

## Curriculum Vitae

**Maureen D. Donovan, Ph.D.**

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**Education:** University of Minnesota College of Pharmacy  
Minneapolis, Minnesota  
Bachelor of Science in Pharmacy, 1983  
  
University of Michigan College of Pharmacy  
Horace H. Rackham School of Graduate Studies  
Ann Arbor, Michigan  
Ph.D. (Pharmaceutics), 1989

### PROFESSIONAL EXPERIENCE

*2013-present*     **Associate Dean for Undergraduate Programs**  
College of Pharmacy  
University of Iowa  
Iowa City, IA

*2008-2013*     **Division Head**  
Division of Pharmaceutics and Translational Therapeutics  
University of Iowa College of Pharmacy  
Iowa City, IA

*2008-present*     **Professor**  
Division of Pharmaceutics and Translational Therapeutics  
University of Iowa College of Pharmacy  
Iowa City, IA

*1996-2008*     **Associate Professor**  
University of Iowa College of Pharmacy  
Division of Pharmaceutics  
Iowa City, IA

*1989-1996*     **Assistant Professor**  
University of Iowa College of Pharmacy  
Division of Pharmaceutics  
Iowa City, IA

*1991*     **Visiting Scholar**  
SmithKline Beecham Pharmaceuticals  
King of Prussia, PA

*1986-88*     **Staff Pharmacist**  
Clark Professional Pharmacy  
Ypsilanti, MI

## ADDITIONAL POSITIONS AND MEMBERSHIPS

2011-present	Visiting Professor, Tongji School of Pharmacy, Tongji Medical University, Wuhan, China
2010-present	Member, Environmental Health Sciences Research Center, University of Iowa
2009-10	Member, Nanoscience and Nanotechnology Institute at the University of Iowa.

## PUBLICATIONS

### Thesis

Donovan, Maureen D. The Molecular Weight Permeability Dependence of the Absorption of Polyethylene Glycols in the Nasal and Gastrointestinal Mucosa and Its Correlation to Size Dependent Diffusion. Ph.D. Thesis, The University of Michigan, 1989.

### Publications

1. Miller SC and Donovan MD. Effect of Poloxamer Gels on the Miotic Activity of Pilocarpine Nitrate in Rabbits. *Int. J. Pharm.* 12, 147-152, 1982.
2. Donovan MD, Flynn GL, Amidon GL. The Molecular Weight Dependence of Nasal Absorption: The Effect of Absorption Enhancers. *Pharm. Res.* 7, 808-815, 1990.
3. Donovan MD, Flynn GL, Amidon GL. Absorption of Polyethylene Glycols 600 through 2000: The Molecular Weight Dependence of Gastrointestinal and Nasal Absorption. *Pharm. Res.* 7, 863-868, 1990.
4. Donovan MD and Zhou M. Drug Effects on *In Vivo* Nasal Clearance in Rats. *Int. J. Pharm.* 116, 77-86, 1995.
5. Chung FY and Donovan MD. Pre-systemic Bradykinin Metabolism in Rat and Sheep Nasal Homogenates. *J. Pharm. Sci.* 84, 794-798, 1995.
6. Chung FY and Donovan MD. Bradykinin Metabolism in Rat and Sheep Nasal Secretions. *J. Pharm. Sci.* 84, 829-834, 1995.
7. Bhat PG, Flanagan DR, Donovan MD. The Limiting Role of Mucus in Drug Absorption: Drug Permeation through Mucus Solution. *Int. J. Pharm.* 126, 179-187, 1995.
8. Huang Y and Donovan MD. Microsphere Transport Pathways in the Rabbit Nasal Mucosa. *Int. J. Pharm. Adv.* 1, 298-309, 1996.
9. Chung FY and Donovan MD. Nasal Pre-systemic Metabolism of Peptide Drugs: Substance P Metabolism in the Sheep Nasal Cavity. *Int. J. Pharm.* 128, 229-237, 1996.
10. Zhou M and Donovan MD. Recovery of the Nasal Epithelium following Laureth-9 Induced Damage. *Int. J. Pharm.* 130, 93-102, 1996.
11. Bhat PG, Flanagan DR, Donovan MD. Drug Diffusion through Cystic Fibrotic Mucus: Steady-State Permeation, Rheologic Properties, and Glycoprotein Morphology. *J. Pharm. Sci.* 85, 624-630, 1996.
12. Bhat PG, Flanagan DR, Donovan MD. Drug Binding to Gastric Mucus Glycoproteins. *Int. J. Pharm.* 134, 15-25, 1996.

13. Zhou M and Donovan MD. Intranasal Mucociliary Clearance of Bioadhesive Polymer Gels. *Int. J. Pharm.* 135, 115-125, 1996.
14. Nardviriyakul N, Wurster DE, Donovan MD. Determination of Diffusion Coefficients of Sodium p-Aminosalicylate in Sheep Nasal Membranes and Dialysis Membranes by Fourier Transform Infrared Horizontal Attenuated Total Reflectance Spectroscopy. *J. Pharm. Sci.* 86, 19-25, 1997.
15. Chou K-J and Donovan MD. Distribution of Antihistamines into the CSF following Intranasal Delivery. *Biopharm. Drug Disp.* 18, 335-346, 1997.
16. Donovan MD and Huang Y. Large Molecule and Particulate Uptake in the Nasal Cavity: The Effect of Size on Nasal Absorption. *Adv. Drug Deliver. Rev.* 29, 147-155, 1998.
17. Chou K-J and Donovan MD. Distribution of Local Anesthetics into the CNS following Intranasal Administration. *Int. J. Pharm.* 168, 137-145, 1998.
18. Chou K-J and Donovan MD. Lidocaine Distribution into the CNS following Nasal and Arterial Delivery: A Comparison of Local Sampling and Microdialysis Techniques. *Int. J. Pharm.* 171, 53-61, 1998.
19. Khanvilkar K, Donovan MD, Flanagan DR. Drug Transfer through Mucus. *Adv. Drug Deliv. Rev.* 48, 173-193, 2001.
20. Donovan MD. Sex and Racial Differences in Pharmacologic Response: Effect of Route of Administration and Drug Delivery System on Pharmacokinetics. *J. Womens Health* 14(1), 30-37, 2005.
21. Kandimalla K. and Donovan M.D. Carrier Mediated Transport of Chlorpheniramine and Chlorcyclizine across Bovine Olfactory Mucosa: Implications on Nose-to-Brain Transport. *J. Pharm. Sci.* 94, 613-624, 2005.
22. Sinn PL, McCray PB, Donovan MD, Shah AJ. Viscoelastic Gel Formulations Enhance Airway Epithelial Gene tTransfer with Viral Vectors. *Am. J. Resp. Cell. Mol. Biol.* 32, 404-410, 2005.
23. Chemuturi NV, Hayden P, Klausner M, and Donovan MD. Comparison of Human Tracheal/bronchial Epithelial Cell Cultures (EpiAirway) and Bovine Nasal Respiratory Explants for Nasal Drug Transport Studies. *J. Pharm. Sci.* 94, 1976-1985, 2005.
24. Kandimalla K. and Donovan M.D. Localization and Differential Activity of P-glycoprotein in the Bovine Olfactory and Nasal Respiratory Mucosae. *Pharm. Res.* 22, 1121-1128, 2005.
25. Kandimalla K. and Donovan M.D. Transport of Hydroxyzine and Triprolidine Across Bovine Olfactory Mucosa: Role of Passive Diffusion in the Direct Nose-to-Brain Uptake of Small Molecules. *Int. J. Pharm.* 302, 133-144, 2005.
26. Chemuturi NV and Donovan MD. Metabolism of Dopamine Hydrochloride by the Nasal Mucosa. *J. Pharm. Sci.* 95, 2507-2515, 2006 (doi:10.1002/jps.20724).
27. Chemuturi NV, Haraldsson JE, Prisinzano TP, and Donovan MD. Role of Dopamine Transporter (DAT) in Dopamine Transport Across the Nasal Mucosa. *Life Sci.* 79, 1391-1398, 2006.

