DEPARTMENT OF CHEMISTRY AND BIOCHEMISTRY COLLOQUIUM
UTAH STATE UNIVERSITY

FEB 17 2021

New Light on an Old Problem: Time-resolved X-ray Crystallography of Enzymes in Action

Enzyme catalysis is essential for life and defines the core of biochemistry. Watching enzymes catalyze their reactions in real-time and at atomic resolution has been a long-standing goal of structural biology. In this talk, I will describe using recently developed time-resolved serial crystallography methods to characterize functionally important non-equilibrium motions in the cysteine-dependent enzyme isocyanide hydratase (ICH) during catalysis. ICH is the principal enzyme that detoxifies isocyanide natural products that possess antibiotic, antiviral, and anticancer properties. We found that transient cysteine modification during ICH catalysis activates a non-equilibrium protein dynamics that can be mapped in atomic detail by mix-and-inject serial X-ray crystallography. Combining computation, serial crystallography, and enzyme kinetics, we have shown how non-equilibrium protein motions facilitate passage along the reaction coordinate in ICH. Recent developments in serial crystallography promise to dramatically expand the accessibility of these new structural biological techniques, allowing their broader application to observing dynamic events during catalysis in many enzymes.

4-5PM (MDT) | Zoom
Meeting ID: 991 3991 8394
Passcode: 4W3tYY

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