

# Lifeline

UMKC SCHOOL OF BIOLOGICAL SCIENCES

UNIVERSITY OF MISSOURI-KANSAS CITY • SUMMER 2009

## Inside

Major Conferences  
page 3

Faculty Awards  
page 3

Publications  
page 4 - 5

Student Awards  
page 5

New Research Funding  
page 6

## Message from the Dean

### A REMEMBRANCE



Dr. Lawrence A. Dreyfus

On March 17, 2009, the School of Biological Sciences, UMKC and the entire scientific community lost a dear friend, colleague and mentor. Dr. Dmitry Belostotsky personified what many of us consider to be the consummate scientist. Intelligent, insightful, curious, passionate and driven, all accurately reflect

Dmitry and his approach to the scientific world in which he invested his life and career. But more than this, Dmitry was a kind and thoughtful man who cared deeply about those around him.

I am honored to have known him in this way and will forever miss him.

— Lawrence A. Dreyfus  
Dean

## Dmitry Belostotsky



Dmitry Belostotsky died March 17, 2009. He had been an associate professor in the School of Biological Sciences, University of Missouri-Kansas City (UMKC) since 2007. At the age of 44 and in the midst of a blossoming career,

Dmitry's passing shocked and immeasurably saddened his friends and colleagues in the scientific areas that he tirelessly worked and served in.

Born in Moscow, Dmitry received his MS.c. degree from Kiev State University in Ukraine and the Institute of Molecular Genetics, and his Ph.D. from the USSR Academy of Sciences, studying under Drs. Evgeny Ananiev and Yuri Gleba. In 1990, he received a British Council Fellowship to work with Dr. David Lonsdale in the Cambridge Laboratory of the John Innes Centre for Plant Science Research in the United Kingdom. Subsequently, he was a postdoctoral fellow (1991–95) in Dr. Richard Meagher's laboratory at the University of Georgia in Athens.

Dmitry joined the faculty of the Department of Biological Sciences at The State University of New York (SUNY) at Albany in 1995. Together with his wife and longtime collaborator, Dr. Julia Chekanova, who is currently a faculty member at UMKC, he devoted his scientific career to studying the molecular mechanisms that underlie a broad array of processes at the RNA level. His critical and perceptive scientific mind is evident from the elegant work that his laboratory has been known to produce. Notably, he beautifully combined yeast and Arabidopsis genetics and biochemistry to probe fundamental molecular processes and address the function of PolyA binding proteins (PABPs). His group used a wide variety and constantly evolving set of tools that range from classical to the latest systems biology approaches to uncover the intriguing connections between PABPs and nuclear dynamics.

Dmitry's major interests were in different aspects of RNA metabolism, in particular the mechanisms and functions of polyadenylation, deadenylation, and RNA stability. Building on his postdoctoral work, Dmitry continued exploring functional specialization among Arabidopsis PABPs at SUNY-Albany. Combining functional and phylogenetic analyses, his work suggested that the distinct classes of plant PABPs are ancient and that their functional specialization contributed to their conservation during evolution. He proposed that, unlike in other

organisms, multiple plant PABPs function together at the posttranscriptional level to regulate growth and development.

In an elegant series of work in yeast, some in collaboration with Michael Rosbash at Brandeis University, Dmitry and Julia's team recently described a complex of four proteins that mediate posttranscriptional tethering of active genes to the nuclear periphery as well as to non-nascent mRNPs. These studies represent one of the first efforts to unravel the poorly understood nuclear dynamics of compartmentalized transcriptional and posttranscriptional processes.

