



College Connections



Paul Dobesh, Pharm.D., with his wife, Stacey, and daughters Alexandra, left, and Emily.

Distinguished Teacher of the Year

Paul Dobesh, Pharm.D., associate professor of pharmacy practice, received the College of Pharmacy 2010 Distinguished Teacher Award. The awardee is selected annually by pharmacy students. Dr.

Dobesh also won the award in 2007.

Reasons given in selecting Dr. Dobesh for the award include his mastery of the subject material, energetic teaching style, willingness to take time to talk with students, encouraging life long learning and assisting in projects advancing student learning and the practice of pharmacy.

Branden Nemecek, P4 class President, presented Dr. Dobesh with the award.

Before announcing the recipient, Mr. Nemecek placed a diet Mt. Dew on the podium. "And we have this just in case he gets thirsty during his acceptance

speech."

A surprised Dr. Dobesh popped open the Dew, took a sip, and then proceeded to thank the students and college for this great honor.

Past Distinguished Teaching Award Recipients

Paul W. Jungnickel	1994
David J. Warner	1995
Wallace J. Murray	1996
Pierre A. Maloley	1997
Keith M. Olsen	1998
Dennis H. Robinson	1999
Eric M. Scholar	2000
William F. Elmquist	2001
Charles H. Krobot	2002
Udaya B. Kompella	2003
Todd S. Paulsen	2004
Keith M. Olsen	2005
Jeffrey N. Baldwin	2006
Paul P. Dobesh	2007
Edward "Ted" B. Roche	2008
Kyle R. Peters	2009

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Fall Honors

The 2010 Annual College of Pharmacy Fall Honors Convocation was held on October 22. Over \$600,000 in scholarships and other leadership awards and prizes were presented. Mr. John Ridgway, Chair of the Scholarship, Honors and Financial Aid Committee, presided at the Convocation. The 2010 Scholarship and Award recipients are listed below and on the following page.



Shirley Lucke, scholarship donor, pictured with P4 Erin Kautz the Leland "Lee" C. Lucke Memorial Scholarship Recipient

University of Nebraska Regents Scholarship

Tessa B. Deyle
Holly D. Donahue
Austin D. Farnstrom
Jeremy M. Gieseke
Jaeyeon Kim
Ryan J. Kolarik
Danielle M. Longo
Ngoc-Thao Phan
Julia L. Reffert
Daniel K. Schroeder
Corinne A. Shields
Adam S. Smith
Mary E. Vacha

University of Nebraska College of Pharmacy Tuition Waiver

Jeanie M. Bayliss
Matthew P. Crotty
Brody W. Crowe
Amanda L. Gilbert
Kayli A. Hall
Alisyn L. Hansen
Jordan M. Hanson
Elizabeth K. Jamieson
Brittany L. Johnson
Erin E. Kautz
Megan K. Kehrli
Robert J. Kurasawa
Colby N. McMann
Kristin K. McNaughton
Hope M. Mulgrew

Regan D. Pettijohn
Anna J. Schreck
Kyle A. Young
Allysa M. Zoucha

Donald Walters Miller Scholarship

Austin D. Farnstrom
Craig G. Reha

Gustav L. Cobb Scholarship

Amanda M. Champ

Plough Foundation Scholarship

Jeremiah D. Bertschinger
Sara E. Bisanz
Leigh K. Blobaum
Whitney K. Breunsbach
Brent F. Cernik
Frederick N. Dunkerson
Evan T. Gahan
Brandon T. Gufford
Laurice L. Hansen
Grant M. Huning
Ashley M. Kenkel
Megan M. Kenkel
Jared W. Knoell
Michael J. Koraleski
Travis V. Kuchar
Beth A. McKelvey
Ashley V. Milota
Kathleen M. Mohan
Dzuan K. Nguyen
Gina M. Paletta
Stephanie O. Popken

Jessica L. Rago
Brian M. Robinson
Rory E. Sallach
Rebecca A. Schainost
Jenna J. Vogel
Shayla M. Wrage

Robert A. and Elizabeth Hardt Scholarship

James N. Bower
Kristin R. Bumsted
Amy R. Carlson
Brent F. Cernik
Morgan L. Farrell
Monica J. L. Hollrah
Megan C. Hrnicek
Patrick J. Mesenbrink
Dzuan K. Nguyen
Jennifer A. Schoenfeld

