: World of Veterinary Drug Delivery, 35<sup>th</sup> Annual Meeting of the Controlled Release Society, New York, NY, July, 2008.
162. Dietary Supplements in Horses, Dogs and Cats: Presentation of NRC Committee Findings; Center for Veterinary Medicine, Food and Drug Administration, Rockville, MD, August, 2008.
163. Keynote Lecture: Should physiological based pharmacokinetic models become de rigueur for veterinary antimicrobial studies? 4<sup>th</sup> International Conference on Antimicrobial Agents in Veterinary Medicine (AAVM). Prague, Czech Republic, August 2008.
164. Chair, Pharmacokinetics/Pharmacodynamics Session, 4<sup>th</sup> International Conference on Antimicrobial Agents in Veterinary Medicine (AAVM). Prague, Czech Republic, August 2008.
165. Pharmacokinetics of nanomaterials: Is it different from chemicals or drugs? NanoTox 2008, Zurich, Switzerland, September, 2008.
166. Animal models of dermal absorption. National Taiwan University, Taipei; National Chung-Hsing University, Taichung, Taiwan, October, 2008.
167. FARAD, “Chew on This” AVMA Podcast series on Food Safety, [www.avma.org](http://www.avma.org), Apple iTunes.
168. Skin: Barrier or portal for entry of environmental contaminants. Distinguished lecture for swearing-in ceremony of new NIEHS Director Dr. Linda Birnbaum, NIEHS, Research Triangle Park, NC, March, 2009.
169. Panel member: US FDA Advisory Committee Participation Special Session, and Chair, Advances in Biological Modeling Platform Session, 48<sup>th</sup> Society of Toxicology Annual Meeting, Baltimore, MD, March, 2009.
170. Global change and food safety. Lecture at the 50<sup>th</sup> Anniversary of NCSU Sigma Xi Research Awards, Symposium on Reseach on a Changing Planet, Raleigh, NC, April, 2009.
171. *Organizer*, Veterinary and Comparative Pharmacokinetic Workshop, CVM / FDA, Rockville, MD, May, 2009.
172. Predicting dermal absorption. Novartis, Basel, Switzerland, June, 2009.
173. Debate Leader “Math vs Mouse”, Gordon Research Conference on Barrier Function of Mammalian Skin, Waterville Valley, NH, Aug. 2009.
174. Overview of the Food Animal Residue Avoidance Databank, Red River Valley Agriculture Research Station, Fargo, ND, Oct, 2009
175. Pharmacometric Tools for Veterinary Species, Center Management Team, Center for Veterinary Medicine, Food and Drug Administration,. Rockville, MD, Oct, 2009.

176. Chemical Risk Assessment, BLE 597, College of Engineering, University of Maine, Nov, 2009.
177. Chemical Risk Management and Food Safety, MARS Workshop on Risk Management and Food Safety Science, McLean, VA, Feb. 2010.
178. Prediction of Dermal Absorption from Complex Chemical Mixtures. 8<sup>th</sup> Int. Conference on Biological Barriers, Saarland University, Saarbruecken, Germany, March, 2010.
179. Predicting Skin Absorption from Chemical Mixtures Utilizing Simple Quantitative Structure Permeation Relationships and a Mixture Factor. Perspectives in Percutaneous Penetration 2010, La Grande Motte, France, April, 2010.
180. Formulation Effects Across Veterinary Species, Joint AAVPT/ECVPT/EAVPT Workshop on Bioequivalence Issues in Veterinary Medicine, Potomac, MD, June, 2010.
181. Use of In Vitro Dermal Penetration Models to Estimate In Vivo Absorption of Topical Dosage Forms, 37<sup>th</sup> Controlled Release Society Annual Meeting, Portland, OR, July 2010.
182. Novel Ingredients: Assuring Safety and Sustainability, WALTHAM International Nutritional Sciences Symposium, Cambridge, UK, September, 2010.
183. *Organizer*, Veterinary and Comparative Pharmacokinetic Workshop, CVM / FDA, Rockville, MD, October, 2010.
184. Approaches to Developing Computational Models of Nanomaterial Biodistribution. 7<sup>th</sup> Int. Seminar on Nanotechnology, Society and the Environment, Rio de Janeiro, Brazil, November, 2010.
185. A Primer on Physiological Based Pharmacokinetic Models, Utrecht University, Utrecht, Netherlands, February, 2011.
186. Factors Involved in Selecting Model Systems to Predict Transdermal Drug Delivery, Glaxo-Smith kline, Research Triangle Park, NC, February, 2011

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Miscellaneous industrial/local departmental/university seminars and guest lecturers, 1978-Present: Purdue University, NCSU, UNC-Chapel Hill, Duke University, Georgetown University, and Wright State University; NIEHS, EPA, and FDA; Affymax, Becton Dickinson, Burroughs Wellcome, Cellegy, Ciba Geigy, Cygnus Therapeutic Systems, Enzon, Glaxo, Johnson and Johnson, Lederlee Labs, Merck, Pharmetrix, Pfizer and Servière.

