

Molecular & Integrative Physiology

Newsletter December 2010

Greetings from the Head

Byron Kemper

It has been a historic year for us. Surely without precedent for the Department of Molecular and Integrative Physiology, four faculty members—Phil Best, Al Feng, Dave Sherwood, and Essie Meisami—retired in a single year. This group represents 125 years of scholarly contributions to MIP and 15 years of service as department heads. At the recent retirement dinner celebrating their accomplishments, a consistent theme in their remarks was the character of our department as a welcoming, diverse, collegial department which played an important role in the development of their careers. Of course, the character of the department reflects that of its members, and these four individuals played major roles in making this a great department. Inside the newsletter, you will find parting comments by each about their MIP years. We are extremely thankful for all their contributions and wish them the very best as they transition to new and exciting ventures.

While lamenting the loss of valued proven colleagues, we are excited to welcome to MIP new faculty members loaded with potential. In last year's newsletter, I mentioned Eric Bolton and Hee Jung Chung. They

arrived in January and introduce themselves to you in this newsletter. Daniel Llano, a neuroscientist and new faculty member in the College of Medicine and MIP, has just arrived as I write this in October. Dan has M.D./Ph.D. degrees from the University of Illinois and MIP, and is the first hire of a physician-scientist as part of a new initiative by the campus Division of Biomedical Sciences. Look for his introductory article next year. With these outstanding hires, the future of the department remains bright. Also in this issue, a new element is added: a feature article written by Dr. Jeanne Bullock Goldberg, a U of I alumnus and MIP supporter. Dr. Goldberg describes Alzheimer's disease research in MIP.

Below is a picture of a gel documentation system purchased with funds donated by MIP alumni and supporters. These funds also allowed us to upgrade a system to provide purified water for critical histochemical preparations, and to increase departmental support for graduate student travel to research meetings. Your contributions are greatly appreciated, especially in the present financial climate, and are essential for our efforts to maintain the excellence of MIP. As always, we would love to hear from you—email us at mip-news@illinois.edu.



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About the Newsletter

The Molecular and Physiology Newsletter is an annual publication of the Department of Molecular and Integrative Physiology in the School of Molecular and Cellular Biology at the University of Illinois, Urbana-Champaign. The newsletter is written by MIP faculty and friends, and designed by William Gillespie.

Our alumni are important to us. We want to hear from you. Send us your latest news, and we'll include it in the next newsletter's MIP Family News.

We also welcome suggestions for future newsletters. Here's how to reach us

email: mip-news@illinois.edu

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Ph.D. student Danny Ryerson demonstrating the multiuser gel documentation system.



Alzheimer's Disease: New Directions for Understanding and Treatment

by Jeane Bullock Goldberg

Since its original description in 1906 by Dr. Alois Alzheimer, Alzheimer's disease (AD) has achieved worldwide recognition. Approximately 5.3 million U. S. residents are known to have AD. There are approximately 78 million baby boomers in our country, and over the next 18 years 3–4 million members of this generation will turn 65 annually. This demographic tsunami of aging individuals, in combination with the advent of early detection diagnostic techniques (e.g., MRI and spinal tap analysis), has led to predictions that the number of known AD cases may very soon double or even triple.

Researchers are working at a feverish pace to understand the pathophysiology of AD at the molecular level in order to develop targeted therapies for this heart-breaking, disabling, and costly disease. The global cost of dementia this year will likely exceed 1% of the world's gross domestic product. Our world-class scientists in MIP are involved in groundbreaking research, studying AD from many angles.

Professors Yang (Kevin) Xiang, Charles Cox, and colleagues have received top-level recognition for work that has been performed in their laboratories, including publication in the *FASEB Journal*, *Science Daily*, and in local Illinois publications. Their research focuses on the role of a protein fragment, amyloid- β ($A\beta$), in the decline of cerebral function which is characteristic of AD. Using transgenic

mice, Drs. Xiang and Cox have elucidated a cellular mechanism whereby $A\beta$ binds to and activates β_2 adrenergic receptors (β_2ARs), which are specialized, cell membrane-based protein receptors responsible for converting signals created by hormones and neurotransmitters into "downstream" intracellular events such as electrical activity ("ion-gating") or production of specific chemical products (see figure). Normally the β_2ARs are targets for endogenous neurotransmitters like norepinephrine rather than a peptide like $A\beta$, and the binding of $A\beta$ to the β_2ARs is definitely a pathologic process with significant "downstream" implications. Binding of $A\beta$ to β_2ARs stimulates protein-based receptors known as AMPA receptors, which function as critical "gate-keepers," allowing calcium and sodium ions to enter cells. A chronic state of excitatory neurotoxicity and subsequent synaptic dysfunction and neuronal death results from this binding of $A\beta$ to the β_2ARs . Of great interest is the fact that this sequence of events seems to be common to other pathologic neurodegenerative diseases such as stroke, epilepsy, Down's syndrome (DS), and Parkinson's disease.

