

Indispensable News

MinneCeutics

University of Minnesota

Fall 2001

Department of Pharmaceutics

REGULAR FACULTY:

David J.W. Grant
Ronald J. Sawchuk
Ronald A. Siegel
Raj G. Suryanarayanan
Timothy S. Wiedmann
Cheryl L. Zimmerman

ASSOCIATE AND ADJUNCT FACULTY:

Walid M. Awni, Abbott Laboratories
Rene A. Braeckman, Pan Pacific Pharmaceuticals, Inc.
Keith K.H. Chan, GloboMax LLC
Belinda W.Y. Cheung, University of Minnesota
Lawrence J. Felice, Medtox Laboratories
William H. Frey, II, Alzheimer's Institute at Regions
Hospital

Janet M. Dubinsky, University of Minnesota
Michael D. Karol, Abbott Laboratories
Eric Munson, University of Kansas
Aldo Rescigno, University of Parma, Italy
Evgeniy Y. Shalaev, Pfizer Pharmaceuticals
Ray Skwierczynski, 3M Pharmaceuticals
Lian Yu, Eli Lilly and Company

MESSAGE FROM THE DEPARTMENT HEAD

You will be proud to know the University of Minnesota was rated this year among the top three public research universities in the U.S., behind the University of California at Berkeley and the University of Michigan. Of course, we are proud that our University can be mentioned in the same breath as the other two (or *vice versa*)! We in the Department of Pharmaceutics believe that we contribute daily to this excellence.

In our Department the highlight of the past year was the selection of Gerhard Levy, Emeritus Professor of Pharmacodynamics at the State University of New York, Buffalo, for an Honorary Doctorate at the University of Minnesota. Dr. Levy, who is the "father" of pharmacodynamics, is the first Academic Health Center nominee in the history of the University to receive this honor. To celebrate this occasion, the Department and the College of Pharmacy held a Symposium in Honor of Gerhard Levy on May 14, 2001. The keynote talk was given by Dr. Levy, who summarized his life's work on the interindividual variability of drug response. Other talks, given by invited external and College of Pharmacy speakers, focused on fundamental and applied aspects of pharmacokinetics and pharmacodynamics.

An upcoming event of interest is the Third International Symposium on Microdialysis in Drug Research and Development, organized by Ronald J. Sawchuk and William F. Elmquist (University of Nebraska) and to be hosted by the College of Pharmacy. We look forward to this symposium and the accompanying course on basic and advanced aspects on *in vivo* microdialysis in June 2002, as it will bring internationally known scientists to our campus. More on the symposium inside.

The Drug Delivery Center (DDC), headed by Prof. David Grant, continues to provide a means for initiating collaborations among faculty and local industry. The DDC was initially slated for three years of support from the UM Graduate School. Through the efforts of Dr. Grant and the support of our industrial advisers, the DDC will continue beyond its original mandate.

The search for new faculty members continues. We are presently seeking two faculty who will apply the new techniques of genomics and proteomics to the study of pharmacokinetic, pharmacodynamic, and drug metabolism processes.

As part of the College of Pharmacy's efforts to expand into the area of pharmacogenomics, a core molecular biology facility is being built that will be available to the College. Construction is underway, and there is temporary displacement of Prof. David

Grant's laboratory until completion. Prof. Grant's students are presently working in other Departmental space, and the Department is experiencing a feeling of "coziness" as a result!

We continue to graduate and enroll an excellent cadre of doctoral students. We are grateful for support we have received from industry for our doctoral program, including the 3M Fellowship in Pharmaceutics, the Walter Enz Fellowship (Pharmacia), and the Novartis Fellowship. These awards are assigned based on competition, and students are required to apply. The recipients are therefore rewarded not only monetarily but also by distinction.

In addition to the industrial fellowship awards, we are seeking funds for the Ronald J. Sawchuk and Edward G. Rippie Fellowships. As indicated in last year's letter, donations to certain fellowships will be matched by the University of Minnesota from funds resulting from the Ziagen settlement. We encourage you to contribute to these fellowships, and remind you that each dollar contributed is actually worth two! More information is inside.

The University of Minnesota, like many publicly funded universities, is being affected by changes in the perception of its mission by government. Higher education is seen by many as benefiting the individual more than society at large. The University of Minnesota received much less funding this year than was requested to cover many basic needs, and has had to respond by increasing tuition. These funding cuts and tuition increases impact the cost of graduate training and research since services are reduced and we must cover the tuition of our graduate students. For this reason, sustained support from the pharmaceutical industry is essential if we are to maintain our track record of producing well trained, exceptional individuals to work in industry.