Dmitry's group has been a major force behind the research on the Arabidopsis exosome, a multi-subunit 3-foot to 5-foot exonuclease complex that acts in mRNA decay in both the nucleus and the cytoplasm. In a seminal paper published in *Cell* in 2007, Dmitry's lab, in collaboration with Joseph Ecker's group, used transcriptome profiling by tiling arrays not only to decipher the composition of the Arabidopsis exosome complex, but also to reveal the genomic landscape of the substrates of the Arabidopsis exosome. This provided an unprecedented view into the hidden features of the Arabidopsis transcriptome. A striking association between exosome substrates and heterochromatic loci that give rise to endogenous small interfering RNAs was discovered, suggesting a novel function of the exosome in epigenetic regulation in plants. The full value of the large body of transcriptome information revealed by this study will only be appreciated in the years to come. Dmitry is remembered by many of his colleagues as talented in many different ways and as one of the smartest people they have encountered. Michael Rosbash commented that Dmitry was "incredibly curious and passionate about science" and his was "a rare combination of memory, intelligence, and imagination," sentiments echoed by many, including his long-time colleague Joseph Mascarenhas, who also remarked that Dima (as he was fondly called) ran a most-respected research program throughout his independent career. Dmitry was passionate about everything he believed in and never did anything halfway. This intensity was evident in the dedication he showed in organizing the Frontiers of Sexual Plant Reproduction conferences. These meetings were initiated to honor Joseph, his senior colleague, mentor, and eminent pollen biologist at SUNY-Albany. Largely because of Dmitry and Julia's meticulous organization of the first two meetings in Albany, the symposium has blossomed into a centerpiece activity, a scientific forum that has considerably advanced the sense of community among colleagues in the plant reproductive biology field. As Scott Russell of the University of Oklahoma and editor of the journal *Sexual Plant Reproduction* said so well, "Dima was a great organizer for this area, and he gave extremely generously even though he was really an onlooker when it came to gametophyte biology" (although we all remember his fascination and understanding of the

topic). Scott also remembered Dima's energy as "just incredible and his understanding of our area so deep that it was clear that he could succeed on any task that we saw him try."

We also remember Dmitry in more personal ways. Ravi Palanivelu, a graduate student contemporary in the Meagher lab, remembers Dima as an inspiration and an extremely generous mentor. He is remembered for his daring personality – he never hesitated to venture into new arenas – and his demand for perfection from himself and others who worked with him made everyone better. Orna Elroy-Stein, whose collaborative study with Dima on the effect of PABPs on the performance of internal ribosome entry sites from crucifer-infecting tobamovirus was just accepted for publication weeks after Dima's passing, remembers him as a sincere, most enthusiastic and responsive collaborator, a very good friend and someone always ready to help. Ueli Grossniklaus, who visited Dima and his family on several occasions in SUNY-Albany and collaborated with him on the characterization of exosome mutants, will miss him dearly as a good friend. They had many plans for future collaborations and undertakings that are now, so unexpectedly and sadly, cut short. We also remember Dima's clever sense of humor such that one often had to think twice before understanding his witty comments. Dima was also intensely dedicated to his family: his wife Julia, whom he met in 1986 when both were graduate students, and their son Andrey, who studies at the University of North Carolina, Chapel Hill. Dima's untimely death is felt deeply among colleagues as a loss to the plant RNA metabolism and sexual reproduction fields, but it is perhaps the saddest when we ponder the loss of Dima as a friend, and remember his love and affection for Julia and Andrey.

#### **ACKNOWLEDGMENTS**

We are grateful to Drs. Wenbo Ma, Joseph Mascarenhas, Scott Russell and Michael Rosbash for comments and input on the article and many others who sent words and thoughts that we incorporated.

Xuemei Chen, University of California, Riverside  
Alice Y. Cheung, University of Massachusetts–Amherst  
Orna Elroy-Stein, Tel Aviv University, Israel  
Ueli Grossniklaus, University of Zürich, Switzerland  
Ravi Palanivelu, University of Arizona, Tucson

Reprinted with permission from the American Society of Plant Biologists News, Vol. 36, No. 4, copyright ASPB

## Dee Denver receives 2009 Alumni Achievement Award

Dr. Dee Denver is this year's Alumni Achievement Award recipient at the School of Biological Sciences. Since graduating from the School of Biological Sciences in 2002, Denver's career path has been on a sharp upward trajectory. His extraordinary research on the spontaneous mutation rate of *C. elegans*, a type of microscopic worm, has led many scientists to reconsider long-held beliefs on the relatively slow pace of evolution. Denver's research, published in *Nature* and *Science*, demonstrated that the rate of spontaneous mutation is many times faster than previously thought.



