Protein dynamics and allostery

BABIS KALODIMOS, Rutgers University, Chemistry Department, Newark NJ 07102 — Cooperativity and allostery are phenomena of universal importance in biological systems. According to the classical “mechanical” view allosteric interactions are mediated by a series of discrete changes in bonding interactions that alter the protein conformation. Nevertheless, proteins may have adopted additional mechanisms for energetically linking distant sites, thereby allowing a signal to be propagated over long distances. We have identified a cooperative biological system wherein allosteric interactions appear to be mediated exclusively by transmitted changes in protein motions. Changes in the structure, fast and slow protein motions and the redistribution of the native-state ensemble along the cooperative reaction coordinate have been characterized.