I hope to see you on October 22 at the AAPS Minnesota Alumni Breakfast in Denver!

Best regards,



Ronald A. Siegel, Sc.D.
Professor of Pharmaceutics and
Biomedical Engineering
Head, Department of Pharmaceutics

3rd INTERNATIONAL SYMPOSIUM ON *Microdialysis in Drug Research and Development*

JUNE 20-22, 2002, MINNEAPOLIS, MINNESOTA, USA

**Preceded by course on
Basic and Advanced Aspects
of *In Vivo* Microdialysis**

INTRODUCTION

The application of microdialysis is rapidly expanding in the field of pharmacokinetic and drug disposition studies. Both the 1st and 2nd International Symposia on Microdialysis in Drug Research and Development (1998, the Netherlands and 2000, Sweden) proved to be valuable to those in attendance, allowing them opportunities for in-depth discussions of the microdialysis technique and providing them with an overview of important research involving microdialysis.

The 3rd *International Symposium on Microdialysis in Drug Research and Development* will be held in Minneapolis, Minnesota. The general topics to be addressed are outlined below. Poster and podium sessions will be held in which participants may present their research. A call for abstracts will be posted on the website, with a submission deadline of January 25, 2002. In addition, the symposium will be preceded by a Microdialysis course planned for June 19, 2002.

PROPOSED SESSIONS

- ◆ Analytical and methodological aspects of microdialysis
- ◆ Clinical microdialysis sampling
- ◆ *In vivo* membrane transport processes studied with microdialysis
- ◆ Dermal microdialysis
- ◆ Microdialysis in ADME research
- ◆ Novel applications of microdialysis in preclinical settings

Organizing Committee

Ronald J. Sawchuk, *University of Minnesota, Minneapolis, MN, USA*

William F. Elmquist, *University of Nebraska Medical Center, Omaha, NE, USA*

Amy L. Olson, *University of Minnesota, Minneapolis, MN, USA*

Corby Wold, *University of Minnesota, Minneapolis, MN, USA*

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Eva Benfeldt, Denmark; Peter Bungay, USA; Elizabeth de Lange, Netherlands; Hartmut Derendorf, USA;

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Michel Lemaire, Switzerland; Craig Lunte, USA; Markus Mueller, Austria; Gary Pollack, USA; Mark Rogge, USA;
Hans Rollema, USA; Ronald Sawchuk, USA; Tetsuya Terasaki, Japan; Urban Ungerstedt, Sweden; and Devin Welty, USA

**Other international scientific leaders in the field have been invited.*

Please see the website listed for informational updates.

FOR FURTHER INFORMATION

Amy L. Olson, Professional and External Relations, College of Pharmacy
and Corby Wold, Department of Pharmaceutics, College of Pharmacy

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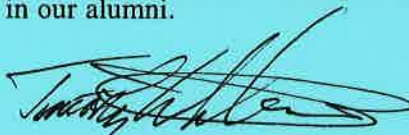
MESSAGE FROM THE DIRECTOR OF GRADUATE STUDIES

As my second term as DGS begins, I have had time for reflection and planning. I am extremely grateful for the wonderful students, exceptional colleagues, and supportive staff that have provided assistance over the past three years. As such, we have been able to focus our efforts to build and strengthen our graduate program and department. Presently, new faculty are being added, students are entering with ever stronger records, and industry clamors for our graduates.

However, now is not a time to rest on our laurels. Rather, it is a time to use our momentum to achieve more. We are updating our web site. Our goal is to have an on-line application process, and we are implementing an on-line prescreening process this fall. Finally, we have entered a collaborative relationship with Mr. Winston Minor, the recruiter for the College's professional program, to increase the number of applicants from the Midwest.

The major issue in the coming year is consideration of a Master's program in Pharmaceutics. This program will not be a feeder to the doctoral program, but rather, it is intended to fill a niche in the pharmaceutical industry. With the great demand for pharmacists and the shift away from basic science and laboratory courses in the professional curriculum, there is a need for technically competent individuals who are also familiar with the drug discovery and development process. These individuals also need a fundamental understanding of the corporate side of drug development. Our aim is to develop a self-supporting M.S. program that will complement, and thereby enhance, our doctoral program.

