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JUN OHATA, Ph.D NORTH CAROLINA STATE UNIVERSITY WEDNESDAY MAY 7th, 2025 @4:00 219 BRL

ORGANIC CHEMISTRY SEMINAR

Protein bioconjugation and chemical evolution in nonaqueous systems

Selective and efficient reactions of polypeptides in living systems are enabled by a range of enzymes and molecular machinery even in a complex mixture of cellular components. During the past decades, nonenzymatic reactions or chemical modification of polypeptides have been extensively studied by addressing challenges of aqueous chemical transformation of the polyfunctional biomolecules for various purposes such as creation of therapeutic agents as well as investigation of biomolecular processes in many contexts. Nonetheless, realization of selective, effective chemical reactions of polypeptides in aqueous media represents a formidable challenge. Recognizing the existence of nonaqueous environments where polypeptides would not necessarily lose their structural integrity or functions, the central theme of the Ohata research group is to examine chemical reactivities of polypeptides in nonaqueous media. One aspect of the research campaign is to achieve nonaqueous bioconjugation for creation of therapeutic agents such as antibody–drug conjugates. This presentation also describes another direction of the program about chemical reactivities of polypeptides in prebiotically plausible conditions such as those in the early Earth and other astrochemical events.

Jun was born and raised in Japan. Jun received his B.S. in 2011 and his M.S. in 2013 from Osaka Prefecture University, where he worked in Hiroyuki Matsuzaka's group examining the reactive carbon species on ruthenium complexes (synthesis of metal complexes). Jun received his Ph.D. in 2018 in Zachary Ball's group at Rice University studying transition metal-mediated protein bioconjugation (utilization of metal catalysis). As a Japan Society for the Promotion of Science (JSPS) postdoctoral fellow, Jun worked in Christopher Chang's group at the University of California, Berkeley for two years to develop detection methods of calcium and copper ions in living systems through protein labeling (visualization of metals). In 2020, Jun moved to North Carolina State University as Assistant Professor (Department of Chemistry).

