

## W0167

**Engineering a Protein Mimic of Visual Rhodopsin.** S. Vaezeslami, E. Mathes, C. Vasileiou, R.M. Crist, B. Borhan, J.H. Geiger, Dept. of Chemistry, Michigan State Univ., E. Lansing, MI 48824 USA.

Although for long time it has been known that retinal is the unique visual chromophore in eye, still it is not clear how the interactions in the binding pocket of each of the four different opsins lead to the perception of different wavelengths in human eye. Since rhodopsins are transmembrane proteins, performing spectroscopic and crystallographic experiments on them is not as straight forward as for soluble proteins. Therefore in order to study the postulated theories about the mechanism of wavelength regulation, using a mimic of rhodopsin would be helpful. Cellular retinoic acid binding protein (CRABP) II, which is a small, cytosolic protein and binds to retinoic acid as its natural substrate, is a proper candidate for this purpose. Our collaborators have been able to convert CRABP II from a retinoic acid binding protein to a retinal binding protein. However, in order to make these rational mutations having the crystal structures of the mutants would be necessary. We have solved the crystal structures of several apo, retinoic acid- and retinal-bound mutants of CRABP II at high resolutions. These structures show the importance of different mutations in the wavelength regulation and binding properties of the mutants. More rational mutations are being made based on these structures.