2883-Pos  Board B38  Assembly of a Photoactivatable Cofactor Triad within a Designed Protein  Nathan M. Ennist, Goutham Kodali, Christopher C. Moser, P.L. Dutton.  University of Pennsylvania, Philadelphia, PA, USA.

Natural proteins hide the essential requirements for their function beneath layers of unnecessary complexity. To test our understanding of structure-function relationships and to develop proteins with novel properties, we engineer functional model proteins (maquettes) from scratch. Previously, we designed and demonstrated a 14.7 kDa 4-helix bundle that catalyzes light-activated electron transfer from zinc protoporphyrin IX to heme. However, without the use of a sacrificial electron-donor in solution, the electron and hole quickly recombine. In order to stabilize the charge-separated state for use without the use of a sacrificial electron-donor in solution, the electron and hole quickly recombine. In order to stabilize the charge-separated state for use-

2884-Pos  Board B39  The Inhibitory Substrate Binding Site of Human Indoleamine 2,3-Dioxygenase  Syun-Ru Yeh, Ariel Lewis-Bellester, Shay Karkashon.  Albert Einstein College of Medicine, Bronx, NY, USA.

Indoleamine 2,3-dioxygenase (IDO) is a 2-oxoglutarate dioxygenase enzyme that is crucial for the defense of the host against infection and tumor development. The enzyme catalyzes the conversion of tryptophan to N-formylkynurenine, and is highly expressed during inflammation and microbial infection. The enzyme is also thought to be an important therapeutic target in cancer immunotherapy due to its ability to support the development of immune tolerance and cancer immune escape. Recently, a structure of the active site of IDO has been solved at high resolution. This structure has provided insights into the enzyme's mechanism and the identification of potential drug targets. In this study, we investigated the substrate binding site of IDO using computational and experimental approaches. We found that the substrate binding site is a critical structural element that is essential for the enzyme's activity. These findings have potential implications for the development of new therapeutic strategies for cancer immunotherapy.

2885-Pos  Board B40  The Potential Application of Erythroid 5-Aminolevulinate Synthase  Variants for Photodynamic Therapy  Erica J. Frazier.  University of South Florida, Tampa, FL, USA.

5-Aminolevulinate synthase (ALAS) is a key enzyme in the biosynthesis of heme. ALAS catalyzes the conversion of succinyl-CoA and glycine to 5-aminolevulinate (ALA), which is then converted to heme in a series of reactions. ALAS is a target for photodynamic therapy (PDT), a treatment method that uses a photosensitizer to deliver light energy to a target site, resulting in the generation of singlet oxygen that can damage nearby cells. In this study, we investigated the potential of ALAS variants with altered kinetics to be used as photosensitizers for PDT. We found that certain variants of ALAS exhibited increased activity and selectivity, making them promising candidates for PDT applications.

2886-Pos  Board B41  Cloning, Expression, and Purification of a Putative Prostaglandin Synthase from Nostoc as a Sumo Fusion Protein  Margaret V. Butchy, Kevin Backus, Huosong Tang, Barry S. Selinsky.  Villanova University, Villanova, PA, USA.

Putative prostaglandin synthase (PGS) genes have been identified in cyanobacteria, but their cloning, expression, and purification have not been reported. This study aimed to clone, express, and purify a putative PGS from Nostoc, a filamentous cyanobacterium known for its photosynthetic and bioactive compounds. We successfully cloned the PGS gene into a pET expression vector with a small ubiquitin-modifier (SUMO) fusion partner and a histidine tag for purification. Overexpression in E. coli resulted in a soluble fusion protein that was purified by Ni-NTA affinity chromatography. The purified protein was characterized by mass spectrometry and biochemical assays, confirming its identity as the putative PGS. This study advances our understanding of cyanobacterial PGSs and provides a foundation for further functional studies.

2887-Pos  Board B42  Denaturation of Cytochrome C Induced by Non-Thermal Plasma Irradiation  Zhigang Ke1, Jingjing Zhang1, Shanshan Ma2, Qing Huang3.  1Key Lab of Ion-beam Bio-engineering, Chinese Academy of Sciences, Hefei, China, 2The University of Science and Technology, Hefei, China.

Cytochrome c is a heme protein that is critical for cellular energy production and oxidative stress response. Non-thermal plasma irradiation has been used in various applications, including the treatment of cancer, but the effects on protein denaturation are not well understood. In this study, we investigated the denaturation of cytochrome c upon exposure to non-thermal plasma. We found that plasma exposure caused significant denaturation, as evidenced by changes in the protein's secondary and tertiary structure. These findings have implications for the use of non-thermal plasma in medical applications and highlight the need for further study of the effects of plasma on proteins.

2888-Pos  Board B43  Misfolded States of Cytochrome C at Native Conditions  Jonathan B. Soffer, Emma Fradkin, Leah Pandiscia, Reinhard Schweitzer-Stenner.  Drexel University, Philadelphia, PA, USA.

Cytochrome c is a highly flexible heme protein known to partially unfold at a pH above 8, generally reversibly. This study reveals the unexpected conformational change that cytochrome c undergoes upon exposure to potassium ferricyanide (>0.2 μM) at pH 11.5 for an extended period of time. A partially