ACS chemical biology

INTRODUCING OUR AUTHORS

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Jeremy M. Baskin

Image courtesy of Pamela Chang.

Current position: Department of Cell Biology, Yale School of Medicine, Postdoctoral Fellow with Prof. Pietro De Camilli

Education: Massachusetts Institute of Technology, S.B. in Chemistry, 2004; University of California, Berkeley, Ph.D. in Chemistry, 2009 (Advisor: Carolyn R. Bertozzi)

Nonscientific interests: Classical music, playing the piano

My research interests in graduate school centered on the development of cyclooctyne-based reagents for copper-free click chemistry, an approach to labeling biological molecules within living systems that allows their tracking *via* imaging or their isolation for *in vitro* analysis. It has been a truly rewarding experience to be a part of nurturing these emerging tools from the methods development stage to their application to imaging the dynamics of glycan biosynthesis in live cells and whole organisms, and it is my hope that they will continue to see myriad applications in diverse research areas. (Read Baskin's article: DOI: 10.1021/cb100284d)

Karen Dehnert

Image courtesy of Karen Dehnert.

Current position: University of California, Berkeley, Department of Chemistry, Ph.D. candidate with Prof. Carolyn R. Bertozzi

Education: Stanford University, B.S. in Chemistry, 2006; University of California, Berkeley, Ph.D. in Chemistry with Prof. Carolyn R. Bertozzi, 2011

Nonscientific interests: Traveling, running, cooking, music

My research focuses on methods for imaging glycans in living systems. Fucosylated glycans play important roles in embryonic development, but they are difficult to visualize because they are not directly encoded in the genome. In this work, we have used a chemical reporter strategy to metabolically label fucosylated glycans and image them in live zebrafish embryos. (Read Dehnert's article, DOI: 10.1021/cb100284d)

Martin Horn

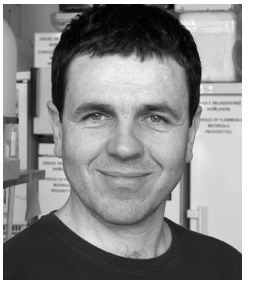

Image courtesy of Martin Horn.

Current position: Institute of Organic Chemistry and Biochemistry, Academy of Sciences of the Czech Republic, Postdoctoral researcher with Dr. Michael Mares

Education: Charles University, Prague, M.S. in Biochemistry; Institute of Organic Chemistry and Biochemistry, Academy of Sciences of the Czech Republic, Ph.D. in Biochemistry

Nonscientific interests: Rugby, hiking, and skiing

My research focuses on structure–function relationships among proteases of blood-feeding parasites. One such parasite, the blood fluke *Schistosoma mansoni* (approximately 1 cm long), causes schistosomiasis, a disease of poverty that infects over 200 million people worldwide. The present research, a collaboration with the UCSF Sandler Center for Drug Discovery, centers on the protease called cathepsin B1 (SmCB1) that contributes to the digestion of the blood meal in the gut of the parasite. SmCB1 is also an experimental drug target for the treatment of schistosomiasis. In the activation peptide (pro-peptide) of SmCB1, we uncovered structural motifs that specifically inhibit the enzyme. These motifs provided scaffolds for the design of small molecule inhibitors of SmCB1 that might eventually lead to the development of new antischistosomal drugs. (Read Horn's article, DOI: 10.1021/cb100411v)

Fei Huang

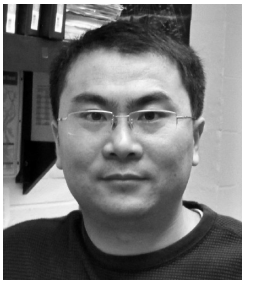

Image courtesy of Fei Huang.

