ACS chemical biology

Introducing Our Authors

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LISA ANDERSON

Image courtesy of Christopher Oulton.

Current position: Ph.D. student at the University of California, Davis in the Department of Chemistry with a Designated Emphasis in Biotechnology; Advisor: Dr. Annaliese K. Franz

Education: B.A. in Chemistry, Albion College, Michigan, 2009, Advisor: Dr. Cliff Harris

Nonscientific interests: Running, sports, the outdoors, and trombone

My research interests encompass advancing renewable energy technologies with an emphasis on microalgae as a biofuel feedstock. Our recent article in *ACS Chemical Biology* discusses a phenotypic screen with microalgae to identify modulators of growth and lipid productivity in microplates and larger scale cultures. I am excited to further probe the mode of action of small molecules such as kinase inhibitors and antioxidants in microalgae and the opportunity that our results provide to investigate lipid metabolism and oxidative stress pathways. My other projects involve analyzing lipid composition and monitoring the catalytic conversion to biodiesel by NMR spectroscopy. Hopefully our findings will provide a new angle for microalgae biofuel development and aid in developing a renewable and sustainable petroleum replacement. (Read Anderson's article, DOI: 10.1021/cb300573r)

AMIN JAHROMI

Image courtesy of Amin Jahromi.

Current position: University of Illinois at Urbana−Champaign, Center for Biophysics, Ph.D. candidate under the supervision of Professor Steven C. Zimmerman

Education: Tehran University of Medical Sciences, School of Medicine, M.D., 2007; University of Tehran, School of Chemistry, M.S. in Organic Chemistry, 2007; University of Tehran, School of Chemistry, B.S. in Chemistry, 2004

Nonscientific interests: Religion, table tennis, football

My research goal is to discover a potential therapeutic agent for myotonic dystrophy. Myotonic dystrophy is the most common adult muscular dystrophy without any treatment at this time. In the current study we started from a previously developed *in vitro* hit and transformed it to a bioactive lead ligand through conjugation with a polyamine side-chain. We used SPR to evaluate the activity of this lead molecule. This is the first ligand that was directly proved to be bioactive through a novel live-cell imaging. This ligand was able to disperse MBNL1 nuclear foci in real time over a period of 7 h in live myotonic dystrophy model cells. Animal studies on this ligand will be conducted in due course. (Read Jahromi's article, DOI: 10.1021/cb400046u)

RENA MIZRAHI

Image courtesy of Kathy Lee.

Current position: University of California, Davis, Chemistry Department, Ph.D. candidate under the guidance of Prof. Peter Beal

Education: Washington University in St. Louis, B.A. in Chemistry, 2005

Nonscientific interests: Traveling, reading, cycling, scuba diving

My research focuses on the mechanism and function of a family of enzymes called ADARs (adenosine deaminases acting on RNA) that catalyze a type of RNA editing. This type of RNA editing can change codons and therefore the amino acid sequence of a protein. Many new editing sites have recently been discovered but their biological consequences are not well understood, so I have worked on developing new tools to study this process. These tools include assays as well as molecular tools such as the inhibitors described in this paper in *ACS Chemical Biology*. We hope to use these inhibitors and others like them to better understand the biological effects of altered editing. (Read Mizrahi's article, DOI: 10.1021/cb300692k)

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MASHA G. SAVELIEFF

Image Courtesy of Masha Savelieff.

Current position: Postdoctoral Researcher at the University of Michigan, Life Sciences Institute

Education: American University of Beirut, B.Sc. in Chemistry (2000) with Professor Ulrich Kortz; American University of Beirut, M.Sc. in Chemistry (2002) with Professor Ulrich Kortz; University of Illinois at Champaign-Urbana, Ph.D. in Chemistry (2008) with Professor Yi Lu

Nonscientific interests: Traveling, cooking, drawing, reading, yoga

Alzheimer's disease (AD) is a progressive neurodegenerative condition with multiple underlying pathological factors. Our research explores the bioinorganic aspect of AD; we seek to understand the relationship between three of these underlying factors, amyloid-β (Aβ), metal ions, and reactive oxygen species (ROS), through the design of small, bifunctional molecules with moieties for Aβ and metal ion interaction. The goal is to form ternary metal−Aβ−compound complexes, thereby attenuating the toxicity metal−Aβ oligomers. Antioxidant capability is also designed into these molecules to simultaneously combat ROS. In addition to small molecule design, the role of metalloproteins in the aggregation properties of Aβ is being explored since numerous metalloproteins have been found coaggregated with Aβ. Our review in *ACS Chemical Biology* provides a tutorial view on recent advances on three proposed key players in AD, Aβ, tau protein, and metal ions, and the interconnections between them. We suggest that a multifaceted approach to AD may be necessary to develop effective therapeutics. (Read Savelieff's article, DOI: 10.1021/cb400080f)

MARIA SASSANO

Image courtesy of Betsy Clarke.

Current position: Research Associate, University of North Carolina at Chapel Hill

Education: College of Charleston, B.S. in Biochemistry, B.A. in Chemistry, 2004; University of North Carolina at Chapel Hill, Ph.D. in Medicinal Chemistry, 2009, Advisor: Michael B. Jarstfer; University of North Carolina at Chapel Hill, postdoctoral training, Advisor: Bryan L. Roth

Nonscientific interests: Visiting friends and family, traveling, and reading.