Rufus A. Lyman Scholarship

Regan D. Pettijohn

Mark Augustin Memorial Scholarship

Megan C. Hrnicek

Floyd Hall Bridges Scholarship

Brent F. Cernik

Sarah E. Cohen Feldman Scholarship

Tyler J. Fries

Alice Elizabeth Barnes Fortna Scholarship

Monica J. L. Hollrah

<u>LaJoie H. Gibbons Scholarship</u> Patrick J. Mesenbrink	<u>Joseph D. Williams Pharmacy Scholarship/Leadership Award</u> Branden D. Nemecek	<u>Nora Parker Linn Student Leadership Award</u> Emily M. Hays
<u>Adam and Frances Rubendall Scholarship</u> Dalal A. Gumeel	<u>UNMC Faculty Women's Club Scholarship</u> Anna J. Foley	<u>Walgreens Diversity Scholarship</u> Emily M. Hays
<u>Herman and Joseph Schuchman Scholarship</u> Tori L. Cunningham	<u>Hengstler-Ordineal Scholarship</u> Jordan M. Hanson	<u>Class of 2010 Scholarship</u> Kimberly J. Terry
<u>Henry and Frank W. Schwake Scholarship</u> Patrick J. Mesenbrink	<u>Daub Family Scholarship</u> Rachel E. DeVries	<u>E. F. Schwedhelm Memorial Scholarship</u> Jeffrey R. Brezina Melissa M. Eickmeier Valarie J. Hoffman Sharla L. Janssen Christine E. Korth Grant A. Meier Elizabeth R. Morgan Alyssa M. Tello
<u>Kohl's Pharmacy & Homecare Scholarship</u> Christen R. Mick	<u>Kay F. Crawford Scholarship</u> Marcus L. Anderson	<u>Pharmacist's Mutual Scholarship</u> Craig G. Reha
<u>Phuong Nguyen & Yen Le Pharmacy Scholarship</u> Anna J. Foley	<u>Eleanor & Marion Johnson Scholarship</u> Tyler J. Fries	<u>Ted Roche BRAN Scholarship</u> Alisyn L. Hansen
<u>Gilbert Swanson Foundation Scholarship</u> Casey R. Koch	<u>J.J. Thomas Scholarship</u> Megan C. Hrnicek	<u>Rex C. Higley Memorial Scholarship</u> Shane A. Halouska
<u>Robert Valdez Scholarship</u> Colby N. McMann	<u>Leland "Lee" C. Lucke Memorial Scholarship</u> Erin E. Kautz	<u>Cora Mae Briggs Scholarship</u> Monica J. L. Hollrah
<u>Carlberg Leadership Scholarship</u> Ryan M. Moore	<u>College of Pharmacy Alumni Association Scholarship</u> Jeanie M. Bayliss Jeremy M. Gieseke Kayli A. Hall Ryan M. Moore Branden D. Nemecek Mary E. Venteicher	<u>Dean's Pharmacy Leadership Award</u> Jeanie M. Bayliss Sara E. Bisanz Elizabeth A. Brenner Brent F. Cernik Amanda M. Champ Kayli A. Hall Alisyn L. Hansen Lonna L. Hughes Austin R. Lucht Ashley V. Milota Ryan M. Moore Branden D. Nemecek Benjamin M. Noll Craig G. Reha Rebecca A. Schainost Mary E. Venteicher
<u>U-Save Pharmacy, Inc Retail Scholarship</u> Katie M. Marquette	<u>Glaxo/Wellcome, Inc. Scholarship</u> Brandon T. Gufford	<u>Charles A. Story Scholarship</u> Emily A. Johnson
<u>Thomas J. O'Holleran Scholarship</u> Anna J. Foley Angela C. Perez	<u>National Association of Chain Drug Stores Scholarship</u> Whitney K. Breunsbach Shopko Stores, Inc. Scholarship Elizabeth K. Jamieson	
<u>Dr. Witold Saski Pharmacy Scholarship</u> James N. Bower	<u>Pamida Scholarship</u> James N. Bower	
<u>John and Marie Augustine Scholarship</u> Megan C. Hrnicek	<u>CVS Caremark Corporate Giving Scholarship</u> Laurice L. Hansen Ambri D. Merrill Stephanie O. Popken Ashley L. Presler Jeffrey R. Stansberry	
<u>Class of 1968 Scholarship</u> Loree R. Weese		
<u>Class of 1986 Scholarship</u> Jolyn N. Anderson		
<u>Melvin R. Gibson Scholarship-Leadership Prize</u> Emily M. Hays		

UNMC pharmacy professor receives prestigious alumni award from University of Kentucky

Recognized for his contribution to pharmacy profession, teaching and research

Jeffrey Baldwin, Pharm.D., professor and vice chairman of pharmacy practice in the University of Nebraska Medical Center College of Pharmacy, received the Paul F. Parker Award from the University of Kentucky College of Pharmacy. A 1973 graduate of the University of Kentucky College of Pharmacy, Dr. Baldwin received the award on Dec. 7 in Anaheim, California in conjunction with the meeting of the American Society of Health-System Pharmacists.

