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Department of Chemistry

Dow Lecture Series

9:45 a.m. Thursday, March 24 • 331 Smith Hall



Associate Professor

Xi Chen

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University of California-Davis

*Chemoenzymatic
Approaches for Chemical
Glycobiology*

Research interests include carbohydrate chemistry and glycobiology, chemical biology, bioorganic chemistry: chemoenzymatic synthesis of complex oligosaccharides, polysaccharides, and glycoconjugates; kinetics, enzyme mechanistic, X-ray crystal structure and mutagenesis studies of glycosyltransferases and other carbohydrate biosynthetic enzymes; carbohydrate-protein interactions; site-specific glycoconjugation; carbohydrates in cancer, bacterial and viral infection.

Website:

<http://www.chem.ucdavis.edu/faculty/cf-info.php?id=64>

Abstract

The important roles of carbohydrates have been increasingly recognized. Among carbohydrates, sialic acid-containing structures have attracted much attention. Sialic acids are common terminal carbohydrate units on glycoproteins and glycolipids of vertebrates. They play pivotal roles in many physiologically and pathologically important processes, including cellular recognition and communication, bacterial and viral infection, inflammation, and tumor metastasis. Compared to common monosaccharides of five- or six- carbons, sialic acids contain a 9-carbon backbone and are much more complex monosaccharides. Structural modifications on sialic acid residues further increase the complexity of sialic acid-containing structures. Currently, more than 50 sialic acid structures have been found in nature. These include three basic forms: *N*-acetylneuraminic acid (Neu5Ac), *N*-glycolylneuraminic acid (Neu5Gc), 2-keto-3-deoxy-D-glycero-D-galacto-nonulosonic acid (Kdn), and their modified forms with 8-*O*-methylation, 8-*O*-sulfation, 9-*O*-lactylation, 9-*O*-phosphorylation and single or multiple *O*-acetylation at C-4, C-5, C-7, C-8, and/or C-9 positions. Most of these naturally existing modifications are post-glycosylational modifications.

In order to understand the structure-function relationship of sialic acid modifications, my laboratory has developed highly efficient one-pot multienzyme chemoenzymatic methods to obtain structurally defined homogenous sialylglycans with different sialyl linkages, various underlying glycans and diverse sialic acid forms. These compounds have been used as invaluable probes for studying the important biological roles of sialosides and sialic acid-recognizing proteins.

Host: Assistant Professor Valerie Pierre
Refreshments will be served prior to the seminar.