Three key findings in the Xiang and Cox laboratories are the following:

(1) Blocking $A\beta$ binding to the β_2AR , should block the potentially pathologic stimulation of the AMPA receptors.

(2) $A\beta$ binds to a different part of the β_2AR than "physiological" binding agents such as neurotransmitters and hormones.

(3) If binding of $A\beta$ could be selectively blocked by existing or new pharmaceuticals, potentially breakthrough progress could be made in the control of AD.

Drs. Xiang and Cox state that there are likely other important "players" in AD in addition to the β_2ARs , but they believe that their research findings offer some key areas to explore in the ongoing effort to understand and hopefully control



Kevin Xiang



Charles Cox



Paul Gold



Tom Anastasio



Hee Jung Chung

this disease. Currently they are seeking funding to access and utilize vast "libraries" of chemicals to find at least one which can serve as an $A\beta$ targeted treatment for AD.

Dr. Paul Gold and his staff are studying the neurobiological mechanisms of learning and memory formation. Recently the role that impaired glucose availability and utilization plays in AD and in DS has been one of their interests. They are studying the regulation of brain potassium-ATP (K-ATP) channels, which play a crucial role in glucose metabolism and hence in memory formation. They are focusing on a protein, α -endosulfine, which is a key regulator of the K-ATP channels, and is absent in the brains of most patients with AD or DS. Dr. Gold's AD-related research is in its early stages, but a potential outcome of his laboratory's work is the development of drugs which target the functions of the K-ATP channels in the brain to improve severe cognitive deficits that are associated with AD.

Dr. Thomas Anastasio is approaching Alzheimer's disease from a totally different angle. His expertise in computational biology is being applied to understanding AD. Many of the individual factors involved in the etiology of AD are known, but constructing a coherent picture of its pathogenesis remains an open challenge. In Dr. Anastasio's study, facts related to AD are collected through literature review and represented as declarations in a programming metalanguage known as Maude which, in his words, "allows us to 'know what we know.'" This approach facilitates the evaluation of the effects of simultaneous interventions at multiple sites in the pathways that are involved in AD—this is critical since AD is a multifactorial disease and will likely require a multi-pronged treatment strategy.

Dr. Hee Jung Chung is studying the basic physiological mechanisms by which the brain acquires, processes, and

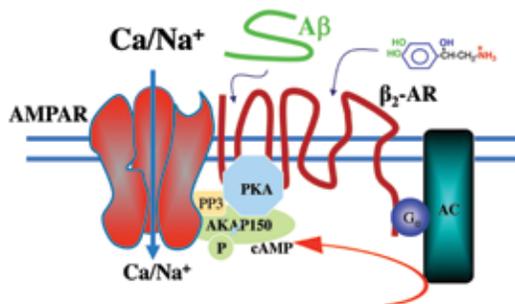


Figure: Activation of β_2 AR/AMPA receptor by $A\beta$.

stores information. Her work focuses on inhibitory potassium (ion) channels and their role in changing neuronal excitability, which directly influences learning, memory, and forgetting. Although not specifically focused on AD, this research undoubtedly has direct relevance regarding what “goes wrong” in the brain in AD.

All of the MIP and MIP-affiliated projects described above are excellent examples of applying basic scientific research findings to solve “real world” problems and therefore improve the quality of life for all of mankind—the true essence of “translational research.”

Dr. Jeanne Bullock Goldberg and her late husband, Dr. Edwin Goldberg (known affectionately as Dr. Ed), are long-time friends and supporters of MIP. Dr. Goldberg received a B.S. in physiology at the U of I and an M.D. from Northwestern University. She was a practicing radiologist in Decatur, IL before retirement.