28. Donovan MD. Nose to Brain Drug Delivery: An Optimistic Pessimist's Analysis. In *Respiratory Drug Delivery 2006*. Dalby RN, Byron PR, Peart J, Suman JD, Farr SJ (Eds). Davis Healthcare International Publishers, River Grove IL. 2006, p. 239-248.
29. Shah AJ and Donovan MD. Rheological Characterization of Bioadhesive Polysaccharide Polymers with Reduced Mucociliary Clearance for Intranasal Delivery. *AAPS PharmSciTech*, 8(2):Article 32, 2007. (<http://www.aapspharmscitech.org>) doi: [10.1208/pt0802032](https://doi.org/10.1208/pt0802032)
30. Shah AJ and Donovan MD. Formulating Gels for Decreased Mucociliary Transport Using Rheologic Properties: Polyacrylic Acids. *AAPS PharmSciTech*, Article 33, 2007. (<http://www.aapspharmscitech.org>) doi: [10.1208/pt0802033](https://doi.org/10.1208/pt0802033)
31. Foo M-Y, Cheng Y-S, Su W-C, and Donovan MD. The Influence of Spray Geometry on Intranasal Deposition and Distribution. *J. Aerosol Med.* 20 (4), 495-508, 2007 [doi: 10.1089/jam.2007.0638]
32. Chemuturi NV and Donovan MD. The Role of Organic Cation Transporters in Dopamine Transport Across Olfactory and Nasal Respiratory Tissues. *Mol. Pharmaceutics*, 4(6), 936–942, 2007. [doi:10.1021/mp070032u]
33. Abbas AO, Donovan MD, Salem A. Technical Aspects of Formulating Poly (lactide-co-glycolide). *J. Pharm. Sci.*, 97, 2448-2467, 2008. [doi: 10.1002/jps21215]
34. Zhang H, Schmidt M, Murry DJ, Donovan MD. Permeation and Systemic Absorption of R- and S- Baclofen across the Nasal Mucosa. *J. Pharm. Sci.*, 100. 2717-2723, 2011. [doi:10.1002/jps.22499; PMID 21283988]
35. Zhang H, Prisinzano T, and Donovan MD. Permeation and Metabolism of Cocaine in the Nasal Mucosa. *Eur J Drug Metab Pharmacokinetics* 37(4), 255-262, 2012. [doi:10.1007/s13318-012-0085-x]
36. Zhang H, Lin C-W, Donovan MD. Correlation between Nasal Membrane Permeability and Nasal Absorption Rate. *AAPS PharmSciTech* 14(1), 60-63, 2013. [doi:10.1208/s12249-012-9884-2]
37. Lack WD, Fredricks D, Petersen E, Donovan MD, George M, Nepola J, Smucker J, Fermino JE. The Effect of Low Dose Aspirin on Bone Healing in a Rabbit Ulna Osteotomy Model. *J Bone Joint Surg*, 95(6), 488-96, 2013. [doi: 10.2106/JBJS.L.00462]
38. Al-Ghabeish M, Scheetz T, Assem M, Donovan MD. Microarray Determination of Expression of Drug Transporters in Humans and Animal Species Used in the Investigation of Nasal Absorption. *Mol. Pharm.* 12(8), 2742-2754, 2015.
39. Dhamankar V, Assem M, Donovan MD. Expression and Localization of Major Cytochrome P450 Metabolizing Isoforms in Bovine Nasal Olfactory and Respiratory Mucosa. *Inhal. Tox.* 16, 1-11, 2015. [doi: 10.3109/08959378.2015.1066903]
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41. Dhamankar V and Donovan MD. Metabolic Loss of Melatonin during Nasal Permeation Demonstrates CYP1A2-like Activity in the Nasal Mucosa. *In review*

42. Awasthi R, An Guohua, Donovan MD, Ponto LB. Relating Observed Psychoactive Effects to the Plasma Concentration of  $\Delta^9$ -tetrahydrocannabinol (THC) and Active Metabolite: An Effect-Compartment Modeling Approach. *in revision*
42. Reiland J and Donovan MD. Expression of Drug Transporters in Cultured Human Mammary Epithelial Cells. *in preparation*
43. Reiland J and Donovan MD. Analysis of Peptide Transport in MCF10A Cells by Flow Cytometry. *in preparation*
44. Foo M-Y and Donovan MD. Viscosity and Surface Tension Effects on Nasal Spray Characteristics. *in preparation*
45. Foo M-Y and Donovan MD. A Geometric Model to Predict Nasal Deposition Efficiency. *in preparation*.

#### Other Publications

1. Donovan MD. Rifampin Stability Monograph in *Chemical Stability of Pharmaceuticals. A Handbook for Pharmacists 2<sup>nd</sup> Edition*. Connors KA, Amidon GL, and Stella VJ, John Wiley & Sons, New York, NY 1986.
2. Amidon GL, Sinko PJ, Donovan MD. "Oral Absorption of Peptide and Peptide-Type Drugs: Problems and Prospects." in *Peptides, Theoretical and Practical Approaches to Their Delivery*. Capsugel Symposia Series, Greenwood, SC Capsugel Library, 1992.
3. Donovan MD. Gender Equity in Faculty Hiring and Retention in *The Dean's Compass: Practical Advice for Achieving Excellence*, P. Chase, B. Hayes, V. Yanchik (Eds). AACP 2007.
4. Donovan MD. Graduate Education in Colleges of Pharmacy in *The Dean's Compass: Practical Advice for Achieving Excellence*, P. Chase, B. Hayes, V. Yanchik (Eds). AACP 2007.

#### **BOOK CHAPTERS**

Donovan MD and Flanagan DR. "Bioavailability of Disperse Dosage Forms" in Pharmaceutical Dosage Forms: Disperse Systems Lieberman HA, Rieger MM, and Banker GS (Eds). Marcel Dekker, New York, 1995.

Donovan MD "The Effect of Route of Administration and Distribution on Drug Action" in *Modern Pharmaceutics* (5<sup>th</sup> Ed). A.T. Florence and J. Siepmann (Eds), CRC Press, Boca Raton, FL, 2009

Donovan MD. "The Feminine World of Drug Delivery. On Female Needs and Delivery of Drugs Vaginally" in *Physical and Biophysical Foundations of Pharmacy Practice. Issues in Drug Delivery*. GL Flynn and MS Roberts. Michigan Publishing, Ann Arbor, MI 2015.

Donovan MD, Foo A, Sawant N. Aerosol Delivery to the Nasal Cavity – A Tortuous Pathway to Efficacy. In: Dhand, R, editor. *Textbook of Aerosol Medicine*. Knoxville(TN): International Society of Aerosols in Medicine; 2015. p.e1-40. Available from: [www.isam.org](http://www.isam.org).

#### **PATENTS**

"Formulation and method for treating neoplasms by inhalation" M.E. Placke, A.R. Imondi, M.J. Brooker, J.E. Frye, P.K. Shah, D.R. Flanagan, M.D. Donovan US 6,348,209.

"RNA interference in respiratory epithelial cells" PB McCray, BL Davidson, A Fischer, HP Jia, MD Donovan. US 7,297,786 (11/20/07).

## ABSTRACTS

"Poloxamer Gels for Ophthalmic Drug Delivery" Maureen D. Donovan and Susan C. Miller  
University of Minnesota/3M Research Poster Session St. Paul, MN December 15, 1982.

"Evaluation of a Pilocarpine Nitrate Ophthalmic Gel" Maureen D. Donovan and Susan C. Miller  
Rho Chi Vistas in Pharmacy Program Kansas City, MO March 4-5, 1983.

"Molecular Weight Permeability Dependence in the Nasal and Gastrointestinal Mucosa"  
Maureen D. Donovan, Gordon L. Flynn and Gordon L. Amidon American Association of  
Pharmaceutical Scientists 2<sup>nd</sup> National Meeting Boston, MA June 5-12, 1987. *Pharm. Res.*  
4, S38, 1987

"The Effect of Absorption Adjuvants on the Molecular Weight Permeability Profile of Polyethylene  
Glycols in the Nasal Mucosa" Maureen D. Donovan, Gordon L. Flynn and Gordon L. Amidon  
American Association of Pharmaceutical Scientists 3<sup>rd</sup> National Meeting Orlando, FL October  
30-November 3, 1988. *Pharm. Res.* 5, S97, 1988

"Diffusion of Polyethylene Glycols 600-2000 through HEMA-MA Hydrogels" Maureen D.  
Donovan, Gordon L. Flynn and Gordon L. Amidon 16<sup>th</sup> International Symposium on Controlled  
Release of Bioactive Materials Chicago, IL August 6-9, 1989. *Proceed. Int. Symp. Control. Rel.*  
*Bioactiv. Mater.* 16, 213-214, 1989.

"The Molecular Weight Permeability Dependence of Polyethylene Glycols through Mucin"  
Maureen D. Donovan, Gordon L. Flynn and Gordon L. Amidon American Association of  
Pharmaceutical Scientists 4<sup>th</sup> National Meeting Atlanta, GA October 22-26, 1989. *Pharm. Res.*  
6, S120, 1989.

"Osmotic Effects on the Molecular Weight Permeability Profile of PEG in the Nasal Mucosa"  
Maureen D. Donovan, Michael Arndorfer and Kristen K. Swantz American Association of  
Pharmaceutical Scientists 6<sup>th</sup> National Meeting Washington D.C., November, 1991. *Pharm.*  
*Res.* 8, S129, 1991

"Assessment of Mucosal Damage following Intranasal Drug Administration" Maureen D.  
Donovan and Mengping Zhou American Association of Pharmaceutical Scientists 7<sup>th</sup> National  
Meeting San Antonio, TX November, 1992. *Pharm. Res.* 9, S207, 1992.

"Drug Binding Studies to BSA and Reconstituted Mucin by Diafiltration" Pavan G. Bhat, Douglas  
R. Flanagan and Maureen D. Donovan. American Association of Pharmaceutical Scientists  
Midwest Regional Meeting Chicago, IL May 17, 1993.

"Proteolytic Activity in Nasal Secretions" Francis Y. Chung and Maureen D. Donovan. 20<sup>th</sup>  
International Symposium on Controlled Release of Bioactive Materials Washington D.C. July,  
1993. *Proc. Int. Symp. Control. Rel. Bioactiv. Mater.* 20, 1993.

"The Effects of Drugs on Intranasal Clearance *In Vivo*" Mengping Zhou and Maureen D.  
Donovan. American Association of Pharmaceutical Scientists 8<sup>th</sup> Annual Meeting Orlando, FL,  
November 1993. *Pharm. Res.* 10, S196, 1993.

"Distribution of Antihistamines into the CSF following Intranasal Delivery" Kang-Jye Chou and  
Maureen D. Donovan. American Association of Pharmaceutical Scientists 8<sup>th</sup> Annual Meeting  
Orlando, FL November, 1993. *Pharm. Res.* 10, S196, 1993.

"Drug Interaction with and Permeation through Mucus" Pavan G. Bhat, Douglas R. Flanagan, Maureen D. Donovan. American Association of Pharmaceutical Scientists 8<sup>th</sup> Annual Meeting Orlando, FL November, 1993. *Pharm. Res.* 10, S259, 1993.

