Bachelor thesis AK Prof. Schwalbe:

Incorporation of non-natural amino acids into proteins for biophysical spectroscopy techniques

Category: Chemical Biology

Start: Anytime, starting mid October 2013

Tutor: Dr. Martin Hengesbach

Project description

Spectroscopic analysis of proteins is difficult due to the limited sensitivity of methods available. Site-specific labeling of proteins is a powerful tool to introduce probes for various analytical methods, which increase sensitivity. Incorporation of e.g. fluorophores or labels for NMR spectroscopy are possible applications.

The goal of this project is to establish and apply a system for the introduction of unnatural modifiable amino acids (UAA) into proteins which are recombinantly expressed from e.g bacteria, followed by coupling of various labels or probes.

Methods involved in this project are mostly from microbiology (E. coli), molecular biology, and chemical biology.

Project tasks:

- Generation of modified gene constructs for protein expression
- Expression optimization of UAA-containing proteins
- Detection and purification of UAA-containing proteins
- Coupling of labels and probes to UAA-containing proteins

References

1. Plass et al.: Genetically encoded copper-free click chemistry, Angew Chem Int Ed Engl. 2011 Apr 18;50(17):3878-81 (Pubmed Link)
2. Loh et al.: Lanthanide tags for site-specific ligation to an unnatural amino acid and generation of pseudocontact shifts in proteins. Bioconjug Chem. 2013 Feb 20;24(2):260-8 (Pubmed Link)