Androgen Receptor Activity in Health and Disease

by Eric Bolton

I study the androgen receptor (AR), a ligand-activated transcriptional regulator that governs prostate development and homeostasis in healthy males, but also drives prostate cancer progression. In the embryo, AR functions as a switch that toggles between development of the prostate in males producing testosterone or vaginal tissue in the absence of androgens and in females. AR acts in concert with other signaling pathways, thus making AR a useful biological probe for examining regulatory crosstalk between pathways. Furthermore, AR-mediated signaling in mesenchyme stimulates proliferation and differentiation of the epithelium that, in turn, induces mesenchymal differentiation (see figure). Hence, AR provides a robust model to study cell-cell

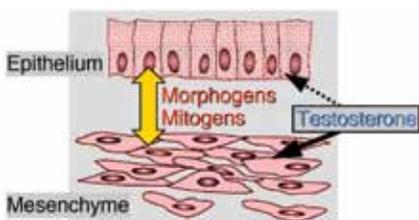


Figure: Prostate development.

interactions in development.

In my postdoctoral studies, I described the genomic organization and molecular architecture of AR-regulated genes and the androgen response elements (AREs) that confer remarkable selectivity to the transcriptional regulation mediated by AR. My study identified several AR-regulated genes that were themselves linked in gene clusters, and suggested that transcriptional regulation by AR may involve the coordination of multiple AREs near androgen-responsive genes, and that some AREs may affect the expression of multiple genes (*Genes and Dev.*, 2007). My findings revealed insight into cell- and gene-specific mechanisms of transcriptional regulation of hormone-responsive gene networks.

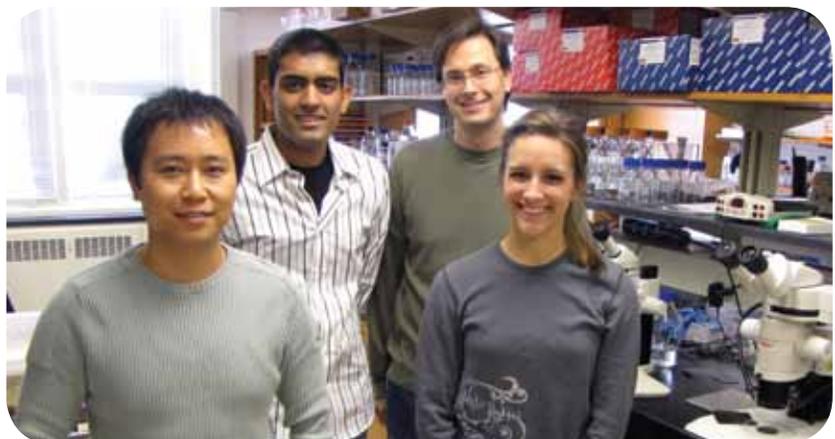
I also interrogated novel AR inhibitors. Androgen deprivation, a mainstay in prostate cancer treatment, results in substantial tumor regression, but tumors often become resistant. In a collaborative study, I demonstrated that AR signaling can be inhibited *in vivo* by ligand-independent, non-competitive inhibitors (*PNAS*, 2009). Our work indicates that it may be possible to develop effective non-competitive AR antagonists for treatment of androgen-dependent diseases, like prostate cancer.

In the course of my AR studies, an opportunity to pursue an exciting, yet overlooked area of research at the interface of cellular, developmental and cancer biology became apparent. Moreover, the collegial atmosphere and prominent nuclear receptor research community at the U of I and in MIP seemed a natural fit for me to

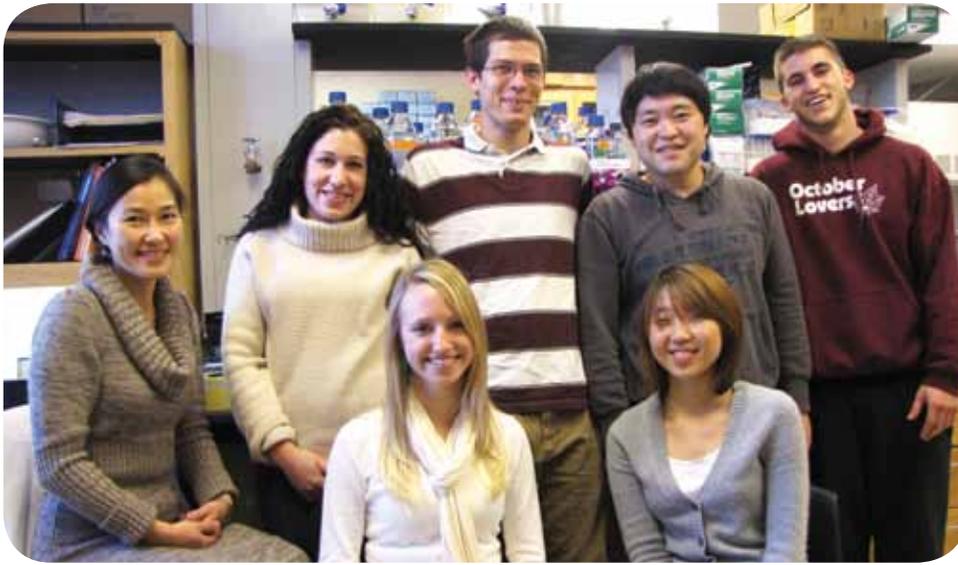
start a research program aimed at defining gene networks that control normal development and signaling pathways that are frequently misregulated and contribute to birth defects and hormone-dependent cancers.

