

# RHODOPSIN—LIPID INTERACTIONS

Keelung Hong, Yong Shiau Chen, and Wayne L. Hubbell

*Department of Chemistry, University of California, Berkeley*

Purified, lipid-free rhodopsin has been incorporated into bilayers of natural and synthetic phosphatidyl cholines and a natural digalactosyl diglyceride. Successful incorporation and high regenerability of rhodopsin appears to depend on the nature of the hydrocarbon chains and not specifically on the type of polar head group of the lipids.

Electron paramagnetic resonance spectra of recombinant membranes containing small amounts of spin labeled phosphatidyl cholines reveals that rhodopsin interacts directly with the hydrocarbon chains of the phospholipids in the bilayer, resulting in a dramatically decreased motional freedom of the chains.

In studies of the recombinant membranes using freeze–fracture electron microscopy, the presence of rhodopsin is detected as discrete particles in the plane of fracture. The particle distribution is dependent on the nature of the lipid hydrocarbon chains and whether or not the rhodopsin has been photolyzed.

From these studies, it is concluded that the rhodopsin-bilayer structure is stabilized primarily by direct interaction of the hydrocarbon chains with the protein molecule, and that structural parameters in this model system are subject to modulation by visible light.