acs chemical biology

Introducing our AUTHORS

Thomas M. Bridges

Image courtesy of Thomas M. Bridges.

Current position: Vanderbilt University Medical Center, Department of Pharmacology, Ph.D. candidate with Profs. Craig Lindsley and Jeffrey Conn
Education: Wheaton College, B.S. in biology, 2005
Nonscientific interests: Boating, reading

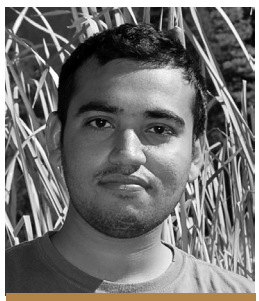
The most common molecular targets of small-molecule therapeutics, G-protein-coupled receptors (GPCRs), have a rich history of characterization by numerous biochemical and pharmacological techniques and models. Over time, classical modes of GPCR modulation have given way to more advanced allosteric approaches, which exploit binding of a compound to a non-orthosteric site and often carry advantages over traditional orthosteric ligand binding. In our article, we reviewed the fundamentals of GPCRs in terms of their structure, function, and model-conceptualization, with an emphasis on allosteric ligands and non-traditional pharmacological dynamics. The clinical relevance and the insight into basic science provided by novel small-molecule GPCR modulators, in particular those that bind allosterically, remain a central focus of modern chemical biology and drug discovery. (Read Bridges' article on p 530.)

Pascal D. Fortin

Image courtesy of Grace Law.

Current position: Novartis Institutes for Biomedical Research, Inc., Oncology, Research Investigator
Education: Université Laval, B.Sc. in biochemistry, 1999; University of British Columbia, Ph.D. in microbiology with Prof. Lindsay D. Eltis, 2005; Harvard Medical School, Department of Biological and Molecular Pharmacology, postdoctoral researcher with Prof. Christopher T. Walsh, 2006–2008
Nonscientific interests: Rock climbing, surfing, playing piano

During my Ph.D. work, I studied biocatalysts involved in the catabolism of aromatic molecules. After learning about microbial strategies employed to break down small molecules, I became interested in the enzymology behind natural products biosynthesis. My postdoctoral work led to the characterization of a novel transglutaminase homolog involved in the biosynthesis of antibiotics. The current article describes the promiscuity of that biocatalyst and how its activity is channeled, through the action of enzymatic partners, toward the synthesis of specific antibiotics. I am currently pursuing drug discovery efforts at Novartis, where my research focuses on the enzymatic circuitry underlying cancer. (Read Fortin's article on p 542.)

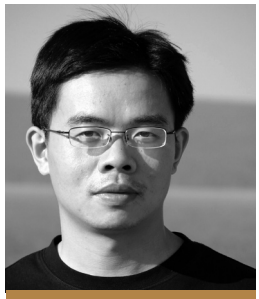


Harshal A. Chokhawala

Image courtesy of Harshal A. Chokhawala.

Current position: University of California–Berkeley, Energy Biosciences Institute and the Department of Chemical Engineering, Postdoctoral Scholar with Prof. Douglas S. Clark
Education: Institute of Chemical Technology (ICT, formerly UDCT), India, B. Tech., 2003; University of California at Davis, Department of Chemistry, Ph.D. with Prof. Xi Chen, 2008
Nonscientific interests: Photography, cooking, traveling

Sialic acids are a family of >50 structurally diverse nine-carbon acidic monosaccharides primarily found as terminal residues on glycolipids and glycoproteins on mammalian cell surfaces. As the outermost carbohydrate residues, they serve as critical recognition elements and play important roles in many physiological and pathological processes through their interaction with sialic-acid-recognizing proteins or enzymes. My doctoral studies have focused upon developing chemoenzymatic synthesis and high-throughput screening methods to better understand how the structural diversity of the sialic acid moiety, the glycosidic linkage, and the underlying glycan affect the binding or activity of sialic-acid-recognizing proteins. (Read Chokhawala's article on p 567.)



Shengshu Huang

Image courtesy of Tingting Qi.

Current position: University of California at Davis, Department of Chemistry, Ph.D. candidate with Prof. Xi Chen
Education: University of Science and Technology of China, B.S in chemical physics, 2004
Nonscientific interests: Traveling, movies, poker

My research interest is trying to understand carbohydrate-related biological processes in the areas of cancer, inflammation, and bacterial infection. First, my interest focuses on the synthesis of homogenous carbohydrates by using the combination of organic and enzymatic methods. With those complicated synthetic carbohydrates in hand, I can study their structure-related activities toward different bacterial and viral proteins. Another interest of my research is protein X-ray structure-based mechanistic and mutagenesis studies of carbohydrate biosynthetic enzymes. Currently, I am systematically synthesizing naturally occurring sialyltransferase acceptors and their sialylated product. I am also using X-ray chromatography to study *Pasteurella multocida* sialyltransferase–oligosaccharides interactions. (Read Huang's article on p 567.)