The Paul F. Parker Award is given annually to a former resident of the UK Pharmacy Residency Program or an individual associated with the success of the program. It recognizes someone who has made a contribution to the profession, teaching or research. The recipient has a commitment to high ideals and excellence in their chosen field and encourages the personal and professional growth of others.

The award honors the legacy of Paul F. Parker, who was instrumental in the development of clinical pharmacy practice and teaching programs in the UK College of Pharmacy.



Dr. Baldwin with Henry Mann, Pharm.D., Dean, U. of Toronto (right) and Timothy Tracy, Ph.D., Dean, U. of Kentucky (left) at the Paul F. Parker Award ceremony on December 7th in Anaheim. Photo courtesy of University of Kentucky College of Pharmacy.

After graduating from pharmacy school, Dr. Baldwin joined the UNMC College of Pharmacy in 1973. During his 37-year career at the UNMC, Dr. Baldwin has played a key role in faculty development, promotion and tenure and developed clinical pharmacy services for the pediatrics department.

A recognized national leader in pharmacy education, Dr. Baldwin completed his term as president of the American Association of Colleges of Pharmacy (AACP) in 2010. As AACP president, Dr. Baldwin's main agenda item was the pharmacist's role in primary care.



Congratulations to Julie H. Oestreich, Pharm.D., Ph.D., Assistant Professor, Department of Pharmacy Practice. Dr. Oestreich's proposal, "Impact of ethnicity on platelet

function and response to aspirin and clopidogrel," submitted for the 2010 AACP New Pharmacy Faculty Research Awards Program (NPF-RAP) has been approved for funding.



The editorial "Multifunctional Polymeric Carriers for Gene and Drug Delivery" written by Tatiana Bronich, Ph.D., Professor and Associate Director, Center for Drug Delivery and Nanomedicine, was

published in *Pharmaceutical Research*. An interview with Dr. Bronich is featured as well.

Please see pages 11-13 for the full article and interview.



Dr. Ally Dering-Anderson, Clinical Assistant Professor, Department of Pharmacy

Practice, lead the discussion/debate regarding Medical Marijuana at the Lincoln Science Cafe on October 28, 2010.

Her presentation stimulated discussion and thought, "if it is MEDICAL marijuana - then these are some things to consider and questions that should be addressed."

The science cafes involve face to face conversations about current science topics. They are open to

everyone, and take place in casual settings. For more information visit www.unmc.edu/sciencecafe.

Assistant Professor Don Klepser, Ph.D., MBA, of the UNMC College of Pharmacy, Department of Pharmacy Practice, answered questions December 14 about the big changes coming for Medicare prescription coverage during a live web chat on the Omaha World-Herald's website.



Visit <http://www.livewellnebraska.com/article/20101213/LIVEWELL03/101219898/1161> to view the web chat.

HRSA lauds accomplishments in patient safety, health outcomes

The Health Resources and Services Administration (HRSA) has recognized health care teams from across the nation that have achieved dramatic improvements in patient safety and health outcomes as part of the HRSA Patient Safety and Clinical Pharmacy Services Collaborative (PSPC). The PSPC is a national breakthrough effort to improve the quality of U.S. health care by integrating medical management into the care of high-risk, high-cost patients.

The teams were recognized at a recent PSPC Learning Session in Dallas. Learning Sessions provide a forum for sharing leading practices among teams, who then implement these practices in their local health care communities throughout the country. Using improved data collection and documentation systems, PSPC teams are now able to implement system changes and improve patient health outcomes. Teams report that rates for adverse drug events (events that result in harm or injury to the patient due to medication use) are being reduced by nearly 50 percent, and many cite specific instances when a life-threatening adverse drug event was identified and resolved.

“PSPC teams are continuing to show significant improvements and results,” said HRSA Administrator Mary K. Wakefield, Ph.D., R.N. “They’re building on proven successes and sharing these with other teams to improve patient safety and health outcomes across the country.”

