

Russell J. Mumper, Ph.D.

Curriculum Vitae

April, 2011

PERSONAL INFORMATION:

Work Address: Russell J. Mumper, Ph.D.
Vice Dean,
John A. McNeill Distinguished Professor

UNC Eshelman School of Pharmacy
CB 7355, 100G Beard Hall
University of North Carolina at Chapel Hill
Chapel Hill, North Carolina 27599-7355

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Home Address: 209 Turtleback Crossing Drive
Chapel Hill, North Carolina 27516

Marital Status: Married (1990) to Natalie A. Pascuzzi (Registered Nurse)
Children: Ryan (17), Shannon (15), Erin (10)

PROFESSIONAL HIGHLIGHTS:

Research & Development Experience:

- Nanotechnology (nano-based delivery systems and nano-based sensors)
- Cell- and tissue-specific targeting (e.g., dendritic cells, tumor cells, blood-brain barrier)
- Vaccine delivery systems
- Genetic and subunit immunization
- Microbicide development
- (Micro)emulsions and multiple emulsions
- Biocompatibility, hemocompatibility, and toxicology of nanoparticles and nanomaterials
- Stabilization of proteins/peptides/plasmid DNA
- Micro- and nano-encapsulation technologies
- Topical and (trans)mucosal delivery systems
- Qualification/Validation of analytical methods
- Solid, liquid, and semi-solid dosage forms: R&D, scale-up, and GLPs/GMPs
- Over \$10.1M in grants/contracts as Principal Investigator in 10 years (and >\$24.1M total)
- Completed 36 grants/contracts from Federal or Foundation sources and 50 from Industry
- Over 235 scientific publications/abstracts and 36 patents or patents pending

Management & Leadership Experience:

- School and center-based academic administration
- Operation & Management of FDA-registered cGMP manufacturing facility
- Implementation and Leadership of R&D pharmaceutical operations
- Co-Founder & CSO of start-up companies
- Write Business & Strategic Plans
- Presentations to partners/collaborators, VCs, investment firms, SABs, and BODs
- Technology acquisition, licensing, and contract negotiations
- Member of the Board of Directors for Angel and VC-backed start-up companies
- Write U.S. and foreign (PCT) patent applications and responding to office actions
- Expert patent witness including expert reports, deposition, and witness in federal trial
- Write regulatory documents (CMC sections for IND/NDA submissions)
- Member of federal (NIH, DOD, and NSF) Scientific Review Panels
- Member of Editorial Advisory Board for scientific journals
- Consult with pharma & biotechnology companies on drug delivery/product development
- Write and implement short and long-term technical research and development plans

EDUCATION:

- 1991 – 1992 Postdoctoral Fellowship, Protein Drug Delivery
Center for Bioengineering, University of Washington, Seattle, Washington
Advisor: Allan S. Hoffman, Sc.D., Professor, Bioengineering and Chemical Engineering
- 1991 Ph.D., Pharmaceutical Sciences (Pharmaceutics/Drug Delivery)
College of Pharmacy, University of Kentucky, Lexington, Kentucky
Advisor: Michael Jay, Ph.D., Professor, Pharmaceutical Sciences
- 1988 B.A., Chemistry, with High Distinction and Departmental Honors
University of Kentucky, Lexington, Kentucky

ACADEMIC PROFESSIONAL EXPERIENCE:

- 2007 – present **UNC Eshelman School of Pharmacy, University of North Carolina at Chapel Hill,
Chapel Hill, North Carolina**

Vice Dean (June 2010-present)

- Substitute for the Dean, as required
- Support the dean operationally within the School and the University
- Facilitate all MOUs and MOAs between ESOP and other University units
- Chair the Executive Committee meetings
- Chair the Full Professors Committee
- Function as the Equal Employment Opportunity Officer for the ESOP
- Function as the curator of key ESOP documents including the Strategic Plan, Faculty Code (Governance Document), and Policies and the Procedures Governing Appointments, Reappointments, Promotion, and Tenure for Faculty in the ESOP
- Oversee and Approve External Professional Activities for Pay for Faculty in the ESOP
- Function as the Initial leader for New Initiatives including InfoPorte™
- Serve as the liaison with the University regarding implementation of University-wide program activities
- Manage areas that cut across professional education and graduate education, such as instructional technology, distance education, and programmatic expansion
- Provide assistance to the division chairs with recruitment processes
- Oversee all external communications by the ESOP
- Oversee the Appointment, Reappointment, Promotion, and Tenure process in the ESOP
- Provide oversight of all independent research intensive Centers/Institutes
- Provide oversight of the Continuing Education and Campbell Faculty Mentoring Programs

John A. McNeill Distinguished Professor, Division of Molecular Pharmaceutics (2007-present)

Research programs are focused primarily in five areas including: 1) nanotemplate engineering of nano-based detection devices and cell-specific nanoparticles for tumor and dendritic cell targeting and vaccines, 2) biocompatibility, hemocompatibility, and toxicology of nanoparticles and nanomaterials, 3) drug-polymer conjugates, 4) mucoadhesive gels, thin-films, and intravaginal rings for (trans)mucosal delivery of drugs, vaccines, and microbicides, and 5) anticancer and anti-inflammatory properties of berries and berry extracts. NIH, NSF, and industrial funding for these programs as well as others are listed under “Research Grants Awarded”. I manage several on-going collaborations with other institutions.

Director, Center for Nanotechnology in Drug Delivery (2007-present)

The Center for Nanotechnology in Drug Delivery (CNDD) was established in June 2007 at UNC-Chapel Hill to safely and effectively translate new drug and imaging discoveries into clinical trials with the goal to improve human health. Working in collaboration with other

UNC Centers and with a focus in nanotechnology, the CNDD facilitates drug discovery, characterizes and formulates lead drug candidates, and facilitates clinical development of formulated product.

Professor, UNC/NCSU Joint Department of Biomedical Engineering at UNC-Chapel Hill (2010-present)

Co-Director, UNC Institute for Nanomedicine (2008-present)

Full Member, UNC Lineberger Comprehensive Cancer Center (2007-present)

1999 – 2007

College of Pharmacy, University of Kentucky, Lexington, Kentucky

Vice Chair, Department of Pharmaceutical Sciences (2004-2007)

Associate Professor, Pharmaceutical Sciences (2004-2007): early tenure Jan. 1, 2004

Associate Director, Center for Pharmaceutical Science and Technology (2003-2006)

The CPST was the College of Pharmacy's analytical and formulation development and FDA-registered cGMP clinical trial manufacturing facility. As Associate Director, I oversaw selected operations of the Center pertaining to Business Development, Formulation Development, consulting, writing grant proposals, and negotiating contracts. As Principal Investigator on many projects, I worked closely with clients, the Director of the CPST and the Managing Director in overseeing all aspects of selected projects to their successful completion. From 1999 to 2006, working with seven different clients, I led the CPST's efforts to complete seven full product development (analytical, formulation, manufacturing, quality control) leading to the successful submission of INDs and commencement of human clinical trials. The CPST became a for-profit company, Coldstream Laboratories Inc., in 2007.

Assistant Professor, Pharmaceutical Sciences (1999-2003)

Assistant Director, Center for Pharmaceutical Science and Technology (1999-2003)

INDUSTRIAL PROFESSIONAL EXPERIENCE:

2009 – present

Ionx Capital Holdings, Inc. Lexington, Kentucky

Member, Board of Directors and Executive Committee: Ionx Capital Holdings, Inc. is a science-driven investment and development company in the human and animal health and consumer product industries. Ionx first product is IonX™ Body Temperature Alert Patch to prevent heat-related deaths (www.ionxalert.com).

2009 – present

Capture Pharmaceuticals, Inc. Chapel Hill, North Carolina

Co-Founder: Co-founded Capture Pharmaceuticals, Inc. to develop and commercialize orally bioavailable metal chelators as radionuclide decorporation agents. Co-inventor on intellectual property that was originally developed at the University of Kentucky through a series of contracts awarded by the Department of Homeland Security through the NIH-NIAID.

2004 – present

Four Tigers, LLC., Lexington and Paris, Kentucky

Co-Founder and Vice President and Chief Scientific Officer: Co-founded Four Tigers, LLC (www.four-tigers.com) in 2004 to develop and commercialize various medical and health products derived from blackberries, the State fruit of Kentucky. Blackberries are grown at WindStone Farms (www.windstonefarms.com) located in Paris, Kentucky. WindStone is largest blackberry producer east of the Mississippi River. Four Tigers is developing a pipeline of blackberry-based health products that will be marketed as cosmetics, dietary supplements, and foods, as well as medical products to prevent and treat cancer and other inflammatory diseases. Co-founded subsidiary, **Berryceuticals LLC**, in March 2008 to facilitate the commercialization of health products.

2000 – 2009

NanoMed Pharmaceuticals Inc., Kalamazoo, Michigan

Co-Founder: Co-founded NanoMed and was the co-inventor on all founding technology. NanoMed is developing nanoparticle-based advanced drug delivery systems to diagnose and treat disease. Negotiated two worldwide exclusive licenses from the University of Kentucky Research Foundation. Wrote initial business plan and all US and foreign patent applications. Successfully recruited President & CEO and helped to raise Series ‘A’ and ‘A2’ funds. Served on the Board of Directors until 2009.

1998 – 1999

ViroTex Corporation, The Woodlands, Texas

Director of Product Development: Designed, optimized, and scaled-up drug delivery systems for skin and mucosal delivery. Developed and validated analytical assays for the development of these delivery systems as products. Delivery systems were primarily polymer-based formulations applied as films, gels, pump sprays, or aerosols. Led research effort on the application of ViroTex’s BEMA™ (BioErodible MucoAdhesive) delivery technology for mucosal vaccines based on protein antigens with or without adjuvants. Established and managed two academic collaborations investigating novel mucosal vaccine candidates. Note: ViroTex was sold to Atrix Laboratories, Inc. in Nov. 1998; Atrix was subsequently sold to QLT, Inc. of Canada in 2005.

1994 – 1998

GENEMEDICINE Inc., The Woodlands, Texas

Project Team Leader, Infectious Disease Product Discovery (1997-1998): Led a team of scientists involved with the discovery and application of novel genetic vaccines for infectious diseases caused by bacterial and viral pathogens. The lead product target was *Helicobacter pylori*. The team also assessed the efficacy of proprietary formulations administered with needle-free injection devices to dogs. Responsible for long term technical planning of the projects and for leading discussions with potential corporate partners. Managed two external collaborations with Baylor College of Medicine and MD Anderson Cancer Center, both in Houston, Texas. Note: GENEMEDICINE became Valentis, Inc. in 1999.

Project Team Leader, Antigen Presenting Cell (APC) Targeting (1996-1997): Coordinated and directed a team of twelve scientists that worked to target genetic vaccines to immature dendritic cells residing in the skin epidermis (Langerhans cells) and mature dendritic cells in the draining lymph nodes. Managed annual research/personnel budget of \$1.75 million.

Group Leader, Polymer Systems Group, Gene Delivery Sciences (1995-1996): Group Leader of five scientists that worked on the discovery of polymeric gene delivery systems including protective, interactive, non-condensing (PINC™) polymers and chitosan-based systems. Coordinated and implemented the synthetic, analytical, and formulation efforts across a matrix of Program Teams (Cancer, Vaccines, Muscle/Growth Factors). Member of the Institutional Animal Care and Use Committee (IACUC).

Senior Scientist, Gene Delivery Department (1994-1995): Led a team of four formulation scientists pursuing the research, development, and scale-up of delivery systems for plasmid DNA. The delivery systems included cell-targeted plasmid complexes, dry powders, protective interactive non-condensing (PINC™) systems, and novel condensing agents such as dendrimers and chitosan analogues. Managed collaborations with two academic groups. Led the discovery, development, and scale-up of a stable, one-vial, lyophilized formulation for human Insulin-like Growth Factor (hIGF-I) Gene Medicine for potential treatment of neuromuscular diseases.

1992 – 1994

Burroughs Wellcome Co., Pharmaceutical Research and Development Laboratories, Greenville, North Carolina (now GlaxoSmithKline)

Development Scientist III, Solid Formulation Development, New Products: Designed, manufactured, and optimized oral dosage forms for new chemical entities. Wrote CMC sections for two INDs, sections of one NDA (VALTrex®), and several other regulatory

documents. Research focused on solids characterization, solid state stability, and novel drug delivery systems.