My laboratory is defining gene regulatory networks for AR in the developing prostate and in the adult prostate during homeostatic signaling. A major goal is to determine nodes where AR-mediated signals and other signaling pathways intersect and influence cell-cell signaling. Neal Patel and Katelyn Bennan are interrogating the transcriptional regulation of AR-regulated genes in prostate. Young-Chae Kim is pursuing the hypothesis that regulatory crosstalk between androgen and other signaling pathways, like Notch, control cell proliferation, differentiation, and fate in the developing prostate. We are also interested in cell type-specific crosstalk between AR and other signaling pathways that are upregulated in prostate tumors. The elucidation of AR regulatory networks will increase our understanding of prostate homeostasis, will provide a baseline for future studies of prostate tumors, and more generally will expand our knowledge of hormone action in development, homeostasis, and disease.

Eric received a B.S. magna cum laude in Biochemistry and Molecular Biology at the University of Wisconsin and a Ph.D. in Molecular Biology and Genetics at the Johns Hopkins University School of Medicine. He was a postdoc with Dr. Keith Yamamoto at UC, San Francisco. He joined MIP as an assistant professor in January 2010.



Members of the newly renovated Bolton Lab (left to right): Young-Chae Kim, Neal Patel, Eric Bolton, and Katelyn Brennan.



Chung Lab (left to right). Back row: Hee Jung Chung, Sara Royston, Daniel Ley, Kwan Young Lee, Max Vest. Front row: Kaitlyn Sherer, Han Sol Oh.

Role of Potassium Channels in Synaptic and Intrinsic Plasticity

by Hee Jung Chung

I joined MIP as an assistant professor in January this year. The collegial and scientifically excellent environment of MIP and the Neuroscience Program is one of the primary factors that attracted me to the U of I.

One of our main research objectives is to understand how ion channels are targeted to specific regions of neurons such as axons and dendrites because their correct distribution is crucial for proper regulation of neuronal excitability. For example, in my postdoctoral studies, I discovered that the mutations in the voltage-gated KCNQ potassium channels that cause benign familial neonatal convulsions (BFNC) impair preferential axonal distribution of these channels (PNAS,

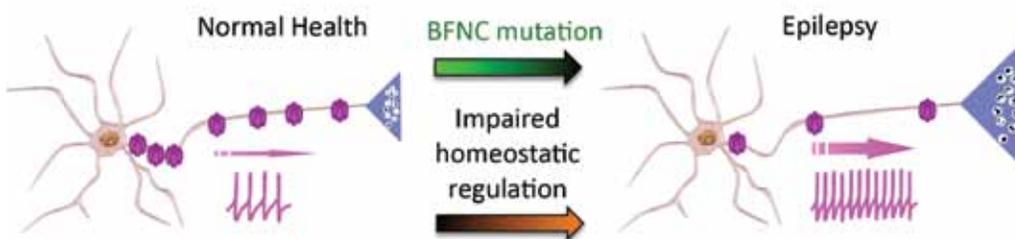
2006) (see figure). My graduate student, Kaitlyn Sherer, has begun to investigate how KCNQ channels are targeted to the axonal surface with remarkable specificity and precision, and whether failure of such targeting leads to neuronal hyperexcitability and underlies pathogenic mechanisms of inherited neonatal epilepsy.