The teams received HRSA PSPC awards for outstanding achievements in managing patient health outcomes,

integrating medical management into their service delivery model, and improving patient safety through detection and reduction of adverse drug events. In addition, three teams received awards from the Food and Drug Administration’s Office of Women’s Health for innovative use of FDA’s health education materials.

The PSPC recently received the 2010 Healthcare Transformation Award from Communities Joined in Action (CJA), which recognizes a replicable and transferable idea, tool, project, or learning that has value in community safety net care.

For more information, visit www.hrsa.gov/patientsafety. A list of all awardees is below.

PSPC Award Winners

Clinical Pharmacy Services Improvement Award

– Awarded to 16 teams that implemented clinical pharmacy services and showed improvements in clinical pharmacy services.

- Allen County Health Partners (Lima, Ohio)
- Ammonoosuc Community Health Services Inc. (Littleton, N.H.)
- Clinicas Del Camino (Ventura, Calif.)
- Coos County Family Health Services (Berlin, N.H.)
- Eastern Virginia Medical School (Norfolk)
- Family HealthCare Center (Fargo, N.D.)
- Greater Lawrence Family Health Center (Lawrence, Mass.)
- Holyoke Health Center (Holyoke, Mass.)
- Louisville PSPC (Louisville, Ky.)
- Open Door/BMH Health Center Inc. (Muncie, Ind.)
- Program for Health Care to Underserved Populations/Birmingham Free Clinic (Pittsburgh, Pa.)
- River Hills CHC (Ottumwa, Iowa)
- Share our Selves Free Medical Clinic (Costa Mesa, Calif.)
- **Siouxland Community Health Center (Sioux City, Iowa)**
- University of Mississippi School of Pharmacy/Delta Pharmacy Partnership (University)
- White River Rural Health Center Inc. – ARCare (Augusta, Ark.)



(left) Kyle Peters, Pharm.D., BC-ADM Clinical Assistant Professor UNMC College of Pharmacy, Siouxland Community Health Center, accepts award

Student News

UNMC pharmacy grads once again achieve 100 percent pass rate on licensing exam

Students also score well above national average

For a second consecutive year, the University of Nebraska Medical Center College of Pharmacy graduating class had a 100 percent pass rate on the national pharmacy licensing examination.

All 69 of UNMC's graduating pharmacy students passed the examination on their first attempt.

The national pass rate for all colleges of pharmacy was 95.3 percent. UNMC students had an average score of 109.8. The national average score was 103.1.

“Once again our students performed remarkably well on their licensing exams,” said Courtney Fletcher, Pharm.D., dean of the College of Pharmacy. “This reflects the outstanding quality of

our students as well as the dedication of our faculty and preceptors to the education of pharmacists. It’s assuring to the public to know that these students are exceedingly well prepared to meet the health care needs of patients.”



Career Day

UNMC College of Pharmacy's Annual Career Day was November 19, 2010. The event is held to facilitate face-to-face



meetings for our P4 students with companies/residencies throughout the United States.

During open circulation P1, P2 and P3 students are able to speak with companies and learn more about the options in pharmacy careers.



Medicare Part D

Submitted by Peter Vu, Pharm.D., RPh, '10, Pamida Beatrice Pharmacy Manager

In preparation for the November 15, 2010 Medicare Part D open enrollment, the UNMC College of Pharmacy Rural Pharmacy Students Association (RPSA) traveled to Beatrice, NE to provide a much needed Medicare Part D Workshop on November 6.

Providing customized information to patients enrolling in a Medicare Part D plan is very technologically challenging. The workshop equipment included four laptops, three laser printers, two desktop computers and one wireless access point. Not more than 30 minutes into the workshop, technical difficulties began to surface. The RPSA students worked through slow/lost internet connections, password lock-outs, and frozen screens with great determination. Eventually, only three computers were functional for the workshop. These technical complications lead to an act of kindness and sacrifice by two students who voluntarily donated their "smart phones" to help enter patient information so that the patients would not have a long wait. Other students facing technical difficulties proceeded to help their patients politely and kept their cool. The RPSA members' dedication to their patients kept their spirits high.

The workshop provided the students with a positive atmosphere where they practiced being mentors to their fellow peers and developed the lifelong skills necessary to teach others.