## **J. TEACHING EXPERIENCE**

### -North Carolina State University:

- 2010: Alumni Association Distinguished Graduate Professorship  
 2005 -2007: Director, Biomathematics Graduate Program, College of Physical and Mathematical Sciences  
 2000-2003: Executive Committee, Food Safety Graduate Faculty  
 1990 -94: Chair, Pharmacology Concentration Area, Comparative Biomedical Sciences Graduate Program.  
 Interdepartmental Toxicology Program:       Executive Committee-1982-85.  
   Graduate Student Admissions Committee - 1982-85.  
   Curriculum Committee - 1986-87, 1989-91.
- Pharmacokinetics, CBS 787 (graduate course) – *Course Leader* and Instructor - 1999, 2001, 2003, 2005, 2007, 2009  
 Instrumentation in Pharmacological Research, CBS 860, lecture 2006, 2008, 2010  
 Biomathematics Graduate Seminar *Coordinator*, BMA 801, 2005-2006  
 Special Topics in Biomathematics, BMA 610, 2005 – 2007.  
 Introductory Pharmacology, VMA 933, pharmacokinetic lectures, 1998, 2000.  
 Principles of Pharmacology, CBS 590 (graduate course), *Course Leader* - 1994; Lectures - 1996 – 2002, 2004  
 Risk Assessment, TOX 820E, Lectures, 2001 – 2004.  
 Biochemical Toxicology - Tox 510 (graduate course), Lectures - 1989 - 99.  
 Orientation to Toxicology Research - TOX 590A (graduate course), Lectures – 1997-98  
 Pharmacology and Veterinary Therapeutics, VMA 843, *Course Leader* - 1984-87; 1992; Lectures - 1988-91, 1993, 96  
 Advanced Pharmacology (graduate course) VMS 660, Lectures - 1986, 88, 90  
 Systemic Pharmacology and Toxicology (graduate course), VMS 562, *Course Leader* - 1984, 86, 88, 90, 92; Lectures - 1993  
 Seminars in Pharmacology, VMS 696A (graduate course), *Course Co-ordinator* - 1992 - 94  
 Clinical Laboratory Senior Rotation, VMM 877 (Clinical Pharmacology) 2 lectures/block, 1984, 85  
 Pharmacology (Principles), VMS 833, *Course Leader* - 1982

### -University of North Carolina at Chapel Hill:

- Advances in Drug Delivery - PHAR 163 / Advances in Pharmaceutical Chemistry – PHAR 165 (graduate course) /  
 Advances in Drug Delivery – MOPH 864: Lectures: 1997 – 2000, 2002, 2004, 2006

### -Purdue University:

- Pharmacology for Veterinary Technicians, VPH141, 1978 Course Leader

Veterinary Pharmacology, VPH 444/445, 1980 (25%)  
 Veterinary Toxicology, VMI 456, 1980, 81 (60%)  
 Medical Pharmacology (Renal), PCTX 610, 1980, 81 (4 lectures)  
 Veterinary Clinical Pharmacokinetics (graduate course), VPH 602, 1981 Course Leader

**Graduate Students (Major Advisor)/Post-Doctoral Fellows**

**M.P. Carver** M.S. Toxicology, 1982-85  
 Ph.D. Toxicology, 1985-88  
*(Recipient of NC Society of Toxicology graduate student poster award, 1986 and 1987, National S.O.T. travel award, 1987)*

**J.L. Riond** M.S. Pharmacology, 1983-86  
 Ph.D. Pharmacology, 1986-89  
*(Recipient of Squibb Animal Health Resident Research Grant; Second place 1988 AAVPT Graduate Student Research Award; 1988 Hoechst-Roussel Graduate Student Award)*

**D.L. Frazier** Ph.D. Pharmacology, 1984-87

**R. DeWosken** Ph.D. Toxicology, 1987-91  
*(Recipient of NC Society of Toxicology graduate student poster award, 1989, 90; National S.O.T travel award, 1991)*

**S. Vaden** Ph.D. Pharmacology, 1987-1992  
*(1988 Hoechst-Roussel Graduate Student Award; NCI-NRSA, 1990-93; First Place, 1990 AAVPT Graduate Student Research Award)*

**S.K. Chang** Ph.D. Pharmacology, 1988-1993  
*(Recipient of National S.O.T travel award, 1991)*

**M. Heit** Ph.D. Pharmacology, 1989-1993  
*(First Place, 1992 AAVPT Graduate Student Research Award)*

**R. Baynes** Ph.D. Pharmacology, 1994 - 1997  
*(Keenan Fellow; 1995 ACAAGS College Research Award)*

**K. Budsaba** Ph.D. Biomathematics (Co-Chair), 1996 - 2000

**T. Martin** Ph.D. Pharmacology, 1995 - 2000  
*(1998 AAVPT Graduate Student Award)*

**T. Bidgood** Ph.D. Pharmacology (Co-Chair), 2000-2003

**S. Kukanich** Ph.D. Pharmacology (Co-Chair), 2001-2004  
*(2005 Graduate School Dissertation Award)*

**F. Muhammad** Ph.D. Pharmacology, 2001 - 2004

**D. Van der Merwe** Ph.D. Pharmacology, 2003 - 2005

**J. L. Buur** Ph.D. Pharmacology (Co-Chair), 2003- 2007  
*(First Place, 2006 CVM Research Day Competition; 2007 National Phi Zeta Best Basic Science Research Manuscript award; NCSU nominee for 2007 Committee of Graduate Schools (CGS) Distinguished Dissertation Award; 2008 Merck-Merial Veterinary Research Award for Graduate Veterinarians, 2009 SOT Poster Award)*

**V. Vijay** Ph.D. Pharmacology (Co-Chair), 2005 -2009  
*(Recipient of SOT RegulatoryToxicology Specialty Section Travel award, 2008)*

**H. Lee** Masters of Biomathematics, 2006- 2010.  
*(2009 SOT Risk Assessment Specialty Section Poster Award)*

Current Students

**J. Chittendon** Ph.D. Biomathematics, 2006 →

**L. Waltman** Ph.D. Pharmacology (DVM/PhD program), 2008 →  
*(George Hitchins award, 2009)*

**D. Karadzovska** Ph.D. Pharmacology, 2010 →  
*(Novartis Fellowship)*

Fellows

**L.P. Dix** Post-doctorate in Toxicokinetics, 1983 - 86

**P. L. Williams** Post-doctorate in Toxicokinetics, 1987 - 89

**G. Qiao** Post-doctorate in Toxicokinetics, 1990 - 95

**Y. H. Li** Visiting Scientist, 1997  
**R. Baynes,** Post-doctorate in Toxicology, 1997 - 98  
**C. C. Chou** Post-doctorate in Toxicology, 2001 - 2002  
**X. R. Xia** Post-doctorate in Toxicokinetics, 2001 – 2003  
**M. Imran** Post-doctorate in Biomathematics, 2006 - 2007

Member of other graduate student advisory committees at NCSU, UNC-CH, UC-Davis, Georgetown University, University of Agriculture, Faisalabad, Pakistan (thesis reviewer), University of Queensland.