I am also interested in understanding one form of excitatory synaptic plasticity called “depotentialiation” which is the reversal of long-term potentiation (LTP). LTP is well studied as an activity-dependent persistent enhancement in synaptic transmission which is a putative substrate for learning and memory. In contrast, depotentialiation is an understudied process hypothesized to mediate “forgetting.” However, testing this simple but critical concept has been impeded by the lack of knowledge about its molecular mechanisms and animal models with specific impairment in depotentialiation. I found

that depotentialiation but not LTP requires G-protein activated inwardly rectifying potassium channels (GIRKs) (PNAS, 2009b). My postdoc, Dr. Kwan Young Lee, and an undergraduate, Han Sol Oh, have begun to dissect the underlying molecular mechanism by investigating how GIRKs control synaptic calcium signaling necessary for LTP induction, and whether activity-dependent GIRK trafficking (PNAS, 2009a) mediates depotentialiation. This research will facilitate future development of animal models to test the role of depotentialiation in behavior.

Lastly, I am investigating the molecular mechanisms of intrinsic plasticity that is implicated in learning and memory, adaptive response to nerve injury, and homeostatic control of neuronal excitability. Synaptic plasticity has been studied extensively, however we know very little about how intrinsic plasticity is induced and expressed. Using microarray analysis, I have identified a large number of activity-regulated genes encoding proteins that are critical regulators of neuronal excitability, including potassium channels and their interacting proteins. Sara Royston and two undergraduates, Max Vest and Daniel Ley, are investigating the extent to which activity-dependent modulation of potassium channels mediate homeostatic plasticity in intrinsic excitability and whether failure of this plasticity has an active role in pathogenesis of hyperexcitability-associated diseases, including epilepsy.

I am hopeful that my laboratory research will increase our knowledge about the fundamental mechanisms of neuromodulation in health and disease. In addition, I am thrilled to mentor the next generation of neuroscientists in my laboratory, as well as in the classroom in a one-year core Neuroscience course, which I will teach jointly with Rhanor and Martha Gillette.



Neuronal hyperexcitability could arise from the impairment of correct targeting of axonal ion channels or perturbation of homeostatic regulation of axonal ion channels.

Hee Jung was born in South Korea. She received a B.S. cum laude in Biochemistry and Chemistry from Cornell University and a Ph.D. degree from Johns Hopkins University School of Medicine. Her postdoctoral work was with Dr. Lily Jan at UC, San Francisco. She was appointed as an assistant professor in MIP in January 2010.

MIP Family News

Joanne Walker (Rubin), Ph.D., Recognized by the Foundation



On October 1, 2010, at the annual U of I Foundation meeting, Dr. Joanne Rubin (professionally Walker), was recognized for establishing a major six-figure estate gift provision that will fund the Dr. Joanne G. Rubin Endowment. The income from this fund will be used to support fellowships for students in physical chemistry and in the School of Molecular and Cellular Biology, to support the Biology Library, and to provide research seed money for MIP. Dr. Rubin graduated from the U of I with high honors in chemistry in 1953. She received a Ph.D. in physiology in 1959 as Howard Ducoff's first graduate student, although her official advisor was John Anderson. She worked on toxicity of oxygen in living systems, using an annelid as a model. After graduating, she was an assistant professor at Muskingum College in Ohio for several years, before moving to Ohio State where she conducted research for 30 years. There she met her husband, Dr. Thor Rubin, a physical chemist on the Ohio State faculty, who passed away in 2004. The fellowships in physical chemistry honor his memory. We are extremely grateful for her interest and generous support.

Faculty/Student/Staff Milestones

Retirements: Personal Comments

Esmail (Essie) Meisami

In 1985 while I was at Berkeley, I came upon an ad in *Science*, seeking a faculty candidate with a Ph.D. to teach Human Physiology to undergraduates at Illinois. At that time, due to reorganization of bi-

ology at Berkeley, I knew my prospects at Berkeley were not bright. I therefore applied for the Illinois position. One of my conditions of accepting the Illinois job was to be able to have a research lab and train undergraduate and graduate students. To my great delight, Chair of the Physiology Division John Zehr and Department Head Dennis Buetow accepted this condition. Prior to my arrival, Howard Ducoff, and then Lloyd Barr and Eric Jakobsson, taught the Human Physiology course which became my responsibility. I had met Lloyd in 1964 at a symposium in Iran when I was the Secretary General of the Iranian Society of Physiology and Pharmacology and one of the founders of the Institute of Biochemistry and Biophysics at the University of Tehran. At Illinois I taught several large physiology and animal biology classes, and estimate that I have taught physiology to over 20,000 undergraduates. In addition, I am proud that my research lab during these 25 years was the home of 10 Ph.D. candidates, 25 Biology Master's students, and nearly 100 undergraduates. My research focus has been the development of the mammalian brain and recovery from developmental brain retardation and damage, using the developmental hypothyroidism model. A second life-long pursuit has been to merge quantitative neuroanatomy, neurochemistry, and function together in the olfactory system. Several of my discoveries have received worldwide recognition: massive retardation of olfactory bulb growth and development following closure of a nostril after birth; complete recovery of olfactory epithelium cell number and size following massive retardation due to hypothyroidism; and lastly, paradoxical hypertrophy of testis size and sperm number following recovery from early hypothyroidism. I could not have made these achievements without the support of my MIP heads and colleagues, but most importantly the hard and intelligent endeavors of my wonderful and devoted graduate and undergraduate research students. I also am forever grateful to the Neuroscience Graduate Program and its directors, Bill Greenough, Al Feng, Lloyd Barr, and Gene Robinson, who provided another intellectual home to enrich my mind, brain and life.