The students will be given a rigorous, but broad, scientific background as well as exposure to marketing and management courses. We believe that with the assistance of faculty from the basic sciences, engineering and business, along with scientists from local industry, we can graduate approximately three individuals each year. To this end, my vision is to supply technically competent individuals with an expertise in management that have the potential to become leaders in the pharmaceutical industry. It is too soon to know exactly when and how this program will evolve, but I am certain we will always foster pride in our alumni.



Timothy S. Wiedmann, Ph.D.
Associate Professor

We invite you to join us in catching up on news of fellow Minnesota graduates:

MINNESOTA ALUMNI BREAKFAST

MONDAY, OCTOBER 22, 2001

7:00 - 8:00 a.m.

Adam's Mark Hotel, Denver



AAPS Annual Meeting and Exposition

October 21 - 25, 2001

Colorado Convention Center, Denver

DRUG DELIVERY CENTER

Since its inception on July 1, 1998, the Drug Delivery Center (DDC) has been recognized as a "Type 2 Center" by the Academic Health Center at the University of Minnesota, and establishes our claim to drug delivery at the University. The DDC began by coordinating our efforts in the delivery of peptides, antiviral agents, and nitric oxide donors for the treatment of cancer, infections, inflammation and restenosis. These research initiatives are expected to lead to new therapies for the treatment of patients suffering from these diseases. In addition, we are helping to foster collaboration between our faculty and local companies, as well as between the companies themselves, to help improve drug delivery within the State of Minnesota.

Most importantly, we are bringing together various graduate programs to help improve graduate education in the design and optimization of therapeutic delivery systems. The DDC has developed three research programs involving graduate students. Members of the DDC have submitted a number of research proposals to further its research activities and educational mission. An Industrial Advisory Board (IAB) consisting of representatives from local industry has been convened to advise the DDC in its research and educational mission and to enable the DDC to provide services to industry within Minnesota.

The DDC will host its annual Open House this year on October 4, and will include a poster session by graduate students in Pharmaceutics or other drug delivery-related research. The keynote speech, entitled "Diffusion of Substances in the Brain", will be given by Dr. J. Charles Nicholson, Professor of Physiology and Neuroscience at New York University Medical Center.

The joint seminar program with Advanced Therapies and Molecular & Cellular Therapies has been highly successful and will continue to be held the first Thursday of each month. Goals for the coming year include strengthening relations with members of the IAB, arranging exchange visits between IAB Laboratories and DDC Laboratories, developing a questionnaire to help improve the services provided by the Center to the IAB companies and to act on the feedback provided, and obtaining more funding through collaboration with IAB Members.



David J.W. Grant, D.Phil., D.Sc.
Professor and Director

UNIVERSITY OF MINNESOTA

♦ Pharmaceutics ♦ Biomedical Engineering ♦ Chemistry ♦ Computer Science and Electrical Engineering ♦ Laboratory Medicine and Pathology ♦ Regions Hospital in St. Paul

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♦ CIMA Laboratories, Brooklyn Park and Eden Prairie ♦ Comedicus ♦ General Mills ♦ Hosokawa Bepex ♦ LecTec Corporation ♦ Medtronic ♦ 3M Pharmaceuticals
♦ Minnesota Technologies, Inc., Academic Health Center, University of Minnesota ♦ TSI, Inc. ♦ Upsher-Smith Laboratories, Inc.

THE RONALD J. SAWCHUK FELLOWSHIP IN PHARMACOKINETICS THE EDWARD G. RIPPKE FELLOWSHIP IN PHARMACEUTICS

To learn more about contributing to these important graduate fellowships
and eligibility for matching funds, please contact:

Laurel Mallon, Director of Development
College of Pharmacy, University of Minnesota
308 Harvard Street S.E., Room 5-138 Weaver Densford Hall
Minneapolis, MN 55455 (Ph. 612-624-2490)

NEWS AND ACTIVITIES

ALUMNI

Jun Han [Ph.D., 1998], accepted a position as senior research pharmacist in the area of pharmaceuticals and new technologies at Abbott Laboratories in Chicago, Illinois.

Srinivasan Venkatesh [Ph.D., 1993], is enrolled in the Executive MBA Degree Program at the University of Pennsylvania's Wharton School of Business. He was recently promoted to associate director of preclinical candidate optimization at Bristol-Myers Squibb in Wallingford, Connecticut.