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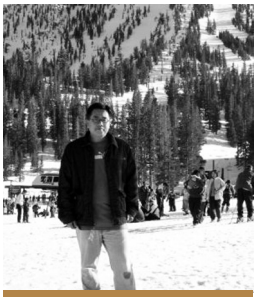

Kam Lau

Image courtesy of Shengshu Huang.

Current position: University of California at Davis, Department of Chemistry, Ph.D. candidate with Prof. Xi Chen
Education: Brigham Young University Provo, B.S. in biochemistry, 2006
Nonscientific interests: Fishing, hiking, reading, movies

Sialidases, or neuraminidases, are a family of exoglycosidases that catalyze the cleavage of terminal sialic acids from sialosides and sialoglycoconjugates in nature. They have been found in viruses, bacteria, and animals. Viral sialidases have been suggested to play key roles in viral infection by facilitating the release of the viral particles from infected host cells. Human sialidases are related to sialic acid metabolism and a number of diseases such as sialidosis and cancer. It has been postulated that bacteria sialidases are involved in bacterial invasion and colonization. My research focuses on performing substrate profiling for neuraminidases from influenza viruses using sialoside libraries containing naturally occurring and non-natural sialic acid modifications. A one-pot three-enzyme approach has been established in the Chen group for highly efficient synthesis of sialosides. (Read Lau's article on p 567.)

Micah J. McCauley

Image courtesy of Thayaparan Paramanathan.

Current position: Northeastern University, Boston, Department of Physics, Postdoctoral Scholar with Prof. Mark C. Williams
Education: University of Illinois, B.A. in physics, 1992; Colorado State University, Ph.D. in physics, 2001
Nonscientific interests: Traveling, running, history

My research interests are focused on applying single-molecule techniques to probe nucleic acid–protein interactions. I use optical tweezers to observe the effects of nucleic acid binding proteins on force-induced melting of DNA. In this article, I observed that the polymerase subunit, α, of the *E. coli* DNA replication complex binds both double-stranded and single-stranded DNA. We were able to localize these two different binding activities to two distinct regions of the protein. I have applied single-molecule optical tweezers techniques to understand other nucleic acid interactions, including those of HMG proteins. I have also probed the mechanisms of DNA intercalators, which allowed discrimination between the intercalation mode of binding and other binding modes. Applying optical tweezers to nucleic acid–ligand interactions provides fundamental insights into the biology and chemistry of these systems. (Read McCauley's article on p 577.)

Jana Sefcikova

Image courtesy of Mohammad Tehrani.

Current position: Northeastern University, Boston, Department of Chemistry and Chemical Biology, Postdoctoral Scholar with Prof. Penny J. Beuning
Education: Comenius University, Bratislava, Slovakia, master in biophysics and chemical physics with Dr. Peter Kvasnicka, 1993, and master in physics education, 1994; University of Michigan, Ann Arbor, Ph.D. in physical chemistry with Prof. Nils G. Walter, 2006
Nonscientific interests: Reading, gardening, jewelry making, traveling

My research interests focus on understanding the functions of DNA replication complexes and how these complexes deal with damaged DNA. In this article, we showed that distinct domains of *E. coli* DNA polymerase III bind double-stranded and single-stranded DNA, respectively. I showed that the replication activity of DNA polymerase III was unperturbed under the various conditions at which we observed binding to DNA. My postdoctoral research also explores functional and structural properties of Y family DNA polymerases that have the specialized ability to copy damaged DNA. I am investigating the conformational dynamics of DNA polymerases by complementing my experimental work with extensive modeling and simulation studies. The goal of my multifaceted approach is to fully characterize the mechanism of the DNA-damage bypass synthesis. (Read Sefcikova's article on p 577.)

Jamie P. Ellis

Image courtesy of Molly Isola.

Current position: University of Wisconsin–Madison, Department of Chemistry, Ph.D. candidate with Prof. Silvia Cavagnero
Education: University of California–Berkeley, B.S. in chemistry, 2003
Nonscientific interests: Road biking, traveling

I am very interested in the application of physical, chemical, and biological methods to understand the pathways of *in vivo* protein folding at high resolution. Specifically, my graduate work has focused on the segmental motions and folding of proteins during protein translation on the ribosome. This work explores the dynamics of ribosome-bound nascent polypeptides by dynamic depolarization, a high-resolution time-resolved fluorescence technique in the frequency domain. This powerful technique is able to explicitly resolve local and global motions. The spectroscopic method captures evidence for the presence of an independent conformation of the ribosome-bound nascent protein. (Read Ellis's article on p 555 and Point of View on p 527.)