**K. HOBBIES / ACTIVITIES**

Boating, Collecting Baseball Cards, Beachcombing  
 YMCA Indian Guide/Princess Program (1988-99)  
 YMCA Youth Baseball (1997-99)  
 Boston College Alumni Volunteer Admissions Councilor (1993-2000)

**L. CURRENT RESEARCH INTEREST**

General Area: Mathematical modeling of drug, chemical and nanomaterial disposition  
 Pharmacokinetics and toxicokinetics of drug and xenobiotic percutaneous absorption and transdermal drug delivery  
     Development of *in vivo* and *in vitro* animal models for skin pharmacology  
     Develop QSAR models for assessing chemical mixture absorption  
     Develop models to study absorption and disposition of nanomaterials  
 Comparative pharmacokinetics and prediction of drug residues in tissues of food producing animals

**M. EXTRAMURAL GRANTS AWARDED**

Principal Investigator (PI, Co-PI) / Project Director - (Total \$ 18,408,167) ***Bold faced projects are presently active.***

Federal:

|   |  |                            |                                  |
|---|--|----------------------------|----------------------------------|
| PHS/ NIH/BRSG   | The effects of renal insufficiency on aminoglycoside nephrotoxicity in the isolated perfused rat kidney                                  | 4/82 - 12/83               | \$ 7,750                         |
| Quantitating Absorption of complex Chemical Mixtures. |  |                            |                                  |
| PHS/NIH/NIADDDK                                       | Aminoglycoside nephrotoxicity in chronic renal disease<br>R01-AM-31862   | 1/84 - 12/86               | \$ 339,668                       |
| PHS/NIH/NCI   | Hyperthermia and perfusion effects in cancer therapy. Project II: Whole body hyperthermia and cisplatin in canines<br>P01-CA-42745       | 6/87 - 5/90                | \$ 865,508                       |
|   | Postdoctoral National Research Service Award (Sponsor for Shelly Vaden):<br>An isolated perfused tumored skin flap model<br>F32-CA-08822 | 5/90 - 4/93                | \$ 94,750                        |
| PHS/NIH/NIEHS   | Mechanisms of pesticide toxicity: Project I: Pesticide percutaneous absorption, metabolism and toxicokinetics P01-ES-00044               | 7/88 - 2/93<br>3/93 - 2/96 | \$ 948,527<br><u>\$ 275,362</u>  |
|   |  | <i>Project Total :</i>     | <i>\$1,223,889</i>               |
| PHS/NIOSH   | Quantitating absorption of complex chemical mixtures<br>R01-OH-07555 ( <i>STAR grant</i> )<br>( <i>Comp. Renew</i> )                     | 6/01 – 5/04<br>4/05 – 3/10 | \$ 746,528<br><u>\$1,632,645</u> |
|   |  | <i>Project Total:</i>      | <i>\$2,379,173</i>               |
| PHS/FDA   | Interspecies pharmacokinetic extrapolations FDA B70630094  | 5/94 - 12/94               | \$ 15,000                        |
|   | Interspecies model for predicting drug residues FDA 0615900097   | 8/97 - 7/98                | \$ 15,000                        |