This Medicare Part D Workshop was the 2nd annual RPSA service project sponsored by Pamida. For a few RPSA students, this was their second opportunity to counsel

patients. In just one year, I was delighted to observe a significant increase in the depth of their pharmacological knowledge. Along with the professionalism expected of all UNMC Pharmacy students, the RPSA members displayed maturity, confidence, humility and a genuine concern for the health care of their patients. They brought laughter and joy to seniors stressed with the daunting task of selecting a Medicare Part D plan.

For a P-3 student, a thorough review of a patient's medication list revealed therapeutic suggestions/changes the patient could review with their physician. These suggestions included switching from an expensive brand medication to that of a generic drug within the same therapeutic class. Patients were informed of the \$4 for 30 days supply of generic drugs offered by many pharmacies. The sum result of these recommendations allowed one particular patient to potentially avoid the doughnut hole as compared to their original projection of being in the doughnut hole in the seventh month.

Special thanks to the Social Security Administration of Beatrice for providing information to patients facing financial difficulty paying for their prescription drug plan. Many Pamida support center personnel along with local Pamida employees teamed together to make this Medicare Part D workshop possible.

On behalf of Pamida, I'd like to thank the UNMC College of Pharmacy and the RPSA members for their hard work and dedication towards improving the lives of rural Nebraska residents. The RPSA students are already looking forward to the 3rd annual Medicare Part D workshop next year with Pamida.



Kappa Epsilon - Beta Chapter is FAMOUS!!!!

The UNMC College of Pharmacy Kappa Epsilon Beta Chapter was featured on the cover of the Spring 2010 issue of *The Bond*. Maggie Hitzeman, P3, Beta Chapter President and Grand Council VP Member Recruitment, wanted to share some information about the volunteer events the group has participated in over the last couple of years.

- Beta chapter raised over \$500 for Susan G. Komen last year through Pink Day and Breast Cancer T-shirt sales.
- About fifteen volunteers went to the Light the Night for Leukemia & Lymphoma event.



- A large UNMC team participated last year and this year for Race for the Cure!

- The chapter collected over 6000 ounces of dish soap, laundry detergent and cooking oil for the Ronald McDonald House when the chapter served dinner there last Spring.

The Beta Chapter members have been busy and dedicated to making a difference in the community.

All these events have lead to a revitalization of the Kappa Epsilon Beta Chapter at UNMC. Please see pages 14-15 for the cover and a complete revitalization article by Maggie that was featured in *The Bond*.

Upcoming Events

January 28, 2011

COP Seminar Series

Dr. Ken Bayles

Noon, COP Room 1038

March 20-27, 2011

P1-P3 Spring Break

April 23, 2011

Last day of classes

April 25-29, 2011

Finals Week

May 6, 2011

Spring Honors Convocation, 10am

Dean's Message

We are regarded as a preeminent College because of the accomplishments of our faculty and students, the contributions of our alumni to our educational programs, and the willingness of our partners to help us advance the breadth and excellence of the educational, research and service programs of this College. As 2010 closes, I would like to send a special note of thanks to the faculty, staff, students, alumni and partners of the College of Pharmacy for making 2010 a truly inspiring year.



As I write this message, there are some economic uncertainties for the University of Nebraska, and therefore, the College of Pharmacy. However, I have confidence in the ability of the College of Pharmacy and UNMC to move forward, because of what we do - and the vital role we play in the health of Nebraska:

- *We educate pharmacists*, health care professionals with the scientific knowledge, clinical skills, compassion and integrity to deliver the highest quality patient care and improve human health.

- *We educate pharmaceutical scientists*, researchers who are focused on discovery of new drugs, of new ways to deliver drugs, on the efficacy of drugs, and on the cost, access and outcomes of drug therapy.

- *We develop leaders*, professional role models through their ideals and standards for the practice of pharmacy, and community, state, national and international leaders through their work with professional organizations, health care industries, consumer groups and governmental agencies.

- *We discover new knowledge, conduct innovative research and apply that knowledge to improve human health.*

Thank you all for your efforts on behalf of the College of Pharmacy.

Warmest holiday wishes to all, and best wishes for 2011.

A handwritten signature in black ink that reads "Courtney". The signature is written in a cursive, flowing style.