"Bradykinin Degradation in Rat Nasal Secretions and Plasma" Francis Y. Chung and Maureen D. Donovan. American Association of Pharmaceutical Scientists Midwest Regional Meeting Chicago, IL May, 1994.

"Comparison of Drug Permeation Rates through the Nasal Mucosa of Three Animal Species" Hsiao-Hui Wu, Peichung Kuo, and Maureen D. Donovan. American Association of Pharmaceutical Scientists Midwest Regional Meeting Chicago, IL May, 1994.

"Pre-Systemic Metabolism of Bradykinin and Substance P in the Nasal Mucosa" Francis Y. Chung and Maureen D. Donovan. American Association of Pharmaceutical Scientists 9<sup>th</sup> Annual Meeting San Diego, CA November, 1994. *Pharm. Res.* 11, S205, 1994.

"The Influence of Formulation Viscosity on Intranasal Clearance" Mengping Zhou and Maureen D. Donovan. American Association of Pharmaceutical Scientists 9<sup>th</sup> Annual Meeting San Diego, CA November, 1994. *Pharm. Res.* 11, S205, 1994.

"Selecting Nonabsorbable Markers to Study Water Flux During In Situ Nasal Perfusions" Pei-Fen Chou and Maureen D. Donovan. American Association of Pharmaceutical Scientists 9<sup>th</sup> Annual Meeting San Diego, CA November, 1994. *Pharm. Res.* 11, S206, 1994.

"In Vitro and In Vivo Correlations of Drug Permeability through the Nasal Mucosa" Benjamin P. Kuo, Hsiao-Hui Wu, and Maureen D. Donovan American Association of Pharmaceutical Scientists 9<sup>th</sup> Annual Meeting San Diego, CA November, 1994. *Pharm. Res.* 11, S206, 1994.

"Rheological Characteristics and Intestinal Bioadhesion of Polymer Gels" Mengping Zhou, Diane Venice, Douglas R. Flanagan, and Maureen D. Donovan 22<sup>nd</sup> International Symposium on Controlled Release of Bioactive Materials. Seattle, WA July, 1995. *Proc. Int. Symp. Control. Rel. Bioactiv. Mat.* 22, 310-11, 1995.

"Microsphere Transport Pathways in the Rabbit Nasal Mucosa" Ye Huang and Maureen D. Donovan 22<sup>nd</sup> International Symposium on Controlled Release of Bioactive Materials. Seattle, WA July, 1995. *Proc. Int. Symp. Control. Rel. Bioactiv. Mat.* 22, 622-3, 1995,

"Effects of Bioadhesive Polymer Gels on Nasal Mucociliary Clearance" Mengping Zhou and Maureen D. Donovan American Association of Pharmaceutical Scientists 10<sup>th</sup> Annual Meeting Miami, FL November, 1995. *Pharm. Res.* 12, S290, 1995.

"Characterization of Lipid-DNA Complexes Formed between Lipofectin® and Calf Thymus DNA" Alan M. Goldberg, Douglas R. Flanagan, and Maureen D. Donovan American Association of Pharmaceutical Scientists 10<sup>th</sup> Annual Meeting Miami, FL November, 1995. *Pharm. Res.* 12, S267, 1995.

"Effect of Osmolarity on Plasma Secretion into the Nasal Cavity" Pei-Fen Chou and Maureen D. Donovan American Association of Pharmaceutical Scientists 10<sup>th</sup> Annual Meeting Miami, FL November, 1995. *Pharm. Res.* 12, S316, 1995.

"Drug Permeation through Cystic Fibrosis Mucus Solution" Pavan G. Bhat, Douglas R. Flanagan, and Maureen D. Donovan American Association of Pharmaceutical Scientists 10<sup>th</sup> Annual Meeting Miami, FL November, 1995. *Pharm. Res.* 12, S244, 1995.

"Correlation between Drug Diffusion through Cystic Fibrotic Mucus and Rheological Properties and Glycoprotein Morphology" Pavan G. Bhat, Douglas R. Flanagan, and Maureen D. Donovan American Association of Pharmaceutical Scientists Annual Meeting Seattle, WA October, 1996. *Pharm. Res.* 13, S170, 1996.

"Determination of Diffusion Coefficients of Sodium p-Aminosalicylate in Sheep Nasal Mucosae and Dialysis Membranes Using FT-IR-H-ATR Spectroscopy" Nahathai Nardviriyakul, Dale Eric Wurster, and Maureen D. Donovan American Association of Pharmaceutical Scientists Annual Meeting Seattle, WA October, 1996. *Pharm. Res.* 13, S170, 1996.

"Modification of the Sol-Gel Transition Temperature and Gelling Time of Pluronic F127 Using Ionic and Non-Ionic Additives" Ye Huang and Maureen D. Donovan American Association of Pharmaceutical Scientists Annual Meeting Seattle, WA October, 1996. *Pharm. Res.* 13, S212, 1996.

"Intranasal Delivery of Local Anesthetics into the Central Nervous System" Kang Jye Chou and Maureen D. Donovan American Association of Pharmaceutical Scientists Annual Meeting Seattle, WA October, 1996.

"The Role of Water Flux in Altering Nasal Bioavailability" Pei-Fen Chou and Maureen D. Donovan American Association of Pharmaceutical Scientists Annual Meeting San Francisco, CA November, 1998. *PharmSci* 1, S388, 1998

"An In Vitro Testing System for Assessing Performance of Vaginal Suppositories" V. Mark Kothapali, Nahathai Nardviriyakul, Eric R. Butikofer, Michelle L. Maynard, Dale Eric Wurster, and Maureen D. Donovan American Association of Pharmaceutical Scientists Annual Meeting San Francisco, CA November, 1998. *PharmSci* 1, S494, 1998.

"Effect of Processing Variables on Adenoviral Vector Infectivity" Jeffrey J. Scott and Maureen D. Donovan American Association of Pharmaceutical Scientists Annual Meeting Indianapolis, IN October, 2000. *PharmSci* 4, S2285, 2000.

"Drug Permeation through Excised Bovine Olfactory Mucosa" Karunya Kandimalla and Maureen D. Donovan American Association of Pharmaceutical Scientists Annual Meeting Indianapolis, IN October, 2000. *PharmSci* 4, S3270, 2000

"Differential Transport Properties of Antihistamines across Olfactory and Respiratory Mucosae" Karunya Kandimalla and Maureen D. Donovan American Association of Pharmaceutical Scientists Annual Meeting Denver, CO October, 2001. *AAPS PharmSci* 3(3), 2001

"Influence of Emitted Spray Angle on Nasal Deposition Efficiency" Mow Yee Foo and Maureen D. Donovan. American Association of Pharmaceutical Scientists Annual Meeting. Toronto, Canada November 11, 2002. *AAPS PharmSci* 4(4), M1326.

"Dopamine Transport and Metabolism across the Nasal Mucosa" Nagendra Chemuturi and Maureen D. Donovan. American Association of Pharmaceutical Scientists Annual Meeting. Toronto, Canada November 14, 2002. *AAPS PharmSci* 4(4), R6127.

"Carrier Mediated Transport of Small Molecules across Bovine Olfactory Mucosa: Implications In Nose To Brain Transport" Karunya Kandimalla and Maureen D. Donovan. American Association of Pharmaceutical Scientists Annual Meeting, Salt Lake City UT October, 2003. *AAPS PharmSci* 5(4), T3140 (2003)



“Characterization Of Viscoelastic Properties Of Formulations Resistant To Mucociliary Clearance” Ankur J. Shah and Maureen D. Donovan. American Association of Pharmaceutical Scientists Annual Meeting, Salt Lake City, UT *AAPS PharmSci* 5(4), R6144 (2003)

“Drug Permeability Across Bovine Respiratory Tissues Compared To A Human Tracheobronchial Cell Culture (EpiAirway™)” Nagendra Venkata Chemuturi, Maureen D. Donovan, Patrick J. Hayden, Mitchell Klausner. AAPS Annual Meeting, Salt Lake City, UT October, 2003. *AAPS PharmSci* 5(4), T3102 (2003)

“Dopamine Transport And Metabolism across Nasal Mucosa” Nagendra Chemuturi and Maureen D. Donovan. AAPS Annual Meeting, Salt Lake City UT October, 2003. *AAPS PharmSci*, 5(4), T3103 (2003)

“Dopamine Transport across Respiratory Epithelium” Nagendra Venkata Chemuturi, Patrick J. Hayden, Mitchell Klausner, Maureen D. Donovan. AAPS Annual Meeting, Salt Lake City UT October, 2003. *AAPS PharmSci* 5(4), T3104 (2003)

“Formulation of Adenoviral Vectors with Inhibitors of Mucociliary Clearance Enhances Gene Transfer to Airway Epithelia In Vivo” Patrick L. Sinn, Ankur Shah, Maureen D. Donovan, Paul B. McCray, Jr. American Society of Gene Therapy Annual Meeting, Minneapolis MN June, 2004. *Mol Therapy*, 9, Suppl. 1, S191, 2004.

“Reducing mucociliary clearance rates through rheological property optimization” Ankur J. Shah and Maureen D. Donovan. AAPS Annual Meeting, Baltimore MD November, 2004. *AAPS J*, 6(Suppl), 2004

“Nose to brain dopamine delivery: Targeting dopamine transporter and organic cation transporter-2 for improved CNS bioavailability and therapeutic effect” Nagendra V. Chemuturi and Maureen D. Donovan. AAPS Annual Meeting, Baltimore MD November, 2004. *AAPS J*, 6(Suppl), W4290, 2004.

