Rational design of hybrid photocatalyst using protein engineering- Powering the enzyme

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Abstract: Global energy crisis due to population explosion can be tackled by harnessing renewable energy sources. Sun is an inexhaustible source of renewable energy but it is intermittent. An attractive solution to this problem is to store solar energy in the form of chemical bonds and this is what nature does in photosynthesis. By mimicking natural photosynthesis, an artificial photosynthetic system can be constructed. For the last couple of decades, researchers have been designing artificial photosynthetic systems by conjugating photosensitizer to biocatalyst.[1] By this approach, the biocatalyst is empowered to harvest solar energy and convert it into chemical energy. Among the myriad of biocatalysts, Cytochrome P450 is a versatile candidate due to its substrate scope.[2] Even though artificial photosynthetic construct with Cytochrome P450 is achieved,[3] little knowledge is shed in understanding the correlation between the site of bioconjugation of photosensitizer and the catalytic activity of biocatalyst. Herein, our focus will be on studying the electron transfer rates from photosensitizer to heme active site and correlating it to catalytic activity.

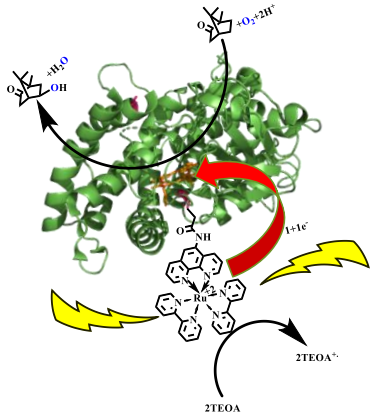

Fig: Schematic diagram of photobiocatalyst

References and Notes:

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