Current position: Drexel University College of Medicine, Department of Biochemistry and Molecular Biology, Postdoctoral Researcher with Prof. Alexander V Mazin, 2008

Education: Dalian University of Technology, B.S. in Polymer Science and Engineering, 2001; Beijing University of Chemical Technology, M.S. in Polymer Chemistry and Physics, 2004; Peking University, Ph.D. in Medicinal Chemistry, 2007

Nonscientific interests: Fishing, reading, planting

My research interests focus on the roles of homologous recombination (HR) in cancer cells. Overexpression of RAD51, a

   dx.doi.org/10.1021/cb2001654 | *ACS Chem. Biol.* 2011, 6, 523–527

key protein in HR, was observed in many cancers. It is thought that the RAD51 rescues the cancer cells by promoting the repair of DNA double strand breaks (DSBs) and interstrand cross-links (ICLs) induced by chemo- or radiation treatment. We are seeking for efficient small molecule inhibitors of RAD51 that can diminish the resistance of cancer cells to the chemo or radiation treatment. In this paper we identified B02 compound that efficiently inhibited human RAD51, but not its *E. coli* homologue RecA. It will be interesting to use B02 in combination with cytotoxic agents, *e.g.*, cisplatin or ionizing radiation, in order to enhance the efficiency of cancer therapy. (Read Huang's article, DOI: 10.1021/cb100428c)

Kenneth Jensen

Image courtesy of Cherry Nielsen.

Current position: University of Copenhagen, Department of Plant Biology, Plant Biochemistry Laboratory, Ph.D. student in Plant Biochemistry with Prof. Birger Lindberg Møller

Education: University of Copenhagen, Faculty of Science, B.Sc. in Biochemistry, 2005; University of Copenhagen, Faculty of Science, M.Sc. in Biochemistry, 2008 with Prof. Stuart A. MacNeill

Industrial work: Laboratory technician at Novozymes A/S, R&D bacterial screening department, 2001−2008

Nonscientific interests: Wife and kids, swimming, weight training.

My Ph.D. studies are focused on combining the catalytic properties of photosynthesis and cytochrome P450 enzymes. Based on synthetic biology approaches, we have generated a light-driven system able to carry out highly regio- and stereospecific hydroxylations. I greatly appreciate the opportunity to become absorbed in the virtually unlimited possibilities of synthetic biology and its immense potential for cross-disciplinary research. Besides the continuation of the light-driven cytochrome P450 research presented in this paper, other research interest includes the study of the multidomain cytochrome P450 reductase and the elucidation of the mechanisms required for the assembly of metabolons thought to significantly increase catalytic turnover and specificity. (Read Jensen's article, DOI: 10.1021/cb100393j)

Tamer Kaoud

Image courtesy of Tamer Kaoud.

Current position: The University of Texas at Austin, College of Pharmacy, Ph.D. candidate in Medicinal Chemistry with Professor Kevin N. Dalby

Education: Tanta University (Egypt), B.S. in Pharmaceutical Sciences (BPharm), 1999; Minia University (Egypt), M.S. in Pharmaceutical Sciences, Medicinal Chemistry (MPharm), 2002

Nonscientific interests: Petunias, traveling, biking, and watching movies

As a pharmacist studying medicinal chemistry, my interests lie where chemistry, biology and pharmacology meet at the various stages of the drug discovery pipeline. I joined Professor Kevin Dalby's laboratory to learn about biochemistry and enzymology and to study the mitogen activated protein kinases (MAPKs). JNKs (c-Jun *N*-terminal kinases) including JNK1, JNK2, and JNK3 are members of the MAPKs family. JNK genes are implicated in several diseases such as diabetes, Alzheimer's, cancer, heart failure, and Parkinson's disease. Herein, we introduce a newly engineered, potent, cell-permeable peptide inhibitor, with a 10-fold selectivity for JNK2 over JNK1 and JNK3 ($K_i \sim 90$ nM). This peptide inhibits breast cancer cell migration in a JNK2-specific manner, as evidenced by migration studies in $JNK2^{-/-}$ and $JNK2^{+/+}$ cell lines. (Read Kaoud's article, DOI: 10.1021/cb200017n)

Yuichiro Koide

Image courtesy of Yuichiro Koide.