Jitesh Tank [M.S., 1997], is taking a leave of absence from Merck to enroll in the MBA degree program at the University of Michigan School of Business at Ann Arbor.

Jim Haijian Zhu [Ph.D., 1997] became a Team Leader at GlaxoSmithKline in May and has enjoyed working in the area of drug delivery technologies in Research Triangle Park, North Carolina.

NEW GRADUATE STUDENTS

The Department welcomed new students in Fall 2001:

Mr. Aniruddha Amrite, University of Pune (Pharmacy), Nashik, India.

Mr. Cory Hitzman, University of Minnesota's Institute of Technology (Chemical Engineering), Minneapolis, Minnesota.

Mr. Sachin Lohani, Banaras Hindu University's Institute of Technology (Pharmacy), Varanasi, India.

GRADUATE STUDENT ACHIEVEMENTS

Ms. Smita Debnath received the Third Place Podium Presentation Award at the June 2001 Pharmaceuticals Graduate Student Research Meeting in Madison, Wisconsin, for her presentation on "Evaluation of Phase Transitions During Dissolution". (Advisor: Prof. Raj Suryanarayanan)

Mr. Zedong Dong received a 2000-2001 Novartis Fellowship Award from Novartis Pharmaceuticals. He has been selected to receive the 2001-2002 Enz Award from Pharmacia Corporation. (Advisor: Prof. David Grant)

Mr. Alex Yuandong Gu was selected for a 'poster-pick' presentation at the 28th International Symposium on Controlled Release of Bioactive Materials in San Diego, California in June 2001. He was selected to present a brief oral summary of his poster entitled "Synthesis and Confinement of a Hydrogel Within a Micromachined Cavity." (Advisor: Prof. Ronald Siegel)

Ms. Joanna Zhuoying Peng received a 2000-2001 Novartis Fellowship Award. (Advisor: Prof. Ronald Sawchuk)

Mr. Rahul Surana has been selected to receive the 2001-2002 Novartis Fellowship Award from Novartis Pharmaceuticals.

GRADUATE DEGREES EARNED

Guanfa Gan, Ph.D.

Thesis: Intestinal Absorption and Presystemic Elimination of Three Model Compounds in the Rabbit (Advisor: Prof. Ronald Sawchuk). Guanfa is employed at Boehringer-Ingelheim Pharmaceuticals in Ridgefield, Connecticut.

Chong-Hui Gu, Ph.D.

Thesis: Influence of Solvent and Impurity on the Crystallization and Properties of the Crystallized Product (Advisor: Prof. David Grant). Chong-Hui is employed at Bristol-Myers Squibb in New Brunswick, New Jersey.

Yue Huang, Ph.D.

Thesis: Studies of Middle Ear Distribution Kinetics of Selected Antibiotics in Chinchilla Model Using Microdialysis (Advisor: Prof. Ronald Sawchuk). Yue is employed at Quintiles, Inc., in Kansas City, Missouri.

Prajakti Atul Kothare, Ph.D.

Thesis: The Role of Enzyme Localization in Intestinal Elimination (Advisor: Prof. Cheryl Zimmerman). Prajakti is employed at Eli Lilly and Co. in Indianapolis, Indiana.

Aparna Lakkaraju, Ph.D.

Thesis: Potential of Anionic Liposomes to Deliver Aminonucleotides to Neurons: Design, Characterization, Demonstration of Biological Activity and Study of Mechanisms of Internalization (Advisor: Prof. Y.E. Rahman). Aparna is doing postdoctoral work in neuroscience at the University of Minnesota in the laboratory of Dr. Janet Dubinsky.

Abira Pyne, Ph.D.

Thesis: Crystallization Behavior of Mannitol and Glycine During Freeze-Drying (Advisor: Prof. Raj Suryanarayanan). Abira is employed at Eli Lilly and Co. in Indianapolis, Indiana.

Calvin Changquan Sun, Ph.D.

Thesis: How Does Tableting Performance Depend on the Crystal Structure of the Polymorphic Form? Sulfamerazine as an Example (Advisor: Prof. David Grant). Calvin is employed at Pharmacia in Kalamazoo, Michigan.

SUMMER INDUSTRY INTERNS & TRAINEES

Mr. Koustuv Chatterjee worked with Dr. Evgeniy Y. Shalaev of the Pharmaceutical Research and Development Department at Pfizer Central Research in Groton, Connecticut on two projects entitled "Solid-state pH of Lyophilized Systems" and "Inversion of Sucrose in Lyophilized Systems".

