SOLVENT EFFECTS ON PROTON TRANSPORT IN BACTERIORHODOPSIN

JANE K. RICE, TINA M. MASCIANGIOLI, *Code 6111, Chemistry Division, Naval Research Laboratory, Washington DC 20375-5342*.

Bacteriorhodopsin, is a prototypical alpha-helical transmembrane protein that acts as a proton pump after photoinitiated isomerization of its retinal chromophore. We examine the dependence of the photocycle dynamics of the native bR photocycle upon adding ethanol, a solvent which is thought to perturb the lipid environment. Protein and chromophore absorption changes are monitored during the photocycle using time-resolved FTIR. We measure the kinetics of proton transport from the M to N and N to O transitions in bR in the infrared region of the spectrum. This provides information on the specific vibrational bands involved and helps assess the mechanisms, rate limiting steps, and proton pathway. The most notable change is the slowing of the N to O transition which is associated with proton transport from the cytoplasmic side of the membrane to the Asp 96 (amino acid residue), one of the later steps in the proton transport process.