



KTH Biotechnology

Master thesis project:

Development of new SPR-based assays for antibody characterization and protein-protein binding competition

Antibodies constitute the main class of affinity reagents with wide use in diagnostics, therapy and biotechnology. The Human Protein Atlas (HPA) project is a systematic effort to generate antibodies against all human proteins. To understand the function, kinetics and specificity of the antibody it is important to map the epitope on the target antigen. Several methods that exploit overlapping peptides are available for mapping of linear antibody epitopes. Surface plasmon resonance (SPR) is the leading technology to achieve detailed information about protein-protein interactions, but it is seldom used to collect data on binding epitopes. A novel method based on SPR-detection was recently described. This technology can be used to characterize monoclonal as well as polyclonal antibodies in a way that yields superior information as compared to competing methods. In addition, new labeling techniques developed by Episentec allow more data to be extracted from one single SPR-experiment. Those methods may expand the assay formats that can be evaluated on standard SPR-based instruments.

The aim of this master thesis project is to establish a method for detailed characterization of antibodies on a ProteOn XPR36 protein interaction array system. Initial experiments intend to validate the system using monoclonal antibodies targeting cancer related biomarkers identified in the HPA workflow. The final method is anticipated as a means to screen mono- or polyclonal antibodies to identify the most interesting candidates in regard to binding kinetics and epitope. The project provides opportunity to learn molecular biology techniques as well as state of the art epitope mapping technologies in close collaboration with Atlas Antibodies AB.

Episentec is a Swedish company that has developed a novel labeling technique that may be employed to extract more data from SPR-experiments. This method has yet not been tested on protein-protein interactions or competition assays. This part of the project aims to express and purify different variants of two very well characterized binding proteins to be used in an evaluation of this innovative technology. The student will learn cloning, protein expression and purification and work in close collaboration with Episentec in the evaluation of a method that has never been described before.

Please contact us for a meeting if this sounds interesting! The project is planned to start during spring 2012.

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