PROFESSIONAL AFFILIATIONS:

American Association of Pharmaceutical Scientists (AAPS) (1988- present)
Rho Chi Pharmaceutical Society (1988- present)
Controlled Release Society (CRS) (1990- 2003)
American Society of Gene Therapy (ASGT) (1997- 2002)
Sigma Xi Scientific Research Society (1987- 2002)
American Association of Colleges of Pharmacy (AACP) (1999- 2001)

CORPORATE, SCIENTIFIC ADVISORY BOARDS AND PATENT CONSULTING:

enGene, Inc., Vancouver, British Columbia; Member, Scientific Advisory Board (2009- present)
Frommer Lawrence & Haug LLP, New York, NY (2008- present)
Isis Pharmaceuticals, Inc., Carlsbad, California (2008- present)
Sterne, Kessler, Goldstein & Fox P.L.L.C, Washington, DC (2008- 2010)
NanoMed Pharmaceuticals, Inc., Kalamazoo, MI (2000- 2009)
Affinium Pharmaceuticals, Austin, Texas and Toronto, Ontario (2007- 2008)
Federal Trade Commission, Washington, DC (2008)
Merck & Co. Inc., West Point, Pennsylvania (2007)
enGene, Inc., Vancouver, British Columbia (2006- 2007)
Sterne, Kessler, Goldstein & Fox P.L.L.C, Washington, DC (2005)
Altea Therapeutics Corporation, Tucker, Georgia (2004)
Dynogen Pharmaceuticals, Inc., Research Triangle Park (2004)
BioDelivery Sciences International, Newark, New Jersey (2002- 2004)
Dr. Reddy's Laboratories, Inc., Upper Saddle River, New Jersey (2003- 2004)
GlaxoSmithKline Consumer Healthcare, Parsippany, New Jersey (2003- 2004)
McKinsey & Company, New York, New York (2003- 2004)
Sterne, Kessler, Goldstein & Fox P.L.L.C, Washington, DC (2002)
Niadyne, Inc., Tucson, Arizona (2000- 2002)
Access Pharmaceuticals, Dallas, Texas (1999- 2001)
Tigen Pharmaceuticals, Inc., Lexington, Kentucky (2001)
Viridae Clinical Sciences, Inc., Vancouver, British Columbia (2000- 2001)
Intranasal Technologies Inc., Lexington, Kentucky (1999- 2001)
Caprion Pharmaceuticals, Montreal, Quebec, Canada (1999- 2000)
Atrix Laboratories, Fort Collins, Colorado (1998- 1999)

SCIENTIFIC REVIEW PANELS:

Clinical Trials. National Institute on Deafness and Other Communication Disorders. ZDC1 SRB-L (48). NIDCD-National Institutes of Health. Teleconference. February 23, 2010.
Chair. Multifunctional Particles for Targeting and Delivery Special Emphasis Panel ZGM1 CBB-4 (MP). ARRA Grand Opportunity. NIGMS-National Institutes of Health. Teleconference. August 12, 2009.
Drug Discovery ARRA. Special Emphasis Panel (ZRG1 OTC-B-96). Center for Scientific Review. National Institutes of Health. Teleconference. June 30, 2009.
Vaccines for Immunotherapy of HIV. Special Emphasis Panel (ZAI1-EC-A M3). Program Application (P01). NIAID-National Institutes of Health. Teleconference. March 31, 2009.
Division of Microbiology and Infectious Diseases (DMID), NIAID, NIH, BARDA – Application of Platform Technologies for the Development of Therapeutics for Biodefense. Gaithersburg, Maryland. October 16-17, 2008.
AAPS Lipid-Based Drug Systems Focus Group – Review of AAPS Lipid-Based Drug Delivery Outstanding Research Award and AAPS Lipid-Based Drug Delivery Graduate Student Award. June, 2008.
KAUST Research Fellows Competition. King Abdullah University of Science and Technology Global Research Partnership (GRP). April 4, 2008.
2007 Breast Cancer Research Program (BCRP) Concept – Clinical and Experimental Therapeutics

- (CET#5). Department of Defense, United States Army Medical Research and Materiel Command, Congressionally Directed Medical Research Programs (CDMRP). March 12, 2008.
- Vanderbilt University's Intramural Discovery Grant Program (IDGP). Vanderbilt University. December 19, 2007.
- Nanotechnology and Nanoscience Special Emphasis Panel (ZRG1 BCMB-S-50). Center for Scientific Review. National Institutes of Health. Bethesda, Maryland. February 22-23, 2007.
- HIV/AIDS Vaccine Study Section (VACC-3). Center for Scientific Review. National Institutes of Health. Bethesda, Maryland. July 13-14, 2006.
- Respiratory Integrative Biology and Translational Research (RIBT) Study Section. Special Emphasis Panel Bioengineering Research Applications – Respiratory. ZRG1 RES-D (52) (R). National Institutes of Health. June 14, 2006.
- Nanotechnology and Nanoscience Special Emphasis Panel (ZRG1 BCMB-A-50). Center for Scientific Review. National Institutes of Health. Bethesda, Maryland. July 11-12, 2005.
- Biophysical and Chemical Sciences Integrated Review Group (ZRG1 BPC-B-02). Center for Scientific Review, Special Emphasis Panel. National Institutes of Health. July 16, 2004.
- Biomedical Research Program. Florida Department of Health. June 9, 2004
- 2003 Breast Cancer Research Program - Clinical Concept and Experimental Therapeutics. Department of Defense, United States Army Medical Research and Materiel Command, Congressionally Directed Medical Research Programs (CDMRP). March 12, 2004.
- Breast Cancer Research Program. Clinical and Experimental Therapeutics #3. Department of Defense, United States Army Medical Research and Materiel Command, Congressionally Directed Medical Research Programs (CDMRP). Reston, Virginia. July 30 – August 1, 2003.
- Brain Disorders and Clinical Neurosciences (SSS-S). Center for Scientific Review. SBIR/STTR Grant Applications. National Institutes of Health. Bethesda, Maryland. July 7-8, 2003.
- Seed Money for Cancer Research. Ohio Cancer Research Associates. March 24, 2003.
- NIH Predoctoral Fellowship Awards for Students with Disabilities (SSS-C). Center for Scientific Review. National Institutes of Health. Bethesda, Maryland. March 12, 2003.
- Medical Imaging Technologies Study Section (SSS-7). Center for Scientific Review. SBIR/STTR Grant Applications. National Institutes of Health. Bethesda, Maryland. March 3-4, 2003.
- Medical Imaging Technologies Study Section (SSS-7). Center for Scientific Review. National Institutes of Health. Teleconference. December 16, 2002.
- Drug Delivery and Drug Discovery Study Section (SSS-L). Center for Scientific Review, Special Emphasis Panel, Biophysical and Chemical Sciences. SBIR/STTR Grant Applications. National Institutes of Health, Silver Spring, Maryland. October 28-29, 2002.
- Microbicide Preclinical Development Program. Program Project Grants. National Institute of Child Health and Human Development & National Institute of Allergy and Infectious Diseases, National Institutes of Health. April 10, 2002.
- Biophysics and Chemistry. Center for Scientific Review, Special Emphasis Panel. Bioengineering Research Partnerships. National Institutes of Health, Silver Spring, Maryland. March 12, 2002.
- Drug Delivery and Drug Discovery Study Section (SSS-L). Center for Scientific Review, Special Emphasis Panel, Biophysical and Chemical Sciences. SBIR/STTR Grant Applications. National Institutes of Health, Silver Spring, Maryland. March 11, 2002.
- Drug Delivery and Drug Discovery Study Section (SSS-L). Center for Scientific Review, Special Emphasis Panel, Biophysical and Chemical Sciences. SBIR/STTR Grant Applications. National Institutes of Health, Bethesda, Maryland. November 1-2, 2001.
- Microbicide Preclinical Development Program. Program Project Grants. National Institute of Child Health and Human Development, National Institutes of Health, Silver Spring, Maryland. August 7-9, 2001.
- Drug Delivery and Drug Discovery Study Section (SSS-L). Center for Scientific Review, Special Emphasis Panel, Biophysical and Chemical Sciences. SBIR/STTR Grant Applications. National Institutes of Health, Bethesda, Maryland. March 22-23, 2001.
- Biophysics and Chemistry. Center for Scientific Review, Special Emphasis Panel. Bioengineering Research Partnerships. National Institutes of Health, Bethesda, Maryland. March 21, 2001.
- Drug Delivery and Drug Discovery Study Section (SSS-L). Center for Scientific Review, Special Emphasis Panel, Biophysical and Chemical Sciences. SBIR/STTR Grant Applications. National Institutes of Health, Bethesda, Maryland. November 16-17, 2000.
- Nanoscale Modeling and Simulation Program. National Science Foundation, Arlington, Virginia. June 1-2, 2000.

SCIENTIFIC JOURNAL AND BOOK REVIEWER:**Journals:**

<i>AAPS PharmSciTech</i>	<i>Journal of Biological Inorganic Chemistry</i>
<i>Advanced Drug Delivery Reviews</i>	<i>Journal of Biomedical Nanotechnology</i>
<i>Bioconjugate Chemistry</i>	<i>Journal of Controlled Release</i>
<i>Biomacromolecules</i>	<i>Journal of Dispersion Science and Technology</i>
<i>Biomaterials</i>	<i>Journal of Drug Targeting</i>
<i>Cancer Research</i>	<i>Journal of Gene Medicine</i>
<i>Critical Reviews in Therapeutic Drug Carrier Systems</i>	<i>Journal of Nanoscience and Nanotechnology</i>
<i>Drug Development and Industrial Pharmacy</i>	<i>Journal of Pharmacy & Pharmacology</i>
<i>European Journal of Pharmaceutics and Biopharmaceutics</i>	<i>Journal of Pharmaceutical Sciences, Peptides</i>
<i>Expert Opinion in Drug Delivery</i>	<i>Molecular Pharmaceutics</i>
<i>Expert Opinion on Investigational Drugs</i>	<i>Nanomedicine</i>
<i>Free Radical Biology and Medicine</i>	<i>Pharmaceutical Development and Technology</i>
<i>International Journal of Pharmaceutics</i>	<i>Pharmaceutical Research</i>
<i>Journal of Applied Polymer Science</i>	

Vaccine Protocols. Second Edition. Eds., Andrew Robinson, Michael J. Hudson, and Martin P. Cranage. Humana Press. Totowa, New Jersey. 2003, 414 pp. Book Review published in *Pharmaceutical Research*, Vol. 21, No. 6, June 2004.

The Process of New Drug Discovery and Development. 2nd Edition. Edited by Charles G. Smith and James T. O'Donnell. Informa Healthcare, New York, New York. 2006, 657 pp. Book Review published by *Drug Dev Ind. Pharm.* In-Press.

EDITORIAL ADVISORY BOARD:

2009 – present	<i>HIV/AIDS – Research and Palliative Care</i>
2004 – present	<i>Journal of Biomedical Nanotechnology</i>
2000 – present	<i>Drug Development and Industrial Pharmacy</i>
2001 – 2007	<i>TheScientificWorld Journal – Drug Delivery</i>

HONORS, AWARDS, and OTHER ACTIVITIES:

2010 – pres. Chair, Bio-Targeting Working Group, NCI Alliance for Nanotechnology in Cancer

2009 – pres. Steering Committee Member, AAPS Nanotechnology Focus Group

2009 Elected Fellow, American Association of Pharmaceutical Scientists (AAPS)

2009 External Reviewer. The University of Texas at Austin College of Pharmacy Research and Graduate Program. June 9-12, 2009.

2009 Advisory Scientific Panel. The Third International Conference on Modern Vaccines Adjuvants & Delivery Systems. The Austrian Industrial Association, Vienna, Austria. October 28-30, 2009.

2009 Lead Organizer. Fourth Annual Chapel Hill Drug Conference. “The Use of Nanotechnology to Create Safe and Effective Therapeutic and Diagnostic Products”. University of North Carolina at Chapel Hill. Chapel Hill, North Carolina. May 13-14, 2009. PI on proposal to fund conference via several corporate sponsors as well as the North Carolina Biotechnology Center.

2008 Co-coordinator of “Nanotechnology Congress on Pharmaceutical Applications.” Instituto de Ingenieros Químicos, Colegio de Ingenieros y Agrimensores de Puerto Rico. San Juan, Puerto Rico. March 7, 2008.

2007 Peer-reviewed papers published in *Eur. J. Pharm. Biopharm* (2005) and *J. Con. Rel.* (2004) listed as top-ten most cited papers in the journals for these years.

2007 2007 Great Teacher Award. The UK Alumni Association Great Teacher Award recognizes annually six outstanding faculty members at UK for their work in the classroom. It is the oldest, continuously given award for teaching on the UK campus. Since its inception in 1961, 223 faculty members have been honored with this prestigious award.

2007 Co-Editor of Special Issue in the *Journal of Biomedical Nanotechnology*. Volume 3, Number 2 (June 2007)

- 2006 2006 AAPS Lipid-based Drug Delivery Award sponsored by Gattefossé Corporation
- 2006 Co-organizer and US Coordinator of the “Indo-US Symposium on Nanotechnology in Advanced Drug Delivery” held at the National Institute of Pharmaceutical Education and Research (NIPER), October 5-6, 2006 in Punjab, India. Co-PI on proposal to secure funding from the Indo-US Science and Technology Forum (IUSSTF).
- 2006 Advisory Scientific Panel and Session Moderator on “Particulate Delivery Systems”. International Conference on Modern Vaccines: Adjuvants & Delivery Systems. The Royal Society of Medicine, London, United Kingdom. September 12-14, 2006.
- 2005 Invited Panel Member on “Due Diligence”. The Power of Angel Investing. Kauffman Foundation. Lexington, Kentucky. October 31, 2005.
- 2005 Robert A. Blouin Excellence in Pharmaceutical Graduate Education Award for Academic Year 2004-2005. Department of Pharmaceutical Sciences, College of Pharmacy, University of Kentucky
- 2004 *Best Paper Award 2003* in *European Journal of Pharmaceutics and Biopharmaceutics*. Award co-sponsored by APV and Elsevier and presented at the “International Meeting on Pharmaceutics, Biopharmaceutics and Pharmaceutical Technology 2004” in Nuremberg, Germany. March 15-18, 2004. Paper by Z Cui and RJ Mumper titled “The Effect of Co-administration of Adjuvants with a Nanoparticle-based Genetic Vaccine Delivery System on the Resulting Immune Responses” published in *Eur. J. Pharm. Biopharm.* (2003) 55:11-18.
- 2004 VivaGel™, a topical dendrimer-based microbicidal gel developed by the CPST for Starpharma, was named one of the Top 5 Nanotech Breakthroughs of 2004 in the Forbes/Wolfe Nanotech Report (December 2004).
- 2003 Advisory Scientific Panel. International Conference on Modern Vaccines: Adjuvants & Delivery Systems. Dublin, Ireland. June 4-6, 2003.
- 2003 Panel Moderator, Drug Discovery and Delivery. Life Sciences Without Boundaries. Ohio Valley Affiliates for Life Sciences (OVALS). Cincinnati, Ohio. March 10-11, 2003.
- 2001 PhRMA Foundation Fellowship to Support Undergraduate Research in Pharmaceutics
- 1999 New Investigator Award, American Association of Colleges of Pharmacy
- 1991 Procter & Gamble AAPS Graduate Symposium in Drug Delivery and Pharmaceutical Technology
- 1988 Oswald Research and Creativity Award for Undergraduate Research
- 1988 Willard Riggs Meredith Award for Outstanding Undergraduate Chemistry Student
- 1988 Department of Energy Undergraduate Fellowship in Nuclear Chemistry and Radiochemistry
- 1986 University Honors Program Anniversary Scholarship
- 1985-1987 University of Kentucky Alumni Association Scholarship
- 1985-1987 President, University of Kentucky Student Alumni Council

