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Modification of protein structure and function using photoactivated porphyrin ligands GABRIEL MORENO, University of Texas at San Antonio — The tremendous advances in genomic research have sparked an interest in investigating the possibility to "manipulate" the structure of proteins that modify existing functionality. This study makes use of small molecules (e.g., porphyrins) to photosensitize proteins and modify the higher order structure of the polypeptide with the goal of engineering novel functions, or affecting/eliminating native functions. The irradiation of non-covalently bound ligands prompts charge transfer events that have the potential to locally modify the structure of the host protein. The characterization of photoinduced conformational changes in the protein/porphyrin complex is carried out using a combination of electronic spectroscopy and kinetics (e.g., fluorescence spectroscopy, fluorescence decay, circular dichroism). This study is focused primarily on human serum albumin (HSA) as a model. The structure of HSA is well established, the binding sites for an array of ligands are well characterized (including one for protoporphyrins), and HSA provides a series of functions (including some allosteric activity) that can be tested.

Gabriel Moreno
University of Texas at San Antonio

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