Mr. Yushi Feng also interned at Pfizer in the Global Research and Development Section with Dr. Sheri L. Shamblin on a research project entitled "Detection of Low Level Amorphous Content Using Thermally Stimulated Polarization Current (TSPC)".

Mr. Zhihong Li worked at Bristol-Myers Squibb with Dr. Rajesh Krishna on research entitled "Food Effect Prediction of Selected BCS Class II Drugs Using *In Vitro* Biorelevant Dissolution Test and Caco-2 Cell Monolayer Permeability Test".

Mr. Wei Liu worked with Dr. Yazdi Pithavala at Pfizer-Agouron in La Jolla, California on a project entitled "Application of WinNonlin and WinNonmix in Clinical Pharmacokinetics Research."

Ms. Yan Song worked at Pfizer-Agouron in La Jolla, California with Dr. Caroline Lee on a project entitled "A Dose Projection Model Based on Human Hepatocyte Metabolism Study."

Mr. Deliang Zhou interned with Dr. Eric A. Schmitt at Abbott Laboratories, Chicago, Illinois, on a project dealing with "Molecular Mobility and Stability of Amorphous Pharmaceuticals".

UNDERGRADUATE STUDENTS

Ms. Sarah M. Betterman, a junior in chemical/biomedical engineering (Institute of Technology), worked with Agam Sheth and Prof. David Grant on a project entitled "Determination of Crystal Structures from Powder Diffraction Data" on a warfarin sodium solvate in the 2001 Summer Undergraduate Internship Program. The summer internship program is supported by the National Science Foundation through the University of Minnesota's Supercomputing Institute.

Ms. Tracy Burns, a biochemistry undergraduate student at the University of Minnesota, started work this summer in Dr. Cheryl Zimmerman's laboratory on a project to develop a Chinese hamster ovary (CHO) cell culture system in order to evaluate the effects of NNK-metabolite binding to beta-adrenergic receptors. This is part of a larger project to determine the mechanism of lung carcinogenesis due to exposure to tobacco-specific nitrosamines.

Ms. Anya Grosberg, a chemical engineering undergraduate student at the University of Minnesota, began a project in Dr. Ronald Siegel's laboratory this summer

developing mathematical models of controlled release of nerve growth factor from polymers, triggered by plasmin which is activated at the tip of a growing neuron. This work, supported by the University of Minnesota's Drug Delivery Center, is part of a larger collaboration with Prof. Robert Tranquillo of the Biomedical Engineering Department at the University in which the directed regeneration of injured neural tissue in collagen matrices is being studied.

Ms. Laura Maertens, an undergraduate student in chemical engineering at the University of Minnesota, began a project in Dr. Zimmerman's lab this summer on a project to develop an assay for tamoxifen and its metabolites in the blood and urine of women receiving tamoxifen for breast cancer. This is part of a collaborative project with Dr. Rebecca Raftogianis at Fox Chase Cancer Center to evaluate the influence of genetic variability on drug metabolism and response to tamoxifen treatment.

ITEMS OF INTEREST

Ms. Linda Cartier received a College of Pharmacy Meritorious Service Award in May 2001 for outstanding service. Linda is a scientist in the Bioanalytical and Pharmacokinetic Services and works with Dr. Ronald Sawchuk.

Ms. Anne Johnson will be known as **Anne Waltz** following her September 29 marriage to Mr. Michael Waltz. Ms. Johnson is the staff to the *Journal of Pharmaceutical Sciences*.

Mr. Nael Mostafa and wife, Amira, welcomed a healthy baby boy named Mohamed on August 31.

Mr. Agam Sheth was elected Postgraduate Officer to the APhA-APRS (American Pharmaceutical Association Academy of Pharmaceutical Research and Science) for 2001-2002.

Mr. Robbie Thorne was a member of Team Dobrin and won second place in the 5-on-5 Men's Open League Basketball at the Minneapolis Jewish Community Center (Spring 2001).

Mr. Jon Urban, a graduate student in biomedical engineering at the University of Minnesota, has joined Professor Ronald Siegel's laboratory. Jon is pursuing his doctorate while working at Medtronic, Inc. His research project involves mathematical modeling and computer simulation of swelling and transport in hydrogels, as applied to pulsating delivery systems for hormones.