“Localization of p-glycoprotein in human tracheal/bronchial epithelial cell culture (EpiAirway) system” Nagendra V. Chemuturi NV and Maureen D. Donovan. AAPS Annual Meeting, Baltimore MD November, 2004. *AAPS J*, 6 (Suppl), W4289, 2004

“Influence of viscosity and surface tension on nasal spray characteristics” Mow Yee Foo and Maureen D. Donovan. AAPS Annual Meeting, Baltimore MD November, 2004. *AAPS J*, 6 (Suppl), M1137, 2004

“Nose to brain delivery – Characterization of biomolecular processes controlling dopamine transport across the nasal mucosa” Nagendra V. Chemuturi and Maureen D. Donovan. AAPS Annual Meeting, Nashville, TN. November, 2005

“Rheological characterization of bioadhesive polymer gels with reduced mucociliary transit rates” Ankur J. Shah and Maureen D. Donovan. AAPS Annual Meeting, Nashville, TN. November, 2005

“Optimization of bioadhesive gels for extending intranasal residence time” Ankur J. Shah and Maureen D. Donovan. AAPS Annual Meeting, Nashville, TN. November, 2005

“Spray characteristics for optimal deposition beyond the nasal valve” Mow Yee Foo and Maureen D. Donovan. AAPS Annual Meeting, Nashville, TN November, 2005

“Permeation and metabolism of cocaine in the nasal mucosa” Hefei Zhang and Maureen D. Donovan. AAPS Annual Meeting, San Antonio, TX, October, 2006

“Deposition of nasal sprays in an MRI-derived human nasal airway cast” Mow Yee Foo, YS Cheng, WC Su, and Maureen D. Donovan. AAPS Annual Meeting, San Antonio, TX, October, 2006.

“Nanoparticulate movement through viscoelastic barriers” Chen Ming Lee and Maureen D. Donovan. AAPS Annual Meeting, San Antonio, TX, October, 2006.

“Permeation of L-Phenylalanine across the Nasal Mucosa” Hefei Zhang and Maureen D. Donovan. AAPS Annual Meeting, San Diego, CA. AAPS Journal, Vol. 9, No. S2, Abstract T2023 (2007).

“A Geometric Approach to Simulating Nasal Spray Deposition Efficiency” Mow Yee Foo, YS Cheng, WC Su, and Maureen D. Donovan. AAPS Annual Meeting, San Diego, CA, November, 2007, AAPS Journal Vol. 9, No. S2, Abstract W5254 (2007).

“Nanoparticulate Movement in Concentrated Polymer Solutions” Chen Ming Lee and Maureen D. Donovan. AAPS Annual Meeting, San Diego, CA. AAPS Journal, Vol 9, No. S2, Abstract W4198 (2007).

“Measurement of Drug Transport in the Mammary Epithelium Using Cytometric Methods”. Joanne E. Reiland and Maureen D. Donovan. AAPS Annual Meeting, San Diego, CA. AAPS Journal Vol. 9, No. S2, Abstract T2021 (2007).

“A Novel Biotinylated Chitosan Polymer for Applications in Tissue Engineering and Gene Delivery” Aiman Abbas, Maureen Donovan, Aliasger Salem. AAPS Annual Meeting, San Diego, CA. AAPS Journal, Vol 9, No. S2, Abstract T3044 (2007)

“Analysis of Mitoxantrone Uptake and Efflux in Mammary Epithelial Cells Using Flow Cytometry”. JE Reiland and MD Donovan, AAPS Annual Meeting, Atlanta, GA, AAPS Journal 10(S2), 2524, (2008)

“Development of a Predictive Relationship between Nasal Membrane Permeability and Nasal Absorption Rate Constant”. H Zhang and MD Donovan, AAPS Annual Meeting, Atlanta, GA. AAPS Journal 10(S2), 2916, (2008).

“Chitosan-Dextran Sulfate as Vaccine Delivery Systems” AO Abbas, MD Donovan, AK Salem. AAPS Annual Meeting, Los Angeles, CA. AAPS Journal 11(S2), 3849, 2009. [www.aapsj.org/abstracts/AM\\_2009/AAPS2009-003849.pdf](http://www.aapsj.org/abstracts/AM_2009/AAPS2009-003849.pdf).

“Biotinylated Chitosan Applications in Enzyme Immobilization.” AO Abbas , MD Donovan, AK Salem, AAPS Annual Meeting, Los Angeles, CA. AAPS Journal 11(S2), 3727, 2009. [www.aapsj.org/abstracts/AM\\_2009/AAPS2009-003727.pdf](http://www.aapsj.org/abstracts/AM_2009/AAPS2009-003727.pdf).

“Expression of Drug Transporters in the Mammary Epithelium”. JE Reiland and MD Donovan, , AAPS Annual Meeting, Los Angeles, CA. AAPS Journal 11(S2), 3760, 2009. [www.aapsj.org/abstracts/AM\\_2009/AAPS2009-003760.pdf](http://www.aapsj.org/abstracts/AM_2009/AAPS2009-003760.pdf).

“PEPT1 and PEPT2 Activity in Human Mammary Epithelial Cells.” JE Reiland, MD Donovan, , AAPS Annual Meeting, Los Angeles, CA. AAPS Journal 11(S2), 3553, 2009. [www.aapsj.org/abstracts/AM\\_2009/AAPS2009-003553.pdf](http://www.aapsj.org/abstracts/AM_2009/AAPS2009-003553.pdf).

"Localization of Cytochrome P450 (CYP450) Enzymes in Bovine Olfactory and Respiratory Mucosa." VS Dhamankar, KS Walters, MD Donovan, AAPS Annual Meeting, Los Angeles, CA. AAPS Journal 11(S2), 1421, 2009, [www.aapsj.org/abstracts/AM\\_2009/AAPS2009-001421.pdf](http://www.aapsj.org/abstracts/AM_2009/AAPS2009-001421.pdf).

"Size and Surface Properties Determining Nanoparticle Uptake in the Nasal Mucosa". N Chen, DE Wurster, MD Donovan, AAPS Annual Meeting, Los Angeles, CA. AAPS Journal 11(S2), 2528, 2009. [www.aapsj.org/abstracts/AM\\_2009/AAPS2009-002528.pdf](http://www.aapsj.org/abstracts/AM_2009/AAPS2009-002528.pdf).

"The Presence of Multiple Nucleoside Transporters in the Nasal Mucosa". Manar Al-Ghabeish, K. Walters, M. Donovan AAPS Annual Meeting, New Orleans, LA AAPS Journal 12(S1), 1180, 2010.

"The Role of OCT-2 and OCTN-2 in the Transport of Amantadine Across the Nasal Mucosa". Maya George and M Donovan, AAPS Annual Meeting, New Orleans, LA AAPS Journal 12(S1), 1195, 2010.

"Characterization of CYP450 Drug Metabolizing Activities in the Nasal Mucosa". Varsha Dhamankar and M Donovan, AAPS Annual Meeting, New Orleans, LA AAPS Journal 12(S1), 4276, 2010.

"Surface Modification and Size Dependence of Nanoparticle Translocation in the Nasal Cavity." Nan Chen, Dale E. Wurster, M. Donovan, AAPS Annual Meeting, New Orleans, LA AAPS Journal 12(S1), 6110, 2010.

Role of OCT2 and OCTN2 in Nose to Brain Distribution of Amantadine". Jiangeng Huang, Maya George, Rakesh Awasthi, Maureen Donovan. AAPS Annual Meeting, Washington DC. 2011. (<http://abstracts.aaps.org/published/ContentInfo.aspx?conID=26805>)

"Identification of Multiple Nucleoside Transporters to Facilitate Intranasal Drug Delivery" Manar Al-Ghabeish, Maureen Donovan. AAPS Annual Meeting, Washington DC. 2011. (<http://abstracts.aaps.org/published/ContentInfo.aspx?conID=27021>)

"Nose to Brain Delivery of Cimetidine in Rats" Maya George, Maureen Donovan. AAPS Annual Meeting, Washington DC. 2011. (<http://abstracts.aaps.org/published/ContentInfo.aspx?conID=27252>)

"CYP1A2 Mediated Metabolism of Melatonin by the Nasal Mucosa" Varsha Dhamankar, Maureen Donovan. AAPS Annual Meeting, Washington DC. 2011. (<http://abstracts.aaps.org/published/ContentInfo.aspx?conID=26519>)

"Pharmacoinaging of Drug Disposition after Intranasal Administration" Laura B. Ponto, Susan Walsh, Jiangeng Huang, Christine Mundt, John Sunderland, Maureen Donovan. AAPS Annual Meeting, Washington DC. 2011. (<http://abstracts.aaps.org/published/ContentInfo.aspx?conID=26420>)

"Surface Modification and Size Dependence of Nanoparticle Translocation in the Nasal Mucosa" Nan Chen, Maureen Donovan. AAPS Annual Meeting, Washington DC. 2011. (<http://abstracts.aaps.org/published/ContentInfo.aspx?conID=26234>)

"Permeability Characteristics of Non-Functionalized Cellulose Membranes Prepared From Dimethyl Sulfoxide Paraformaldehyde Solvent System- Influence of Degree of Polymerization of Cellulose" Bhavik Bhatt, Maureen Donovan, Douglas Flanagan, Vijay Kumar. AAPS Annual Meeting, Washington DC. 2011. (<http://abstracts.aaps.org/published/ContentInfo.aspx?conID=27142>)

“Expression of Drug Transporters in Animal Models Used for Nasal Absorption Characterization” Manar Al-Ghabeish, Todd Scheetz, Mahfoud Assem, Maureen Donovan. AAPS Annual Meeting, Chicago, IL 2012. (<http://abstracts.aaps.org/published/ContentInfo.aspx?conID=1838>)

“A Mass Transport Model for Concurrent Diffusion and Metabolism of Drugs across the Nasal Mucosa” Varsha Dhamankar, Stephen Stamatis, Maureen Donovan. AAPS Annual Meeting, Chicago IL 2012. (<http://abstracts.aaps.org/published/ContentInfo.aspx?conID=893>)

“Use of PET Imaging to Measure Nucleoside Transporter-Mediated Distribution from the Nasal Mucosa” Laura Ponto, Jiangeng Huang, Susan Walsh, Michael Acevedo, Christine Mundt, John Sunderland, Maureen Donovan. AAPS Annual Meeting, Chicago, IL 2012. (<http://abstracts.aaps.org/published/ContentInfo.aspx?conID=1329>)

“Effect of Marijuana Smoking on Global Cerebral Blood Flow in Chronic and Occasional Users.” Rakesh Awasthi, Daniel O’Leary, Jonathan Koeppel, R Nguyen, Maureen Donovan, Laura Ponto. AAPS Annual Meeting & Exposition, San Antonio TX, November, 2013.

