

Chemistry and Molecular Biology Department
Seminar
May 1, 2008
3:45 pm in Dunbar 152

Singlet Oxygen Chemistry and Biology in *Brooklyn, New York*

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Research on singlet molecular oxygen and other reactive and cytotoxic agents is of interest to us. I will describe our study of singlet oxygen photochemically generated at a solid-water interface, and how singlet oxygen then diffuses into the aqueous medium. The heterogeneous system that I will describe could have application in ridding wastewater of *E. coli*. Collaborations with Ruomei Gao and Harry Gafney revealed that singlet oxygen is generated cleanly in aqueous solution upon irradiation of a heterogeneous complex, meso-tetra (N-methyl-4-pyridyl) porphine adsorbed onto porous Vycor glass (PVG). Despite the effectiveness of this and other heterogeneous systems to generate singlet oxygen, little is known about the dynamics of oxygen quenching at solid-water interfaces. For example, how does the oxygen encounter the excited heterogeneous sensitizer? What mechanism (static or dynamic) converts ground-state oxygen into singlet oxygen, which then escapes into the surrounding aqueous solution? Our recent work with Jovan Giaimuccio and Jerry Meyer led us to conclude that O₂ quenching at the glass-water interface differs from O₂ quenching at the glass-gas interface. An assessment of the quenching of the oxygen could help in the design of other heterogeneous systems that attempt to control the exact mode of generation of singlet oxygen in water.