Ms. Corby Wold joined the Department in March 2001 as a senior secretary. Corby has completed the University's specialized training for on-line purchasing and payments. Corby hails from Eau Claire, Wisconsin and brings her Upper Midwest insights to the Department.

FACULTY NEWS AND ACTIVITIES

PROFESSOR DAVID J.W. GRANT was invited to present "Effect of Crystallinity and Habit on Powder Properties" at the XVI Helsinki University Congress of Drug Research in June 1001 in Finland.

He was also invited to present "Solid-State Behavior of Cromolyn Sodium: New Insights" by Orion Pharma in Helsinki, Finland in June 2001.

Dr. Grant was invited to present "Thermodynamics of Solvate Systems" at the July 2001 International Calorimetric Conference in Colorado Springs, Colorado.

He participated in teaching three short courses related to the crystallization and solid-state behavior of drugs at the Pharmaceutical Congress of the Americas in Orlando, Florida (March 2001), Novartis Pharma in Basel, Switzerland (August 2001), and at Abbott Laboratories in North Chicago, Illinois (August 2001).

Dr. Grant was invited to present "Nucleation and Crystal Growth of Polymorphs: The Role of Solvents and Impurities in the Case of Sulfamerazine" by Pharmacia Corporation in Portage, Michigan, May 2001.

PROFESSOR RONALD J. SAWCHUK was invited to present "Clinical Pharmacokinetic Principles in Drug Development" at Novartis Pharma, Tokyo, Japan, in April 2001.

He was also invited to present "*In Vivo* Microdialysis as a Tool to Study Drug Delivery in Preclinical Studies" at Xi'an Medical College, Xi'an, China, April 2001.

Along with Prof. Richard Brundage of the Department of Experimental and Clinical Pharmacology, Dr. Sawchuk coordinated the assignment of the College of Pharmacy as an Academic Center of Excellence (Pharsight) for software development and training.

Dr. Sawchuk took a semester leave to engage in drug development research at Novartis Pharma in Basel Switzerland, June-July 2001.

PROFESSOR RONALD A. SIEGEL, along with Dr. Gauri Misra, received the 2000 CRS/Ethypharm Outstanding Pharmaceutical Paper Award, presented at the 28th International Symposium on the Controlled Release of Bioactive Materials in San Diego, California.

Starting September 1, 2001, Dr. Siegel became a Book Review Editor for the *Journal of Controlled Release*.

Dr. Siegel has received a joint appointment in the new Department of Biomedical Engineering at the University of Minnesota.

He is engaged in a collaborative effort with scientists at the Russian Academy of Sciences in Moscow, investigating the mechanism of adhesion of a new class of biocompatible blends. These pressure-sensitive adhesive materials are useful

as components in skin patches and wound dressings. Part of this collaborative effort involves scientific exchange, and Dr. Siegel traveled to Moscow this summer to confer with his Russian counterparts.

PROFESSOR RAJ G. SURYANARAYANAN, along with Prof. Steve Byrn of Purdue University, edited a theme issue entitled "Characterization of the Solid State" for the *Advanced Drug Delivery Reviews*.

He was invited to present lectures this year by Glaxo Wellcome (North Carolina), Parke-Davis/Pfizer (France), Schering-Plough (New Jersey), Purdue Pharma (New York), Boeringer Ingelheim (Connecticut), and Amgen (California).

Dr. Suryanarayanan will be Chair of the AAPS Preformulation Focus Group for 2001-2002.

Dr. Suryanarayanan served on the organizing committee of the First International Workshop on Physical Characterization of Pharmaceutical Solids held in Lancaster, Pennsylvania in September 2000. He presented two keynote lectures entitled "Qualitative and Quantitative Application of Nonambient XRD" and "Thermoanalytical Technique for the Characterization of Drugs and Dosage Forms".

PROFESSOR TIMOTHY S. WIEDMANN was elected to a second 3-year term as Director of Graduate Studies in Pharmaceutics. He was also elected Teacher of the Semester for Fall 2000 by Pharm.D. students at the University of Minnesota.

Dr. Wiedmann was invited to present "Interaction of Micellar Aggregates with Glycoprotein Networks" at the Molecular Theory and Properties Interest Group in Minneapolis, Minnesota.

He was also invited to present "Respiratory Delivery of Chemopreventive Agents" to the Drug Delivery Center, University of Minnesota, in Minneapolis, Minnesota.