|  |   |                    |                      |                   |
|--|---|--------------------|----------------------|-------------------|
|  | Pharmacokinetic information through the Food Animal Residue Avoidance Databank (FARAD)  | FDA V128400001GHO  | 9/01 – 9/03          | \$ 100,000        |
| PHS/CDC/ATSDR  | Chemical mixtures risk assessment   | U61/ATU484504      | 9/97 - 9/01          | \$ 315,110        |
| DoD/USAMRDC  | Development of <i>in vitro</i> isolated perfused porcine skin flaps for the study of percutaneous absorption of xenobiotics   | DAMD-17-84C-4103   | 10/84 - 6/87         | \$ 295,703        |
| DoD/USAMRMC / <i>Gulf War Illness Research Program</i>   |   |                    |                      |                   |
|  | Percutaneous absorption of chemical mixtures relevant to the Gulf War   | DAMD-17-99C-9047   | 2/99 – 6/2002        | \$ 760,031        |
| DoD/USAMRMC/SciTech Inc.   |   |                    |                      |                   |
|  | Use of methyl salicylate as a simulant for predicting the percutaneous absorption of sulfur mustard   | DAAD-13-98D-0014   | 1/99 – 9/99          | \$ 114,958        |
| DoD/ USAFOSR/ <i>Basic Research In Environmental Quality Initiative:</i>                             |   |                    |                      |                   |
|  | Development of a quantitative model for prediction of percutaneous absorption   | F49620-95-1-0017   | 10/94 - 9/97         | \$ 445,182        |
|  | Quantitating the percutaneous absorption of mechanistically-defined chemical mixtures   | F49620-98-1-0105   | 11/97 - 11/00        | \$ 375,484        |
|  |   | F49620-01-1-0080   | 11/00 – 12/03        | \$ 578,260        |
|  | Quantitating the absorption, partitioning and toxicity of hydrocarbon components of JP-8 Jet Fuel   | FA9550-04-1-0376   | 6/04 - 5/07          | \$ 599,954        |
| DoD/ <i>Defense University Research Instrumentation Program (DURIP)</i>                              |   |                    |                      |                   |
|  | Gas chromatography and mass spectrometry for membrane transport   | FA9550-04-1-0358   | 5/04 – 4/05          | \$ 213,284        |
|  |   |                    | <i>Project Total</i> | \$2,212,164       |
| DoD/ USAFOSR   | Biokinetics and Biodynamics of Nanomaterial Interactions (Co-PI)  |                    | 3/08 – 6/09          | \$ 320,000        |
| EPA  |   |                    |                      |                   |
|  | Quantitative prediction of xenobiotic percutaneous absorption and cutaneous disposition.  | CR 818129          | 10/91 - 2/93         | \$ 217,218        |
|  | Studies on the cutaneous disposition of environmental chemicals under different exposure conditions: <i>In vitro</i> , <i>ex vivo</i> and <i>in vivo</i> studies.                                       | CR 824077          | 3/95 - 2/00          | \$ 411,621        |
|  | Modelling of percutaneous absorption data   | OW 0043 NTTA       | 1/00 – 9/00          | \$ 30,000         |
| EPA / STAR <i>Nanomaterial Research</i>  |   |                    |                      |                   |
|  | Evaluation of nanoparticles interactions with skin (Co-PI)  | RD-83171501        | 10/04 – 9/07         | \$ 328,972        |
|  | Impact of physiochemical properties on the absorption of manufactured nanomaterials (Co-PI)   | <b>RD-83332801</b> | <b>05/07-05/11</b>   | <b>\$ 391,617</b> |
|  |   |                    | <i>Project Total</i> | \$ 720,589        |
| USDA/CSREES-FSIS-ES National Food Animal Residue Avoidance Databank FARAD (Founder and Co-Developer) |   |                    |                      |                   |
|  | <i>Only support for North Carolina component (40% of this national program) is tabulated</i>  |                    |                      |                   |
|  | [12-05-300-595; 83-EXCA-3-0675; 88-EXCA-2-0910; 91-EFSQ-1-4040; 93-EFSQ-1-4097; 97-EFSQ-1-0099; 97-EFSQ-1-4165; 99-EFSQ-1-0570; 2001-45051-01128; 2002-45051-01362; 2005-45051-03174; 2006-45051-03471; |                    |                      |                   |



2007-48664-03944; 2009- 41480-05770]

\$ 3,820,384

**2010 – 41480-21453****9/10 – 8/11****384,000***Project Total*

\$ 4,204,384

Private Sector:

|   |  |                            |                          |
|---|--|----------------------------|--------------------------|
| BECTON DICKINSON                                  | The isolated perfused porcine skin flap (IPPSF) as an <i>In Vitro</i> model for developing drug delivery systems<br>( <i>Research supported development of FDA approved iontophoretic lidocaine delivery system for humans - LidoSite®</i> ) | 11/86 - 9/92               | \$1,500,773              |
| CIBA GEIGY  | <i>In Vitro</i> percutaneous absorption and metabolism of chlorbenzilate   | 9/86 - 6/87                | \$ 4,000                 |
| VEPROL  | Doxycycline pharmacology and toxicology  | 9/86 - 12/88               | \$ 88,952                |
| BATTELLE  | Establish the NCSU-Battelle Cutaneous Pharmacology and Toxicology Program  | 5/88- 9/92                 | \$ 80,193                |
| BATTELLE/MREF                                     | Isolated perfused porcine skin flap transfer project   | 5/94 - 6/96                | \$ 391,759               |
| SANDOZ  | Percutaneous absorption, and disposition of topically applied cyclosporineA  | 9/88 - 10/89               | \$ 31,194                |
| GENSIA  | Selected studies on transdermal iontophoretic drug delivery  | 10/89 - 12/92              | \$ 216,911               |
| PFIZER  | Transdermal drug delivery studies with the isolated perfused porcine skin flap model   | 6/91 - 12/91               | \$ 32,121                |
|   | Dermal absorption modeling of topical ectoparasiticides  | <b>7/09 – 06/11</b>        | <b>\$ 200,000</b>        |
| MERCK   | Pharmacokinetics and metabolism of androgens in skin   | 12/91- 2/94                | \$ 20,000                |
| CYGNUS  | Transdermal drug delivery studies  | 11/92 - 6/94               | \$ 136,739               |
| PHARMETRIX  | Pharmacokinetics of <i>in vitro</i> and <i>in vivo</i> transdermal drug delivery   | 6/93 - 12/93               | \$ 29,500                |
| WYETH AYERST                                      | Isolated perfused skin flap transfer   | 4/94 - 12/94               | \$ 40,000                |
| NCSU/CVM  | A novel mechanistic approach to quantitating the percutaneous absorption of pesticide mixtures   | 7/96 - 6/97                | \$ 12,574                |
| CELLEGY   | Drug delivery research<br>( <i>Research supported development of FDA-approved iontophoretic glucose sensor for humans</i> )  | 6/96 - 6/98                | \$ 316,947               |
| HOECHST CELANESE – Kenan Institute Research Award | Drug delivery techniques for active or passive delivery  | 7/96 - 6/97                | \$ 30,000                |
| FIBROGEN  | Drug delivery research   | 9/96 - 3/97                | \$ 10,000                |
| PHARMACIA UPJOHN                                  | Percutaneous absorption of drugs in porcine skin   | 12/97-11/98                | \$ 34,671                |
| NOVARTIS  | Dermal absorption of veterinary drug formulations in cattle  | 1/06 – 12/07               | \$ 111,167               |
|   | Quantitating absorption of veterinary topical drug formulations  | 9/08 - 8/10                | \$ 121,041               |
|   | High Throughput Approach to Assess Formulation Effect on Topical Drug Delivery   | <b><u>1/10 – 12/13</u></b> | <b><u>\$ 207,109</u></b> |
|   |  | <i>Project Total</i>       | \$439,317                |

