

BIOGRAPHICAL SKETCH

NAME Mumper, Russell J.		POSITION TITLE Vice Dean, John A. McNeill Distinguished Professor, and Director, Center for Nanotechnology in Drug Delivery	
eRA COMMONS USER NAME RUSSELL.MUMPER			
EDUCATION/TRAINING			
INSTITUTION AND LOCATION	DEGREE (if applicable)	YEAR(s)	FIELD OF STUDY
University of Kentucky, Lexington, KY	B.A.	1984-1988	Chemistry
University of Kentucky, Lexington, KY	Ph.D.	1988-1991	Pharmaceutics
University of Washington, Seattle, WA	Post-Doc	1991-1992	Bioengineering

A. Personal Statement

Dr. Mumper has 24 years of experience in drug formulation, advanced drug delivery systems including peptide and protein delivery, and biodistribution and pharmacokinetics of macromolecules and nanoparticles. His current research program focuses on nano-based delivery systems for cancer and vaccines, drug-polymer conjugates, and (trans)mucosal drug and microbicide delivery. Three significant areas of focus include,

- 1) the use of advanced drug delivery systems to treat (resistant) cancers including breast, lung, prostate, leukemia, and liver. Dr. Mumper's lab has several mouse cancer models up and running and routinely performs maximum tolerated dose (MTD), biodistribution, pharmacokinetic, and efficacy studies in these models.
- 2) the engineering of safe and effective nanoparticle-based vaccine delivery system to co-deliver multiple HIV proteins and adjuvant(s) as a prophylactic or therapeutic HIV vaccine.
- 3) the development of improved microbicide formulations including mucoadhesive gels and intravaginal rings.

Since 1999, Dr. Mumper has received over \$10.1M in grants/contracts as Principal Investigator (and >\$24.1M total). These grants and contracts include 36 grants/contracts from federal or foundation sources and 50 from industry. Dr. Mumper has over 235 scientific publications/abstracts and 36 patents or patents pending.

Dr. Mumper has the unique experience of having worked in the pharmaceutical/biotech industries for 7 years and then academia for the past 12 years. In addition to various product development activities in the industry, from 1999-2007, Dr. Mumper was the Associate Director of the Center for Pharmaceutical Science & Technology (CPST), a unique university-based fully-integrated FDA-registered GMP pharmaceutical manufacturing facility located at the University of Kentucky. From 1999 to 2006, working with seven different clients, Dr. Mumper led the CPST's efforts to complete seven full product development (analytical, formulation, manufacturing, quality control) leading to the successful submission of INDs and/or commencement of human clinical trials including dosage forms intended for nasal, topical, oral and injectable routes of administration.

B. Positions and Honors

Positions and Employment

1992 – 1994	Development Scientist III, Burroughs Wellcome Co., Greenville, North Carolina
1994 – 1998	Senior Scientist and Program Leader, Infectious Disease Product Discovery GeneMedicine, Inc., The Woodlands, TX
1998 – 1999	Director of Product Development, ViroTex Corporation, The Woodlands, TX
1999 – 2006	Associate Director, Center for Pharmaceutical Science and Technology, College of Pharmacy, University of Kentucky

1999 – 2003 Assistant Professor of Pharmaceutical Sciences, College of Pharmacy, Univ. of Kentucky
 2004 – 2007 Vice Chair, Dept of Pharmaceutical Sciences, College of Pharmacy, Univ. of Kentucky
 2004 – 2007 Associate Professor of Pharmaceutical Sciences, College of Pharmacy, Univ. of Kentucky
 2000 – 2009 Founder, NanoMed Pharmaceuticals, Inc., Kalamazoo, Michigan
 2004 – Present Founder and Chief Scientific Officer, Four Tigers LLC, Paris, Kentucky
 6/1/07 – Present John A. McNeill Distinguished Professor, Division of Molecular Pharmaceutics, UNC Eshelman School of Pharmacy, University of North Carolina at Chapel Hill
 6/1/07 – Present Director, Center for Nanotechnology in Drug Delivery, UNC-Chapel Hill
 2007 – Present Full Member, UNC Lineberger Comprehensive Cancer Center
 2008 – Present Co-Director, UNC Institute for Nanomedicine
 2009 – Present Founder, Capture Pharmaceuticals LLC, Chapel Hill, North Carolina
 2009 – Present Steering Committee Member, AAPS Nanotechnology Focus Group
 2010 – Present Chair, Bio-Targeting Working Group, NCI Alliance for Nanotechnology in Cancer
 2010 – Present Professor, UNC/NCSU Joint Department of Biomedical Engineering at UNC-Chapel Hill
 2010 – Present Vice Dean, UNC Eshelman School of Pharmacy, UNC-Chapel Hill

Other Experience and Professional Memberships

1999 – Present *Ad hoc* Member of >25 NIH Review Panels
 2009 Study Section Chair, Multifunctional Particles for Targeting and Delivery Special Emphasis Panel ZGM1 CBB-4 (MP). NIGMS-NIH.