My current interests focus on the development of new and improved drugs and the investigation of their polypharmacology (read DOIs 10.1038/nature11691, 10.1021/jm300603y, and 10.1073/pnas.1104807108). One part of my research includes the high-throughput screening aspect of the drug discovery process as the key first step to identify potential leads that can result in promising, new drugs. In addition, I have developed a novel screening technique that allows testing at all receptors in parallel (read DOI 10.1038/nmeth.2324). This technology is being used to unravel the polypharmacology of marketed drug in addition to discover cognate ligands for orphan receptors. (Read Sassano's article, DOI: 10.1021/cb400103f)

ROBERT URICH

Image courtesy of Robert Urich.

Current position: Lonza Group AG, CH-Visp, Quality Assurance Project Manager

Education: University of Dundee, College of Life Sciences, Ph.D. in Medicinal Chemistry, 2011, Advisers: Dr. Ruth Brenk and Prof. Dr. Paul Wyatt; University of Tübingen, Diplom in Chemistry, 2007, final year project Advisor: Dr. Christian Peifer

Nonscientific interests: Alpine sports, juggling and running

My Ph.D. research was focused on the design, synthesis, and evaluation of novel protein kinase inhibitors (PKs). PKs regulate many fundamental cellular processes such as gene expression and protein synthesis by biomolecular phosphorylation. Therefore, human PKs are attractive drug targets. PKs are the second most exploited group of drug targets for many serious human diseases including cancer, diabetes, and Alzheimer's disease. As described in our manuscript, we have recently established a *de novo* design approach for novel PK inhibitors. Using a wide range of methods at the interface of chemistry and biology, *e.g.*, structure-based design, chemical synthesis, X-ray crystallography, and biological profiling, the approach was validated. Using this approach, we have identified a number of inhibitors with good binding efficiency for a range of kinases with therapeutic relevance. (Read Urich's article, DOI: 10.1021/cb300729y)

RAJARAM VENKATESAN

Image courtesy of Bhargav Prabhakar.

Current position: University of Oulu, Department of Biochemistry, Oulu, Finland, Postdoctoral Researcher in Prof. Rik K. Wierenga's Group since February 2008

Education: Pondicherry University, Pondicherry, India, M.Sc. Chemical Sciences, 2001; Indian Institute of Science, Bangalore, India, Ph.D. in Structural Biology, 2007, Advisor: Prof. M.R.N. Murthy

Nonscientific interests: Movies, reading, and traveling

For my Ph.D., I worked on pyridoxal 5′-phosphate (PLP) dependent enzymes which catalyze a wide variety of reactions involving amino acids. The research focused on the structure–function relationship through protein crystallography and enzyme activity studies. For example, the reaction mechanism and role of many active site residues were elucidated through these studies for the enzyme Serine hydroxymethyltransferase. I have continued my research in structural enzymology as a postdoctoral fellow with the enzyme complexes involved in the fatty acid metabolism of human mitochondria and *Mycobacterium tuberculosis* (Mtb). My article in *ACS Chemical Biology* concerns the structure of the Mtb trifunctional β-oxidation complex. This is an important article because the lipid metabolism of mycobacteria, in general, and this class of enzymes, in particular, are poorly characterized. Our studies highlight the unique structural features of this complex including its altered assembly and a possible substrate channeling path. In future, this unique assembly could possibly be exploited for therapeutics against Mtb. I will continue my research with more such multisubunit/multifunctional enzymes from human and disease causing organisms. (Read Venkatesan's article, DOI: 10.1021/cb400007k)

DAHLIA WEISS

Image courtesy of Jack Wang.

Current position: University of California, San Francisco, Dept. of Pharmaceutical Chemistry, NIH Postdoctoral fellow in Dr. Brian Shoichet's Lab since August 2009

Education: University of Tel Aviv, Israel, B.S. in Chemistry and Biology 2000; Stanford University, Ph.D. in Chemistry 2009, Advisor: Dr. Michael Levitt.

Nonscientific interests: Traveling, yoga, cycling, friends!

I am interested in exploring the limits of structure-based ligand design for G-protein Coupled Receptor (GPCR) targets. GPCRs are the protein family most frequently targeted by drugs, representing more than 30% of all marketed therapeutics. As the objects of intense drug development for the past 60 years, structurally, all drug design has happened "in the dark". Beginning in 2007, crystallographic structures of several pharmacologically important GPCRs have been determined. I am fascinated to see how these newly emerging GPCR structures will change the process of drug design, and I believe structure-based design will prove to be especially important. In this manuscript we find out how the first active GPCR structure influences the outcome of a prospective virtual screen. (Read Weiss' article, DOI: 10.1021/cb400103f)

DIANA WONG

Image courtesy of Jim Hughes.

Current position: Ph.D. Candidate in Analytical Chemistry at the University of California Davis, Department of Chemistry; Research Advisor: Annaliese K. Franz

Education: University of California, San Diego, Department of Chemistry and Biochemistry; B.S. Chemistry, 2003

Nonscientific interests: Teaching my dog new tricks

My research involves developing analytical tools and identifying chemical triggers to monitor and increase intracellular lipid production in microalgae for biofuel applications. I developed a high-throughput method to analyze intracellular lipid productivity in microalgae using a lipophilic dye, Nile Red. The challenge is getting Nile Red to penetrate through microalgae's thick cell walls. This method allowed us to identify compound classes that help us understand lipid pathways in algae. We also identified compounds that are affordable and safe for industrial scale production. My other research interests combine analytical tools such as fluorescence microscopy (confocal) to study the storage of lipid bodies and to determine the optimal harvest date in different microalgae strains. I believe this research opens ideas for advancing algal biofuels to commercialization. (Read Wong's article, DOI: 10.1021/cb300573r)

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