Dr. Wiedmann served as Chair of the Faculty Consultative Committees for the College of Pharmacy and Academic Health Center. The Committees consult with the Senior Vice President of the AHC.

He also served as Member of the Campus Biological Sciences Policy and Review Council, which deals with curricular issues critical to the Biological Sciences.

PROFESSOR CHERYL L. ZIMMERMAN was invited to present "Stereoselective Biological Disposition of Tobacco-specific Nitrosamines" by the Department of Chemistry at the College of St. Benedict and St. John's University in Collegeville, Minnesota.

She was also invited to present "The Role of Enzyme Localization in Intestinal Metabolism" in May 2001 at the Symposium in Honor of Gerhard Levy at the University of Minnesota.

Dr. Zimmerman was the AAPS Section Chair (2000) and Past-Chair (2001) for the Pharmacokinetic, Pharmacodynamic and Drug Metabolism Group, and is a member of the Section/Focus Group Coordination Committee.

Dr. Zimmerman participated in a Program Project Grant Proposal Initial Review Group site visit at Mountain View, California in February 2001 for the National Cancer Institute.

RECENT PUBLICATIONS

Belur L.R., Boelk-Galvan D., Diers M.D., McIvor R.S. and Zimmerman C.L. Methotrexate accumulates to similar levels in animals transplanted with normal vs. drug-resistant transgenic marrow. *Cancer Res.* 61: 1522-1526, 2001.

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Li B. and Siegel R.A. Global analysis of a model pulsing drug delivery oscillator based on chemomechanical feedback with hysteresis. *CHAOS* 10: 682-690, 2000.

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Pham S. and Wiedmann T.S. Dissolution of aerosol particles of budesonide in Survanta, a model lung surfactant. *J. Pharm. Sci.* 90: 98-104, 2001.

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In March 2001 Dr. Zimmerman presented a poster at the 92nd Annual Meeting of the American Association for Cancer Research entitled "The Pharmacokinetics of NNAL and NNAL-Gluc After Cessation of Smokeless Tobacco Use" in New Orleans, Louisiana. Authors were C.L. Zimmerman, M. Ye, S.G. Carmella, J.A. Jensen, D.Katsukami, and S.S. Hecht.

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Siegel, R.A. Theoretical analysis of inward hemispheric release above and below drug solubility. *J. Controlled Release* 69: 109-126, 2000.

Stanley G.B., Poolla K. and Siegel R.A. Threshold modeling of autonomic control of heart rate variability. *I.E.E.E. Trans. Biomed. Eng.* 47: 1147-1153, 2000.

Sun C. and Grant D.J.W. Compaction properties of L-lysine salts. *Pharm. Res.* 18(3): 2001.

Sun C. and Grant D.J.W. Effects of initial particle size on the tableting properties of L-lysine monohydrochloride dihydrate powder. *Int. J. Pharmaceutics* 215: 221-228, 2001.

Sun C. and Grant D.J.W. Influence of crystal shape on the tableting performance of L-lysine monohydrochloride dihydrate. *J. Pharm. Sci.* 90: 567-577, 2001.

Sun C. and Grant D.J.W. Influence of crystal structure on the tableting properties of sulfamerazine polymorphs. *Pharm. Res.* 18(3): 2001.

Sun C. and Grant D.J.W. Influence of elastic deformation of particles on Heckel analysis. *Pharm. Dev. Tech.* 6(2):143-150, 2001.

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SYMPOSIUM IN HONOR OF GERHARD LEVY

Gerhard Levy, Pharm.D., University Distinguished Professor of Pharmaceutics Emeritus at the State University of New York at Buffalo School of Pharmacy, received an Honorary Doctorate of Science from the University of Minnesota at the College of Pharmacy's Commencement on May 12, 2001. He is the first individual in the history of the University of Minnesota to be so honored after being nominated from the Academic Health Center.

