

Probing the Active Site of Amine Oxidase with Electron Tunneling Wires

Corinna R. Hess, Jay R. Winkler, David M. Dooley, Michael G. Hill, Harry B. Gray

*Department of Chemistry, Beckman Institute,
California Institute of Technology, 1200 E.
California Blvd., Pasadena, CA 91125 USA
(email: corinna@its.caltech.edu)*

Amine oxidase is a copper enzyme with a deeply buried redox site. We have synthesized a series of electron tunneling wires, designed to access the active site of this enzyme. The complexes consist

of phenyl – ethynyl units, terminated on one end by a protein – specific amine functionality. Fluorescence and inhibition studies indicate that these wires bind tightly within the substrate channel of the protein, providing a direct link to the buried active site. A variety of reporter groups have been attached, allowing us to use several techniques to probe the structure and function of the enzyme. A thiol terminated oligomer has been employed in electrochemical experiments. A Re(I) tunneling wire is being used to generate radical species involved in enzyme cofactor biogenesis and catalytic reactions.