

Dr. Tom Magliery Ohio State University



Protein-protein interactions and conformations and the uses they have in medical therapy

Proteins adopt their conformations based on their sequence of amino acids, but we still have little more than rules of thumb relating sequence to structure or thermodynamic stability. In part, this is due to the vast number of possible variants of even small proteins. For example, one molecule of every possible 50-amino acid protein sequence would have more mass than our galaxy. Moreover, it is difficult to apply traditional biophysical techniques in a high-throughput format. We can also statistically analyze databases of natural protein variants for higher-order patterns that lead to stability, such as correlated occurrences of amino acids. We have recently constructed the consensus sequence of a large enzyme family, and found that it is active but has unusual structural properties. We are re-engineering this sequence with correlated mutations to probe their effects. Our group is also interested in developing powerful tools for in vivo detection of protein-protein interactions. We are using the recently developed power of in vivo, site-specific unnatural protein mutagenesis, and we are developing a method to rapidly scan a photoaffinity label through every position of a protein to elucidate binding partners and interaction surfaces. Separately, we are improving a split-GFP reassembly screen to trap interacting proteins and applying this to four-helix bundle interfaces in tumor suppressor proteins. We apply our technologies to improve the physical properties of proteins used for therapeutic purposes. We are part of a large NIH Center that aims to improve the activity and properties of enzymes that inactivate organophosphorous nerve agents. Our lab uses a wide variety of techniques, including DNA library construction and screening, protein expression and purification, spectroscopic analysis of proteins (CD, fluorescence, NMR and X-ray crystallography), bioinformatics and synthetic organic chemistry.

When Tuesday October 27, 2009

12:30 – 1:30

Where Hamblin Hall 107

Refreshments will be served

Students who wish to meet with Dr. Magliery to talk to him about graduate school or his research can meet with him informally at 1:30 in the Conference room or contact Dr. Fultz for a scheduled conference with him.