To further honor Dr. Levy's achievements, a **Symposium in Honor of Gerhard Levy** was sponsored by the Department of Pharmaceutics and the College of Pharmacy on May 14, 2001. Dr. Levy was the keynote speaker, and he delivered a summary of his extensive research on variability of pharmacodynamic response. In addition, three internationally known speakers made presentations at the symposium. **Prof. Wolfgang Sadée** (University of California at San Francisco) presented a survey of pharmacogenomics and its potential therapeutic applications. **Prof. Mary V. Relling** (University of Tennessee) discussed the pharmacogenetic and pharmacodynamic aspects of treatment of childhood leukemia. **Prof. Ho-Leung Fung** (State University of New York at Buffalo) presented an overview of his work on pharmacodynamics and gene-regulation effect of nitric oxide donors. These lectures were complemented by talks given by faculty in the UM College of Pharmacy. From the Department of Pharmaceutics, **Ronald J. Sawchuk** discussed his work on transport kinetics in the middle ear as characterized by microdialysis, and **Prof. Cheryl Zimmerman** summarized her recent work on the effects of enzyme localization on intestinal metabolism. **Prof. Rory P. Remmel** of the Department of Medicinal Chemistry discussed progress on a multidisciplinary team's efforts to develop an artificial liver. Finally, two speakers presented work from the Department of Experimental and Clinical Pharmacology. **Prof. Courtney V. Fletcher** lectured on concentration-controlled anti-retroviral therapy, and **Prof. Angela K. Birnbaum** discussed the pharmacokinetics of phenytoin in the elderly.

A video recording of the symposium is available on request. Contact Candice McDermott (mcder002@umn.edu or 612-624-5153) for information.



Regent Jessica Phillips, Dr. Gerhard Levy, and University President Mark Yudof at the College of Pharmacy Commencement

Biography of Gerhard Levy. A graduate of the University of California School of Pharmacy, Dr. Levy has served on the faculty at Buffalo since 1958. He is a member of the editorial or editorial advisory boards of many journals and has received honorary doctorate degrees from six universities. In 1980 he was elected to membership in the Institute of Medicine of the National Academy of Sciences. Dr. Levy is a recipient of the APhA Research Achievement Award (1969), the Ebert Prize (1969), the McKeen Cattel Distinguished Achievement Award in Clinical Pharmacology (1978), the Oscar Hunter Award in Experimental Therapeutics (1982), the Host-Madsen Gold Medal of the International Pharmaceutical Federation (1978), the Volwiler Award (1982), the AACP Therapeutic Frontiers Lecturer Award (1983) and other academic awards and prizes. He received the first APhA Takeru Higuchi Research Prize in 1983 and was selected as a Wellcome Visiting Professor in the Basic Medical Sciences for 1985-1986. He was the 1988 Ida Beam Distinguished Professor at the University of Iowa and the 1988 Distinguished Lecturer in the Pharmaceutical Sciences at the University of Leiden in the Netherlands. He is a recipient of the 1990 Gold Medal of the Slovak Medical Society and of the 1990 Scheele Award of the Swedish Academy of Pharmaceutical Sciences. He received the Dale E. Wurster Research Award in Pharmaceutics from the American Association of Pharmaceutical Scientists in 1992 and was the Nagai Foundation Distinguished Lecturer in Tokyo in 1992 and again in 1998. Dr. Levy is the recipient of the first Lifetime Achievement in the Pharmaceutical Sciences Award of the International Pharmaceutical Federation (F.I.P.), 1994. He was the 1995 Medeval Distinguished Lecturer in Pharmaceutical Sciences at the University of Manchester (U.K.) and he received the Distinguished Investigator Award of the American College of Clinical Pharmacology in 1998. He was the Distinguished Scientist Lecturer at the Annual Higuchi Research Seminar in 2000 and he received the Millennial Distinguished Pharmaceutical Scientist Award at the Millennial World Congress of Pharmaceutical Sciences in 2000. His research interests are in the areas of pharmacokinetics, kinetics of drug action, and biopharmaceutics.

PICTURES FROM THE LEVY SYMPOSIUM



Cheryl Zimmerman and Mrs. Rosalyn Levy



Aldo Rescigno, Former Dean Larry Weaver, and Gerhard Levy



L to R: Wolfgang Sadée, University of California at San Francisco; Ho-Leung Fung, State University of New York at Buffalo; Mary Relling, University of Tennessee; Gerhard Levy.



Angela Birnbaum



Courtney Fletcher



Ron Siegel, Ho-Leung Fung, Rory Rimmel

Ron and Lyn Sawchuk



Dean Marilyn Speedie

Gerhard Levy and David Grant



SPRING 2001 GRADUATION



Guanfa Gan

Yue Huang

Prof. Zimmerman

Prof. Sawchuk

Prof. Suryanarayanan

Abira Pyne

Prajakti Kothare



Prajakti's parents traveled from India to attend.



Advisor and Advisee.



Chong-Hui Gu



Interpretations of proper mortarboard placement.



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