“Expression and Activity of LAT-2: An L-Type Amino-Acid Transporter in the Olfactory and Respiratory Nasal Mucosa”. Ana Ferreira, Maureen Donovan. AAPS Annual Meeting & Exposition, San Antonio TX, November, 2013.

“Uptake of Quantum Dots Across the Nasal Mucosa”. Bhanu Bejgum, Maureen Donovan. AAPS Annual Meeting & Exposition, San Antonio TX, November, 2013.

“Expression of the LAT-2 Transporter in the Nasal Mucosa and Its Role in the Uptake of Gabapentin.” Nan Ferreira and Maureen Donovan. AAPS Annual Meeting and Exposition, San Diego, CA November, 2014.

“Uptake and Transport Pathways for Ultrafine Nanoparticles (Quantum Dots) in the Nasal Mucosa.” Bhanu Bejgum and Maureen Donovan. AAPS Annual Meeting and Exposition, San Diego, CA November, 2014

“PBPK Simulation of Brain Tetrahydrocannabinol (THC) and Metabolites Based on Fitting to Plasma Concentrations following IV Administration of a Surfactant/Ethanol Solution.” Rakesh Awasthi, Michael Bolger, Maureen Donovan, and Laura Boles Ponto. AAPS Annual Meeting and Exposition, San Diego, CA November, 2014

“Characterization of Atrazine Transport across Nasal Respiratory and Olfactory Mucosa”. Wisam Al Bakri and Maureen Donovan. AAPS Annual Meeting and Exposition, San Diego, CA November, 2014

“Assessment of Deposition Patterns of Nasal Sprays in Children Using an In Vitro MRI-Based Nasal Cast Model” Namita Sawant and Maureen Donovan. AAPS Annual Meeting and Exposition, Orlando, FL, October, 2015

“An Effect-Compartment Modeling Approach to Relate the Plasma Concentrations of  $\Delta^9$ -tetrahydrocannabinol (THC) and Active Metabolite to the Observed Psychoactive Effects”. Rakesh Awasthi, Guohua An, Maureen Donovan, Laura Ponto. . AAPS Annual Meeting and Exposition, Orlando, FL, October, 2015

“Atrazine Permeation across the Nasal Mucosa: Formulation Effects of Commercial Herbicide Products”. Wisam Al Bakri and Maureen Donovan. . AAPS Annual Meeting and Exposition, Orlando, FL, October, 2015

"Synergistic Behavior of LAT-2 and other Amino Acid or Cation Transporters in the Nasal Uptake of Gabapentin" Ana Ferreira and Maureen Donovan. . AAPS Annual Meeting and Exposition, Orlando, FL, October, 2015

"Enhancing Midazolam Permeability Across the Buccal Mucosa for Rapid Seizure Treatment". Laxmi Shanthi Chede, Max Baker and Maureen Donovan. AAPS Annual Meeting and Exposition, Denver, CO, November, 2016.

"Nasal Spray Deposition in Children-In Vitro Investigation of the Effect of Plume Angle and the Role of Surface Mucus". Namita Sawant and Maureen Donovan. . AAPS Annual Meeting and Exposition, Denver, CO, November, 2016

"Permeation of Herbicides Across the Nasal Mucosa: An Overlooked Route with Potential Toxicological Implications". Wisam Al Bakri and Maureen Donovan. . AAPS Annual Meeting and Exposition, Denver, CO, November, 2016

## **INVITED PRESENTATIONS**

"The Molecular Weight Dependence of Gastrointestinal and Nasal Absorption" Ciba-Geigy Corp. Ardsley, NY May 1, 1989.

"Nasal Drug Delivery: Molecular Weight and Formulation Effects" SmithKline Beecham Pharmaceuticals, Upper Merion, PA March 15, 1991.

"Drug Absorption into CSF and Plasma following Intranasal Administration" Glaxo Inc., Research Triangle Park, NC March 28, 1993.

"Presystemic Metabolism following Intranasal Delivery" First International Conference on Pharmaceutical and Food Sciences and Technology - Symposium on Drug Delivery Systems Chicago, IL August 26, 1993.

"Nasal Drug Delivery: Local vs. Systemic Effects" University of Connecticut School of Pharmacy Storrs, CT October 28, 1993.

"Local Effects following Intranasal Drug Administration" Boehringer Ingelheim Pharmaceuticals, Inc. Ridgefield, CT October 29, 1993.

"Evaluation of Intranasal Dosage Forms Using *In Vitro* Systems" Miles Laboratories, Inc., Elkhart, IN November 8, 1993.

"Predicting Nasal Bioavailability and Toxicity Using *In Vitro* and *In Vivo* Animal Models" Syntex, Inc. Palo Alto, CA June 9, 1994.

"Career Opportunities in Pharmaceuticals" 12th Annual Symposium on Pharmaceutical Sciences Graduate Programs, Merrillville, IN October 15, 1994.

"Nasal Drug Delivery: Mucosal and Formulation Effects on Systemic Distribution and Bioavailability" Parke-Davis/Warner Lambert Pharmaceutical Research Division Ann Arbor, MI October 17, 1994.

"Nasal Drug Delivery: Local vs. Systemic Effects" Alza, Inc. Palo Alto, CA November 4, 1994.

"Limitations to Drug Permeability Due to Mucus Layers" Eli Lilly & Co. Indianapolis, IN April 10, 1996

"Metabolism and Residence Time Effects on Nasal Drug Delivery" Indianapolis/Cincinnati Pharmaceutical Discussion Group Indianapolis, IN April 10, 1996

"Drug Delivery to a Virtual Space: Development of Vaginal Formulations" Gilead Sciences, Inc. Foster City, CA September 6, 1996

"Drug Disposition into the CNS following Nasal Delivery" Natestech Pharmaceutical Company Hauppauge, NY October 4, 1996

"Preferential Drug Delivery to the CNS: Myth or Fact?" American Association of Pharmaceutical Scientists October 29, 1996

"Nasal Drug Delivery" American Association of Pharmaceutical Scientists October 31, 1996.

"Nasal Drug Delivery: Mucosal and Formulation Effects on Nasal Bioavailability" The West Company, January 6, 1997.

"Drug Delivery to a Ciliated Mucosal Surface: Trying to Trick Mother Nature" Aguron Pharmaceuticals, Inc. March 28, 1997.

"Non-immunologic Complications of Nasal Drug Delivery" Nasal and Pulmonary Drug Delivery, Conference V, Stockholm, Sweden, September 30, 1997

"Nasal Drug Delivery: Formulation and Mucosal Surface Effects" Unigene, Inc. August, 1998

"Evaluation of Vaginal Drug Delivery System Efficacy", Women's Health Symposium, University of Iowa, March, 1999.

"Drug Disposition into the CNS Following Nasal Delivery" West Pharmaceutical Services, Inc. August, 2000

"Nasal Drug Delivery: Mucosal and Formulation Effects on Nasal Bioavailability" Bristol Myers Squibb, May, 2001

"Nasal Drug Delivery: Mucosal and Formulation Effects on Systemic Distribution and Bioavailability" Pharmacia Corporation, 2001

"Biopharmaceutics Curriculum at the University of Iowa: What to Include and Why" AACP Teachers of Pharmaceutics Seminar. American Association of Pharmaceutical Scientists Annual Meeting. Toronto, CA November 10, 2002.

"Carrier Mediated Processes as an Explanation for Selective Nose to Brain Transport" Uppsala University, Uppsala Sweden. March, 2003.

"Intranasal Deposition: Effect of Particle Size, Velocity, and Nasal Anatomy" AAPS Workshop on Particle Size Analysis. Alexandria, VA May 2, 2003

"Gender Differences in Medication Response: Drugs and Delivery Systems" 11<sup>th</sup> Annual Congress on Women's Health, Hilton Head, SC June 2, 2003.

"The Pharmaceutics Curriculum: Integrating Physical Concepts with Clinical Practice" AACP Annual Meeting, July 20, 2003.

"Gender and Racial Differences in Pharmacologic Response: Drug Delivery Systems" Expert Meeting on Improving the Use and Safety of Medications in Women Through Gender and Race Analysis. Sponsored by the Agency for Healthcare Research and Quality, April 19, 2004.

"Nose to Brain Delivery: An Optimistic Pessimist's Analysis" Respiratory Drug Delivery X Conference, Boca Raton, FL, May, 2006

"Nasal Drug Delivery: Passing the Sniff Test" Affymax, Inc. Palo Alto, CA September 22, 2006

"Using Biological Properties and Permeability to Select Routes of Administration" University of Michigan, October, 2006.

