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Open position – Paid Master’s thesis

Topic: Surface synthesis of glycosylated peptides on solid substrates

The glycosylation of amino acid residues in proteins is a very common post-translational modification in living organisms. The most encountered structural motives are probably *O*- and *N*-glycosylation. Alternative chemical bonds between saccharides and amino acid residues can be formed by the so called Amadori rearrangement (**Figure 1**).¹ These motives in peptides can potentially be of interest for basic biological interaction studies with proteins or living cells, and little is known about their biological efficacy. Interactions between the glycosylated peptides and proteins can either be studied in solution, or at solid liquid interfaces.

The aim of this work is the on-surface synthesis of short peptides containing saccharide residues in their side chains. These surface bound peptides are expected to elicit a specific biological response.

The saccharide modified building blocks are obtained in IBIOSYS. Successful coupling of the peptides on various surfaces containing amines will be investigated by X-ray photoelectron spectroscopy and fluorescence scanning, as has been shown recently on chitosan thin films.² A quartz crystal microbalance (QCM-D) will be used to elucidate specific interactions of the peptides with proteins in solution. Identified specific interactions could further be used in suitable cell growth assays.

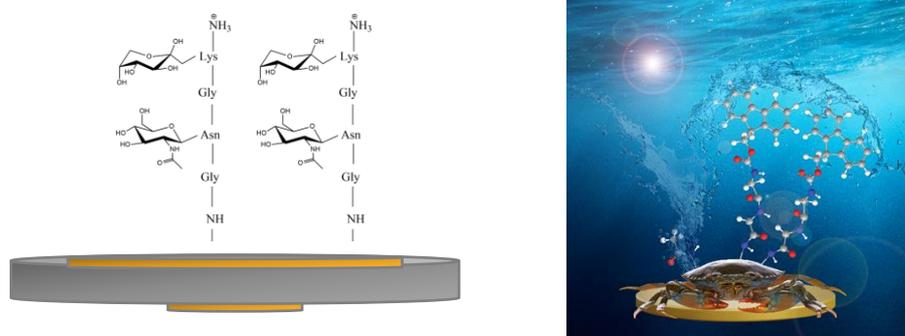


Figure 1: left: bound glycosylated peptides on amino group contain surfaces, **right** example of a water repellent dipeptide bound to the amino groups of a thin coating of the polysaccharide chitosan.²

1. Wrodnigg, T. M.; Kartusch, C.; Illaszewicz, C., The Amadori rearrangement as key reaction for the synthesis of neoglycoconjugates. *Carbohydrate Research* **2008**, 343, (12), 2057-2066.
2. Katan, T.; Kargl, R.; Mohan, T.; Steindorfer, T.; Mozetič, M.; Kovač, J.; Stana Kleinschek, K., Solid Phase Peptide Synthesis on Chitosan Thin Films. *Biomacromolecules* **2022**.