Essie was born in Iran, but earned a B.A. (1967) and Ph.D. (1970) at UC, Berkeley, in Physiology. He was appointed an assistant professor in the Department of Biology at the University of Tehran in 1971, and moved up the ranks. In 1980 he was appointed visiting associate professor at UC, Berkeley, came to the University of Illinois in 1986, and was appointed associate professor in MIP in 1988. Essie was an extraordinary teacher who won many awards.

Philip M. Best

One would think that after spending the better part of four decades writing reports, papers, grant applications, and way too many administrative memos, that writing a short commentary reflecting on my retirement from the U of I would be an easy task. Not so. I find myself turning to the standard clichés one often finds in notes such as this one. While those standard comments certainly contain elements of truth, they do not seem to do justice to the complexity of emotions and thoughts that run through my mind. But two thoughts do stand out as I write this. First and foremost is the sense of privilege and satisfaction that comes from having had the opportunity to pursue scientific research, teaching, and administration at the U of I. There could have been no better job! From the deck of our new home in Seattle, I can see in the distance buildings on the University of Washington campus where I did my graduate work in the Department of Physiology and Biophysics. So every morning as I look at that view, I am reminded of where things started, and then reflect on how the support and inspiration of my colleagues and students at Illinois made my academic life possible and so rewarding. From our deck I also have a view of the mountains (at least on a clear day) and of the neighborhood where my daughter lives. So the second thought that stands out as I write this is a sense of excitement about the future. Certainly there will be extended time for family and for outdoor activities in a landscape possessing more topographical interest than that found in central Illinois. There will also be continued involvement with ongoing research projects. But most importantly, there will be opportunities and adventures not yet revealed!

Phil received a B.A. (1969) from Duke and a Ph.D. (1974) from the Department of Physiology and Biophysics at the University of Washington. His postdoctoral training was at the University of Bern, Switzerland, and the University of Chicago. He was appointed assistant professor in MIP and the College of Medicine in 1979. Phil served as Head of MIP for 10 years and as Interim Dean and Associate Dean of LAS. His research focused on the structure and function of cardiac ion channels.

Albert S. Feng

It seemed it was only yesterday that I arrived in Burrill Hall to embark on my academic career, yet here it is that I am turning into an emeritus professor in MIP. Looking back, the past 33 years was the most fulfilling, rewarding, and satisfying period of my life, a period during which I could listen to my heart, pursue the unknown, and generate new knowledge. Best of all, I got to work with and interact with some of the brightest students in the country, and watch them grow in their chosen professions. I am grateful that MIP provided space and facilities as well as complete freedom to pursue whatever scientific questions interested me, and created an ambience that was supportive, collegial, and friendly, allowing me to grow and succeed as a scientist, and to raise a family at the same time. As a scientist, I was blessed to have the opportunity to embark on new and exciting projects every 8–10 years. Two of these projects were translational work that involved active collaborations with colleagues in MIP, the College of Engineering, and the Beckman Institute, using knowledge gained from basic re-