|   |  |   |                    |                   |
|---|--|---|--------------------|-------------------|
| BIOCHEMICS  | Vascular modulation of nanomaterial delivery to skin   | 1/08 – 12/08  | \$ 150,000         |                   |
| <u>Co-Investigator</u>  |  |   |                    |                   |
| BEECHAM   | Ampicillin pharmacokinetics in horses  | 1/80 - 12/80  | \$ 2,200           |                   |
| ELI LILLY   | Pharmacology testing and drug clearance in the sorbent suspension dialyzer   | 1/81 - 12/81  | \$ 17,400          |                   |
| PHS/NIH/NIEHS   | Training in biochemical and environmental toxicology (F. Guthrie, R. Smart, P.I.)<br>ES-07046  | 7/82 - 6/87   | \$ 634,466         |                   |
|   |  | 7/88 - 6/92   | \$ 794,044         |                   |
|   | Comparative in vivo biodistribution of characterized manufactured nanomaterials<br>(N. Monteiro, PI)                                   | <b>R01-ES-016138</b>  | <b>9/09 – 9/11</b> | <b>\$ 658,367</b> |
| PHS/NIH/NCI   | Hyperthermia and perfusion effects in cancer therapy(M.Dewhirst {Duke}, P.I.)<br>P01-CA-42745  | 6/90 - 5/95   | \$8,649,914        |                   |
| PHS/FDA   | Symposium: Educational perspectives (A. Aronson, P.I.)   | 7/91 - 6/92   | \$ 5,000           |                   |
| PHS/NIH/NIOSH   | Dermal absorption of cutting fluid mixtures (R. Baynes, PI)<br><b>R01-OH-03669</b>   | 8/00 - 7/04   | \$ 880,687         |                   |
|   |  | 8/05 - 7/08   | \$ 725,020         |                   |
|   |  | <b>8/10 - 7/13</b>  | <b>\$ 735,295</b>  |                   |
|   |  | <i>Project Total</i>  | <i>\$2,341,002</i> |                   |
| DoD/USAMRDC   | Cutaneous toxicity of mustard and lewisite in the isolated perfused porcine skin flap (N. Monteiro, P.I.)<br>DAMD 17-87C-7139          | 9/87 - 6/91   | \$ 792,543         |                   |
|   |  | Mechanism of cutaneous vesication (N. Monteiro, P.I.)<br>DAMD-17-92C-2071 | 7/92 - 12/95       | \$ 862,377        |
| USDA  | Leadership training for veterinary students (P.Carter, P.I.)<br>(Cornell Subcontract #26408-5521)                                      | 9/95 - 9/98   | \$ 41,735          |                   |
| CELLEGY   | Drug delivery research (N. Monteiro, P.I.)<br>(Research supported development of FDA-approved iontophoretic glucose sensor for humans) | 1/97 - 1/99   | \$ 307,235         |                   |
| BASF  | Comparative in vitro dermal absorption and metabolism  | 3/07-2/08   | \$ 201,832         |                   |
| European Commission / Research Directorate G: Industrial Technologies |  |   |                    |                   |
|   | Comprehensive assessment of hazardous effects of engineered nanomaterials on the immune system.  | 9/08 – 8/11   | €3,358,500         |                   |

#### N. TECHNOLOGY TRANSFER ACTIVITIES: Patents, Copyrights, and Licenses

##### Patents:

1. Method and Composition for Iontophoresis , *U.S. Patent # 5,302,172* issued 4/12/94; (B. Sage and **J. Riviere**); Australian Patent #634,867; Canadian Patent # 2,038,097; European Patent #0449463; Irish Patent # 64873; Japanese Patent #1972677; Korean Patent # 75853; New Zealand Patent # 237333; South African Patent #911875; NCSU File 91-49. (Licensed to Becton Dickinson Inc.)

2. Method and Composition for Increased Skin Concentration of Active Agents by Iontophoresis, *U.S. Patent # 5,334,138* issued 8/2/94; (B. Sage and **J. Riviere**); Australian Patent #643760; New Zealand Patent # 237332; European Patent # 448299; Irish Patent # 64891; Japanese Patent #2028663; Korean patent # 75852; South African Patent # 911876; Taiwanese Patent # NI-66181; NCSU File 91-41. (Licensed to Becton Dickinson).
3. Iontophoretic Electrode, *U.S. Patent # 5,540,654* issued 7/30/96 (**J. Riviere**, R. Rogers and N. Monteiro-Riviere); NCSU File 94-80.
4. Methods of Using Topical Agents with Systemically Administered Active Agents, *U.S. Patent # 5, 620,416* issued 4/15/97. (**J. Riviere**) NCSU File 93-15.
5. Methods, Systems, and Products for Determining Drug Withdrawal Intervals, *U.S. Patent # 6,066,091* issued 5/23/00. (**J. Riviere**, T. Martin, R. Baynes, A. Craigmill); NCSU File 98-23.
6. Method and Apparatus for Determining a Molecular Descriptor of Absorption for a Candidate Compound. *U.S. Patent 7,517,693* issued 4/14/2009. (**J. Riviere**, X Xia, R. Baynes, N. Monteiro-Riviere); NCSU File 02-82.