Current position: Graduate School of Pharmaceutical Sciences, The University of Tokyo, Ph.D. Student with Prof. Tetsuo Nagano

Education: The University of Tokyo, B.S. in Pharmaceutical Sciences, 2006; The University of Tokyo, Ph.D. in Pharmaceutical Sciences, 2011

Nonscientific interests: Playing and watching sports (baseball, badminton, football, etc.), traveling abroad, reading books in café

My research interests at the University of Tokyo have been focused on the development of novel smart fluorescence probes and photosensitizing drugs for elucidating biological phenomena and also for diagnosis and treatment of disease. In my Ph.D. course, I focused on a new kind of fluorescent dyes, 10-substituted rhodamines, which contain atoms other than oxygen at the 10 position of the xanthene chromophore, and I have further developed novel functional molecules based on the 10-substituted rhodamines. As part of my research, in this paper we report a strategy for the development of near-infrared (NIR) fluorescence probes based on group 14 rhodamines utilizing photoinduced electron transfer (PeT). We believe that this strategy should be a general platform for a wide range of NIR light-emitting fluorescent probes. (Read Koide's article, DOI: 10.1021/cb1002416)

Dana Kuruvilla

Image courtesy of Ruben Garcia-Ordonez.

Education: B.S. in Biological Sciences, Florida Atlantic University; M.S. in Biology-Recombinant DNA Technology, New York University. Advisors: Christine Rushlow, Ph.D. (NYU), Patrick R. Griffin, Ph.D. (Scripps Florida)

Nonscientific interests: Playing piano or violin, reading, learning languages, cooking

My scientific work utilizes biochemical assays to determine the mode of action of nuclear receptor modulators. One such assay is built around the use of Time-Resolved FRET Lanthascreen technology to elucidate the effect ligands have on cofactor interaction (coactivator or corepressor) with various nuclear receptors. In the FRET assay, a donor fluorophore is brought within proximity of an acceptor fluorophore, causing the donor to excite and transfer energy to the acceptor. Binding of a ligand to the nuclear receptor induces a conformational change in its ligand binding domain, which changes the affinity of receptor for its cofactor peptide and affects FRET signal. In this paper, the TR-FRET assay helped corroborate that the novel ligand SR-0065 enhanced interaction between RARg and its corepressor SMRT. (Read Kuruvilla's article, DOI: 10.1021/cb100396s)

Shreya Mitra

Image courtesy of Tamer Kaoud.

Current Position University of Texas, MD Anderson Cancer Center, Department of Systems Biology, Post-Doctoral Researcher with Dr. Gordon B. Mills, 2009−present

Education: University of Calcutta, India, B.S. in Zoology in 1996; University of Calcutta, India, M.S. in Marine Biology, 1999; University of Texas at Austin, College of Pharmacy, Ph.D. 2009 with Dr. Carla L. Vandenberg

Non-Scientific Interests Rowing (crew), running and biking outdoors, playing the piano, and playing with brushes and colors

Currently, I am studying breast cancer progression using a Systems Biology approach, combining molecular biology along with high-throughput arrays and computational models. My key question is how abnormal, subcellular trafficking of cell membrane-bound receptors (as frequently observed in cancer cells) contribute to oncogenesis. Previously, as a graduate student in Dr. Carla Van Den Berg's lab at UT Austin, I found that a specific isoform of cJun N-terminal Kinase JNK, namely, JNK2, is critical for mammary cancer cells to gain "motility", a major hallmark of metastasis, the latter itself being the leading cause for breast cancer-related deaths. However, the JNK inhibitors commercially available target all the three isoforms of JNK, which could actually prove detrimental for patients since JNK isoforms can have opposing role in tumorigenesis. The work published here resulted from our fantastic collaboration with a leading protein biochemistry group led by Dr. Kevin Dalby, especially his outstanding graduate student, Tamer Koud. We developed a JNK2 specific, cell permeable peptide inhibitor that antagonizes only JNK2-mediated oncogenic effects on murine mammary cancer cells. This project allowed me to incorporate various aspects of therapeutics and drug development to my cancer biology background. We hope that our work will find application not only in cancer but also in other JNK2-mediated clinical conditions and pave way for targeted therapy. (Read Mitra's article, DOI: 10.1021/cb200017n)

Kamesh Narasimhan

Image courtesy of Devasia Arun George.