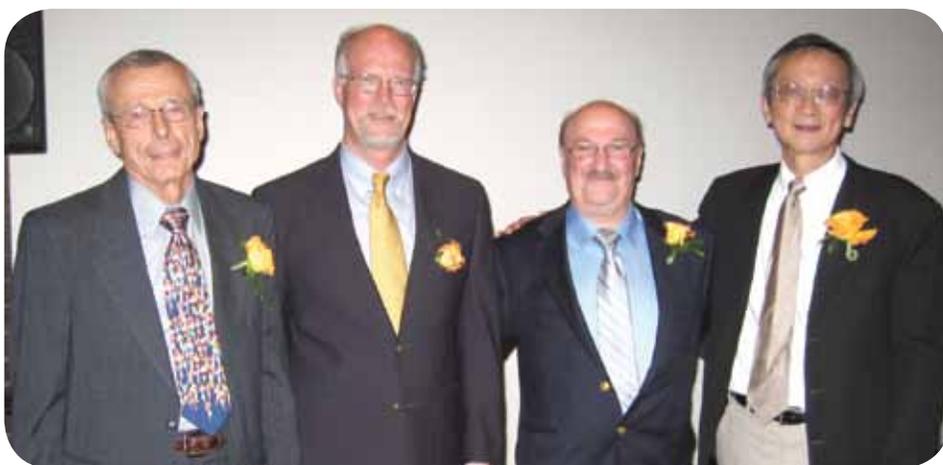
search. Creating technologies that can help the well-being of mankind was particularly rewarding, given that the initial goal for research was simply generating new knowledge for the sake of science. My 5.5-year stint as MIP Department head was equally fulfilling. Although the period of my headship was filled with turmoil and uncertainty, MIP remained intact through the reorganization of the School of Life Sciences, the collegiality of faculty in MIP was maintained, and we became more united as a group. We even established stronger bonds with the alumni of MIP as a result. With my retirement, I shall enjoy even greater freedom to pursue scientific and engineering projects that interest me. I anticipate enjoying every minute of it.

Al received a B.S. (1968) in Electrical Engineering and a M.S. (1970) in Biomedical Engineering at the University of Miami and a Ph.D. degree (1975) in Neurobiology & Behavior and Electrical Engineering at Cornell. After postdoctoral studies at UC, San Diego and Washington University, St. Louis, he was appointed assistant professor in MIP in 1977 and served as head for 5 years. He was the Richard and Margaret Romano Professorial Scholar. He also served as Chair of the Neuroscience Program and Associate Director of the Beckman Institute. His research interests are in the area of neuronal processing of auditory stimuli which has led to development of superior hearing aids.

Orrin David Sherwood

Upon completing my Ph.D. in Zoology at the University of Wisconsin in 1969, the Swiss pharmaceutical company CIBA

offered me the opportunity to isolate the hormone relaxin at its facility in Summit, New Jersey. It turned out the structure of relaxin, which is much like that of insulin, was too complex to synthesize at the time, and the company dropped the relaxin project. This professional turn of events, plus the strong desire by my wife, Julie, and me to return to the Midwest where our families resided, led to my accepting a faculty position in the U of I College of Medicine in August 1973. It was a fortunate decision, and I am extremely grateful for the 38-year professional career the U of I has afforded me. I appreciate the university's strong support of research and encouragement of cooperation among academic units. In this regard, collaborative efforts with Bob Easter and Phil Dziuk in the Department of Animal Science and Paul Cooke in the Department of Veterinary Medicine contributed to broad-based advancement in understanding the physiology of relaxin in pigs, rats, and mice. As I consider research accomplishments, it is the graduate students and postdoctoral fellows who made the great majority of the discoveries that come to mind. The privilege of participating in their professional development and enjoying their friendship are gratifying. I was originally a high school science teacher and continue to enjoy trying to "get it right." In that regard, primary responsibility for teaching the MIP general endocrinology course for about 30 years and the School of Molecular and Cellular Biology course "Human Reproduction and Society" since 2000 has enabled me to share with students my fascination with reproductive biology, and also to examine with them the personal and societal challenges associated with human reproduction. Finally, and perhaps most importantly, the U of I has enabled attainment of my professional aspirations without being so all-consuming that other facets of life that I value greatly—such as family, outdoor physical activities, and travel—are seriously impeded. With professor emeritus status I look forward to modest teaching, spending more time with our two sons and their families, continued biking tours, and serious efforts to learn to sail so as to get Julie on board my new sailboat!



(left to right) Dave Sherwood, Phil Best, Essie Meisami, and Al Feng at the retirement dinner.

Dave received a B.S. from the University of Wisconsin, Whitewater, in 1961, taught briefly in public school, and was awarded M.S. (1967) and Ph.D. (1969) degrees from the University of Wisconsin, Madison. After 4 years with CIBA-GEIGY, he was appointed assistant professor in MIP and the College of Medicine in 1973. He served for many years as Director of the Reproductive Biology Program. His research interests focused on the structure and function of relaxin.

New Ph.D.s '09-'10

Thomas Garcia (Ph.D., 2009) "*Molecular Interactions and Physiological Function of the Voltage-Dependent Calcium Channel Gamma6 Subunit*" with Phil Best. Tom is a postdoctoral fellow in the Department of Comparative Science in the College of Veterinary Medicine at the University of Illinois.