#### Registered Copyrights:

- 1-12. 12 software programs on pharmacokinetics and IPPSF methodology registered with U.S. Copyright Office, November 18, 1993 { "Moments", TXu 622-548; "Jiffyplot", TXu 616-206; "Iorama", TXu 622-559; "Invert", TXu 616-209; "V2V", TXu 622 549; "Docuprog", TXu 616-208; "Whole1", TXu 622-555; "IPPSF Modelling Package," TXu 622-556; "Assimilate", TXu 616-935; "Roundup", TXu 622-557; "Predict", TXu 622-412; Profile, TXu 616-936 (**J. Riviere**, P.L. Williams and K. Mason)}.
- 13-20: 4 Software programs on mathematical modeling registered with U.S. Copyright Office, April 28, 1995 {"Basicman", TXu 686-355; "Kinetica", TXu 686-356; "Diffuse", TXu 686-357; "Species", TXu 686-358} (**J. Riviere** and P.L. Williams).

#### Archived Data Sets:

1. Riviere JE, Brooks JD. Riviere and Brooks pig skin flow-through data file. 2010. <http://www.lib.ncsu.edu/resolver/1840.2/2297>

#### Other:

1. Commercializing of Skin Flap Perfusion Chamber, NCSU Technology Rights License originally issued 1/89 to Diamond Research, Raleigh, NC ; re-issued 6/94 to USA\Scientific Plastics, Ocala, FL.
2. Developed, validated and distributed the USDA-supported Food Animal Residue Avoidance Databank's (FARAD's) Producer's and Veterinarian's Guide to Residue Avoidance Management (ProGRAM; VetGRAM) software packages; Fall, 1995.
3. Isolated perfused porcine skin flap (IPPSF) model selected for inclusion into the evaluated database of *in vitro* techniques maintained by the European Centre for the Validation of Alternative Methods (ECVAM) of the European Commission.

#### **O. PUBLICATIONS: BOOKS**

1. Sundlof SF, **Riviere JE**, Craigmill AL: Comprehensive Compendium of Food Animal Drugs: The Food Animal Residue Avoidance Databank Tradename File. University of Florida Press, Gainesville, 1987 (590 pgs), 2nd Edition 1988 (597 pgs), 3rd Edition 1989 (595 pgs), 4th Edition 1990 (476 pgs), 5th Edition 1991 (466 pgs), 6th Edition (452 pgs), 7th Edition 1992 (451 pgs), 8th Edition 1992 (453 pgs), 9th Edition 1992 (457 pgs).  
Crosier KK, **Riviere JE**, Craigmill AL: Comprehensive Compendium of Food Animal Drugs: The Food Animal Residue Avoidance Databank Tradename File. University of Florida Press, Gainesville. 10th Edition 1996 (479 pgs).
2. **Riviere JE**, Craigmill AL, Sundlof SF: Handbook of Comparative Pharmacokinetics and Residues of Veterinary Antimicrobials. CRC Press, Inc., Boca Raton, FL, 1991, [ISBN-0-8493-3211-7]; 532 pgs.
3. Craigmill AL, Sundlof SF, **Riviere JE**: Handbook of Comparative Pharmacokinetics and Residues of Veterinary Therapeutic Drugs. CRC Press, Inc., Boca Raton, FL, 1994, [ISBN-0-8493-3212-5]; 665 pgs.
4. Sundlof SF, **Riviere JE**, Craigmill AL: Handbook of Comparative Veterinary Pharmacokinetics and Residues of Pesticides and Environmental Contaminants. CRC Press, Inc., Boca Raton, FL, 1995 [ISBN-0-8493-3213-3] 580 pgs.
5. **Riviere JE**: Comparative Pharmacokinetics: Principles, Techniques and Applications. Blackwell Publishing {Iowa State Press}, Ames, IA. [Hardback, 1999, ISBN 0-8138-2931-3; Softcover Reprint, 2003, ISBN 0-8138-2138-X] 327 pgs.; 2<sup>nd</sup> Edition, Wiley-Blackwell [Hardback, 2011, ISBN 978-0-813-2993-7] 443 pgs.
6. **Riviere JE**: Chemical Food Safety, Blackwell Publishing {Iowa State Press}, Ames, IA, 2002 [ISBN-0-8138-0254-7] 213 pgs. 2<sup>nd</sup> Edition under contract, 2012.

7. Craigmill AL, **Riviere JE**, Webb AI. Tabulation of FARAD Comparative and Veterinary Pharmacokinetic Data. Blackwell Publishing, Ames, IA, 2006 [ISBN 0-8138-1349-2] 1935 pgs.
8. **Riviere JE** (ed): Dermal Absorption Models in Toxicology and Pharmacology. Taylor Francis/CRC Press, Boca Raton, 2006 [ISBN 0-415-70036-1] 374 pgs.
9. **Riviere JE** (ed.): Biological Concepts and Techniques in Toxicology: An Integrated Approach. Taylor Francis, New York, 2006 [ISBN 0-8247-2979-1] 394 pgs.
10. **Riviere JE**, Papich M (eds): Veterinary Pharmacology and Therapeutics, 9<sup>th</sup> Edition. Wiley-Blackwell, Ames, IA . 2009. [ISBN 978-0-8138-2061-3], 1524 pgs. (Translated editions in Italian and Chinese)
11. Baynes RE, **Riviere JE** (eds): Strategies for Reducing Drug and Chemical Residues in Food Animals: International Approaches to Residue Avoidance, Management and Testing. New York: John Wiley (Under Contract, 2011).