Current position: Ph.D. student, National University of Singapore, Department of Biological sciences, working under the supervision of Dr. Ralf Jauch and Dr. Prasanna Kolatkar at the Genome Institute of Singapore, Biopolis

Education: B.Tech Biotechnology (2001−2005), PSG college of Technology, Coimbatore, India; M.S. in Biotechnology, Indian Institute of Technology, Madras, India

Nonscientific interests: Playing guitar, capoeira beginner, amateur star-gazer

My long-term research interest is to leverage the advances made in the field of high-throughput transcription factor binding studies and combine it with the power of structural biology/structural bioinformatics approaches toward providing a mechanistic understanding of transcriptional regulation. I am also interested in modulation of the "undruggable" transcription factor class of proteins using small molecules with applications in cancer and stem-cell biology. In this published study, I explored the chemical tractability of the transcription factor Sox2 with an aim to identify molecules capable of modulating transcription by interfering with protein−DNA interactions. A Dawson polyoxometalate was identified, whose mechanism of abrogating Sox2 DNA binding activity provides a number of physicochemical pointers for the systematic development of inhibitor molecules capable of targeting specific transcription factor-DNA complexes. (Read Narasimhan's article, DOI: 10.1021/cb100432x)

Margot G. Paulick

Image courtesy of Jeff Sullivan.

Current position: Union College, Department of Chemistry, Assistant Professor

Education: University of Wisconsin, Madison, B.S. in Chemistry, 2000; University of California, Berkeley, Ph.D. in Chemistry with Carolyn R. Bertozzi, 2006; Stanford University, postdoctoral researcher with Matthew Bogyo, 2007−2010

Nonscientific interests: Running, hiking, camping, skiing, anything outdoors

My research interests focus on the use of chemistry to study biological molecules and systems. In this work, we synthesized activity-based probes for cathepsin X, a cysteine protease that may be involved in cancer, inflammation, and aging and

degenerative conditions of the brain. We then used these fluorescent probes to label active cathepsin X in complex lysates, whole cells, and *in vivo*. The chemical tools developed in this study will be valuable for the study of cathepsin X and its biological functions both *in vitro* and *in vivo*. Currently, my lab is interested in synthesizing modified glycans for the preservation and understanding of biological systems. (Read Paulick's article, DOI: 10.1021/cb100392r)

Laura Silvian

Image courtesy of Laura Silvian.

Current Position Biogen Idec, Department of Drug Discovery, Head of Crystallography

Education: Yale University, Ph.D. with Dr. Tom Steitz 1997; Postdoctoral Research at Harvard Medical School, Dr. Tom Ellenberger 1998–2002

Nonscientific interests: Historical fiction, playing with kids, gardening

My research is aimed at using structures generated by X-ray crystallography to make rationally designed drugs (biologics or small molecules) with good pharamaceutical properties or with unique potency and selectivity. Specifically, Biogen Idec is working on targets in neurology, immunology, and hemophilia. I am also interested in triaging compounds for mechanism of action after initial high-throughput screens have produced small molecule hits. This process often reveals compounds binding at protein–protein interaction interfaces, as was the case with the CD40L target, and the challenge is to determine whether this compound can be made potent and specific. The ultimate goal of this work is to design unique, specific compounds based on an initial glimpse of their preferred binding modes, conformations, and milieu to aid in producing therapeutics for human disease. (Read Silvian's article, DOI: 10.1021/cb2000346)

Olga Sizova

Image courtesy of Olga Sizova.