TEACHING ACTIVITY:

Primary Responsibilities (Course Coordinator):

- MOPH 899 Seminar in Molecular Pharmaceutics (2009-2010)
- MOPH 738 Nanomedicine; campus-wide graduate elective course (2009-present)
- PHCY 411 Basic Pharmaceutics II; first year required Pharm.D. course at the University of North Carolina at Chapel Hill (2010-present)
- PHR 924 Principles of Pharmaceutical Sciences II: New & Novel Dosage Forms & Drug Delivery System; first year required Pharm.D. course at the University of Kentucky (2002-2007)

Secondary Responsibilities:

- MOPH 864 Advances in Drug Delivery (2008-present)
- MOPH 862 Advanced Pharmaceutics (2008-present)
- PHR 622 Advanced Biopharmaceutics (2000-2007)
- PHR 647 Introduction to Molecular Pharmacotherapeutics (2001)
- PHR 760 Introduction to Pharmaceutical Sciences (1999-2007)
- PHR 924 Basic Principles of Pharmaceutical Science: New and Novel Drug Delivery Systems (2000-2001)
- CME 006 Chemical Engineering Professions (2000)
- PHR 951 Integrated Therapeutics: Molecular Therapy (2000)
- BIO 582 Virology (2000)

ADVISING & MENTORING ACTIVITY:High School Students:

	<u>Student</u>
2005 – 2007	Lauren Gates (Dunbar High School, Math Science & Technology Program)
2002 – 2004	Rohan Dixit (Dunbar High School, Math Science & Technology Program)

Undergraduate and Professional Students:

	<u>Student</u> (Major/selected awards)
2010 – 2010	Will Taylor (Pharmacy Student)
2007 – 2010	Eric Butter (Robertson Scholar at UNC-Chapel Hill and Duke; NIH-NIAID Intramural NIAID Research Opportunities (INRO) Award; Scholarship, North Carolina Section of the American Chemical Society,)
2008 – 2009	Brian Murray (Pharmacy Student)
2005 (summer)	Josh Eldridge (Chemistry; 2005 SURP Fellowship)
2005 (summer)	Tyler Whisman (Pharmacy; 2005 SURP Fellowship)
2003 (summer)	Matthew Berginski (Biomedical Engineering; 2003 NSF REU Fellowship)
1999 – 2002	Will Fountain (Chemistry; PhRMA Undergraduate Research Fellowship in Pharmaceutics 2001; 2000 NSF REU Fellowship; 2000 SURP Fellowship)
2001	Jayne Hartley (Chemistry)
2001 (summer)	Patrick Roberts (Pharmacy)
2001 (summer)	Steven Jay (Biological Engineering; 2001 NSF REU Fellowship)
1999 – 2000	Joseph Martin (Chemical Engineering)
1999 – 2000	Michael Lundin (Chemical Engineering)

Ph.D. Graduate Students as Major Advisor Selected Awards; *First and Current Positions*

Lei Peng	(2009 – present)	2010 Translational Medicine Fellowship awarded by the Howard Hughes Medical Institute-funded UNC Program
Lan Feng	(2008 – present)	2007 Eshelman Fellowship
Shalini Minocha	(2007 – present)	2010 Abbott Internship Program
Dongyun Liu	(2007 – present)	2008 Eshelman Fellowship
Saurabh Wadhwa	(2007 – present)	2010 Fifth Annual NIH National Graduate Student Research Festival; 2010 MOPH Graduate Scholar Award; 2009-2010 Amgen Graduate Fellowship
Ping Ma	(2007 – present)	
Jin Dai	(2004 – 6/16/09)	Research abstract recognized in AAPS press release in 2007; <i>First Position – Ionx Capital Holdings/Four Tigers LLC</i>
Xiaowei Dong	(2005 – 4/13/09)	2008 AAPS Award in Drug Delivery and Pharmaceutical Technology sponsored by Bristol-Myers Squibb; <i>First Position – Novartis</i>
Anshul Gupte	(2003 – 3/19/08)	2008 PDA Graduate Student Award; 2007 AAPS Award in Biotechnology sponsored by Pfizer Global Biologics; <i>First Position – Metrics, Inc.</i>
Jigna Patel	(2002 – 6/21/06)	AFPE Fellowship 2003 & 2004; UK Dissertation Year Fellowship 2005; 2005 AAPS Award in Drug Delivery and Pharmaceutical Technology sponsored by Bristol-Myers Squibb; <i>First Position – Pfizer</i>
Joanna Koziara	(2001 – 8/25/05)	UK Dissertation Year Fellowship 2004; 2004 AAPS Award in Drug Delivery and Pharmaceutical Technology sponsored by Bristol-Myers Squibb; <i>First Position – Alza/J&J; Current Position – Gilead</i>
Moses Oyewumi	(2000 – 8/28/03)	AAPS and CRS/NCI travel awards; <i>First Position – Emisphere Technologies, Inc.; Current Position – Assistant Professor, Northeastern Ohio Universities College of Pharmacy (NEOUCOP)</i>
Zhengrong Cui	(1999 – 10/18/02)	UK Dissertation Year Fellowship 2002; UK Presidential Fellowship 2001; UK Medical Center Fellowship 2000; Mid-Year KY Opportunity Fellowship 2000. <i>First Position – Assistant Professor, Oregon State University; Current Position – Associate Professor, University of Texas at Austin.</i>

Graduate Students as Dissertation Committee Member

Dongqiuye Pu	2010 – present
Beth Vasievich	2010 – present
Keith Miller (Biochemistry & Biophysics)	2010 – present
Jing Xu (Chemistry)	2009 – present
Chenchen Wang	2008 – 2009
Zhen Xu	2008 – present
Shyh-Dar (Star) Li	2008
Donghua Zhu	2007
James Weekley	2004 (M.S.)
Ge Jiang	2002
Xueqin Song	2002
Scott Webb	2000 (M.S.)

Outside Examiner on Ph.D. Dissertations:

Vasile Smuleac, Department of Chemistry, University of Kentucky (5/26/2006)

Anahita Fathi-Azarbayjani, Department of Pharmacy, National University of Singapore (11/3/2009)

Postdoctoral Fellows:

Anekant Jain, Ph.D.	2008 – present	Vaccine delivery systems and tumor targeting
Rahima Benhabbour, Ph.D.	2008 – 2010	Intravaginal rings & targeted nanosystems
Anuraag Sarangi, Ph.D.	2009 – 2011	Liver cancer imaging and therapeutics
Weili Yan, Ph.D.	2007 – 2008	Subunit HIV protein vaccines
Moses Oyewumi, Ph.D.	2003 – 2004	Tumor targeting
Zhengrong Cui, Ph.D.	2002 – 2003	Genetic immunization/Brain targeting
Graham Warren, Ph.D.	1999 – 2000	DNA delivery/Acute phase response
Fiona MacLaughlin, Ph.D.	1996 – 1997	Non-viral gene delivery systems

Research Faculty:

Rahima Benhabbour, Ph.D.	2010 – present	Intravaginal rings & targeted nanosystems
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COLLEGE & UNIVERSITY SERVICE & COMMITTEES:

2010 – present	Chair, Curricula Innovations Advisory Committee
2010 – present	Chair, Full Professors' Committee
2010 – present	Member, Singapore Planning Committee
2010 – present	Member, Advisory Council, Asheville Expansion Project Team
2010	Chair, Search Committee, Director of Human Resources, ESOP
2010 – present	Member, UNC InfoPorte 2.0 (Enterprise Version) Steering Committee
2010	Member, Review Committee for the Administrative Review of the Chair, Division of Pharmacotherapy and Experimental Therapeutics, UNC Eshelman School of Pharmacy
2008 – present	Member, Scientific Advisory Committee, Translational Cancer Research Center (TCRC), South Dakota State University
2008 – present	Member, Chapel Hill Drug Conference Advisory Committee
2009 – 2010	ESOP Curriculum Committee
2009	Member, UNC Committee for the 5-year Review of the Institute for Advanced Materials, Nanoscience and Technology (IAM) at UNC-Chapel Hill
2008 – 2009	UNC Licensing Committee
2008 – 2009	ESOP Committee for Internationalization
2008 – 2009	Chair, Organizing Committee, 4 th Annual Chapel Hill Drug Conference (May 2009)
2007 – 2009	University Cancer Research Fund Equipment Committee
2007 – 2010	Imaging Research Building – Construction and Equipment Committee
2007 – present	Scientific Advisory Board, Center for Integrative Chemical Biology and Drug Discovery
2007 – 2009	Conflicts of Interest and Conflict of Commitment Advisory Committee, School of Pharmacy
2008	Member, Search Committee, Associate Director of GLP Center
2007 – 2008	Chair, Search Committee, 1 st Faculty Recruit for CNDD
2003 – 2007	Member, Markey Cancer Center – College of Pharmacy Experimental Therapeutics Steering

	Committee
2005 – 2006	Chair, Search Committee, Director of Graduate Studies, College of Pharmacy
2004 – 2005	Chair, Department Curriculum and Graduate Research Committee
2002 – 2005	Member, CPST Coldstream Building Committee, College of Pharmacy
2002 – 2005	Member, President’s University Research Advisory Committee
2003 – 2004	Co-Chair, Curriculum Committee, College of Pharmacy
2003 – 2004	Chair, Search Committee, College of Pharmacy, Pharmacogenomics Faculty Position
2002 – 2003	Member, Curriculum Committee, College of Pharmacy
2002	Member, Committee to Review Teaching Assistant Policies and Procedures
2002	Member, Search Committee, College of Pharmacy, Chair, Division of Pharmaceutical Sciences
2001 – 2002	Member, Safety Committee, College of Pharmacy
2000 – 2001	Member, Search Committee, College of Pharmacy, Pharmacogenomics Faculty Position

INVITED TALKS & SEMINARS:

1. *Nanoparticle-based Antigen-Adjuvant Delivery Systems*. 2011 Society for General Microbiology. Harrogate International Centre, Harrogate, United Kingdom. April 11-14, 2011.
2. *Pharmaceutical Development of Nanoparticle-based Antigen & Adjuvant Delivery Systems*. Fourth International Conference on Immunopotentiators in Modern Vaccines. Porto, Portugal. April 6-8, 2011.
3. *Engineering Safe and Functional(ized) Nanoparticles for Cancer and Vaccine Applications*. UNC/NCSU Joint Department of Biomedical Engineering. University of North Carolina at Chapel Hill. January 21, 2011.
4. *Wayfinding in the Pharmaceutical Sciences – Challenges & Rewards of an Academic Career*. Canadian Society for Pharmaceutical Sciences. Member of Academic Panel. Richmond, British Columbia, Canada. June 3, 2010.
5. *Engineered Lipid-Based Nanoparticles and Nanocapsules for Overcoming Multi-Drug Resistance in Cancer*. Canadian Society for Pharmaceutical Sciences. Richmond, British Columbia, Canada. June 2-5, 2010.
6. *Nanoparticles as Multi-Epitope HIV Protein Subunit Vaccine Delivery Systems*. Particles 2010. Medical/Biochemical Diagnostic, Pharmaceutical, and Drug Delivery Applications of Particle Technology. Lake Buena Vista, Florida. May 22-25, 2010.
7. *Pharmaceutically Engineered Nanosystems to Address Multi-Drug Resistant Cancer*. Department of Pharmaceutics, College of Pharmacy, University of Minnesota. December 10, 2009.
8. *Nanoparticles - Are They Ever Going to Amount to Anything?* One of two invited panelists for Roundtable Symposium. AAPS Annual Meeting. Los Angeles, California. November 8-12, 2009.
9. *Moving Toward a Nanoparticle-Based Vaccine Delivery System Carrying an Adjuvant and Multiple HIV Protein Antigens*. The Third International Conference on Modern Vaccines Adjuvants & Delivery Systems. The Austrian Industrial Association, Vienna, Austria. October 28-30, 2009.
10. *Addressing Multidrug Resistance in Cancer Using Engineered Nanosystems*. Department of Biopharmaceutical Sciences. College of Pharmacy. University of Illinois at Chicago. October 14, 2009.
11. *Nanotemplate Engineering to Create Cancer Nanomedicines and Nano-based Vaccines*. Mylan School of Pharmacy. Duquesne University. August 7, 2009.
12. *Translating Nanotechnologies into Nanomedicines*. Invited panelist for Special Symposium titled “Nanotechnology and Drug Development”. American Association of Colleges of Pharmacy (AACCP) Annual Meeting. Boston, Massachusetts. July 18-22, 2009.
13. *Nano-Bio Tutorial*. North Carolina Nanotechnology Commercialization Conference. Raleigh Convention Center. Raleigh, North Carolina. March 25, 2009.