**P. EDITOR OF PROCEEDINGS, JOURNAL SUPPLEMENTS and COMMITTEE MONOGRAPHS**

1. Aronson AL, **Riviere JE** (eds.): Educational Perspectives in Preparation for the 21st Century Proceedings of the Seventh Biennial Symposium American Academy of Veterinary Pharmacology and Therapeutics, Raleigh, NC, 1992 (128 pgs).
2. Martinez MN, **Riviere JE** (eds.): Review of the 1993 Veterinary Drug Bioequivalence Workshop. J. Veterinary Pharmacol. Therap. 17: 85-119, 1994.
3. Monteiro-Riviere NA, **Riviere JE** (eds.): In Vitro and In Vivo Assessment of Cutaneous Toxicity Models Continuing Education Course Syllabus for the 37th Annual Meeting of the Society of Toxicology, Seattle, WA, March, 1998.
4. **Riviere JE**, Fink-Gremmels J (eds): Managing canine obesity: a new therapeutic approach. J. Vet. Pharmacol. Therap. 30 (Supplement), 2007.
5. National Research Council. Safety of Dietary Supplements for Horses, Dogs and Cats. National Academy Press, 2009.

**Q. FULL LENGTH PUBLICATIONS (476) [PMID #] (\*indicates research manuscripts in peer reviewed journals – 245)**

1. **Riviere JE**, Engelhardt FR, Solomon J: The relationship of thyroxine and cortisol to the molt of the harbor seal (Phoca vitulina). Gen. Comp. Endocrin. 31:398-401, 1977. [881112] \*
2. **Riviere JE**: Molting in the harbor seal (Phoca vitulina) and its possible significance to exotic animal medicine. J. Zoo Anim. Med. 9:46-52, 1978. \*
3. **Riviere JE**, Shapiro DS, Coppoc GL: Percutaneous absorption of gentamicin by the leopard frog (Rana pipiens). J. Vet. Pharmacol. Therap. 2:235-239, 1979. \*
4. **Riviere JE**, Coppoc GL, Carlton WW, Hinsman EJ: Polyvinyl alcohol toxicosis as a model of glomerulonephritis in beagle dogs. Am. J. Vet. Res. 41:502-555, 1980. [7406271] \*
5. **Riviere JE**, Coppoc GL: Pharmacokinetics of gentamicin in the juvenile dog. Am. J. Vet. Res. 42:1621-1623, 1981.[7325422] \*
6. **Riviere JE**, Coppoc GL, Hinsman EJ, Carlton WW: Gentamicin pharmacokinetic changes in induced acute canine nephrotoxic glomerulonephritis. Antimicrob. Agents Chemother. 20:387-392, 1981. [7305324]\*
7. **Riviere JE**, Silver GR, Coppoc GL, Richardson RC: Gentamicin aerosol therapy in 18 dogs: Failure to induce detectable serum concentrations of the drug. J. Am. Vet. Med. Assoc. 179:166-168, 1981. [7263469] \*
8. **Riviere JE**, Coppoc GL: Determination of cerebrospinal fluid gentamicin in the beagle using an indwelling cerebral ventricular cannula. Chemotherapy 27:309-312, 1981. [7261687] \*
9. **Riviere JE**, Coppoc GL: Dosage of antimicrobial drugs in patients with renal insufficiency. J. Am. Vet. Med. Assoc. 178:70-72, 1981. [7204228]
10. **Riviere JE**, Kaufman GM, Bright RM: Prophylactic use of systemic antimicrobial drugs in surgery. Compend. Cont. Educ. Pract. Veterin. 3:345-355, 1981.
11. **Riviere JE**, Boosinger TR, Everson RJ: Inorganic arsenic toxicosis in cattle. A review of selected cases. Mod. Vet. Prac. 62:209-211, 1981. [7010117]
12. **Riviere JE**, Coppoc GL: Selected aspects of aminoglycoside antibiotic nephrotoxicosis. J. Am. Vet. Med. Assoc. 178:508-509, 1981. [7240011]
13. Traver DS, **Riviere JE**: Penicillin and ampicillin therapy in horses. J. Am. Vet. Med. Assoc. 178:1186-1189, 1981.
14. **Riviere JE**, Hinsman EJ, Coppoc GL, Carlton WW: Single dose gentamicin nephrotoxicity in the dog. Early functional and ultrastructural changes. Res. Commun. Chem. Pathol. Pharmacol. 33:403-418, 1981. [7330449] \*
15. **Riviere JE**: A possible mechanism for increased susceptibility to aminoglycoside nephrotoxicity in chronic renal disease. New Engl. J. Med. 307:252-253, 1982. [7088081] \*
16. Traver DS, **Riviere JE**: Ampicillin in mares: A comparison of intramuscular sodium ampicillin or sodium ampicillin-ampicillin trihydrate injection. Am. J. Vet. Res. 43:402-404, 1982. [7073056] \*