Current position: Zelinsky Institute of Organic Chemistry, Russian Academy of Sciences, Kochetkov Laboratory of Carbohydrate Chemistry, Staff Researcher with Prof. Yuriy A. Knirel

Education: Moscow State Pedagogical University, M.Sc. in Chemistry and Biology, 1983; Zelinsky Institute of Organic Chemistry, Moscow, Ph.D. in Organic Chemistry with Prof. Vladimir N. Shibaev, 1990; University of Dundee, Division of Biological Chemistry & Drug Discovery, The Wellcome Trust Biocenter, Postdoctoral Researcher with Prof. Mike Ferguson, 2001, 2003, 2005, 2006, 2008, 2010

Nonscientific interests: Music, skiing, traveling. I also like dancing, cooking, and socializing with friends

My research at Dundee University focuses on studying glycosyltransferases involved in the biosynthesis of *Leishmania* lipophosphoglycan (LPG). LPG is the most abundant biopolymer on the surface of *Leishmania* parasite. It contains a polymeric phosphoglycan region consisting of $-6)$-Gal-$(\beta 1\rightarrow 4)$-Man-$(\alpha 1$-PO_3H- repeats linked to a *lyso*-alkylphosphatidylinositol anchor by a glycan core. In the present study we established an assay for the LPG repeats pathway elongating β-D-galactosyltransferase (eGT) and branching β-D-galactosyltransferase (bGT) in a *Leishmania* cell-free system using chemically prepared LPG fragments as acceptor substrates. The findings about the substrate specificity of eGT from *L. donovani* and *L. major* and bGT from *L. major* will be useful for future design of enzyme inhibitors. Currently, I'm solubilizing and purifying the eGT activity. Proteomics of the eGT is the final goal. (Read Sizova's article, DOI: 10.1021/cb100416j).

Airong Song

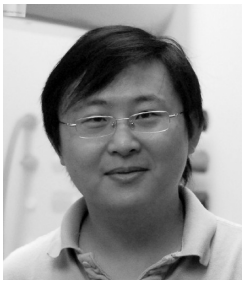

Image courtesy of Airong Song.

Current position: University of California-San Diego, Department of Bioengineering, Postdoctoral researcher with Prof. Karen Christman

Education: Nanjing University, China, B.S. in Chemistry, 2004; Stony Brook University, Ph.D. in Polymer Chemistry with Prof. Nicole Sampson & Kathlyn Parker, 2010

Nonscientific interests: Hiking, playing Texas Hold'em

My research at Stony Brook University was focused on the mechanism and regio- and stereochemistry studies of ring-opening metathesis polymerization (ROMP) of 1-substituted cyclobutenes, investigation of alternating ROMP (AROMP), and development of antibacterial polymers. In this paper, we demonstrate that spacing between side chains that present positively charged groups along polymer backbone is critical for their antibacterial activity. More recently, my research interests are aimed at developing injectable antibacterial and cell-adhesive polymer-based hydrogels. (Read Song's article, DOI: 10.1021/cb100413w)

David Taylor

Image courtesy of Jennifer Cuerrier.

Current Position École Polytechnique Fédérale de Lausanne, Brain Mind Institute, Laboratory of Functional Neurogenomics (LNGF), Postdoctoral Researcher with Prof. Ruth Luthi-Carter

Education: University of Guelph, B. Sc. in Biomedical Toxicology, 2001; McGill University, Ph.D. in Pathology with Heather Durham and John Richardson, 2006

Nonscientific interests: Music, travel, sports

My research career has primarily focused on exploring therapeutic avenues for treating neurodegenerative diseases, with a particular focus on Huntington's disease and amyotrophic lateral sclerosis. I have always been interested in augmentation of the brain's natural defense mechanisms, which combined with recent work on manipulation of sirtuin pathways in neurons has translated into an emerging passion for nutritional neuroscience. Through collaborative postdoctoral work with Nestlé Research, it has become apparent that active components of food extracts can regulate gene expression pathways that preserve the healthy lifespan of neurons. Not only has this yielded the discovery of completely novel systems for influencing brain aging, but the implications for discovery of new therapeutic compounds and targets for prevention of neurodegeneration through readily available nutritional modification is extraordinary. (Read Taylor's article, DOI: 10.1021/cb100376q)