14. *Solid Lipid Nanoparticles and Advanced Oil-Filled Nanocapsules for Drug Delivery*. Particle Sciences, Inc. Bethlehem, Pennsylvania. March 11, 2009.
15. *Nano-based Delivery Approaches to Address Multidrug Resistance in Cancer*. Carolina Center of Cancer Nanotechnology Excellence Seminar Series. UNC Lineberger Comprehensive Cancer Center February 10, 2009.
16. *Recent Advances in Oral (Trans)Mucosal Delivery Using Thin Film Technology*. AAPS Symposium on Emerging Technologies for Development of Oral Delivery Systems. AAPS Annual Meeting. Atlanta, Georgia. November 16-20, 2008.
17. *Nanotoxicology and Other Regulatory Considerations for Translating Nanotechnologies into Nanomedicines*. Singapore Nanomedicine Workshop 2008: Advances in Nanomedicine for Better Healthcare: A Multidisciplinary Approach. The Biopolis. Singapore. October 22-25, 2008.
18. *Moving Toward Clinical Investigation with Pharmaceutically Engineered Lipid-Based Nanoparticles*. 1st Annual Unither Nanomedical and Telemedical Technology Conference. Magog, Quebec, Canada. April 2-3, 2008.
19. *Nanoparticles for Vaccine and Cancer Therapeutics*. "Nanotechnology Congress on Pharmaceutical Applications." Instituto de Ingenieros Químicos, Colegio de Ingenieros y Agrimensores de Puerto Rico. San Juan, Puerto Rico. March 7, 2008.
20. *Nanotoxicology of Manufactured and Pharmaceutical Nanoparticles*. "Nanotechnology Congress on Pharmaceutical Applications." Instituto de Ingenieros Químicos, Colegio de Ingenieros y Agrimensores de Puerto Rico. San Juan, Puerto Rico. March 7, 2008.
21. *Nanotemplate Engineering of Solid Nanoparticles for Pharmaceutical Applications*. Merck & Co., Inc. West Point, Pennsylvania. November 5, 2007.
22. *Transitioning Injectable Nanoparticle-based Drug Delivery Systems into Human Clinical Trials: Engineering, Cost, Safety, and Efficacy*. Eli Lilly & Company Pharmaceutical Nanotechnology Symposium. Indianapolis, Indiana. October 12, 2007.
23. *Characterization of Blackberry Extracts and the Development of a Blackberry Extract Chewing Gum for the Prevention of Gingivitis*. Wm. Wrigley Jr. Company. Chicago, Illinois. October 3, 2007
24. *Anti-Cancer and Anti-Inflammatory Properties of Extracts from Three Kentucky Blackberries: Moving Toward Botanical Drug Products*. Kentucky Tobacco Research and Development Center (KTRDC). Lexington, Kentucky. September 12, 2007.
25. *Engineering of Solid Nanoparticles via Microemulsion Nanotemplates*. 16th International Symposium on Microencapsulation. Lexington, Kentucky. September 9-12, 2007.
26. *Engineered Nanoparticles for HIV-1 Tat and Gag p24-based Vaccines and an Overview of other Nano- and Natural Product based Projects*. University of North Carolina, School of Pharmacy. Chapel Hill, North Carolina. January 12, 2007.
27. *Engineering and In-Vitro and In-Vivo Evaluation of Lipid-Based Nanoparticles*. "Indo-US Symposium on Nanotechnology in Advanced Drug Delivery" held at the National Institute of Pharmaceutical Education and Research (NIPER) in Punjab, India. October 5-6, 2006.
28. *Pharmaceutically Engineered Nanoparticles as Delivery Systems for HIV-1 Protein-Based Vaccines: In-Vitro and In-Vivo Evaluation*. The 2nd International Conference on Modern Vaccine Adjuvants and Delivery Systems. London, England. September 12-14, 2006.
29. *Overview of Research Program and Future Direction*. Lerner Research Institute, Cleveland Clinic Foundation. Cleveland, Ohio. August 8, 2006.

30. *Nanotemplate Engineering of Pharmaceutical Nanoparticles for Improved Dendritic Cell and Tumor Targeting*. Taussig Cancer Center and Lerner Research Institute. Cleveland Clinic Foundation. Cleveland, Ohio. July 5, 2006.
31. *NanoMedicine: The Use of Nano-based Delivery Systems to Address Unmet Needs in Cancer Therapeutics and Vaccine Development*. Northeastern Ohio Universities, Colleges of Pharmacy and Medicine. Rootstown, Ohio. June 5, 2006.
32. *Overview of Four Tigers, LLC*. Amgen Inc. and The Commonwealth of Kentucky Meeting. Cabinet for Economic Development. Department of Commercialization and Innovation. Frankfort, Kentucky. May 10, 2006.
33. *Overview of NanoMed Pharmaceuticals, Inc.* Amgen Inc. and The Commonwealth of Kentucky Meeting. Cabinet for Economic Development. Department of Commercialization and Innovation. Frankfort, Kentucky. May 10, 2006.
34. *Potential Health and Medical Products Derived from Blackberries and Black Raspberries*. Kentucky Dietetic Association. Lexington, Kentucky. April 26-28, 2006.
35. *Nanoscience: Toward a Dendritic Cell Targeted HIV Vaccine*. University of North Carolina, School of Medicine. The Program in Macromolecular Therapeutics Distinguished Lecturer Series. Sponsored by the Department of Pharmacology, the School of Medicine, and the School of Pharmacy. Chapel Hill, North Carolina. November 2, 2005.
36. *Nanotechnology and NanoMedicine*. College of Engineering. University of Kentucky. Lexington, Kentucky. February 16, 2005.
37. *Preparing for Your (Successful) Post-PhD Career in Industry or Academia*. AAPS Visiting Scientist Program. College of Pharmacy. University of Utah. Salt Lake City, Utah. February 11, 2005.
38. *Subunit and Genetic HIV Vaccines Using Nanoparticle Carriers*. College of Pharmacy. University of Utah. Salt Lake City, Utah. February 10, 2005.
39. *Nanotechnology and Cancer NanoMedicine: From the University Lab to a Bluegrass Nano Company*. The Greater Lexington Chamber of Commerce. Invited by UK President Dr. Lee Todd. Lexington, Kentucky. September 28, 2004.
40. *Nanoengineered HIV Vaccines Based on Tat and Gag p24*. Altea Therapeutics Corporation. Tucker, Georgia. July 9, 2004.
41. *Preparing for Your (Successful) Post-PhD Career in Industry or Academia*. Graduate Programs of Pharmacy, Biology, and Medicine. University of Kentucky. Lexington, Kentucky. January 14, 2004.
42. *Targeting Nanoengineered HIV Vaccines to Dendritic Cells*. School of Pharmacy and the National Center for Natural Products Research. University of Mississippi. Oxford, Mississippi. January 8, 2004.
43. *Mucoadhesive Films and Gels for Topical Drug Delivery*. GlaxoSmithKline Consumer Healthcare. Parsippany, New Jersey. December 10, 2003.
44. *Commercial Opportunities Using Film-Forming Gels and Thin-Film Composites*. Pfizer Consumer Health. Morris Plains, New Jersey. August 13, 2003.
45. *Buccal Mucosal Immunization Using Thin-Film Composites Containing Plasmid DNA or Protein Antigen*. International Conference on Modern Vaccines: Adjuvants and Delivery Systems. Dublin, Ireland. June 6, 2003.
46. *Pharmaceutically Engineered Nanoparticles for Genetic and Subunit Immunization*. International Conference on Modern Vaccines: Adjuvants and Delivery Systems. Dublin, Ireland. June 5, 2003.

47. *Targeting the Blood-Brain Barrier Using Nanoparticles*. Pharmaceutical R&D, Pfizer, Inc. Groton, Connecticut. March 13, 2003.
48. *Drug Discovery and Drug Delivery: Entrepreneurial Initiatives at the University of Kentucky*. Life Sciences Without Boundaries. Ohio Valley Affiliates for Life Sciences (OVALS). Cincinnati, Ohio. March 10, 2003.
49. *Engineering Nanoparticles and Thin-Films for Drug and Vaccine Delivery*. College of Pharmacy. The Ohio State University. Columbus, Ohio. February 5, 2003.
50. *Nanotemplate Engineering of Nanoparticles Using Microemulsions: Applications in Radiation Detection, Imaging, and Cell-Targeting*. National Science Foundation's International Workshop on Advances in Micro and Nano Technologies for Sensing Applications. Melbourne, Australia. December 13, 2002.
51. *Dendritic and Tumor Cell Targeting Using Pharmaceutically Engineered Nanoparticles*. School of Pharmacy. Texas Tech University Health Science Center. Amarillo, Texas. November 15, 2002.
52. *New Product Development*. School of Pharmacy. First Year Pharmacy Class in Drug Delivery Systems I. Texas Tech University Health Science Center. Amarillo, Texas. November 15, 2002.
53. *Nanotemplate Engineering of Cell-Specific Nanoparticles: Applications in Genetic and Subunit Immunization and Tumor Targeting*. College of Pharmacy. The Ohio State University. Columbus, Ohio. October 16, 2002.
54. *Novel Drug Delivery Systems Based on Nanotemplate Engineering and Thin-Film Composites*. Eurand America, Inc. Vandalia, Ohio. August 7, 2002.
55. *Nanoengineered and Mucosal Vaccines*. GlaxoSmithKline World Wide Vaccines. Rixensart, Belgium. May 24, 2002.
56. *Nanotemplate Engineering for Enhanced Drug Solubility and Delivery*. Ardana Biosciences. Edinburgh, Scotland, United Kingdom. May 22, 2002.
57. *Nanotemplate Engineering and Thin-Film Composites for Vaccine & Drug Delivery*. Monsanto. St. Louis, Missouri. May 16, 2002.
58. *Advanced Drug Delivery Systems Based on Nanotemplate Engineering and Thin-Film Composites*. The 19th Annual International Technology Transfer Forum. Technology Catalysts International. Reston, Virginia. May 13, 2002.
59. *Nanoengineered (Genetic) Vaccines Targeted to Dendritic Cells*. Department of Physiology. The University of Kentucky. Lexington, Kentucky. April 24, 2002.
60. *Genetic and Subunit Immunization Using Nanoparticles Engineered from Microemulsion Precursors*. The International Conference Particles 2002 - Medical/Biochemical Diagnostic, Pharmaceutical, and Drug Delivery Applications of Particle Technology. Orlando, Florida. April 21, 2002.
61. *Targeted Nanoengineered Vaccines and Thin-Film-Based Mucosal Vaccines*. Schering-Plough Research Institute. Kenilworth, New Jersey. February 28, 2002.
62. *Nanotemplate Engineering and Thin-Film Composites for Transmucosal Drug Delivery*. Bristol-Myers Squibb Company. Pharmaceutical Research Institute. New Brunswick, New Jersey. February 27, 2002.
63. *Nanotemplate Engineering and Thin-Films for Drug Delivery*. Pharmacia Corporation. Global R&D Drug Delivery. Kalamazoo, Michigan. January 16, 2002.
64. *Viral and Non-Viral Gene Delivery: Strategies, Methods, and Models*. American Association of Pharmaceutical Sciences Annual Meeting. New Orleans, Louisiana. November 17, 1999.
65. *Using Carrier Systems for Targeted Plasmid DNA Delivery*. American College of Clinical Pharmacy. Kansas City, Missouri. October 27, 1999.

66. *An Overview of New Product Development*. Caprion Pharmaceuticals, Inc. Montreal, Quebec, Canada. September 10, 1999.
67. *Gene Therapy Technology: Molecular Conjugates*. American Society of Gene Therapy. First Annual Meeting. Seattle, Washington. May 28, 1998.
68. *Advances in Synthetic Gene Delivery Systems*. Department of Pharmaceutics, College of Medicine, and Gene Therapy Center. The University of Florida. Gainesville, Florida. April 16, 1997.
69. *Polymers for Gene Delivery*. Center for Bioengineering. The University of Washington. Seattle, Washington. October 30, 1996.
70. *From Genes to Pharmaceutical Gene Medicines*. American Association of Pharmaceutical Sciences Eleventh Annual Meeting, Seattle, Washington. October 29, 1996.
71. *Pharmaceutical Approaches to Non-Viral Gene Delivery*. American Association of Pharmaceutical Sciences 1996 Southeast Regional Meeting, Research Triangle Park, North Carolina. June 24, 1996.
72. *Particulate-Based Systems for Non-Viral Gene Delivery: Therapeutic Applications in Cancer, Hepatocyte, Pulmonary, and Muscle Gene Therapy*. Division of Diagnostic Imaging including the Departments of Nuclear Medicine and Diagnostic Radiology. The University of Texas M.D. Anderson Cancer Center. Houston, Texas. May 1, 1996.
73. *Pharmaceutical Approaches to Non-Viral Gene Therapy: Traditional Approaches for Medicines of the Future*. Graduate Program in Pharmaceutical Sciences. The University of Texas, Austin, Texas. February 15, 1996.
74. *Synthetic Polymers for Non-Viral Gene Delivery to Muscle*. First International Symposium on Polymer Therapeutics: From Laboratory to Clinic. The School of Pharmacy, London, United Kingdom. January 11, 1996.
75. *Approaches to Controllable Non-Viral Gene Therapy*. Department of Pharmacological and Pharmaceutical Sciences. The University of Houston, Houston, Texas. October 5, 1995.
76. *Non-Viral Gene Delivery: Recent Advances and Future Challenges*. Division of Pharmaceutical Sciences. Colleges of Pharmacy. The University of Kentucky, Lexington, Kentucky. February 14, 1995.
77. *Oral Delivery of Proteins and Peptides*. Drug Discovery Groups. Burroughs Wellcome Co., Research Triangle Park, North Carolina. December 15, 1993.

