The American Society of Biochemistry and Molecular Biology has awarded Lila Gierasch the 2014 Mildred Cohn Award in Biological Chemistry for her extensive work in protein folding, structure and function. This award recognizes scientists who have made substantial advances in the field of biological chemistry through the use of innovative physical methods.

Gierasch’s early research into the relationship between amino-acid sequence and peptide and protein structure resulted in the development of fundamental principles for reverse-turn conformation features as well as the establishment of several biophysical methods commonly used today to characterize protein turns, such as nuclear magnetic resonance, quantitative nuclear Overhauser effects, circular dichroism and computational modeling. This research was also the basis for Gierasch’s later research with Gru RH analogs and the use of peptide fragments to examine protein recognition motifs. Gierasch also studied how protein folding occurs within the cell, using transfected nuclear Overhauser effect, or TNSE, methods to show how chaperone proteins recognize the folded state of a protein substrate.

Some of Gierasch’s more recent work has been focused on developing and testing experimentally a computational model of cellular protein homeostasis in E. coli in collaboration with Evan Powers of The Scripps Institute. This collaboration has resulted in FoldEco, an online modeling program used to examine how protein folding in the cell is facilitated by chaperone and degradation networks. Gierasch’s lab also uses fluorescent reporters to study how protein sequence may affect protein aggregation and folding.

Gierasch earned her A.B. in chemistry in 1970 from Mount Holyoke College in South Hadley, Mass., and earned a Ph.D. in biophysics from Harvard University in Cambridge, Mass., from the lab of Elkan R. Blout in 1975.

Today Gierasch is a distinguished professor at the University of Massachusetts Amherst. She has mentored many undergraduate and graduate students and postdoctoral fellows, served on many editorial advisory boards, and played leadership roles in several scientific societies.

“Gierasch is a rigorous biophysical chemist, but unlike most chemists who avoid complexity and prefer chemistry and biophysical methods to the study of peptides and their role in biology as well as protein folding to the study of proteins and their role in chemistry and biophysical methods, Gierasch has studied the cell, using transferred nuclear Overhauser effect, or trNOE, methods to examine how protein folding in the cell is facilitated by chaperone and degradation networks. Gierasch’s lab also uses fluorescent reporters to study how protein sequence may affect protein aggregation and folding. Gierasch earned her A.B. in chemistry in 1970 from Mount Holyoke College in South Hadley, Mass., and earned a Ph.D. in biophysics from Harvard University in Cambridge, Mass., from the lab of Elkan R. Blout in 1975.

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“The key questions are: what is the attachment of fatty acids to proteins, and how does it affect protein stability? These are the kinds of questions that would answer the key questions underlying a biological system.

“My laboratory’s contributions reflect the energy, creativity, enthusiasm, hard work and dedication of the wonderful students and postdocs I have worked with through the years. I thank them! In addition, thanks to many collaborators who worked with us to tackle daunting problems, who elevated our science and who shared the pleasures of garnering meaningful results.”

— LILA GIERASCH

The American Society for Biochemistry and Molecular Biology has named Sandra Hofmann at the University of Texas Southwestern Medical Center at Dallas the winner of the Avanti Award in Lipids.

Hofmann, a professor in the interactions department at UT-Southwestern, focuses her research on fundamental questions in lipid metabolism and protein lipidation, which has led to novel insights into the treatment of human diseases.

When Hofmann set up her own lab at UT-Southwestern, the enzymology of palmitoylation, which is the attachment of fatty acids to proteins, was unknown. Hofmann’s research led to the purification of palmitoyl protein thioesterase, or PPT1, an enzyme that removes these fatty acids from proteins. This was the first enzyme identified with a role in protein palmitoylation. The PPT1 gene eventually was mapped to a region in chromosome 1p, which also had been linked to infantile neuronal ceroid lipofuscinosis, or INCL, a devastating neurodegenerative disease in children. Her training as a clinician-scientist helped her make this link and discover deficiencies in PPT1 cause INCL.

“Hofmann’s research is a superb example of how tackling a fundamental basic science question can lead to discoveries of great clinical significance,” explains Maurice Linder of Cornell University, who nominated Hofmann for the award.

Hofmann later developed the first mouse model of INCL. That mouse model allowed her to develop enzyme-replacement therapy. The addition of intravenous recombinant PPT1 has led to modest improvements in mice and provides the basis for further studies.

Robert Descheres of the University of South Florida says that “Hofmann’s work is a model of translational science at its best” and that he even uses an example when teaching graduate and medical students.

Hofmann earned her B.A. in chemistry with the highest distinction at the University of Virginia in Charlottesville. She proceeded to earn an M.D. and Ph.D. at Washington University School of Medicine in St. Louis under the mentorship of Philip Majerus. In the Majerus lab, she made seminal contributions to the enzymology of phosphatidylinositol hydrolysis. That work provided her experience in the isolation and characterization of novel enzymes.

She left Washington University to pursue postdoctoral training in the laboratory of Nobel laureate Michael Brown and Joseph Goldstein at UT-Southwestern. Hofmann has since remained at UT-Southwestern, where she has risen through the ranks to professor.

In recognition of her research, Hofmann was inducted as a member of the American Society for Clinical Investigation and the American Association of Physicians. She also chairs the Scientific Advisory Board for the Barret Disease Support and Research Association, which allows her to have a sustained influence on the field of disorders of the nervous system.

Hofmann will receive her award at San Diego in the Experimental Biology 2014 meeting, where she will deliver an award lecture. Her lecture will be at 8:30 a.m. Wednesday, April 30, in Room 6A of the San Diego Convention Center.

I am honored to have received this award and am grateful to my colleagues for the nomination and to Avanti Polar Lipids for their support of this award. Lipid enzymology is a difficult and rewarding field pioneered by a number of courageous individuals and it has been a privilege to continue to work in this great tradition. It is particularly exciting to see protein lipidation being recognized. The potential for new discovery in this area is enormous. It would not surprise me to be treating future patients with cancer or neurological disorders with protein palmitoylation inhibitors in the same way that protein kinase inhibitors are used today.

— SANDRA HOFMANN

I am thrilled to be chosen to receive the Mildred Cohn Award from ASBMB. She was one of my heroes; her contributions reflect her deep physical understanding, her experimental boldness and her willingness to deploy any biophysical approach that would answer the key questions underlying a biological system. My laboratory’s contributions reflect the energy, creativity, enthusiasm, hard work and dedication of the wonderful students and postdocs I have worked with through the years. I thank them! In addition, thanks to many collaborators who worked with us to tackle daunting problems, who elevated our science and who shared the pleasures of garnering meaningful results.

— LILA GIERASCH

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