Honors

1999 New Investigator Award, American Association of Colleges of Pharmacy
 2000 – Present Editorial Advisory Board, *Drug Development and Industrial Pharmacy*
 2003 & 2006 Advisory Scientific Panel, Modern Vaccine Adjuvants & Delivery Systems. International Conference. Dublin, Ireland (June 4-6, 2003); The Royal Society of Medicine, London, United Kingdom (September 12-14, 2006); Vienna, Austria (October 28-30, 2009)
 2004 – Present Editorial Advisory Board, *Journal of Biomedical Nanotechnology*
 2004 Best Paper Award 2003 – *European Journal of Pharmaceutics and Biopharmaceutics*
 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).
 2006 AAPS Lipid-Based Drug Delivery Systems Award sponsored by Gattefossé Corporation
 2007 2007 Great Teacher Award sponsored by the UK Alumni Association
 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.
 2009 – Present Editorial Advisory Board, *HIV/AIDS – Research and Palliative Care*
 2009 Elected Fellow, American Association of Pharmaceutical Scientists (AAPS)
 2010 – Present Chair, Bio-Targeting Working Group of the NCI Alliance for Nanotechnology in Cancer

C. Selected Peer-reviewed Publications (in chronological order): out of >85 total

Five most relevant

1. 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.
2. 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.
3. 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.

4. 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.
5. 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.

Ten additional publications of importance to the field

1. 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.
2. 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.
3. 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.
4. 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.
5. 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.
6. 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.
7. 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.
8. 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.
9. 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.
10. 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.

D. Research Support

ACTIVE

R01 AI058842-3 (PI: Mumper)	4/15/05 – 12/31/10 (in 1 yr NCE)	1.8 calendar
NIH-NIAID	\$237,045 (direct/year)	
Nanoparticle HIV Protein Vaccines for Cellular Responses		
The goal of this project to develop nanoparticle-based HIV-1 vaccines to elicit enhanced CTL and humoral immune responses to recombinant Tat (1-72) and gag p24 proteins		

R01 CA115197-2 (PI: Mumper)	4/12/06 – 2/28/11 (in 1 yr NCE)	1.8 calendar
NIH-NCI	\$188,554 (direct/year)	
EGF-Receptor Targeted Nanoparticles to Overcome Paclitaxel Resistant Breast Cancer		
The goal of this project to develop paclitaxel nanoparticles targeted to the epidermal growth factor receptor on		

breast cancer cells using transforming growth factor-alpha to overcome multi-drug resistance.

U19 AI060598 (PI: Mumper, Core C) 9/1/04 – 8/31/11 (in 1 yr NCE & Admin Suppl) 1.2 calendar
NIH-NIAID-NICHD via subcontract from Starpharma Ltd. \$50,060 (direct/year)
Core C: Formulation Sciences – Development of Dendrimer and Combination Microbicides
The overall goal of this program is to develop combination topical microbicide candidates with a dual mode of action against the sexually transmission of HIV. Core C will contribute to the overall Program Project Grant by developing prototype formulations to support preclinical animal efficacy studies, and manufacturing for GLP safety/toxicity studies and human clinical trials.

HHSN272201000030C Jay (PI); Mumper (Co-I) 9/30/2010 – 9/29/2013 1.2 calendar
NIH-NIAID-DHHS. \$6,632,416 (total award)
Development of Oral Form of DTPA for Use in Radionuclide Decorporation – Radiological Emergency.
This is a continuation of a project to develop orally bioavailable radionuclide decorporation agents. The goal of this contract is to develop and create a national stock-pile of an orally bioavailable dosage form of DTPA to be used in the event of a nuclear explosion or 'dirty' bomb.

U54CA151652 (PI, DeSimone; PI of Project 3 Mumper) 9/1/10 – 8/31/15 1.8 calendar
NIH-NCI Project 3: \$319,253 (directs/yr)
Carolina Center of Cancer Nanotechnology Excellence (in response to RFA-CA-09-012)
Project 3: "Translational Nanosystems for Improved Lung Cancer Treatment with Small Molecules."
The goal of Project 3 is to compare three different nanosystems to standard of care in an orthotopic mouse model of metastatic non-small cell lung cancer.

R01 CA142657. N. DeMore (PI); Mumper (Co-I) 7/1/10 – 6/30/15 0.6 calendar
National Institutes of Health, National Cancer. \$1,535,500 (total award)
SFRP2 and NFAT are Therapeutic Targets in Angiosarcoma.
The overall goal of this project is to further develop and test a monoclonal antibody to SFRP2 that inhibits angiosarcoma tube formation in-vitro for efficacy in an angiosarcoma xenograft in-vivo model.

(PI, Tropsha; Co-I Mumper) 4/1/09 – 3/31/12 0.24 calendar
Semiconductor Research Corporation \$316,000 (total award)
Computational Models and High-Throughput Cellular-Based Toxicity Assays for Predictive Nanotoxicology
The goal of this project is to develop cell-based assays for nanomaterials as well as computational models to describe and predict their toxicity.

PENDING

(PI, Paull; PI of Project 1 Mumper) 7/1/11 – 6/30/2016 3.0 calendar
U19 Submitted in response to RFA-AI-10-006 Total Award to UNC \$2,344,753
Development of Intravaginal Rings for Delivery of Anti-HIV Microbicide
The overall goal of Project 1 is to develop and optimize a coitally-independent delivery system comprising an intravaginal ring (IVR) for sustained release of a SPL7013 dendrimer microbicide.

(PI, Garcia-Martinez; Co-I Mumper) 7/1/11 – 6/30/15 0.6 calendar
R01; Next Generation Pre-exposure Prophylaxis Total Award \$2,951,373
The overall goal of this project is to develop vaginal gels and intravaginal rings containing MK-2048 as the next generation pre-exposure prophylaxis (PrEP) agents.

(PI, Garcia-Martinez; Co-I Mumper) 7/1/11 – 6/30/16 0.6 calendar
R01; Total Award \$3,601,272
Combination Antiviral Vaginal Formulations for HIV Prophylaxis
The overall goal of this project is to develop vaginal gels and intravaginal rings containing vicriviroc and/or indinavir to prevent HIV acquisition.