## Dr. Christine Guthrie speaks at annual "Trailblazers in Molecular Biology and Biophysics" Lecture Series



Dr. Christine Guthrie, professor in the Department of Biochemistry and Biophysics and the American Cancer Society research professor of molecular genetics at the University of California-San Francisco, shared her insights into the regulation of mRNA splicing as part of the

*Trailblazers in Molecular Biology and Biophysics* Lecture Series in April.

Guthrie's pioneering studies on the biology, conformation and processing of bacteriophage

tRNAs laid the foundation for her most celebrated contributions in the area of understanding the components and function of the spliceosome. Using budding yeast as a model system, Guthrie and her colleagues identified the small nuclear ribonucleic acids and small nuclear RNA proteins and their roles in mRNA splicing. Guthrie's seminal research in RNA splicing provides the basis for the existence of genome economy in the face of the extreme complexity of biological systems.

Guthrie earned her Ph.D. at the University of Wisconsin in genetics and performed her doctoral research at the Max-Planck Institute in Berlin.

## Major Conference Presentations

"Map-based Cloning of Mad and Other Genes in Phycomyces" and "Sex and Light Signaling in the Zygomycete *Phycomyces Blakesleeana*," 25th Fungal Genetics Conference, Asilomar, Calif., March 2009, **Dr. Alexander Idnurm.**

"Aspergillus at the FGSC," The Sixth International Aspergillus Meeting, Pacific Grove, Calif.; "Update on FGSC Contribution to the Neurospora Functional Genomics Program," 25th Fungal Genetics Conference, Pacific Grove, Calif., March 2009, **Dr. Kevin McCluskey.**

"Exploring the Role of the C-terminal Domains of Cytoplasmic Dynein Heavy Chain in *Neurospora crassa*," Fungal Genetics Conference, Pacific Grove, Calif., March 2009, **Dr. Michael Plamann.**

"Assembly of the Bacteriophage P22 Terminase," 6th International Virus Assembly Symposium, Crete, Greece; "Mechanisms of Virus Assembly Probed by Raman Spectroscopy," 39th Winter Colloquium on the Physics of Quantum Electronics, Snowbird Resort, Sandy, Utah, 2009, **Dr. George J. Thomas.**

## Faculty Awards

**Dr. Brian Geisbrecht** was promoted from assistant professor to associate professor in the Division of Cell Biology and Biophysics.

**Dr. Jennifer Hackney**, Ph.D. 2008, received the 2008 UMKC Outstanding Dissertation in Sciences Award in April for dissertation titled "Ecdysone Receptor (EcR) Regulates Cell Migration and Chorion Gene Amplification in the *Drosophila* Ovary."

**Dr. Gerald Wyckoff** was promoted from assistant professor to associate professor in the Division of Molecular Biology and Biochemistry.



