ULTRAFAST STUDIES OF RESONANCE ENERGY TRANSFER IN MYOGLOBIN: A-HELIX AND LOCAL CONFORMATIONAL FLUCTUATIONS

JEFFREY A. STEVENS, JUSTIN J. LINK, YA-TING KAO, CHEN ZANG, LIJUN GUO, and DONG-PING ZHONG, *Department of Physics, The Ohio State University, Columbus, OH 43210*.

Myoglobin (Mb), a heme containing protein, is involved in the storage and release of ligands. We report here our studies of resonance energy transfer in Mb using an intrinsic tryptophan (Trp) and the prosthetic heme as an energy transfer pair. With site-directed mutagenesis, we placed one-at-a-time a single Trp donor into four locations on the A-helix. Utilizing the femtosecond up-conversion method, we examined a series of energy transfer dynamics in Mb. A molecular dynamics (MD) simulation was also used to infer structure and dipole orientation fluctuations for specific Trp. Both methodologies were used to characterize the local dynamic nature of Mb in solution compared to the static crystal structure.