"Drug Delivery: Utilizing Chemistry, Biology and Materials Science to Improve Human Health" Department of Biomedical Engineering, University of Iowa, April, 2007

"Nasal Drug Delivery: Passing the Sniff Test" Pallatin, Inc. Cranbury, NJ April, 2007

"Some Do and Others Don't: Understanding Nose to Brain Delivery of Therapeutic Agents" University of Oklahoma College of Pharmacy, May, 2007.

"Prolonging Nasal Residence Time: Bioadhesive Polymers and Their Interactions with the Nasal Mucosa" NovaBay Pharmaceuticals, Inc. Emeryville, CA, April, 2008.

"Nasal Drug Delivery: Passing the Sniff Test" Centocor Pharmaceuticals, Palo Alto, CA February, 2009

"Alternative Routes of Delivery: Significance, Selection and Success" Glaxo SmithKline Consumer Products, Parsippany, NJ March, 2009.

"Drug Transport Processes and Limitations in the Olfactory Mucosa" University of Michigan College of Pharmacy Science Symposium : Physical Chemistry in the Age of Molecular and Cellular Biology. October 15, 2010

"Size and Surface Characteristics Influencing Nanoparticle Uptake and Transport through the Olfactory Mucosa. Environmental Health Sciences Research Center, University of Iowa October 22, 2010.

"Size and Surface Properties Determining Nanoparticulate Uptake in the Nasal Mucosa" University of Iowa Environmental Health Sciences Research Center Retreat. January 10, 2011.

"Alternative Routes of Delivery: Significance, Selection and Success" Tongji Medical College School of Pharmacy, Huazhong University of Science and Technology, Wuhan, China. November 19, 2011.

"Materials and Methods for the Controlled Release of Ophthalmic Medications" Department of Ophthalmology Fourth Military Medical University, Xi'an, China. November 21, 2011.

"Some Do and Others Don't. Understanding Nose to Brain Transport of Therapeutic Agents" University of Iowa Department of Chemical and Biochemical Engineering. February 23, 2012.

"Career and Life Lessons Learned" University of Iowa Chapter of Women in Science and Engineering. February 26, 2012.

"The Nose to Brain Transport Pathway: Navigating the Entrance and Exit Ramps" Duquesne University College of Pharmacy. March 29, 2012.

"The Olfactory Neuroepithelial Barrier as a Delivery Pathway to the CNS" Gordon Research Conference on The Barrier Function of Mammalian Skin. August 21, 2013.

Using the Olfactory Neuroepithelium as a Delivery Pathway to the CNS. China Pharmaceutical Association, Wuhan, China, October 25, 2013.

Using the Olfactory Neuroepithelium as a Delivery Pathway to the CNS. Shiyuan, China. October 28, 2013.

Abuse Deterrent Drug Products: Formulations and Drug Product Equivalence. University of Iowa College of Pharmacy. Cold Night, Hot Topics Symposium January 23, 2014.

Translational Medicine and Drug Development. University of Iowa Institute for Clinical and Translational Science. October, 2014.

In Vitro Assessment of Nasal Deposition Patterns in the Pediatric Population. NIPTE/FDA Science Meeting, Shady Grove, MD. April, 2015.

The Promise of Nose to Brain Transport: It's Not Nice (or Easy) to Fool Mother Nature. Eli Lilly & Co. May, 2015

Molecules and Macromolecules, Nano and Microparticles: Does the Olfactory System Provide a Drug Delivery Pathway to the Brain? Iowa State University Nanovaccine Initiative Annual Meeting. May, 2015

#### CE Presentations

"Drug Delivery Systems: An Application of Technology"  
Trends in Health Care CE Conference Iowa City, IA October 8, 1989.

#### **GRADUATE STUDENTS**

##### Ph.D. Degree Conferred

Yu-Min (Francis) Chung *The Limiting Effects of Mucosal Metabolism on Systemic Bioavailability from the Nasal Cavity*, May, 1995

Pavan G. Bhat *Drug Binding and Permeation in Normal and Cystic Fibrosis Mucus Solutions*, May, 1996

Mengping Zhou *Drug and Formulation Induced Toxicity and Clearance Alterations in the Nasal Cavity*, August, 1996

Kang-Jye Chou *Physicochemical Properties Controlling Transport into the CSF following Intranasal Drug Administration*, August, 1997



- Ye (Bill) Huang    *Characterization of the Rheological Properties of In Situ Gelling Systems and Their Potential Use in Nasal Drug Delivery*, August, 1997.
- Pei Fen Chou Roghair    *The Influence of Formulation Osmotic Pressure on Nasal Bioavailability*, July, 2001
- Karunya Kandimalla    *Carrier Mediated Transport of Small Molecules across Bovine Olfactory Mucosa: Implications in Nose to Brain Drug Delivery*, May, 2004
- Ankur Shah    *Viscoelastic Gels Resistant to Mucociliary Clearance: Rheological and Chemical Optimization for Prolonged Mucosal Contact*, July, 2005
- Nagendra V. Chemuturi    *The Characterization of Biomolecular Processes Controlling Dopamine Transport Across the Nasal Mucosa*, December, 2005
- Mow Yee Foo    *Deposition Patterns of Sprays in the Human Nasal Airway: Interactions Among Formulation, Device, Anatomy, and Administration Techniques*. Dec. 2007.
- Chen-Ming Lee    *Nanoparticle Mobility in Viscoelastic Media*. July, 2008
- Hefei Zhang    *Identification of Membrane Transporters to Facilitate Intranasal Drug Delivery Using Tissue-based and Pharmacokinetic Approaches*. July, 2009
- Joanne Reiland    *Analysis of Cell Culture Models of Mammary Transport*, July, 2009.
- Varsha Dhamankar – *Role of Concurrent Metabolism and Saturable Uptake on Distribution Following Nasal Administration*. May, 2013
- Maya George – *The Role of Organic Cation Transporters in the Nasal Uptake and Brain Distribution of Organic Cation Substrates*. May, 2013
- Nan Chen – *Size and Surface Properties Determining Nanoparticle Uptake and Transport in the Nasal Mucosa*. July, 2013.
- Manar Al-Ghabeish – *Drug Transports in the Nasal Epithelia and Their Contributions in Drug Delivery*. December, 2013.
- Master's Degree Conferred
- Hsiao-Hui (Daisy) Wu    *Comparison of Drug Permeation Rates through the Nasal Mucosae of Three Animal Species*, August, 1994.
- Diane Venice    *Factors Influencing the Viscoelastic Behavior of a (Poly)Acrylic Acid Gel System*, December, 1995.
- Daniel Cullinan    (non-thesis) August, 1997
- Jeffrey Scott    (non-thesis) July, 2000
- Kavita Khanvilkar (non-thesis) December, 2001
- Saroj Vangani (non-thesis) December, 2003
- Saurabh Agarwal (non-thesis) August, 2004

Anita Gondi (non-thesis) December, 2005

Salem Elghami (non-thesis) May, 2011

Juan Carlos Soza Rios (non-thesis) May, 2012

Wided Najahi-Missaoui (non-thesis) December, 2013

Krupal Robeshkumar Maity - *Targeting the Trigeminal Nerve System for Orofacial Pain Treatment* May, 2013

Wisam Al Bakri – *Characterization of Atrazine Transport Across Nasal Respiratory and Olfactory Mucosae*, May, 2014

Mohammed Albarki – *In Vitro Assessment of the Transport of Poly D, L Lactic-co-Glycolic Acid (PLGA) Nanoparticles Across the Nasal Mucosa*. July, 2016.

Current Students (and tentative Ph.D. dissertation title)

Rakesh Awasthi – *Pharmacokinetic Modeling of THC Disposition for Improved Estimation of Duration of Marijuana Pharmacodynamic Effects*  
(expected completion: May, 2017)

Bhanu Bejgum – *Ultrafine Nanoparticle Uptake and Transport in the Nasal Mucosa*  
(expected completion: May, 2017)

Anna Ferreira – *Identification and Function of Amino Acid Transporters in the Nasal Mucosa*  
(expected completion: September, 2017)

Wisam Al-Bakri – *Enhanced CNS Distribution of Pesticides following Inhalation Exposure*  
(expected completion: July, 2017)

Namita Sawant – *Nasal Deposition Patterns in Pediatric Nasal Airways*  
(expected completion: December, 2017)

Mohammed Al Barki – *Endocytic Uptake Mechanisms Regulating Nanoparticle Uptake in Nasal Cell Cultures and the Nasal Mucosa* (expected completion: December, 2018)

Laxmishanti Chede – *Solubility and Permeation Enhancement of Low Solubility Drugs Using Buccal Thin Films* (pre-comp)

Ammar Al-Khafaji - *Nanoparticle Uptake Mechanisms in the Nasal Respiratory and Olfactory Mucosae*. (MS thesis, May, 2017)

Zainab Bakri (HCED Scholar, 2014-17)

Post-Doctoral Fellows

Jiangeng Huang, Ph.D. – *Pharmacokinetic Evaluation of Nose to Brain Transport* (2010-12)

Visiting Scholars

Bjorn Jansson, Uppsala University, October – December, 2001

Jon Haraldsson, Uppsala University, January – May, 2004

Juan Pablo Cerasano, Neurosurgeon, Argentina, June – October, 2011

Bryan Gonzalez, University of Puerto Rico. SROP Scholars Program – June – August, 2012

Jiaqiang Xu, Tongji Medical College, Hubei University of Science and Technology– Dec 2011-  
March 2012; Sept 2012-Sept 2014.

Johnny Xu, Tongji Medical College, Hubei University of Science and Technology – March,  
2014-June 2014.

