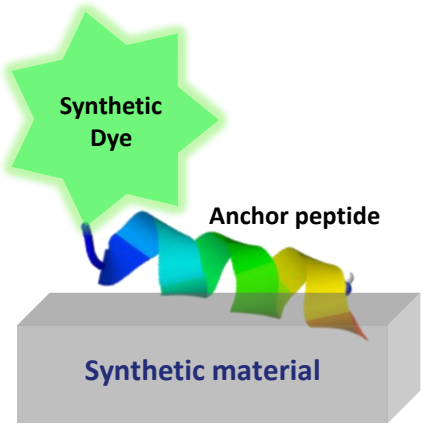
Master Thesis / Internship

Production of fluorescent anchor peptides for functionalization of material surfaces

Background: Anchor peptides (APs) are short peptides with a length between 30 to 100 amino acids with the potential to be widely applied in surface functionalization replacing conventional (chemical and physical) surface modification routes. For the selection of suitable APs to target the materials of interest, we are using the library of peptides fused to reporter enhanced green fluorescent protein (eGFP) [1, 2]. However, the stability and quantum yield of eGFP is often not sufficient for the applications that require functionalization with the dye, which is highly fluorescent and stable in broad range of conditions.

Aim of the study: To produce APs in *E.coli* and *C.glutamicum*. Expressed peptides will be further conjugated to stable synthetic dyes *via* Thiol "click" reaction and sortagging[3]. Following this, conjugated peptides will be used to immobilize to the material's surface. Confocal microscopy, microplate reader, and Surface Plasmon Resonance (SPR) will be applied to evaluate a successful binding.

Methods: Molecular biology (PCR, Golden Gate, Gibson cloning), protein expression in *E. coli* and *C. glutamicum* (shake flask), protein chromatography, fluorescence-based binding assays, SPR



Your profile:

- Master/Internship student (f/m/d) in the fields of biotechnology, biochemistry, biology, or related
- Experience with molecular biology techniques advantageous
- Experience with proteins handling and purification advantageous
- Fluent in English (both writing and conversation) and/or German
- A highly motivated and independent person with the drive to learn and create

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Literature:

1. Dedisch, S.; Wiens, A.; Davari, M. D.; Söder, D.; Rodriguez-Emmenegger, C.; Jakob, F.; Schwaneberg, U., Matter-tag: A universal immobilization platform for enzymes on polymers, metals, and silicon-based materials. **2020,** *117* (1), 49-61.
2. Rübsam, K.; Stomps, B.; Böker, A.; Jakob, F.; Schwaneberg, U., Anchor peptides: A green and versatile method for polypropylene functionalization. *Polymer* **2017,** *116*, 124-132.
3. Nöth, M.; Zou, Z.; El-Awaad, I.; de Lencastre Novaes, L. C.; Dilarri, G.; Davari, M. D.; Ferreira, H.; Jakob, F.; Schwaneberg, U., A peptide-based coating toolbox to enable click chemistry on polymers, metals, and silicon through sortagging. **2021,** *118* (4), 1520-1530.

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