Courtney V. Fletcher, Pharm.D.
Dean and Professor

Multifunctional Polymeric Carriers for Gene and Drug Delivery

Tatiana Bronich

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The need for the discovery and development of innovative technologies to improve the delivery of therapeutic and diagnostic agents is broadly acknowledged. Such technologies are expected to minimize drug degradation upon administration and maximize the therapeutic efficacy of the drug by delivering it to the site of the action in desired quantities while limiting the adverse side effects. During the last few decades, the field of biomaterials for delivery of low molecular drugs, proteins, and nucleic acids has seen exponential growth. It is now well accepted that modern drug carriers need to be multicomponent to be able to overcome many physical and biochemical barriers in the body before a drug molecule can reach a target site. The inherent multifunctionality of polymers (synthetic and natural) offers a unique advantage for the design of such systems. The drugs can be physically mixed or covalently conjugated with polymers to improve their solubility and stability upon administration and facilitate prolonged blood circulation. They can be designed to be stimuli-responsive for releasing therapeutic loads in a site- and time-specific manner. Multiple targeting moieties can be attached to the macromolecular carrier to direct drugs to a certain organ, tissue, cell, or cellular compartment. Recently, polymers were also used to design integrated theranostic systems that combine both therapeutic and diagnostic functionalities and enable image-guided, controlled, and minimally invasive therapies for cancer and other devastating human diseases.

Moreover, there is growing evidence that some synthetic polymers can display biological response-modifying activity and can influence the molecular mechanism of action of a drug. This property can be further exploited to improve delivery and drug or gene performance.

Numerous polymer-based drug and gene delivery carriers, including polymer-drug conjugates, polymer micelles, polymer-coated liposomes, nanogels, and nanoparticles, are being developed. The remarkable and rapid progress in the area of multifunctional polymer therapeutics justifies the appearance of this special section that covers major topics in this fast-growing field. Translation of nucleic acid-based therapy to clinical studies requires significant advances in the delivery systems that will mitigate the undesirable biological properties of the non-viral gene carriers, such as toxicity, instability in the bloodstream, poor cellular internalization, and insufficient intracellular trafficking. Dr. Glen Kwon and colleagues describe how the reversible PEGgylation of DNA/polycation complexes can provide for high colloidal stability of the gene carrier without compromising transfection efficiency. Dr. Karel Ulbrich reminds us that polymers can also be effectively used for surface modification of adenoviral gene delivery vector. The authors developed an elegant technique for controlled conjugation of the targeting moieties to the vector and demonstrated the redirection of the natural viral tropism to receptor-specific adenovirus gene transfer. Dr. Vinod Labhasetwar's group used hydrophilic polymer, poly(ethylene glycol), for surface modification of hydrophobic supermagnetic iron oxide nanoparticles. They demonstrated the feasibility of developing multifunctional nanoparticles with specific, cancer-targeting MRI detection and sustained release of the drug for image-guided cancer therapy.

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The concept of polymer-drug conjugation was proposed in the 1970s and has unquestionably become a practical tool to the pharmaceutical scientists. In this issue, the report by Dr. Tamara Minko and colleagues aims to elucidate in more detail the therapeutic potential of polymer-peptide-drug conjugates based on poly(ethylene glycol) and containing multiple copies of anticancer drug (camptothecin) together with a tumor-targeting moiety (a synthetic analog of luteinizing hormone-releasing hormone) and a suppressor of cellular antiapoptotic defense (BH3 peptide). They clearly demonstrate that the antitumor activity of peptide-drug conjugates increased with an increase in number of copies of each active component conjugated to one molecule of the carrier. Dr. Hamidreza Ghandehari's group continues to explore three-dimensional and flexible architecture of dendrimers in design of delivery systems. They have previously shown that complexes of PAMAM dendrimers and camptothecin analogs improve the trans-epithelial transport and cellular uptake of the drug. In this issue, they report on covalent conjugates of such systems so that non-specific release in the bloodstream is reduced and release is facilitated at the target site. Studies by Dr. Julia Lubimova and coauthors are focused on poly(β -L-malic acid), a biodegradable, non-toxic, and non-immunogenic polymer, as a platform for conjugation of temozolomide, a potent chemotherapeutic agent for treatment of malignant glioma. Previously, they have successfully delivered antisense oligonucleotides specifically to brain tumor using a similar strategy.