#### Pharm.D. Student Trainees

Michael Arndorfer, 1990-1992

Kristen Swantz, 1992-94

Kelsey Mohs (P4 Research Rotation), September, 2013

Ashley Beckman, (2014-2015)

Amanda Rixen, (2014-2015)

Shanrae'L Vinel (2016)

#### Undergraduate Student Research Trainees

Ellen Overholzer (September 2016-present)

Mitchell Roback (March 2016- present)

### **GRANTS AND AWARDS**

*Investigation of the Limiting Role of Mucus in the Diffusion of Drug Molecules in the Lower Respiratory Tract* The University of Iowa College of Pharmacy BRSG Seed Grant \$6000, 1989.

Research gift from the Proctor and Gamble Co. \$5000, 1989.

*Molecular Weight Dependent Absorption following Intraperitoneal, Intramuscular, and Subcutaneous Administration* Parenteral Drug Association Faculty Development Grant Program \$15,000, 1990-91.

*The Limiting Effects of Mucosal Metabolism on Systemic Bioavailability from the Nasal Cavity* The University of Iowa College of Pharmacy BRSG Seed Grant \$5000, 1990.

Research gift from SmithKline Beecham Pharmaceuticals \$5000, 1990.

*CSF vs. Plasma Drug Concentration following Intranasal Administration* American Association of Colleges of Pharmacy Grant Program for Young Investigators \$5000, 1991.

*The Use of a PABA-Peptide (Bentiromide) as a Nasal Absorption Marker* Pharmaceutical Manufacturers Association Undergraduate Research Fellowships Program \$5000, 1991.

Research gift from SmithKline Beecham Pharmaceuticals \$5000, 1991.

*Physicochemical Properties Controlling Transport into the CSF Following Intranasal Administration* Glaxo, Inc. \$15,000, 1991.

*Investigation of Epithelial Damage and Repair in the Nasal Mucosa* Rugby Darby Group Companies, Inc. \$30,000, 1991.

Eli Lilly & Co. Young Investigator Award \$20,000, 1992-93.

National Institutes of Health, National Institute of Allergy and Infectious Disease, DAIDS NO1-AI-95040. T.F. Chin (principal investigator). M.D. Donovan and D. R. Flanagan, co-investigators Funds available \$210,000 (January, 1994 - September 1995).

Abbott Laboratories, *Development of an Otic Formulation*, March - November, 1997, \$25,000

Mimetix, Inc. *Development of Sustained Release Vaginal Formulations* M.D. Donovan and D.E. Wurster, co-investigators, \$13,000, 1997.

Battelle, Inc. *Formulation Development of Solutions for Inhalation* M.D. Donovan and D.R. Flanagan, co-investigators, \$120,000, 1997-1999.

Pharmacia & Upjohn *Preformulation and Formulation of a Veterinary Injectable Dosage Form*. \$64,500, 1998 - 1999.

Aguoron Pharmaceuticals *Dissolution Characterization of Poorly Soluble Drugs*. D.E. Wurster (PI) and MD Donovan (co-investigator) \$75,000, 1998-2000

Meyer Nutraceuticals *Dissolution Characterization of a Targeted Release Oral Dosage Form* \$50,000, 1999-2000.

Pharmaceutical Research & Manufacturers of America Foundation. *Improved In Vitro Drug Release Testing Methods for Dosage Forms Administered to Limited Volume Sites*. \$5000, 2001.

Pinney & Associates *Formulation and Evaluation of Nasal Dosage Forms*, \$113,000, 2001

Bristol Myers Squibb *Bioavailability and Toxicologic Evaluation of Nasal Dosage Forms*. \$108,750, 2002

Ross Products *Development of Gel Formulations*. \$ 310,600, 2002-2006.

The University of Iowa Collaborative Interdisciplinary Projects *Cell Culture Models for Drug Transport across Mammary Epithelium*. co-investigator: Sarah England, Ph.D. \$24,975, 2004

National Cancer Institute, Division of Cancer Treatment and Diagnosis, Developmental Therapeutics Program *Manufacturing of Oral and Topical Dosage Forms*  
PI: Rolland Poust, Ph.D. (task order contract), \$250,000 (annual) 2005-2011 ((MDD, 5% effort)

Abbott Laboratories *Investigation of Mucosal Transport* \$60,000, 2005

Abbott Laboratories *Bioavailability of Sustained Release Injectables* \$20,000, DR Flanagan (PI), 2006

NIH/NIDCD R01 DC008374 *Bypassing the Blood Brain Barrier: Modulation of Transporters in the Nasal Mucosa*, \$1,500,000, (Donovan, PI), 2007-2012. ARRA Supplement \$127,500 (2009)

Glaxo Smith Kline Consumer Products *In Vitro Formulation Evaluation*, \$85,000, 2009-11.

Novartis Pharmaceuticals Corporation “*Novartis Pharmaceuticals Student Internships*”. \$108,318, 2010.

Acquisition of a Dispersive Raman Spectrometer with Confocal Microscope. Roy J. Carver Charitable Trust. \$125,000, 2010

Novartis Pharmaceuticals Corporation “*Novartis Pharmaceuticals Student Internships*”. \$123,000 2011.

Nanoparticle Distribution from the Olfactory Epithelium to the Brain Institute for Clinical Translational Science – University of Iowa \$50,000 2012-13

Enhanced CNS Exposure to Glyphosate following Inhalation Resulting from Olfactory Uptake Center for Health Effects of Environmental Contamination- University of Iowa \$30,000 2013

Pediatric Nasal Dosage Forms: In Vitro Characterization of Intranasal Deposition Patterns in Children for Optimal Delivery and Performance. NIPTE/US FDA U01 \$84,500 2013-2015.

Exposure Characterization following Nasal Inhalation of Narcotic-Containing Drug Products. Mallinckrodt Pharmaceuticals \$65,000 2013-15.

Development of Alternative Dosage Forms of Vanoxerine. Clipse Therapeutics. \$76,250 2015.

Enhanced CNS Exposure to Herbicides Following Inhalation Resulting from Olfactory Uptake. University of Iowa Environmental Health Sciences Research Center \$40,000 2016-2017.

## **TEACHING RESPONSIBILITIES**

Pharmacy Orientation, Pharmacy 46:014 (2 s.h.)  
Spring 1990 - 1993

Drug Delivery Systems: Principles and Applications,  
Pharmacy 46:202/46:232/46:110,111/46:238/239 (3 s.h.)  
Fall 1990, 1992, 1994; 2009, 2011, 2013  
Spring, 1997, 1999, 2001, 2005, 2007, 2009, 2011, 2012, 2014

Introduction to Pharmaceutical Care 46:049  
Fall 1993 - 1996                      lecture on Dosage Forms for Colds and Allergies

Introduction to Pharmaceutical Sciences 46:050  
Spring 1994, 1995 (15 lectures; course coordinator)

Therapeutic and Diagnostic Systems 46:145 (2 s.h.)  
Fall 1995 – Fall, 2002

Principles of Equilibrium Processes 46:050  
Spring 1996 (15 lectures; course coordinator))

Pharmaceutics Seminar 46:231 (2 s.h.)  
1997-2003 (co-coordinator)  
2012-present (coordinator)

Professional Practice 46:143

Fall 1997- 2000      8 lectures on Parenteral Dosage Forms

Pharmacy Projects (Calculations) 46:050 (2 s.h.)  
Spring 1997

Pharmacy Honors Seminar 46:102 (1 s.h.)  
1998-2001 (coordinator)

Pharmaceutics I: Solutions 46:123  
Fall 2001-2004 (20 lectures)

Pharmaceutics II: Solids and Semi-solids 46:124  
Spring 2002-2009 (30 lectures); 2010 (8 lectures), 2011 (15 lectures), 2012 (10 lectures),  
2014 (8 lectures); 2015 (6 lectures)

Pharmaceutics III: Pharmacokinetics and Biopharmaceutics 46:138  
Spring 2002, Fall 2002, 2003 (15 lectures); Fall 2009-16 (25 lectures)

Foundations of Pharmaceutical Science II (46:8137)  
Laboratory Instructor – 20 contact hrs

Parenteral Products and Technology 46:173  
Fall 2002 (6 lectures)

Pharmacy Practice Laboratory I  
Fall 2004-2014 (25 - 35 contact hours)

Pharmacy Practice Laboratory II  
Spring 2005-2009 (10 contact hours)

Pharmacy Practice Laboratory III  
Fall 2004, 2005 (24 contact hours), 2007 (8 contact hours)

Pharmacy Practice Laboratory IV  
Spring 2004-11 (7 contact hours)

Pharmacy Practice Laboratory V  
Fall 2004, 2006, 2007 (8 contact hours)

Introductory Practice Experience I (preceptor)  
2007-2009

First Year Seminar: Health in a Bottle – Drug Development in the 21<sup>st</sup> Century (1 sh)  
Fall 2009-13

First Year Seminar: Apothecary 101 (1 sh) 46:1000  
Fall 2015-16

Introduction to Pharmaceutical Sciences: Drug Development (1 sh)  
Fall 2015-16  
Spring 2016

New Drugs for New Therapies (2 sh)  
Spring 2016-17

Need A New Drug? (1 sh)  
Spring 2017

Foundations of Pharmaceutical Science I (6 contact hours)  
Fall 2016

Pharmacy Projects  
Fall 2014, Spring 2015 – Ashley Beckman  
Fall 2014, Spring 2015 – Amanda Rixen

## **EDITORIAL ADVISORY BOARD MEMBERSHIPS**

Molecular Pharmaceutics (American Chemical Society), 2013-present

Journal of Pharmaceutical Innovation (Springer), 2010.