PUBLICATIONS:

Peer-Reviewed Papers:

1. D Liu, F Li, SE Plevy, TM Gambling, JL Carson, and RJ Mumper. Development of Water-in-Oil Microemulsions for Targeting Peptides to the Colon after Oral Administration. Submitted to *Journal of Controlled Release*.
2. RJ Danaher, C Wang, J Dai, RJ Mumper, and CS Miller. Antiviral Effects of Blackberry Extract Against Herpes Simplex Virus Type 1. Submitted to *Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology and Endodontology*.
3. OA González, C Escamilla, RJ Danaher, J Dai, JL Ebersole, RJ Mumper, and CS Miller. Anti-bacterial Properties of Blackberry Extract against Oral Bacteria. Submitted to *Archives of Oral Biology*.
4. P Murapa, J Dai, M Chung, RJ Mumper, and J D'Orazio. Anthocyanin-rich Fractions of Blackberry Extracts Reduce UV-induced Free Radicals and Oxidative Damage in Keratinocytes. *Phytotherapy Research*. In-Press.
5. EC Hsu, Y Luu, J Gao, C Fleet, K Hargreaves, S Pownall, L Huang, Y Fujita, MP Calos, PD Robbins, RJ

- Mumper, TJ Kieffer, and AT Cheung. Engineering Gut K-Cells for Persistent Meal-Regulated Insulin Production With Chitosan-based Nanoparticles. Submitted to *Science*.
6. TR Moench, RJ Mumper, TE Hoen, M Sun, and RA Cone. Microbicide Excipients Can Greatly Increase Susceptibility to Genital Herpes Transmission in the Mouse. *BMC Infectious Diseases*. (2010) 10(1):331.
 7. A Jain, W Yan, KR Miller, R O'Carra, JG Woodward, and RJ Mumper. Tresyl-Based Conjugation of Protein Antigen to Lipid Nanoparticles Increases Antigen Immunogenicity. *International Journal of Pharmaceutics*. (2010) 401(1-2):87-92.
 8. D Fourches, D Pu, C Tassa, R Weissleder, SY Shaw, RJ Mumper, and A Tropsha. Quantitative Nanostructure-Activity Relationship Modeling. *ACS Nano*. (2010) 4(10):5703-5712.
 9. AS Holpuch, GJ Hummel, M Tong, GA Seghi, P Pei, P Ma, RJ Mumper, and SR Mallery. Nanoparticles for Local Drug Delivery to the Oral Mucosa: Proof of Principle Studies. *Pharmaceutical Research*. (2010) 27:1224-1236.
 10. S Wadhwa, and RJ Mumper. Intracellular Delivery of the Reactive Oxygen Species Generating Agent D-Penicillamine upon Conjugation to Poly-L-glutamic Acid. *Molecular Pharmaceutics*. (2010) 7:854-862.
 11. Q Zhu, J Talton, G Zhang, T Cunningham, J Kirk, B Epper, DM Klinman, I M Belyakov, Y Sui, S Gagnon, RJ Mumper, and JA Berzofsky. Oral Targeting of Nanoparticle Vaccine to the Large Intestine to Combat Genitoretal Viral Transmission. Submitted to *Nature Medicine*.
 12. W Yan, A Jain, R O'Carra, JG Woodward, W Li, G Li, A Nath and RJ Mumper. Lipid Nanoparticles with Accessible Nickel as a Vaccine Delivery System for Single and Multiple His-tagged HIV Antigens. *HIV/AIDS - Research and Palliative Care*. (2009) 1:1-11.
 13. X Dong, CA Mattingly, M Tseng, M Cho, Y Liu, VR Adams, and RJ Mumper. Doxorubicin and Paclitaxel-loaded Lipid-based Nanoparticles Overcome Multi-Drug Resistance By Inhibiting P-gp via ATP Depletion. *Cancer Research*. (2009) 69:3918-3926.
 14. P Ma, X Dong, CL Swadley, A Gupte, M Leggas, HC Ledebur, and RJ Mumper. Development of Idarubicin and Doxorubicin Solid Lipid Nanoparticles to Overcome Pgp-mediated Multiple Drug Resistance in Leukemia. *J. Biomed. Nanotech*. (2009) 5:151-161.
 15. CM Ugalde, Z Liu, C Ren, KK Chan, KA Rodrigo, Y Ling, PE Larsen, GE Chacon, GD Stoner, RJ Mumper, HW Fields, SR Mallery. Distribution of Anthocyanins Delivered from a Bioadhesive Black Raspberry Gel Following Topical Intraoral Application in Normal Healthy Volunteers. *Pharm. Res*. (2009) 26:977-986.
 16. RJ Mumper, MA Bell, DR Worthen, RA Cone, GR Lewis, and TR Moench. Formulating a Sulfonated Anti-Viral Dendrimer in a Vaginal Microbicidal Gel having Dual Mechanisms of Action. *Drug Dev. Ind. Pharm*. (2009) 35:515-524.
 17. X Dong, CA Mattingly, M Tseng, M Cho, VR Adams, and RJ Mumper. Development of New Lipid-Based Paclitaxel Nanoparticles Using Sequential Simplex Optimization. *Eur. J. Pharm. Biopharm*. (2009) 72:9-17.
 18. J Dai, A Gupte, L Gates, and RJ Mumper. A Comprehensive Study of Anthocyanin-Rich Extracts from Selected Blackberry Cultivars: Extraction Methods, Stability, Anticancer Properties and Mechanisms. *Food and Chemical Tox*. (2009) 47:837-847.
 19. A Gupte, S Wadhwa, and RJ Mumper. Enhanced Intracellular Delivery of the Reactive Oxygen Species (ROS)-Generating Copper Chelator D-penicillamine via a Novel Gelatin-D-penicillamine Conjugate. *Bioconjugate Chemistry*. (2008) 19:1382-1388.
 20. SR Mallery, JC Zwick, P Pei, M Tong, PE Larsen, BS Shumway, B Lu, HW Fields, RJ Mumper, and GD Stoner. Topical Application of a Bioadhesive Black Raspberry Gel Modulates Gene Expression and Reduces Cyclooxygenase 2 Protein in Human Premalignant Oral Lesions. *Cancer Research*. (2008) 68:4945-4957.

21. BS Shumway, LA Kresty, PE Larsen, JC Zwick, B Lu, HW Fields, RJ Mumper, GD Stoner, SR Mallery, Effects of a Topically Applied Bioadhesive Berry Gel on Loss of Heterozygosity Indices in Premalignant Oral Lesions. *Clinical Cancer Research*. (2008) 14:2421-2430.
22. A Gupte and RJ Mumper. Copper Chelation by D-penicillamine Generates Reactive Oxygen Species that Are Cytotoxic to Human Leukemia and Breast Cancer Cells. *Free Radical Biology & Medicine*. (2007) 43:1271-1278
23. J Dai, JD Patel, and RJ Mumper. Characterization of Blackberry Extract and Its Anti-Proliferative and Anti-inflammatory Properties. *J. Medicinal Food*. (2007) 10:258-265.
24. JD Patel, S Gandhapudi, R O'Carra, J Jones, JG Woodward, and RJ Mumper. Cationic Nanoparticles for Delivery of CpG Oligodeoxynucleotide and Ovalbumin: *In-Vitro* and *In-Vivo* Assessment. *J. Biomed. Nanotech*. (2007) 3:97-106.
25. A Gupte and RJ Mumper. An Investigation into Copper Catalyzed D-Penicillamine Oxidation and Subsequent Hydrogen Peroxide Generation. *J. Inorganic Biochemistry*. (2007) 101:594-602.
26. SR Mallery, GD Stoner, PE Larsen, HW Fields, KA Rodrigo, SJ Schwartz, Q Tian, J Dai and RJ Mumper. Formulation and In-Vitro and In-Vivo Evaluation of a Mucoadhesive Gel Containing Freeze Dried Black Raspberries: Implications for Oral Cancer Chemoprevention. *Pharm. Res*. (2007) 24:728-737.
27. JD Patel, R O'Carra, J Jones, JG Woodward, and RJ Mumper. Preparation and Characterization of Nickel Nanoparticles for Binding to His-tag Proteins and Antigens. *Pharm. Res*. (2007) 24:343-352.
28. X Dong and RJ Mumper. The Metabolism of Fatty Alcohols in Lipid Nanoparticles by Alcohol Dehydrogenase. *Drug Dev. Ind. Pharm*. (2006) 32:973-980.
29. JM Koziara, TR Whisman, MT Tseng, and RJ Mumper. *In-Vivo* Efficacy of Novel Paclitaxel Nanoparticles in Paclitaxel-Resistant Human Colorectal Tumors. *J. Controlled Rel*. (2006) 112:312-319
30. JD Patel, D Galey, J Jones, P Ray, JG Woodward, A Nath, and RJ Mumper. HIV-1 Tat-Coated Nanoparticles Result in Enhanced Immune Responses and Tat-Neutralizing Antibodies Compared To Alum Adjuvant. *Vaccine*. (2006) 24:3564-3573.
31. JM Koziara, JJ Oh, WS Akers, SP Ferraris, and RJ Mumper. Blood Compatibility of Cetyl Alcohol/Polysorbate -Based Nanoparticles. *Pharm. Res*. (2005) 22:1821-1828.
32. Z Cui, PR Lockman, CS Atwood, CH Hsu, A Gupte, DD Allen, and RJ Mumper. Novel D-Penicillamine Carrying Nanoparticles for Metal Chelation Therapy in Alzheimer's and other CNS Diseases. *European Journal of Pharmaceutics and Biopharmaceutics*. (2005) 59:263-272.
33. PR Lockman, JM Koziara, RJ Mumper, and DD Allen. Nanoparticle Surface Charges Alter Blood-Brain Barrier Integrity and Uptake. *Journal of Drug Targeting*. (2004) 12:635-41.
34. JM Koziara, PR Lockman, DD Allen, and RJ Mumper. Paclitaxel Nanoparticles for the Potential Treatment of Brain Tumors. *J. Controlled Rel*. (2004) 99:259-269.
35. Z Cui, JD Patel, M Tuzova, P Ray, R Phillips, JG Woodward, A Nath, and RJ Mumper. Strong T-Cell Type-1 Immune Responses to HIV-1 Tat (1-72) Protein-Coated Nanoparticles. *Vaccine*. (2004) 22:2631-2640.
36. JC Weekley, S Wuenschel, PE Rosentiel, RJ Mumper, and M Jay. Aqueous Liquid Scintillation Counting with Fluor-Containing Nanosuspensions. *Appl. Rad. Isotop*. (2004) 60:887-891
37. MO Oyewumi, RA Yokel, M Jay, T Coakley, and RJ Mumper. Comparison of Cell Uptake, Biodistribution, and Tumor Retention of Folate-Coated and PEG-Coated Gadolinium Nanoparticles in Tumor-Bearing Mice. *J. Controlled Rel*. (2004) 95:613-626.
38. PR Lockman, MO Oyewumi, JM Koziara, KE Roder, RJ Mumper, and DD Allen. Brain Uptake of Thiamine-

- Coated Nanoparticles. *J. Controlled Rel.* (2003) 93:271-282.
39. DI Bernstein, LR Stanberry, S Sacks, NK Ayisi, YH Gong, J Ireland, RJ Mumper, G Holan, B Matthews, T McCarthy, and N Bourne. Evaluations of Unformulated and Formulated Second Generation, Dendrimer-Based Microbicide Candidates in Mouse and Guinea Pig Models of Genital Herpes. *Antimicrobial Agents and Chemotherapy.* (2003) 47:3784-3788.
 40. JM Koziara, PR Lockman, DD Allen, and RJ Mumper. *In-Situ* Blood-Brain Barrier Transport of Nanoparticles. *Pharm. Res.* (2003) 20:1772-1778.
 41. RJ Mumper and Z Cui. Genetic Immunization by Jet Injection of Targeted pDNA-Coated Nanoparticles. *Methods.* (2003) 31:255-262.
 42. W Fountain, K Dumstorf, A.E. Lowell, R.A. Lodder, and RJ Mumper. Near-Infrared Spectroscopy for the Determination of Testosterone in Thin-Film Composites. *J. Pharm. Biomed. Analy.* (2003) 33:181-189.
 43. CH Hsu, Z Cui, RJ Mumper, and M Jay. Preparation and Characterization of Novel Coenzyme Q₁₀ Nanoparticles Engineered from Microemulsion Precursors. *AAPS PharmSciTech.* (2003) 4(3) Article 32.
 44. Z Cui, CH Hsu, and RJ Mumper. Physical Characterization and Macrophage Cell Uptake of Mannan-Coated Nanoparticles. *Drug Dev. Ind. Pharm.* (2003) 29:689-700.
 45. PR Lockman, RJ Mumper, and DD Allen. Evaluation of Blood-Brain Barrier Thiamine Efflux Using the *In-Situ* Rat Brain Perfusion Methods. *J. Neurochemistry.* (2003) 86:627-634.
 46. PR Lockman, J Koziara, KE Roder, J Paulson, TJ Abbruscato, RJ Mumper, and DD Allen. *In-Vivo* and *In-Vitro* Assessment of Baseline Blood-Brain Barrier Parameters in the Presence of Novel Nanoparticles. *Pharm. Res.* (2003) 20:705-713.
 47. Z Cui, L Baizer, and RJ Mumper. Intradermal Immunization with Novel pDNA-Coated Nanoparticles Via a Needle-Free Injection Device. *J. Biotechnology.* (2003) 102:105-115.
 48. MO Oyewumi, S Liu, JA Moscow, and RJ Mumper. Specific Association of Thiamine-Coated Gadolinium Nanoparticles with Human Breast Cancer Cells Expressing Thiamine Transporters. *Bioconj. Chem.* (2003) 14:404-411.
 49. Z Cui, W Fountain, M Clark, M Jay, and RJ Mumper. Novel Ethanol-in-Fluorocarbon Microemulsions for Topical Genetic Immunization. *Pharm. Res.* (2003) 20:16-23.
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Abstracts:

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 79. Z Cui, JD Patel, M Tuzova, R Ray, R Phillips, JG Woodward, A Nath, and RJ Mumper. HIV-1 Tat Protein-coated Nanoparticles Elicit Strong T-Cell Type-1 Immune Responses. AAPS Annual Meeting. Salt Lake City, Utah. October 26-30, 2003.
 80. JM Koziara, PR Lockman, DD Allen, and RJ Mumper. Evaluation of Nanoparticle Transport Across Blood-Brain Barrier. AAPS Annual Meeting. Salt Lake City, Utah. October 26-30, 2003.
 81. M Oyewumi and RJ Mumper. Biocompatibility and Tumor Targeting of Folate-Coated Gadolinium Nanoparticles in Athymic Mice. AAPS Annual Meeting. Salt Lake City, Utah. October 26-30, 2003.
 82. M Oyewumi and RJ Mumper. Effects of Cetyl Alcohol on Gadolinium Entrapment in Nanoparticles Engineered from Microemulsion Templates. AAPS Annual Meeting. Salt Lake City, Utah. October 26-30, 2003.
 83. M Oyewumi and RJ Mumper. Biodistribution of Thiamine-Coated Nanoparticles in Mice. AAPS Annual Meeting. Salt Lake City, Utah. October 26-30, 2003.
 84. JC Weekley, M Kovarik, RJ Mumper, and M Jay. Development and Application of a Nanosuspension Liquid Scintillation Counting Fluid. 2nd Annual University/Industry Workshop on Materials Nanotechnology. Louisville, Kentucky. September 25-26, 2003.
 85. JM Koziara, PR Lockman, DD Allen, and RJ Mumper. Blood-Brain Barrier Transport of Novel Nanoparticles. 2nd Annual University/Industry Workshop on Materials Nanotechnology. Louisville, Kentucky. September 25-26, 2003. *Ms. Koziara won third place in the poster competition (out of 42 graduate student posters).*
 86. JD Patel and RJ Mumper. Preparation and Characterization of Sterically Stabilized Anionic Nanoparticles for Delivery of HIV-1 Antigens. 2nd Annual University/Industry Workshop on Materials Nanotechnology. Louisville, Kentucky. September 25-26, 2003. *Ms. Patel won first place in the poster competition (out of 42 graduate student posters).*
 87. M Jay and RJ Mumper. Nanotemplate Engineering Applications to Drug Delivery and Radiation Detection. 2nd Annual University/Industry Workshop on Materials Nanotechnology. Louisville, Kentucky. September 25-26, 2003.
 88. ME Berginski and RJ Mumper. The Delivery of Oxybutynin through the Buccal Mucosa Using Thin Films. Research Experiences for Undergraduates (REU) Program Symposium. National Science Foundation. University of Kentucky, Lexington, Kentucky. July 31, 2003.
 89. M Oyewumi and RJ Mumper. Tumor-Targeted Delivery of Folate-Coated Gadolinium Nanoparticles in Athymic Nude Mice. Proceedings of the 30th International Symposium on Controlled Release of Bioactive Materials. Glasgow, Scotland. July 19-23, 2003.
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- Nanoparticles with Thiamine Surface Ligands. Fifth International Conference of Cerebral Vascular Biology (CVB). Amarillo, Texas. June 15-19, 2003.
91. JH McAfee, PR Lockman, J Koziara, RJ Mumper, and DD Allen. Novel Choline Analogs and Blood-Brain Barrier Binding Specificity Studies of the Choline Transporter. Fifth International Conference of Cerebral Vascular Biology (CVB). Amarillo, Texas. June 15-19, 2003.
 92. PR Lockman, RJ Mumper, and DD Allen. Thiamine Efflux at the Blood-Brain Barrier Demonstrated by *In-Situ* Rat Brain Perfusion. Fifth International Conference of Cerebral Vascular Biology (CVB). Amarillo, Texas. June 15-19, 2003.
 93. JD Patel and RJ Mumper. Preparation and Characterization of Sterically Stabilized Anionic Nanoparticles for Delivery of HIV-1 Antigens. 35th Annual Pharmaceutics Graduate Student Research Meeting (PGSRM). University of Illinois. Chicago, Illinois. June 12-14, 2003.
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 95. RJ Mumper, Z Cui, and JD Patel. Pharmaceutically Engineered Nanoparticles for Genetic and Subunit Immunization. International Conference on Modern Vaccines: Adjuvants and Delivery Systems. Dublin, Ireland. June 4-6, 2003.
 96. RJ Mumper and Z Cui. Buccal Mucosal Immunization Using Thin-Film Composites Containing Plasmid DNA or Protein Antigen. International Conference on Modern Vaccines: Adjuvants and Delivery Systems. Dublin, Ireland. June 4-6, 2003.
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 101. PR Lockman, J Koziara, RJ Mumper, and DD Allen. *In-Vitro* Evaluation of Two Novel Nanoparticle Effects on Blood-Brain Barrier Integrity, Permeation and Transport. AAPS Annual Meeting. Toronto, Canada. November 10-14, 2002.
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 103. M Oyewumi, Z Cui, and RJ Mumper. *In-Vitro* Tumor Targeting of Gadolinium Nanoparticles via Folate Receptors. AAPS Annual Meeting. Toronto, Canada. November 10-14, 2002.
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107. M Oyewumi and RJ Mumper. Engineering Gadolinium Nanoparticles for Potential Applications in Neutron Capture Therapy of Tumors. AAPS Annual Meeting. Toronto, Canada. November 10-14, 2002.
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115. M Oyewumi and RJ Mumper. Engineering Gadolinium Hexanedione Nanoparticles from Microemulsion Templates. Proceedings of the 29th International Symposium on Controlled Release of Bioactive Materials. Seoul, Korea. July 20-25, 2002.
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117. JH McAfee, PR Lockman, J Koziara, RJ Mumper, and DD Allen. Two Novel Nanoparticulate Preparations Demonstrate No Adverse Effects at the Blood-Brain Barrier. 5th Annual Merck Undergraduate Pharmacy Student Research Seminar. Denver, Colorado. May 31-June 1, 2002.
118. DI Bernstein, N Bourne, NK Ayisi, J Ireland, RJ Mumper, B Matthews, T McCarthy, and S Sacks. Effect of Formulated and Unformulated Dendrimers as Microbicides. Microbicides 2002. Antwerp, Belgium. May 12-15, 2002,
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120. M Oyewumi and RJ Mumper. Tumor-Targeted Gadolinium Nanoparticles Engineered for Potential Applications in Neutron Capture Therapy. University of Kentucky, Division of Pharmaceutical Sciences. Postgraduate Conference. University of Kentucky, Lexington, Kentucky. May 8-10, 2002.

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122. M Oyewumi and RJ Mumper. Sterile and Freeze-dried Nanoparticles Engineered from Novel Microemulsion Templates. Proceedings of the AAPS Pharmaceutics and Drug Delivery Conference. Arlington, VA. April 22-24, 2002.
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125. DI Bernstein, N Bourne, NK Ayisi, J Ireland, RJ Mumper, B Matthews, T McCarthy, and S Sacks. Effect of Formulated and Unformulated Dendrimers as Microbicides. 15th International Conference on Antiviral Research. Prague, Czech Republic. March 17-21, 2002.
126. Z Cui and RJ Mumper. Bi-Layer Films for Mucosal (Genetic) Immunization Via the Buccal Route in Rabbits. AAPS Annual Meeting. Denver, Colorado. October 21-25, 2001.
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131. W Fountain and RJ Mumper. Thin Films for use in Oral Transmucosal Delivery of Pharmaceutical Compounds. Research Experiences for Undergraduates (REU) Program Symposium. National Science Foundation. University of Kentucky, Lexington, Kentucky. October 16, 2000.
132. RJ Mumper. Using Carrier Systems for Targeted Plasmid DNA Delivery. Proceedings of the American College of Clinical Pharmacy. Kansas City, Missouri. October 24-27, 1999. pp. 323-324.
133. RJ Mumper, FC MacLaughlin, J Wang, JM Tagliaferri, and AP Rolland. Chitosan and Depolymerized Chitosan Oligomers as Carriers for *In-Vivo* Plasmid Delivery. Proceedings of the American Society of Gene Therapy. First Annual Meeting. Seattle, Washington. May 28-31, 1998. pp. 161a.
134. MS Bruno, A Singhal, RJ Mumper, MK Barron, F Nicol, FC Szoka, and AP Rolland. Cryoprotection of Cationic Lipid-DNA Complexes for Gene Delivery. AAPS Tenth Annual Meeting. Miami, Florida. November 5-9, 1995. *Pharm. Res.* (1995) 10(10):S-79.
135. RJ Mumper, MK Barron, K Anwer, RL Lessard, Q Liu, H Nitta, H Alila, and AP Rolland. Interactive Polymeric Gene Delivery Systems for Enhanced Muscle Expression. AAPS Tenth Annual Meeting. Miami, Florida. November 5-9, 1995. *Pharm. Res.* (1995) 10(10):S-80.
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- Complexes to the Lung as Dry Powders and Suspensions. Ninth Annual North American Cystic Fibrosis Conference. Dallas, Texas. October 12-15, 1995.
137. RJ Mumper, J Wang, JM Claspell, and AP Rolland. Novel Polymeric Condensing Carriers for Gene Delivery. Proceedings of the 22th International Symposium on Controlled Release of Bioactive Materials. Seattle, Washington. July 30-August 2, 1995.
138. RJ Mumper, AS Hoffman, LS Bouchard, and WR Gombotz. Calcium-Alginate Beads for the Oral Delivery of TGF- β_1 : Stabilization of TGF- β_1 by Preparatory Methods and by the Addition of Polyanions. AAPS Eighth Annual Meeting. Orlando, Florida. November 14-18, 1993. *Pharm. Res.* (1993) 10(10):183.
139. RJ Mumper and AS Hoffman. Controlled Delivery of Hirudin from Liposomes Coated with Hydrophobically-Modified Thermo- or pH-sensitive Polysaccharides. Future Perspectives of Biomedical Polymers, Maui, Hawaii. December 4-6, 1992.
140. RJ Mumper and AS Hoffman. Liposome-Crosslinked Dextran Systems for the Delivery of Hirudin. AAPS Seventh Annual Meeting. San Antonio, Texas. November 15-19, 1992. *Pharm. Res.* (1992) 9(10):230.
141. RJ Mumper and M Jay. Neutron Activated PLA Microspheres with Rare-Earth Acetylacetonates for Radiotherapy. AAPS Sixth Annual Meeting. Washington, DC. November 17-21, 1991. *Pharm. Res.* (1991) 8(10):3.
142. RJ Mumper and M Jay. Biodegradable Radiotherapeutic Microspheres. Proceedings of the 18th International Symposium on Controlled Release of Bioactive Materials. Amsterdam, The Netherlands. July 8-11, 1991. *J. Controlled Rel.* (1991) pp. 664-665.
143. RJ Mumper and M Jay. Biodegradable Polyester Microspheres Containing Activable Ho-165 for the Internal Radiation Therapy of Hepatic Cancer. AAPS Fourth Annual Meeting. Atlanta, Georgia. October 22-26, 1989. *Pharm. Res.* (1989) 6(10):130.
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PATENTS and PATENTS PENDING:

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2. A Nath, RJ Mumper, J Woodward, and Z Cui. Compositions Comprising Human Immunodeficiency Virus Tat Adsorbed to the Surface of Anionic Nanoparticles. US Patent No. 7,588,764. September 15, 2009.
3. RJ Mumper and X Dong. Nanoparticle Compositions Comprising Liquid Oil Cores. US Patent Application. October 15, 2008.
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5. RJ Mumper, A Gupte, and S Wadhwa. Polymer-Metal Chelator Conjugates and Uses Thereof. US Patent Application. October, 2007.