Three reports in this issue are focused on polymer micelles, another promising modality of macromolecular drug delivery systems. Dr. Younsoo Bae and coauthor explore a concept of tunable drug release using polymer micelles. They emphasize the importance of careful tailoring of polymer-drug cleavable linkers for the design of macromolecular prodrugs that are able to display site-specific drug release with a predetermined profile. Dr. Christine Allen and colleagues utilize the block copolymer micelles labeled with indium-111 and decorated by EGF targeting moieties to elucidate the peculiarities of pharmacokinetics, biodistribution, and intratumoral transport of polymer micelles. They conclude that an adequate passive targeting of macromolecular carriers is required in order to achieve effective active targeting. The authors also highlight that tumor physiology, low levels of cell uptake, and continuous exocytosis of internalized polymer micelles remain formidable challenges in achieving a therapeutically relevant active targeting effect *in vivo*. Dr. Dong Wang's group employs micellar carriers based on Pluronic copolymers terminated with mineral binding moiety in order to enhance the delivery of the antimicrobial agent, triclosan, to the tooth surface. The results showed that targeted

micellar formulations of triclosan inhibited the formation of plaque biofilms and effectively reduced the viability of preformed biofilms. Consequently, the proposed micellar antimicrobial agent has the potential to be effective in the prevention and treatment of dental caries.

We are extremely grateful to all authors for their valuable contributions enabling the appearance of this special theme section. The research directions outlined in these reports show great promise in improving safe and effective delivery of bioactive agents to the site of action in therapeutically relevant quantities. We believe that these reports will be of interest to a very broad group of readers of *Pharmaceutical Research*.

INTERVIEW WITH DR. TATIANA K. BRONICH

What holds the key to your success as a pharmaceutical scientist?

I do not know to what extent I am really successful, but one of its measures is the amount of joy you derive from what you have done. Besides that, a measure of our success is the success of our colleagues, collaborators, and students.

What do you consider to be your key research accomplishments?

I would consider myself lucky if the knowledge that was gained in our research could be translated into the future clinical practice and be beneficial in fighting human disease.

What was the turning point in your career?

I always have been interested in understanding how various polymer molecules recognize and interact with each other and form supramolecular structures. When I joined the Department of Pharmaceutical Sciences at UNMC, it became exciting to include the use of the supramolecular assembly as a tool to produce polymeric nanostructured materials for application in drug delivery.

Which individuals have most influenced your research career?

I am very fortunate to have had several in my life, including my mother, a chemistry professor, and my mentor, Professor Victor Kabanov at Moscow State University. I have always admired their dedication to science and their unconditional love for and belief in the people around them. I credit Dr. Alexander Kabanov, an exceptional scientist, great collaborator, and friend, for making a difference in my scientific career and introducing me to the field of pharmaceutical sciences.

Pharmaceutical scientists are faced with the dilemma of having to publish in biomedical or basic science journals. Does this mean cutting-edge science will not likely be featured in the pharmaceutical research?

I think that the special section on multifunctional polymers in *Pharmaceutical Research* provides an answer to this question: the included papers are related to the science frontiers in this field.

Where is the field of biomaterials for nucleic acid and drug delivery going, and how do the articles in this theme section fill the gap?

During the last few decades, the field of biomaterials for delivery of low molecular drugs, proteins, and nucleic acids has seen exponential growth. Tremendous versatility of modern polymer chemistry allows for a steady introduction of new macromolecular carriers with tunable size, shape, and surface properties. A major advantage of such systems—their multifunctionality—continues to be explored to facilitate a controlled delivery of therapeutic and diagnostic agents to specific tissues, cells, and cellular compartments. The articles collected in this theme section represent some of the latest advancements in this research area.

What are the challenges for designing and using novel multifunctional polymers as carrier molecules, and how can they be overcome?

It is already obvious that the effective polymeric carriers need to be multifunctional to be able to cross the existing barriers in the body, avoid recognition by immune cells, and deliver their payload in the optimum dosage range to the site of the disease in a precise manner. Integration of such multiple signaling cues increases the complexity and heterogeneity of the macromolecular carriers and presents challenges for their characterization and subsequent scale-up. It is also clear that relatively small changes in physicochemical characteristics (e.g., polymer composition, particle size, shape, surface chemistry and charge, and targeting functionality) have significant biological implications for the fate of polymer carriers in the body. Further systemic studies of how these structures interact with cells and cellular compartments are needed to improve targeting strategies at both cellular and subcellular levels. Therefore, a careful tailoring of polymer architecture with biological targeting is essential for a successful design of disease-oriented delivery systems. A multidisciplinary (chemistry, material science and engineering, pharmaceutical sciences, and biology), integrated approach is required to address these challenges and create effective nanomedicines for clinical use.

What is the key to developing successful collaborative relationships, and how can the Center for Drug Delivery and Nanomedicine help?