## Publications

- Maron, L., Hen, S., Pinchasi, D., Chekanova, J., Belostotsky, D. and Elroy-Stein, O. "Diverse poly(A) Binding Proteins Mediate Internal Translational Initiation by a Plant Viral IRES," *RNA Biology*, pp. 1-9, Vol. 6(4), 2009.
- Patrizia, R., Fabio, B., Hackney, J., Dobens, L.L, Garguilo, G. and Cavaliere, V. "Cell Survival and Polarity of Drosophila Follicle Cells Require the Activity of Ecdysone Receptor B1 Isoform," *Genetics*, Vol. 181 (1), pp. 165-175, 2009.
- Navarro A., Rezaiekhaligh M., Keightley J.A., Mabry S.M., Perez R.E. and Ekekezie I. "Higher TRIP-1 Level Explains Diminished Collagen Contraction Ability of Fetal Versus Adult Fibroblasts," *Am J Physiol Lung Cell Mol Physiol* 296: L928-L935, 2009.
- A.L. Olson, H. Yao, T.J. Herdendorf, H.M. Miziorko, S. Hannongbua, P. Saparpakorn, S. Cai and D.S. Sem. "Substrate Induced Structural and Dynamics Changes in Human Phosphomevalonate Kinase and Implications for Mechanism," *Proteins* 75, 127-138 (2009).
- Tran, Q.-K., Leonard, J., Black, D. J. and Persechini, A., "Effects of Combined Phosphorylations at Ser-617 and Ser-1179 in Endothelial Nitric Oxide Synthase on EC50(Ca<sup>2+</sup>) Values for Calmodulin Binding and Enzyme Activation," *J. Biol. Chem.* 284: 11892-11899, 2009. (E-published Feb. 26, 2009)
- Yu W., Zheng H., Price J.L. and Hardin, P.E., "DOUBLETIME Plays a Noncatalytic Role to Mediate CLOCK Phosphorylation and Repress CLOCK-dependent Transcription Within the Drosophila Circadian Clock," *Mol Cell Biol*, Vol. 29, pp. 1452-1458, 2009.
- Fan, J.Y., Preuss, F., Muskus, M.J., Bjes, E.S. and Price, J.L., "Drosophila and Vertebrate Casein Kinase I-delta Exhibits Evolutionary Conservation of Circadian Function," *Genetics*, Vol. 181, pp. 139-152, 2009.
- Alexander, H.M. and N.A. Slade, W.D. Kettle, G.L. Pittman, A.W. Reed, "Detection, Survival Rates, and Dynamics of a Cryptic Plant, *Asclepias meadii*: Applications of Mark-recapture Models to Long Term Monitoring Studies," *Journal of Ecology*, Vol. 97(2), pp. 267-276, 2009.
- Reed, A.W. and Slade, N.A., "Environmental Correlates of Survival and Reproduction in Old-field Rodents," *Journal of Mammalogy*, Vol 90 (3), pp. 680-685, 2009.
- Morton, D.J., Seale, T.W., Bakaletz, L.O., Jurcisek, J.A., Smith, A., Van Wagoner, T.M., Whitby, P.W. and Stull, T.L. "The Heme-binding Protein (HbpA) of *Haemophilus influenzae* as a Virulence Determinant," *Int. J. Med. Microbiology*, 2009. (E-published May 16, 2009)
- Li, R.C., Saleem, S., Zhen G., Cao, W., Zhuang, H., Lee, J., Smith, A., Altruda, F., Tolosano, E. and Doré, S. "Heme-hemopexin Complex Attenuates Neuronal Cell Death and Stroke Damage," *J Cereb Blood Flow Metab.* May 2009; 29(5):953-64. (E-published March 11, 2009)
- Smith, A., Rish, K.R., Lovelace, R., Hackney, J.F. and Helston, R., "Role for Copper in the Cellular and Regulatory Effects of Heme-Hemopexin," *Biometals*, June 2009; 22(3):421-37. (E-published Nov. 28, 2008)
- Tsuboi, M., Benevides, J. M. and Thomas, G. J., Jr. "Raman Tensors and Their Application in Structural Studies of Biological Systems," *Proceedings of the Japan Academy, Series B*, Vol. 85, pp. 83-97, 2009.
- Idnurm, A. and Walton, F. J., Floyd, A., Reedy, J. L. and Heitman, J., "Identification of ENA1 as a Virulence Gene of the Human Pathogenic Fungus *Cryptococcus Neoformans* Through Signature-Tagged Insertional Mutagenesis," *Eukaryotic Cell*, Vol. 8, pp. 315-326, 2009.
- Kapros, T. and McDaniel, S., "Cytotoxicity of Tea Tree Oil in Tobacco Cells," *Allelopathy Journal*, Vol. 23, pp. 185-192, 2009.
- Kinney, M., McCluskey, K., Wiest, A. and Plamann, M., "Identification of the *Neurospora Crassa* Mutation un-10 as a Point Mutation in a Gene Encoding Eukaryotic Translation Initiation Factor 3, Subunit B," *Fungal Genetics Reports*, Vol. 56, pp. 6-7, 2009.
- Němeček, D. and Thomas, G. J., Jr., "Raman Spectroscopy of Viruses and Viral Proteins," *Frontiers of Molecular Spectroscopy*, Chapter 16, Laane, J., Editor, Elsevier B.V., Amsterdam, pp. 553-595, 2009.
- Němeček, D., Overman, S. A., Hendrix, R. W. and Thomas, G. J., Jr., "Unfolding Thermodynamics of the  $\Delta$ -Domain in the Prohead I Subunit of Phage HK97: Determination by Factor Analysis of Raman Spectra," *J. Mol. Biol.* 385:628-641, 2009.
- Němeček, D. and Thomas, G. J., Jr., "Raman Spectroscopy in Virus Structure Analysis," in *Handbook of Molecular Biophysics. Methods and Applications*. Chapter 13, Bohr, H. G., editor, Wiley-VCH Verlag GmbH & Co., Weinheim, 2009.
- Waterborg, Jakob H., "Functional Analysis of the Histone H3 Variants of *Ustilago Maydis*," *Biochemistry and Cell Biology*, Vol. 87, pp. 477, 2009.