Carol Dianne Curtis-Ducey (Ph.D., 2009) "*DNA Repair, Redox Regulation and Modulation of Estrogen Receptor Alpha Mediated Transcription*" with Ann Nardulli. Carol is an Associate Research Scientist at the Oklahoma Medical Research Foundation.

Bhaskar Ponugoti (Ph.D., 2009) "*Nutritional Regulation of Cholesterol 7Alpha Hydroxylase (CYP7A1) Expression*" with Kim Kemper. Bhaskar is a postdoctoral fellow in the Department of Biochemistry at the University of Penn.

Zachary Sellers (Ph.D., 2010) "*Defining a Role for the Cystic Fibrosis Transmembrane Conductance Regulator in the Heart*" with Phil Best. Zach is completing his medical studies here in the College of Medicine.

Jessie Nicodemus-Johnson (Ph.D., 2010) "*Analysis of the Antifreeze Glycoprotein Containing Genomic Locus in the Antarctic Notothenoid Fish *Dissostichus Mawsoni**" with Christine Cheng and Art DeVries. Jessie is a postdoctoral fellow in the Department of Human Genetics at the University of Chicago.

Wei Wang (Ph.D., 2010) "*Analysis of the Role of the Transcription Factor C/EBP Beta in Implantation*" with Milan Bagchi. She is presently a postdoctoral fellow in the Department of Comparative Science in the College of Veterinary Medicine at the University of Illinois.

Alumni News



Charles M. Tipton (Ph.D., 1962) conducted his Ph.D. research with Dr. Steggedra. Charles is Emeritus Professor of Physiology in the Department of Physiology in the College of Medicine at

the University of Arizona. He was recently appointed to the National Research Council Space Studies Board Steering Committee to implement the congress-mandated Decadal Survey on Biological and Physical Sciences in Space. Among other recent scholarly activities, he has been writing profiles of senior American Physiology Society members who have made significant contributions during their career to the advancement of the discipline and the profession of physiology as part of the APS Living History of Physiology Archival Program. See, for example, *Advan. Physiol. Edu.* 33: 243-252, 2009 and 32:111-7, 2008.

Dan Zaharko (Ph.D., 1963) and his wife Nancy are both now retired in Rockville, MD. Dan's thesis was with Robert E Johnson. Nancy taught and



performed for several years in the Illinois Women's Dance Department After graduation Dan taught pharmacology and did research (aspects of insulin) in the Combined Degree Program of Medicine at IU, Bloomington. He then moved to the NIH as a Research Associate and became, over the years, a senior scientist, section head, and branch chief of pharmacology in the Developmental Therapeutics Program, NCI. He is an emeritus member of the American Association of Cancer Research and the ASPET. Dan and Nancy are currently enjoying retired life, with two children and two granddaughters, in the Washington DC area with its many attractions, historical aspects, and cultural activities. Dan and Nancy keep fit by swimming, bicycling, gardening, and golfing.

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Jill B. Becker (Ph.D. 1980, Neuro) is the Patricia Y. Gurin Collegiate Professor of Psychology, resident professor in the Molecular & Behavioral Neuroscience Institute and Psychiatry Department, and Associate Director of the Neuroscience Program at the University of Michigan. She is also co-chair of the Society for Neuroscience Committee on Professional Development, and has been organizing a series of iWIN (Increase Women in Neuroscience) conferences for department chairs to highlight issues related to the recruitment, mentoring, and retention of women faculty members.

David Gordon (Ph.D., 1982) and his wife, Patricia are now retired in Evergreen, Colorado, in the foothills outside of Denver and enjoy traveling. David had a long and productive research career focused on the molecular biology of the pi-

tuitary in the Division of Endocrinology, Metabolism, and Diabetes, Department of Medicine at the University of Colorado Health Science Center. He recently completed co-contributing a chapter in a major endocrinology text.

Yhun-Yhong Sheen (Ph.D., 1986) is professor of pharmaceutical science at Ewha Women's University in Seoul, Korea, and runs a large laboratory doing cancer and pharmacology research. She recently completed service as head of this well-regarded department and is active on science advisory panels throughout Korea.

Hyeseong Cho (Ph.D., 1992) is professor and head of the Department of Biochem. at Ajou University Medicine School in Sewon, Korea.

Susan Aronica (Ph.D., 1994) is a professor in the Department of Biology

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