## **REVIEW AND ADVISORY PANEL MEMBERSHIPS**

NIH/CSR – Small Business: Drug Discovery for Aging, Neuropsychiatric and Neurologic Disorders. ZRG1-ETTN-M(11) February, 2017

FDA Anesthetic and Analgesic Drug Products Advisory Committee - Ad hoc member (May 2016)

NIH/CSR – Small Business: Drug Discovery for Aging, Neuropsychiatric and Neurologic Disorders. ZRG1-ETTN-M(11) February, June, October 2016

NIH/CSR – Small Business: Drug Discovery for Aging, Neuropsychiatric and Neurologic Disorders. ZRG1-ETTN-M(11) February, July, October 2015.

NIH/CSR – Small Business: Drug Discovery for Aging, Neuropsychiatric and Neurologic Disorders. ZRG1-ETTN-M(11) February, June, October, 2014.

NIH/NIDCD – Chemosensory Fellowship Application Review. ZDC1 SRB-Y (68) February, 2014.

NIH/NIDCD – Chemosensory Fellowship Application Review. ZDC1 SRB-Y (52) June, 2013.

NIH/NCI – Special Emphasis Panel – Development of Radiation Modulators for Radiotherapy. ZCA1 SRLB-V (C1) March 21, 2013.

NIH/NCI – Special Emphasis Panel – Development of Radiation Modulators for Use During Radiotherapy. ZCA1-SRLB-V (C2) March 27-28, 2012.

NIH/NIAID – Special Emphasis Panel – Therapeutics for Neurotropic Biodefense Toxins and Pathogens. February 3, 2012.

NIH/CSR – Special Emphasis Panel (mail review) – Translational Research in Aging. ZAG1 ZIJ M1 February, 2012.

FDA Pharmaceutical Science and Clinical Pharmacology Advisory Committee – Ad hoc member (2012)

NIH/NCI – Special Emphasis Panel – Cancer Targeted Discovery and Development (CTDD) Network. November 14-15, 2011.

NIH/NCRR Special Emphasis Panel – Centers for Biomedical Research Excellence (COBRE), June 22-23, 2011.

NIH/NCI – Special Emphasis Panel – Preclinical Pharmacokinetic and Pharmacologic Studies. ZCA1 SRLB-V(C1)S September 30, 2010.

NIH/NIEHS – Special Emphasis Panel – Engineered Nanomaterials: Linking Physical and Chemical Properties to Biology. ZES1-SET-V 03 June 8-9, 2010.

NIH/CSR – Special Emphasis Panel – Emerging Technologies and Training in Neurosciences/Neuropharmacology SBIR ZRG1 ETTN C-11, 2008, Chair 2009-2011

Society for Women's Health Research, Board of Directors, 2007-2009.

Invited reviewer, Leaders Opportunity Fund, Canada Foundation for Innovation, April, 2007

NIH/CSR –Special Emphasis Panel – Brain Disorders and Clinical Neurosciences/Neuropharmacology SBIR ZRG1 BDCN A(11); 2006-2007

NIH/CSR Special Emphasis Panel (SBIR) – Pharmacology and Diagnostics for Neuropsychiatric Disorders, BDCN F(11); 2005-2006

NSF Scientific Review Panel (SBIR) - 2004

## **PROFESSIONAL SERVICE ACTIVITIES**

### **American Association of Pharmaceutical Scientists**

Program Review Team – Distance Learning, 2004-2005  
Program Review Team – Students, 2003  
Program Review Team – Books, 2003  
AAPS Treasurer (1998-2000)  
AAPS Publications Board Member (1998-2000)  
AAPS Diversity Task Force-Mentoring Subcommittee Chair (1994-1995)  
PDD Section Secretary-Treasurer (1993-1995)  
AAPS Finance Committee (1991-95)  
PPDM Travelships-Graduate Student Committee (1993)  
Poster Session Moderator Las Vegas, NV (1991)  
Pharmaceutics and Drug Delivery Section Nominations Committee (1990-91)  
Pharmaceutics and Drug Delivery Section Paper Screening Committee (1990,1992)  
Representative to AACP sponsored "Pharmacy in the 21<sup>st</sup> Century Conference" (1989)  
Pharmaceutics and Drug Delivery Section Membership Committee (1989, 1990, chair 1991, 1992)  
AAPS Long Range Planning Committee (1987,1988)  
University of Iowa AAPS Student Chapter Adviser (1995-present)

### **American Association of Colleges of Pharmacy**

Pharmaceutics Section Strategic Planning Initiative – Concepts Committee (2015)  
Review Panel Member (Teachers of Pharmaceutics) 2006  
Annual Meeting Program Committee (2005-06)  
Academic Leadership Fellow (2004-05)



Review Panel Chair (Pharmaceutics – Biological) New Investigators Program (2003)  
Chair, Section of Teachers of Pharmaceutics, 1998-99  
Vice Chair, Section of Teachers of Pharmaceutics, 1997-98

**American Pharmaceutical Association**

APS Poster Session Committee (1984-85)  
Student American Pharmaceutical Association 1980-83  
SAPhA Special Grant Chairman (1982)

**Society for Women's Health Research**

Board of Directors (2007-2009)

**Kappa Epsilon Pharmaceutical Fraternity**

Alpha chapter pledge trainer 1982  
Province E co-director 1982  
Alpha chapter president 1983  
Gamma Chapter Advisor 1990-1998

**Rho Chi Pharmaceutical Honor Society**

University of Iowa, chapter advisor (2005-2009)  
Chapter secretary/treasurer (1982-83)

**Crohn's and Colitis Foundation of America - Eastern Iowa Chapter**

Board of Trustees member 1992-95

**Mortar Board Honor Society**

Iowa Alumnae Chapter    Treasurer 1994-96  
   Vice-president 1996-97  
   President 1997-98

**Phi Kappa Phi Honor Society**

**ADMINISTRATIVE ACTIVITIES**

University of Iowa Assignments

Graduate College Post-Doc Professional Development Program – Grant Reviews and Study Sections Panelist (2014)  
Graduate College Post-Doc Professional Development Program – Insights from Faculty Search Committees Panelist (2013)  
Task Force on Graduate Education (2009-10).  
Women Faculty Development Conference, Planning Committee Member (2009-15)  
Advisory Board Member, Nanoscience and Nanotechnology Institute at the University of Iowa (2006-2010)  
University of Iowa Animal Care and Use Committee (2006-09)  
Faculty Senate (2006-09)  
Gender Equity Task Force (2005)  
James F. Jakobsen Graduate Forum Faculty Judge (2004, 2006, 2007)  
University of Iowa Presidential Search Committee (2002)  
Task Force on Post-doctoral Scholars – Graduate College (2001-2003)  
University of Iowa Strategic Planning Committee (1998-2000)  
University of Iowa Animal Care and Use Committee (1997-2003)  
Graduate Council (University of Iowa Graduate College) (1996-99)  
Advisory Committee in the Biological Sciences (University of Iowa) (1996-97)

## College of Pharmacy Assignments

Accreditation Steering Committee (2014-2016)  
Administration sub-committee chair  
Curriculum Committee (ad hoc) (2014-present)  
College Council (2010-present)  
Pharmaceutical Sciences Department Chair Search Committee (2010-12)  
Executive Committee (2008-present)  
Accreditation Steering Committee (2008-2010)  
Facilities and Budget sub-committee chair  
College of Pharmacy Dean Search Committee (2006-07)  
Admissions Committee Chair (2006-08)  
Rho Chi Honor Society Faculty Advisor (2005-present)  
College of Pharmacy Accreditation Steering Committee  
Students sub-committee chair (2002-2004)  
Division of Pharmaceutics Search Committee (2001)  
Pharmaceutics Vice-Chair for Professional and Undergraduate Curriculum (2000-2003)  
Ad Hoc Task Force for Clinical Track Appointments (College of Pharmacy) (1999-2000)  
Task Force for Development of B.S. in Pharmaceutical Sciences Program (1999-2001)  
Ad Hoc Pharmaceutics Curriculum Review Committee (1999)  
Advisor, College of Pharmacy Honors Program (1998-2001)  
Task Force on the Development of Educational Outcomes (1997)  
Graduate Studies Committee (College of Pharmacy) (1996 - 1999)  
Division of Medicinal and Natural Products Chemistry Search Committee (1996)  
Division of Pharmaceutics Faculty Search Committees (2) (1993-95)  
College of Pharmacy Dean Search Committee (1991)  
Faculty Secretary (College of Pharmacy) (1990-93)  
Pharmaceutical Service Director Search Committee (1990-91)  
Undergraduate Career Opportunities and Placement (1990 (chair), 1991-92)  
Building and Space Utilization Committee (1989-91)  
Safety Committee (1989, 1992)

## HONORS AND AWARDS

Teacher of the Year, University of Iowa College of Pharmacy, 2005

American Association of Colleges of Pharmacy Academic Leadership Fellow (2004-05)

Treasurer, American Association of Pharmaceutical Scientists 1998-2000

Pharmaceutics and Drug Delivery Section Secretary-Treasurer, AAPS, 1993-1995

American Association of Colleges of Pharmacy, Chair, Section of Teachers of Pharmaceutics, 1998-99

Eli Lilly Young Investigator Award in Pharmaceutics, 1992-93

### Fellowships (Graduate)

Horace H. Rackham Predoctoral Fellow 1987-88

American Foundation for Pharmaceutical Education Fellow 1985-88

1987 Abbott Pharmaceutics Fellow

Nellie Wakeman Fellowship (Kappa Epsilon) 1985

### Nominations

National Dean's List 1980-81  
Who's Who Among Students in American Universities and Colleges  
Outstanding Young Women of America  
Who's Who in Science and Engineering  
Outstanding Mentor, University of Iowa Graduate College, 2003

**MEMBERSHIPS**

American Association of Pharmaceutical Scientists  
American Association of Colleges of Pharmacy  
American Society for Pharmacology and Experimental Therapeutics  
The Controlled Release Society