WPI CHEMISTRY & BIOCHEMISTRY

Department of Chemistry and Biochemistry
Worcester Polytechnic Institute

Thursday, January 22th, 2026

12:00 PM

Gateway Park 1002

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"Chemical Tools to Decode the Biological Roles of Non-Enzymatic Post-Translational Modifications."

The human genome contains approximately 20,000 linear protein-encoding sequences; however, the number of proteoforms within the cell is dramatically expanded to over 1,000,000 due to the vast array of chemical reactions that can occur on proteins. Such reactions are termed post-translational modifications. To date, over 400 post-translational modifications have been discovered, yielding an open frontier for deciphering their roles in health and disease. Here, I describe our efforts to study post-translational modifications driven by reactions between amino acid side chains and various reactive small-molecule metabolites, known as non-enzymatic post-translational modifications. Chemoproteomic methodologies are showcased as powerful approaches that enable residue-level resolution of non-enzymatic post-translational modifications on their target proteins, thereby facilitating discovery of their biological consequences. Collectively, this body of work aids in decoding the chemically complex post-translational modification landscape to uncover its impact on human health and disease.

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