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7. RJ Mumper, J Dai, and VS Gallicchio. Berry Preparations and Extracts. PCT Patent Application WO2007038421. April 5, 2007.
8. RJ Mumper, SR Mallery, GD Stoner, and PE Larsen. Compositions and Methods for Oral Cancer Chemoprevention Using Berry Preparations and Extracts. PCT Patent Application WO2008027037. March 6, 2008.
9. RJ Mumper and Z Cui. Nanoparticle-Based Genetic Vaccine Delivery System Containing Adjuvant. PCT Patent Application WO2004053056. June 24, 2004.
10. RJ Mumper and Z Cui. Nanoparticle-Based Genetic Vaccine Delivery System Containing Adjuvant. US Patent Application US2006189554. August 24, 2006.
11. DW Osborne and RJ Mumper. Pharmaceutical Gel and Aerosol Formulations and Methods to Administer the Same to Skin and Mucosal Surfaces. European Patent No. EP 1,237,540.
12. RJ Mumper and M Jay. Microemulsions as Precursors to Solid Nanoparticles. PCT Patent Application WO202076441. October 3, 2002.
13. RJ Mumper and M Jay. pH-Sensitive Mucoadhesive Film-Forming Gels and Wax-Film Composites Suitable for Topical and Mucosal Delivery of Molecules. PCT Patent Application WO 02/051382, December 2001. European and Canadian Patent Applications, July 2003.
14. RJ Mumper and M Jay. pH-Sensitive Mucoadhesive Film-Forming Gels and Wax-Film Composites. AU2002231157. July 8, 2002.
15. RJ Mumper and M Jay. Nanoscintillation Systems for Aqueous-Based Liquid Scintillation Counting. US Patent No. 6,855,270. February 15, 2005
16. AP Rolland RJ Mumper. Compositions of Nucleic Acid and Viscosity-Increasing Polymers for Use in Gene Therapy. Australian Patent Application No. AU744010B. February 14, 2002.
17. AP Rolland RJ Mumper. Compositions of Nucleic Acid and Viscosity-Increasing Polymers for Use in Gene Therapy. Australian Patent Application No. AU3676699. September 16, 1999.
18. RJ Mumper and M Jay. Nanoscintillation Systems for Aqueous-Based Liquid Scintillation Counting. PCT Patent Application WO02098366. December 12, 2002.
19. RJ Mumper and M Jay. pH-Sensitive Mucoadhesive Film-Forming Gels and Wax-Film Composites Suitable for Topical and Mucosal Delivery of Molecules. US Patent Application. December, 2000.
20. RJ Mumper and M Jay. Microemulsions as Precursors to Solid Nanoparticles. US Patent Application. March, 2000 and March 2001.
21. M Barry, RJ Mumper, and L Smith. Needle-Free Injection of Formulated Nucleic Acid Molecules. US Patent Application. December, 1997.
22. RJ Mumper and F Tagliaferri. Hydrophobic Glycosylamine Derivatives, Compositions, and Methods of Use. US Patent Application No. US2002058795. May 16, 2002.
23. RJ Mumper and F Tagliaferri. Hydrophobic Glycosylamine Derivatives, Compositions, and Methods of Use. PCT Patent Application No. WO9912945. March 18, 1999.
24. WR Gombotz, RJ Mumper, LS Bouchard, and AS Hoffman. A Sustained Release Composition Comprising a Multivalent Cation Cross-Linked Alginate Combined with a Polyacrylic Acid. European Patent No. 0 652 015. March 19, 1997.

25. M Bruno, J Tagliaferri, L Lawson, MJ Logan, and RJ Mumper. Protected One-Vial Formulation for Nucleic Acid Molecules, Methods of Making the Same by In-Line Mixing, and Related Products and Methods. US Patent Application. US Patent No. 6,534,483. March 18, 2003.
26. M Bruno, J Tagliaferri, L Lawson, MJ Logan, and RJ Mumper. Protected One-Vial Formulation for Nucleic Acid Molecules, Methods of Making the Same by In-Line Mixing, and Related Products and Methods. US Patent Application. DE Patent Application No. DE69931166T. February 15, 2007.
27. AP Rolland and RJ Mumper. Formulated Nucleic Acid Compositions and Methods of Administering the Same for Gene Therapy. US Patent No. 6,514,947. February 4, 2003.
28. AP Rolland and RJ Mumper. Formulated Nucleic Acid Compositions and Methods of Administering the Same for Gene Therapy. DE patent application. DE69535576T. May 21, 2008.
29. DW Osborne and RJ Mumper. Pharmaceutical Gel and Aerosol Formulations and Methods to Administer the Same to Mucosal Surfaces and the Skin. US Patent No. 6,432,415. August 13, 2002.
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31. AP Rolland and RJ Mumper. Chitosan Related Compositions and Methods for Delivery of Nucleic Acids and Oligonucleotides Into a Cell. US Patent No. 6,184,037. February 6, 2001.
32. AP Rolland and RJ Mumper. Formulated Nucleic Acid Compositions and Methods of Administering the Same for Gene Therapy. US Patent No. 6,040,295. March 21, 2000.
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34. R Ralston, S Muller, RJ Mumper, W Munger, and M Bruno. IL-2 Gene Expression and Delivery Systems and Uses. Australian Patent Application No. AU1542802. March 21, 2002.
35. WR Gombotz, RJ Mumper, AS Hoffman, and LS Bouchard. Oral Delivery of Therapeutic Agent and Composition. Japan Patent No. JP7258115. September 10, 1995.
36. WR Gombotz, RJ Mumper, AS Hoffman, and LS Bouchard. A Sustained Release Composition Comprising a Multivalent Cation Cross-linked Algenate Combined with a Polyacrylic Acid. Greece Patent Application. GR3023307T. August 29, 1997.
37. WR Gombotz, RJ Mumper, AS Hoffman, and LS Bouchard. Methods and Compositions for the Oral Delivery of Therapeutic Agents. US Patent No. 5,451,411. September 19, 1995.

RESEARCH GRANTS AWARDED:

Summary: Since 1999, I have received over \$10.1 million in research grants/contracts as Principal Investigator (and over \$24.1 million total) – comprising 36 grants/contracts from Federal or Foundation sources and 50 from Industry. Federal grants received as PI include two NIH R01s, two NIH R21s, a Project Director in a NIH U54 grant, a Core Director in a NIH U19 grant, and two NSF grants. ACTIVE grants/contracts are so indicated.

Federal or Foundation:

1. *Development of Oral Form of DTPA for Use in Radionuclide Decorporation – Radiological Emergency.* NIH-NIAID-DHHS HHSN272201000030C. (Co-Investigator, 5% effort). Project period 9/30/10 to 9/29/13. Total Award \$6,632,416. **ACTIVE**
2. *Translational Nanosystems for Improved Lung Cancer Treatment with Small Molecules.* Project 3 in the

- Carolina Center of Cancer Nanotechnology Excellence. National Institutes of Health, National Cancer. U54CA151652. (Principal Investigator, 15% effort). Project period 9/1/10 to 7/31/15. Total Award \$1,662,750. **ACTIVE**
3. *SFRP2 and NFAT are Therapeutic Targets in Angiosarcoma*. National Institutes of Health, National Cancer. R01 CA142657. (Co-Investigator, 5% effort). Project period 7/1/10 to 6/30/15. Total Award \$1,535,500. **ACTIVE**
 4. *Design and Testing of a Novel Acoustically-active Nanoparticle Vehicle for Ultrasound-targeted Chemotherapy*. Carolina Center of Cancer Nanotechnology Excellence (C-CCNE). (Co-Investigator, 0.5% effort). Project period 2/1/10 to 1/31/11. Total Award \$ 40,000.
 5. *Core C: Formulation Sciences - Integrated Preclinical/Clinical Program for Topical Microbicides*. National Institutes of Health NIAID-NICHD via subcontract from Starpharma. U19AI060598-05S1 (Principal Investigator, 5% effort). Project period 9/3/09 to 8/31/11. Total Award \$102,669. **ACTIVE**
 6. *The 4th Annual Chapel Hill Drug Conference: The Use of Nanotechnology to Create Safe and Effective Therapeutic and Diagnostic Products*. North Carolina Biotechnology Center. (Principal Investigator, 0.5% effort). Project period 2/1/09 to 6/30/09. Total Award \$5,000.
 7. *Design and Testing of a Novel Acoustically-active Nanoparticle Vehicle for Ultrasound-targeted Chemotherapy*. Carolina Center of Cancer Nanotechnology Excellence (C-CCNE). (Co-Investigator, 0.5% effort). Project period 2/1/09 to 5/31/10. Total Award \$ 50,000.
 8. *The Carolina Partnership - The Center for Nanotechnology in Drug Delivery*. UNC Eshelman School of Pharmacy and The University Cancer Research Fund. UNC Lineberger Comprehensive Cancer Center. (Principal Investigator, 0% effort). Project period 7/1/2009 to 6/30/2014. Total Award \$1,875,000. **ACTIVE**
 9. *Development of Improved DTPA for Radionuclide Chelation*. NIH-NIAID HHSN266200500045C. (Co-Investigator, 5% effort). Project period 7/1/08 to 9/29/10. Total Award \$ 3,231,335.
 10. *Evaluation of Bioadhesive Berry Gels for Oral Cancer Chemoprevention*. National Institutes of Health in response to PA-04-053 Developmental Projects in Complementary Approaches to Cancer Care) with subcontract from the Ohio State University. R21 CA132138. (Principal Investigator, 5% effort). Project period 3/7/2008 to 2/28/2010. Total Award \$65,899.
 11. *Nanomedicine Delivery*. The University Cancer Research Fund. UNC Lineberger Comprehensive Cancer Center. (Principal Investigator, 0% effort). Project period 3/1/2008 to 6/30/2011. Total Award \$475,000. **ACTIVE**
 12. *Nanotemplate Engineering of a Stealth MRI Contrast Agent*. NanoMed Pharmaceuticals, Inc. via STTR grant R41 EB005856-01A1 from the National Institutes of Health, National Institute of Biomedical Imaging and Bioengineering. (Co-Investigator, 2.5% effort). Project period 9/1/06 to 8/31/07. Total Award \$58,162.
 13. *The Cellular, Inflammatory, Oxidative, and Genomic Effects of Aluminum Oxide Nanoparticles on Blood and Endothelial Cells*. The University of Kentucky Research Foundation. (Principal Investigator, 3% effort). Project period 7/1/06 to 6/30/07. Total Award \$22,020.
 14. *Anti-Cancer and Anti-Inflammatory Effects of Blackberry Extracts*. Kentucky Tobacco Research and Development Center (KTRDC). (Principal Investigator, 5% effort). Project period 7/1/06 to 6/30/07. Total Award \$39,485.
 15. *EGF-Receptor Targeted Nanoparticles to Overcome Paclitaxel Resistant Breast Cancer*. National Institutes of Health, National Cancer Institute in response to PAR-03-045 (Nanoscience and Nanotechnology in Biology and Medicine). R01 CA115197. (Principal Investigator, 15% effort). Project period 4/12/06 to 2/28/11. Total Award \$1,052,401.
 16. *Development of Improved DTPA for Radionuclide Chelation*. National Institutes of Health in response to RFP-NIH-NIAID-DAIT-05-46. (Co-Investigator, 5%/10% effort in phase I/II). Project period 9/30/05 to 9/30/07.

Total Award \$1,204,375.

17. *cGMP Manufacture of Freeze-Dried Black Raspberry Gel*. The Ohio State University, College of Dentistry, Department of Oral Maxillofacial Surgery and Pathology. (Principal Investigator, 1% effort). Project period 8/22/05 to 12/31/06. Total Award \$35,003.
18. *Phase II: Formulation and Characterization of Freeze-Dried Black Raspberry Gel*. The Ohio State University, College of Dentistry, Department of Oral Maxillofacial Surgery and Pathology. (Principal Investigator, 1% effort). Project period 7/6/05 to 12/31/05. Total Award \$10,000.
19. *Phase I: Development of HPLC Method for Freeze-Dried Black Raspberry Gel*. United States Department of Agriculture via subcontract with The Ohio State University, College of Dentistry, Department of Oral Maxillofacial Surgery and Pathology. (Principal Investigator, 1.7% effort). Project period 7/12/05 to 5/30/06. Total Award \$17,678.
20. *Nanoparticle HIV Protein Vaccines for Cellular Responses*. National Institutes of Health, National Institute of Allergy and Infectious Disease. R01 AI058842. (Principal Investigator, 20% effort). Project period 4/15/05 to 12/31/10 (1 year NCE). Total Award \$1,614,753. Received an NIH score of 2.9% percentile (139) in Nov. 2004.
21. *Core C: Formulation Sciences - Integrated Preclinical/Clinical Program for Topical Microbicides*. National Institutes of Health NIAID-NICHD via subcontract from Starpharma. U19AI60598. (Principal Investigator, 10% effort). Project period 10/1/04 to 9/30/10. Total Award \$612,540.
22. *In-Vitro Methods to Assess Structural Similarity of Topical Products*. Food and Drug Administration, Office of Pharmaceutical Science, Division of Bioequivalence. (Co-Principal Investigator, 3.3% effort). Project period 9/1/04 to 9/28/05. Total Award \$49,994.
23. *Development of Mucoadhesive Gels Containing Freeze-Dried Black Raspberries for Chemoprevention of Oral Dysplasia*. The Ohio State University, College of Dentistry, Department of Oral Maxillofacial Surgery and Pathology. (Principal Investigator, 1% effort). Project period 5/1/04 to 12/31/04. Total Award \$6,468.
24. *Methods for Predicting Bioequivalence of Topical Formulations*. Food and Drug Administration, Office of Pharmaceutical Science, Division of Bioequivalence. (Co-Principal Investigator, 3% effort). Project period 9/1/03 to 8/31/04. Total Award \$49,198.
25. *Nanoengineered HIV-1 Vaccines Based on Tat*. National Institutes of Health, National Institute of Allergy and Infectious Disease. R21 AI051147-01A2 (Principal Investigator, 20% effort). Project period 8/1/03 to 7/31/05. Total Award \$412,458.
26. *Nanotemplate Engineering of Cell-Specific Nanoparticles*. National Institutes of Health, National Institute of Biomedical Imaging and Bioengineering. R21 EB00531. (Principal Investigator; 20% effort). Project period 7/1/02 to 6/30/05. Total Award \$300,864.
27. *Cancer Biology Research Center: Artificial T Cells Used for Tumor Drug Delivery*. Texas Tech University Health Sciences Center via subcontract from Dr. David Allen, School of Pharmacy, Amarillo, Texas. (External Co-Investigator; 0% salary; 5% effort) Project period 10/01/01 to 11/1/03. Total Award to Texas Tech \$122,000 which provides in-kind support to Dr. Mumper.
28. *NanoScintillation Systems for Aqueous-Based Liquid Scintillation Counting*. Nanoscale Exploratory Research. National Science Foundation. ECS-0102134 (Principal Investigator; 8.3% effort). Project period 7/01/01 to 6/30/02. Total Award \$80,000.
29. *NanoTemplate Engineering and Film-Composites for Transmucosal Drug Delivery*. PhRMA Foundation 2001 Fellowship in Pharmaceutics to Support Undergraduate Research. Pharmaceutical Research and Manufacturers of America Foundation. (Principal Investigator; 0% salary; 5% effort). Project period 3/01/01 to 2/28/02. Total Award \$5,000.
30. *NF-Kappa-B Decoy DNA: Formulation and Liver Targeting*. University of Kentucky Medical Center Research

Fund. (Co-Investigator; 0% salary; 5% effort). Project period 7/1/00 to 6/30/01. Total Award \$15,000.