Jin, F. L., Xu, X. X., Yu, X. Q., Ren, S. X., "High-level Expression of Active Recombinant Ubiquitin Carboxyl-terminal Hydrolase of *Drosophila Melanogaster* in *Pichia Pastoris*," *Protein Expr Purif.*, Vol. 65, pp. 115-121, 2009.

Ling, E., Rao, X. J., Ao, J. Q. and Yu, X. Q., "Purification and Characterization of a Small Cationic Protein from the Tobacco Hornworm *Manduca Sexta*," *Insect Biochem. Mol. Biol.*, Vol. 39, pp. 263-271, 2009.

Zhang, C. Z., Yin, Z. X., He, W., Chen, W. J., Luo, Y. W., Lu, Q. X., Weng, S. P., Yu, X. Q. and He, J. Q. "Cloning of IRAK1 and Its Up-regulation in Symptomatic ISKNV-Infected Mandarin Fish," *Biochem Bioph Res Co.*, Vol. 383, pp. 298-302, 2009.

Zhang, X. W., Xu, W. T., Wang, X. W., Mu, Y., Zhao, X. F., Yu, X. Q. and Wang, J. X. "A Novel C-type Lectin with Two CRD Domains from Chinese Shrimp *Fenneropenaeus Chinensis* Functions as a Pattern Recognition Protein," *Molecular Immunology*, Vol. 46, 1626-1637, 2009.

Wang, L., Zhou, Z.C., Guo, C.J., Rao, X.Y., Xiao, J., Weng, S.P., Yin, Z.X., Yu, X.Q. and He, J.G. "The Alpha Inhibitor of NF-kappaB (IkappaBalpha) from the Mandarin Fish Binds With p65 NF-kappaB," *Fish Shellfish Immunol.*, Vol. 26, 473-482, 2009.

Wang, P. H., Gu, Z. H., Huang, X. D., Liu, B. D., Deng, X. X., Ai, H. S., Wang, J., Yin, Z. X., Weng, S. P., Yu, X. Q. and He, J. G. "An Immune Deficiency Homolog from the White Shrimp, *Litopenaeus Vannamei*, Activates Antimicrobial Peptide Genes," *Molecular Immunology*, Vol. 46, pp. 1897-1904, 2009.

Ai, H. S., Liao, J. X., Huang, X. D., Yin, Z. X., Weng, S. P., Zhao, Z. Y., Li, S. D., Yu, X. Q. and He, J. G. "A Novel Prophenoloxidase 2 Exists in Shrimp Hemocytes," *Dev Comp Immunol*, Vol. 33, pp. 59-68, 2009.

Zhao, Z. Y., Yin, Z. X., Xu, X. P., Weng, S. P., Rao, X. Y., Dai, Z. X., Luo, Y. W., Yang, G., Li, Z.S., Guan, H. J., Li, S. D., Chan, S. M., Yu, X. Q. and He, J. G. "A novel C-type Lectin from the Shrimp *Litopenaeus Vannamei* Possesses Anti-white Spot Syndrome Virus Activity," *Journal of Virology*, Vol. 83, pp. 347-356, 2009.