Trust, mutual respect, and complementary sets of skills are needed to tackle a problem. From this point of view, our Center for Drug Delivery and Nanomedicine, established in 2004 under the leadership of Dr. Alexander Kabanov, serves to combine diverse technical and scientific expertise in biomedical and material science research and engineering available at the University of Nebraska. It integrates faculty members from clinical and basic sciences departments and has already fostered multiple fruitful cross-disciplinary collaborations that support drug delivery research.

What is your philosophy of educating graduate students?

In my opinion, a research career is an enormous commitment of time. It's not just a job—it's a life. You have to love it, and it will sustain you through the ups and downs. It is very important to maintain focus and always be open-minded.

What are the challenges facing the pharmaceutical sciences?

Drug delivery still remains a challenge. It includes development of better formulation strategies and the search for targeting moieties for site-specific delivery or delivery to the areas which are not readily accessible. Integration of the recent achievements in nanomedicine research and imaging technologies with progress in our understanding of the molecular basis of the diseases can help to address these problems.

What is the place for collaboration with industry in academia?

A close collaboration between pharmaceutical scientists in academia and industry is paramount for transforming a scientific concept into a real product.

Dr. Tatiana K. Bronich is a Professor at the College of Pharmacy and Associate Director of the Center for Drug Delivery and Nanomedicine at the University of Nebraska Medical Center. Her educational background includes undergraduate training in Chemistry at Moscow State University, Russia, followed by graduate studies at the Department of Polymer Sciences of the same University. Dr. Bronich's research interests are in the area of self-assembling polymer materials and applications of these materials in medicine. Of special interest is the design and study of novel types of functional materials based on complexes formed between block ionomers and oppositely charged polymers and low-molecular-weight amphiphilic molecules. Her recent work has expanded to include the application of these amphiphilic block copolymers and block ionomer complexes in drug delivery to treat cancer and the development of the polycation-DNA complexes for gene delivery.

Cogito Ergo Sum :

SPRING 2010

*I think Therefore I Am...
a Kappa Epsilon!*



Plus:

- Revitalization
- KE Home & Abroad
- ASHP – Vegas!
- Zada M. Cooper Scholarships Awarded

THE BOND

Chapter Revitalization



When I joined the Beta chapter of Kappa Epsilon last year at UNMC, I was one of five members to join that year. Going in to my P2 year, our chapter had a total of 7 members. Every current member coming into this year had at least one officer position, some more than one. **We were terrified that we were going to die out and lose our chapter!**

Luckily, three of our chapter officers and I were able to attend convention in Indianapolis. I believe that it was at convention that we began to realize the true meaning of being a part of Kappa Epsilon for life. Through education sessions, we learned about KE and its impact on pharmacy and through workshops and fellowship we learned from other chapters about their traditions and struggles. We were able to share our challenges and receive great ideas, feedback, and support from collegiate and alumni members from across the country. We left convention with a revitalized passion for KE and a determination to share that excitement when we made it back to UNMC. All we could think about on the nine hour drive from Indianapolis back to Omaha was what we were going to do this year to make our chapter a better and more successful chapter. I truly believe that **the enthusiasm we brought back to our chapter revitalized our group** to make our mark on our campus!

We made plans on that drive home and worked hard into the beginning of the school year to get the word out at UNMC about Kappa Epsilon. When school started, we talked with anyone that would listen about our philanthropies and our volunteer activities as well as our **strong bond and friendships**. We did everything that we could think of to make everyone else see what KE meant to us and why it is such an amazing organization to be a part of. We just had to hope that our passion and dedication would pay off!

This fall, we initiated **22 new members** to our small chapter. We tripled in size over one recruiting period! I feel strongly that the tools we learned at convention are a major part of that success. We leave Indianapolis with a multitude of wonderful ideas and new friendships, but we were also given a new energy and attitude towards how Kappa Epsilon is for life. Convention not only helped us to see the bigger picture of KE and gave us the tools to share that with our current and potential new members here at home, but it also **instilled in us that we can always**



Top: Beta members at the Race for the Cure.

Above: Beta Chapter showcasing their new shirt design.

be an active Kappa Epsilon long into our days after school. Our goal now is to make this the tradition that the Beta chapter upholds in the future so that we can expand our chapter and use the greater numbers to make an even greater impact on our community and our contributions to the fraternity.

~Maggie Hitzeman (Beta),

Grand Council VP Member Recruitment