17. **Riviere JE:** Paradoxical increase in aminoglycoside body clearance in renal disease when volume of distribution increases. J. Pharm. Sci. 71:720-21, 1982. [7097546] \*
18. **Riviere JE,** Traver DS, Coppoc GL: Gentamicin toxic nephropathy in horses with disseminated bacterial infection. J. Am. Vet. Med. Assoc. 180:648-651, 1982. [7068505] \*
19. **Riviere JE:** Limitations on the physiologic interpretation of aminoglycoside body clearance derived from pharmacokinetic studies. Res. Commun. Chem. Pathol. Pharmacol. 38:31-42, 1982. [7146620] \*
- 20 - 23. **Riviere JE:** In D Johnston (Editor) Bristol Veterinary Handbook of Antimicrobial Therapy, Princeton Junction, NJ; Veterinary Learning Systems Inc., 1982.  
Chapter 1 "Basic principles of antibiotic use," pp 6-11  
Chapter 29 "The aminoglycosides," pp 186-189  
Chapter 33 "Toxicity and interactions," pp 204-213  
Chapter 34 "Drug use in the presence of liver and kidney disease," pp 214-217
24. **Riviere JE:** Gentamicin nephrotoxicity in horses. Clinical and experimental evidence. Audio Vet. Med. J. VEQ-601, 1982.
25. **Riviere JE,** Coppoc GL, Hinsman EJ, Carlton WW, Traver DS: Species dependent gentamicin pharmacokinetics and nephrotoxicity in the young horse. Fundam. Appl. Toxicol. 3:448-457, 1983. [6642102] \*
26. **Riviere JE,** Hinsman EJ, Coppoc GL, Carlton WW, Traver DS: Morphological and functional aspects of experimental gentamicin nephrotoxicity in young beagles and foals. Vet. Res. Commun. 7:211-213, 1983. [6665986] \*
27. Thornhill JA, **Riviere JE:** Peritonitis associated with peritoneal dialysis. Diagnosis and treatment. J. Am. Vet. Med. Assoc. 182:721-724, 1983. [6841263]
28. Aronson AL, **Riviere JE:** Chapter 3 "Toxicology and Pharmacology" in PW Pratt (Editor): Feline Medicine, Santa Barbara, CA; American Veterinary Publications, Inc., pp 62-78, 1983.
29. Aronson AL, **Riviere JE:** "Adverse drug reactions" In RW Kirk (Ed) Current Veterinary Therapy VIII Philadelphia; WB Saunders Co., pp 122-128, 1983.
30. **Riviere JE:** "Checklist of hazardous drugs in patients with renal failure." In RW Kirk (Editor): Current Veterinary Therapy VIII Philadelphia; WB Saunders Co., pp 1036-1041, 1983.
31. Shy-Modjeska JS, **Riviere JE,** Rawlings JO: Application of biplot methods to the multivariate analysis of toxicologic and pharmacokinetic data. Toxicol. Appl. Pharmacol. 72:91-101, 1984. [6710488] \*
32. Thornhill JA, Hartman J, Boon GD, **Riviere JE,** Jacobs D, Ash SR: Support of an anephric dog for 54 days with ambulatory peritoneal dialysis and a newly designed peritoneal catheter. Am. J. Vet. Res. 45:1156-1161, 1984. [6742576] \*
33. **Riviere JE,** Carver MP, Coppoc GL, Carlton WW, Lantz GC, Shy-Modjeska JS: Pharmacokinetics and comparative nephrotoxicity of fixed-dose versus fixed-interval reduction of gentamicin dosage in subtotal nephrectomized dogs. Toxicol. Appl. Pharmacol. 75:496-509, 1984. [6474477] \*
34. **Riviere JE,** Carver MP: Effects of familial hypothyroidism and subtotal surgical nephrectomy on gentamicin pharmacokinetics in beagle dogs Chemotherapy 30:216-220, 1984. [6744974] \*
35. **Riviere JE:** Calculation of dosage regimens of antimicrobial drugs in animals with renal and hepatic dysfunction. J. Am. Vet. Med. Assoc. 185:1094-1097, 1984. [6392236] \*
36. **Riviere JE,** Davis LE: Chapter 28: "Renal handling of drugs in renal failure," In KC Bovee (Editor): Canine Nephrology Media, PA; Harwal Publishers, pp 643-685, 1984.
37. **Riviere JE:** Adverse drug reactions in cats with feline urethral obstruction. Vet. Clinics No. Am.: Small Anim. Prac. 14:703-709, 1984. [6377671]
38. **Riviere JE:** "The value and limitation of pharmacokinetics in predicting dose regimens. Effects of systemic disease." In J.D. Powers and T.E. Powers (Editors): Proceedings of a Symposium on the Determination of Doses of Veterinary Pharmaceuticals, Columbus; Ohio State University Press, pp 99-118, 1984.
39. Brown SA, **Riviere JE,** Coppoc GL, Hinsman EJ, Carlton WW, Steckel RR: Single intravenous and multiple intramuscular dose pharmacokinetics and tissue residue profile of gentamicin in sheep. Am. J. Vet. Res. 46:69-74, 1985. [3970446] \*
40. Dix LP, Bai SA, Rogers RA, Anderson DL, **Riviere JE:** Pharmacokinetics of digoxin in sheep: Limitations of the use of biological half-life for interspecies extrapolation. Am. J. Vet. Res. 46:470-472, 1985. [3944115] \*
41. Carver MP, Shy-Modjeska JS, Brown T, Rogers RA, **Riviere JE:** Dose-response studies of gentamicin nephrotoxicity in rats with experimental renal dysfunction. I. Subtotal surgical nephrectomy. Toxicol. Appl. Pharmacol. 80:251-263, 1985. [4024115] \*
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43. **Riviere JE,** Bowman KF, Monteiro-Riviere NA: Development of in vitro isolated perfused porcine skin flaps for study of percutaneous absorption of xenobiotics. DAMD17-84C-4103, NTIS Report, ADA183580, pp 1-32, 1985.

44. **Riviere JE:** Chapter 23: "Clinical management of toxicoses and adverse drug reactions," In LE Davis (Editor): Handbook of Small Animal Therapeutics, New York: Churchill Livingstone, Inc., pp 657-683, 1985.
45. **Riviere JE:** Chapter 6: "Aminoglycoside-induced toxic nephropathy" In SR Ash and JA Thornhill (Editors): Handbook of Animal Models for Renal Failure, Boca Raton, FL: CRC Press Inc., pp 145-182, 1985.
46. **Riviere JE,** Carver MP: Effects of pre-existing renal disease on aminoglycoside nephrotoxicity in dogs and rats. In P. Bach, E. Locke (Editors): Renal Heterogeneity and Target Cell Toxicity. Chichester: John Wiley and Sons Ltd., pp 339-344, 1985.
47. **Riviere JE,** Craigmill AL, Sundlof SF: Food Animal Residue Avoidance Databank. Proceedings of the Food Science Symposium VI: Assuring Meat Wholesomeness, The Residue Avoidance Issue pp G1-G5, 1985.
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