Jin, F. L., Xu, X. X., Yu, X. Q. and Ren, S. X., "Expression and Characterization of Antimicrobial Peptide CecropinAD in the Methylophilic Yeast *Pichia Pastoris*," *Process Biochemistry*, Vol. 44, pp. 11-16, 2009.

## Student Awards

**Elizabeth Barrett** received the Mary Kay McPhee Award for a project titled "Unraveling the Atomic Details of the Interactions Between the Neural Proteins Receptor Tyrosine Phosphatase Zeta and Contractin 1."

**Christa Cochran** received the Shook, Hardy & Bacon and the John Newman awards, made available through the 2009 UMKC Women's Council Graduate Assistance Fund, for a project titled "A New Method for Identifying Regulatory Cysteines in Proteins."

**Ze Liu**, Outstanding Merit Recipient, received the Ruth Margolin Award and the Women's Council Annual Fund Donors Award for a project titled "Characterization of Ced12/ELMO Binding Candidates in Muscle Development in the Fruit Fly *Drosophila Melanogaster*."

**Vanessa Masoner** received \$1,250 in February from the SEARCH Undergraduate Grant Committee, UMKC. The grant was approved to fund a one-semester project "An Examination of the Role of the Cut Gene in Protein Turnover During Cell Migration," under the faculty mentorship of Dr. Leonard Dobens.

**Abijah Muthyala** received \$1,250 in February from the SEARCH Undergraduate Grant Committee, UMKC. The grant was approved to fund a one-semester project "The Requirements for the Protein Kinase Tribbles in Epithelia," under the faculty mentorship of Dr. Leonard Dobens.

**Takrima Sadikot**, Outstanding Merit Recipient, received the J.R. Majors Award and the American Multi Cinema, Inc. Award for a project titled "The Role of Telethonin Protein in Muscle Formation, maintenance and Disease."

**Lora Shiflett** received the J. Philip Starr and the Women's Council Presidents awards, made available through the 2009 UMKC Women's Council Graduate Assistance Fund, for the 34th annual Herpesvirus Workshop project.



**UNIVERSITY OF MISSOURI-KANSAS CITY**  
School of Biological Sciences  
5100 Rockhill Road  
Kansas City, Missouri 64110-2499

UMKC is an equal opportunity/affirmative action institution.

Nonprofit Org.  
U.S. Postage  
PAID  
Kansas City, MO  
Permit #6113

## New research funding

### *NATIONAL INSTITUTES OF HEALTH*

Geisbrecht, B., "Structure Function Analysis of Staphylococcal Complement Inhibitors," \$306,500, February 2009.

Geisbrecht, B., "Structure Function Analysis of Staphylococcal Complement Inhibitors," \$275,850, February 2009.

Laity, J., "Mechanisms of Eukaryotic Zinc Homeostasis," \$301,505, March 2009.

Persechini, A., "Switching Kinetics in Calmodulin-IQ Domain Complexes," \$218,409, May 2009.

Yu, X., "Lectin-Carbohydrate Interactions in the Host-Parasite System," \$223,500, May 2009.

Chekanova, J., "Role of the *S. cerevisiae* Pab1p in mRNA biogenesis," \$25,318, May 2008.

### *UNIVERSITY OF MISSOURI RESEARCH BOARD*

Bouyain, S., "Mechanistic Studies of Glioma Cell Adhesion to Tenascin-C," \$48,000, June 2009.

Idnurm, A., "Essential Genes of the Human Pathogen *Cryptococcus Neoformans*," \$35,447, May 2009.

King, S., "Regulation of Dynein/Dynactin Interactions via BicD," \$35,000, February 2009.

Price, J., "Role of Transcriptional Negative Feedback in the Circadian Clock," \$40,000, February 2009.

### *UMKC FACULTY RESEARCH GRANT*

Geisbrecht, E., "Characterization of *Drosophila* CG15105, a Protein Involved in Muscle Wasting Diseases," \$7,000, March 2009.

Yu, X., "Study of a C-type Lectin in Proliferation of Insect Blood Cells," \$7,000, July 2009.