31. *Pharmaceutically Engineered Nanoparticles for the Targeted Delivery of Plasmid DNA*. Exploratory Research on Biosystems at the Nanoscale. National Science Foundation. BES-9986441. (Principal Investigator; 20% effort). Project period 3/15/00 to 2/28/02. Total Award \$99,432.
32. *Ethanol-in-Fluorocarbon (E/F) Microemulsions as In-Vitro/In-Vivo Precursors for Solid Nanoparticle Drug Delivery Systems*. The American Association of Colleges of Pharmacy New Investigators Program. (Principal Investigator; 0% salary; 5% effort). Project period 11/1/99 to 1/1/01. Total Award \$10,000.
33. *The Development and Manufacture of Mucoadhesive Formulations of Vaginal Microbicides*. Children's Hospital Research Foundation. (Principal Investigator; 1% effort). Project period 8/1/99 to 9/30/00. Total Award \$7,560.
34. *Oral Transmucosal Delivery of Peptides*. University of Kentucky Medical Center Research Fund. (Principal Investigator; 0% salary; 5% effort). Project period 7/1/99 to 6/30/00. Total Award \$15,000.
35. *Gene Medicines for Hemophilia B*. Small Business Innovation Research (SBIR) Phase I Grant (1R43HL55838-01). National Institutes of Health. (Co-Investigator; 20% effort). Project period 9/1/96 to 8/31/97. Total Award \$100,000.
36. *Gene Medicines for Rheumatoid Arthritis*. Small Business Innovation Research (SBIR) Phase I Grant (1R43AR43945-01A1). National Institutes of Health. (Co-Investigator; 15% effort). Project period 8/15/96 to 8/31/97. Total Award \$100,000.

Industrial:

1. *Studies to Elucidate the Properties of Antisense Oligonucleotides in Aqueous Solutions and Formulation Approaches*. Isis Pharmaceuticals, Inc. 8/1/09 to 7/31/10. Total Award \$71,291.
2. *Nanoformulation Feasibility Studies for Topical Delivery of Drugs*. Branthan Laboratories, LLC (Principal Investigator, 2% effort). Project period 8/26/09 to 12/25/09. Total Award \$11,789.
3. Unrestricted Research Grant. NanoMed Pharmaceuticals. (Principal Investigator). 5/25/09. \$3,750.
4. Unrestricted Research Grant. NanoMed Pharmaceuticals. (Principal Investigator). 5/18/09. \$1,000.
5. *Computational Models and High-Throughput Cellular-Based Toxicity Assays for Predictive Nanotoxicology*. Semiconductor Research Corporation - Global Research Collaboration. (Co-Investigator; 0.5% effort). Project period 4/1/09 to 3/31/12. Total Award \$316,000. **ACTIVE**
6. Unrestricted Research Grant. Four Tigers, LLC. (Principal Investigator). 11/25/08. \$2,000.
7. *Solubility Enhancement of AFN-1252 using Advanced Nano-based Formulations*. Affinium Pharmaceuticals, Ltd. (Principal Investigator, 1% effort). Project period 3/14/08 to 6/30/08. Total Award \$20,771.
8. *In-Vitro and In-Vivo Evaluation of Idarubicin Nanoparticle Formulations*. NanoMed Pharmaceuticals, Inc. (Principal Investigator, 4% effort). Project period 10/1/07 to 9/30/08. Total Award \$40,386.
9. *Evaluation of Blackberry Extract and Blackberry Extract Lotion in UV-radiation Induced Skin Damage*. Four Tigers, LLC. (Principal Investigator, 2% effort). Project period 10/1/07 to 9/30/08. Total Award \$ 25,000.
10. Unrestricted Research Grant. NanoMed Pharmaceuticals. (Principal Investigator). 8/14/07. \$5,000.
11. *Phase 2: Idarubicin Nanoparticle Formulation Development and Preclinical Evaluation*. NanoMed Pharmaceuticals, Inc. (Co-Investigator, 3% effort). Project period 1/1/07 to 2/1/08. Total Award \$ 169,427.
12. *Manufacture of 1%, 3% and 5% w/w SPL7013 Gels (VivaGel™)*. Starpharma Limited. (Co-Investigator, 3% effort). Project period 8/4/06 to 1/31/07. Total Award \$21,500.

13. *GMP Manufacture and Filling of 3.5 g Applicators with Placebo, 3% and 5% w/w VivaGel™ Formulations 4.* Starpharma Limited. (Co-Investigator, 3% effort). Project period 8/1/06 to 1/31/07. Total Award \$1,000.
14. *GMP Manufacture and Filling of 3.5 g Applicators with Placebo and 3% w/w VivaGel™ Formulations 3.* Starpharma Limited. (Co-Investigator, 3% effort). Project period 8/1/06 to 1/31/07. Total Award \$1,500.
15. *cGMP Manufacture and Filling of 3.5 g Applicators with Placebo and 3% w/w VivaGel™ Formulations 2.* Starpharma Limited. (Co-Investigator, 3% effort). Project period 8/1/06 to 1/31/07. Total Award \$12,000.
16. *GMP Manufacture of SPL7013 Gel (VivaGel™) Formulations: Campaign 2.* Starpharma Limited. (Co-Investigator, 3% effort). Project period 9/1/06 to 6/30/07. Total Award \$171,500.
17. *Phase I: Idarubicin Nanoparticle Formulation and Analytical Development.* NanoMed Pharmaceuticals, Inc. (Principal Investigator, 8% effort). Project period 6/20/06 to 6/30/07. Total Award \$83,210.
18. *GMP Manufacture and Related Activities for VivaGel Formulations.* Starpharma Limited. (Co-Investigator, 3% effort). Project period 1/31/06 to 6/30/08. Total Award \$263,025.
19. *Recombinant Human Lactoferrin Gels for Analytical Development.* Agennix Incorporated. (Co-Investigator, 1% effort). Project period 1/2/06 to 3/31/06. Total Award \$6,584.
20. *GMP Manufacture and Filling of 3.5 g Applicators with Placebo and 3% w/w Vivagel Formulations.* Starpharma Limited. (Co-Investigator, 3% effort). Project period 1/31/06 to 6/30/08. Total Award \$8,000.
21. *Antiflatulence Product Feasibility.* NUTRAssociates. (Principal Investigator, 1% effort). 11/2/05 to 3/31/06. Total Award \$8,000.
22. *Blackberry Consumer Product Development.* Four Tigers, LLC. (Principal Investigator, 1% effort). Project period 10/4/05 to 3/31/06. Total Award \$40,000.
23. *Oral and Topical Blackberry Products.* Innovation and Commercialization Center (ICC) Concept Pool Fund, Lexington, Kentucky via subcontract from Four Tigers, LLC. (Principal Investigator, 1% effort). Project period 10/1/05 to 8/31/06. Total Award \$20,700.
24. *Manufacture of Placebo and 3% VivaGel.* Starpharma Limited (Principal Investigator; 0.5% effort). Project period 8/24/05 to 11/1/05. Total Award \$8,000.
25. Unrestricted Research Grant. NanoMed Pharmaceuticals. (Principal Investigator). 1/25/05. \$4,000.
26. *Nanoengineered Infectious Hematopoietic Necrosis Virus (IHNV) Vaccine.* NanoMed Pharmaceuticals, Inc. (Principal Investigator, 1% effort). Project period 9/1/04 to 6/30/05. Total Award \$3,388.
27. *Feasibility of Nanoparticle-Based Vaccines.* Innovation and Commercialization Center (ICC) Concept Pool Fund, Lexington, Kentucky via subcontract from NanoMed Pharmaceuticals, Inc. (Principal Investigator, 5% effort). Project period 9/1/03 to 7/31/04. Total Award \$24,911.
28. *Development and Scale-Up of an Amphotericin B Cochleate Formulation.* BioDelivery Sciences International. (Principal Investigator; 8.2% effort). Project period 2/20/03 to 12/31/04. Total Award \$141,350
29. *Development of Enteric Coated Capsules Containing Recombinant Human Lactoferrin.* Agennix Incorporated. (Principal Investigator; 2.3%). Project period 2/1/03 to 12/31/04. Total Award \$16,998.
30. *Manufacture of Modified Aqueous Gels Containing Recombinant Lactoferrin.* Agennix Incorporated. (Co-Investigator; 4%). Project period 10/22/02 to 4/30/03. Total Award \$132,621.
31. *Preparation of SPL7013 Topical Microbicide Formulations II.* Starpharma Limited (Principal Investigator; 0.5% effort). Project period 2/10/02 to 12/31/02. Total Award \$3,346.

32. *Development of Recombinant Human Lactoferrin Gels*. Agennix Incorporated. (Principal Investigator; 1% effort). Project period 7/9/02 to 11/30/02. Total Award \$8,656.
33. *Formulation Development of Amlexanox Oral Rinse and Gels II*. Access Pharmaceuticals. (Principal Investigator; 1% effort). Project period 12/01/01 to 6/30/02. Total Award \$3,982.
34. *Preparation of SPL7013 Topical Microbicide Formulations*. Starpharma Limited (Principal Investigator; 0.2% effort). Project period 10/10/01 to 12/31/01. Total Award \$1,000.
35. *Formulation Development of Amlexanox Oral Rinse and Gels*. Access Pharmaceuticals. (Principal Investigator; 1% effort). Project period 8/01/01 to 12/31/02. Total Award \$7,639.
36. Unrestricted Research Grant. Starpharma Limited. (Principal Investigator). 7/04/01. \$1,000.
37. *Preparation and Characterization of SPL7013 Vaginal Gel*. NIH-NIAID Phase I SBIR subcontract via Viridae Clinical Sciences and Starpharma Limited (Principal Investigator; 1% effort). Project period 6/21/01 to 6/30/02. Total Award \$6,226.
38. Unrestricted Research Grant. Agennix Incorporated. (Principal Investigator). 5/16/01. \$1,000.
39. *Preformulation and Formulation Development of Dendrimers as Topical Microbicides*. NIH-NIAID Phase I SBIR subcontract via Viridae Clinical Sciences and Starpharma Limited (Principal Investigator; 5% effort). Project period 2/01/01 to 6/30/02. Total Award \$29,799.
40. Unrestricted Research Grant. Endovasc LTD, Inc. (Principal Investigator). 1/2/01. \$406.
41. Unrestricted Research Grant. Agennix Incorporated. (Principal Investigator). 10/03/00. \$1,438.
42. *Formulation Development, Manufacture, and Stability Testing of NIA 112*. Niadyne, Inc. (Principal Investigator; 12% effort). Project period 9/1/00 to 6/30/02. Total Award \$106,092.
43. *cGMP Manufacture of Liposomal Prostaglandin E₁ (PGE₁)*. Endovasc LTD, Inc. (Principal Investigator; 3% effort). Project period 8/15/00 to 2/01/01. Total Award \$27,945.
44. *Preformulation and Formulation Development of Advanced Nasal Sprays*. Intranasal Technologies, Inc. (Principal Investigator; 20% effort). Project period 7/01/00 to 6/30/01. Total Award \$271,994.
45. *Formulation Development, Manufacture, and Stability Testing of Amlexanox Gels*. Access Pharmaceuticals. (Principal Investigator; 5.2% effort). Project period 6/1/00 to 6/30/02. Total Award \$95,720.
46. *Manufacture and Stability Testing of Recombinant Human Lactoferrin Aqueous Gels*. Agennix Incorporated. (Principal Investigator; 7.5% effort). Project period 5/3/00 to 2/1/02. Total Award \$100,000.
47. Unrestricted Research Grant. Atrix Laboratories, Inc. (Principal Investigator). 12/15/99. \$3,000.
48. *Preformulation and Formulation Development of Advanced Nasal Sprays*. Intranasal Technologies, Inc. (Principal Investigator; 10% effort). Project period 11/15/99 to 7/15/00. Total Award \$220,867.
49. *Formulation Development and Manufacture of Advanced Nasal Sprays for Pain Management*. Intranasal Technologies, Inc. (Co-Investigator; 10% effort). Project period 7/15/99 to 7/15/00. Total Award \$402,274.
50. *The Development and Manufacture of Aqueous-Based Mucoadhesive Gel Formulations of Amlexanox*. Access Pharmaceuticals, Inc. (Principal Investigator; 2% effort). Project period 7/1/99 to 9/30/00. Total Award \$12,600.

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“Hot Dot” Patches Tested on Gulf Oil Cleanup Crews.” News article on IonX International’s IonX Body Temperature Alert Patch. *The Associated Press*. August 20, 2010.

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“Overcoming Chemoresistance: A Conversation with Dr. Mumper”. In feature article titled “Nanotech in 2009: A Fantastic Voyage”. *Oncology Net Guide*. Volume 10, Number 5. May, 2009.

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