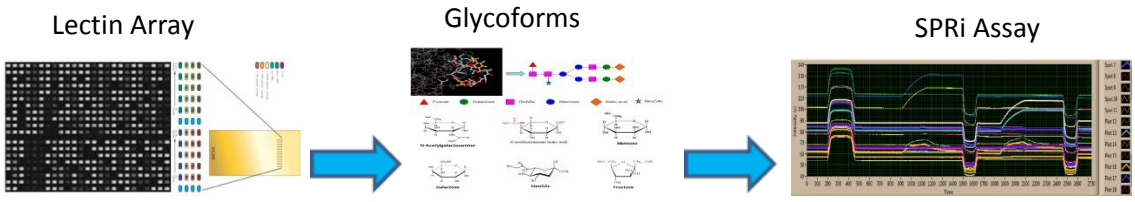
SPRI-BASED LECTIN ARRAY CHIP

A POWERFUL GLYCOPROTEIN ANALYSIS TOOL

LABEL-FREE SCREENING, DETERMINATION, IDENTIFICATION, AND CHARACTERIZATION OF GLYCOPROTEINS IN REAL TIME

Summary

In this SPR array, lectins from seven different sugar binding moieties are immobilized on an SPR-active Nanocapture® chip. These seven glycan binding moieties include D-N-Acetygalactosaminyl, D-N-Acetyglucosamine, D-Mannosyl, α/β-D-Galactosyl, Neu5Ac, α-L-Fucosyl, and complex. Lectins are sugar-binding proteins that are highly specific for their respective conjugate. They serve many different biological functions and play a key role in cells and protein recognition pathways. Their ability to bind to soluble extracellular and intercellular glycoproteins allows them to be excellent glycoprotein screening agents. Combined with SPR imaging technology, our product offers label-free detection of the glycan and respectively sugar subtype. Additionally, the affinity of different glycans can be determined via binding constant calculation using the Plexera analysis software.



Interaction Type	Analyte Injection	Analyte Concentration	Flow Rate	Interacting Ligands	k_a Range	k_b Range	K_D Range
Lectins vs Glycoproteins	Purified protein Complex mixtures Antibody addition	10ng/ml - 2mg/ml	0.1 - 20 µl/s	41 lectins from 7 glycan moieties	10^2-10^6 $M^{-1}S^{-1}$	10^{-2}-10^{-5} S^{-1}	1pM-1µM

Work Flow

1. Mount the Nanocapture Lectin Chip onto the SPR machine
2. Set the SPR angel for parallel analysis
3. Set up injection method table in the Instrument Control Software
4. Dilute and inject the analyte of interest (concentration of 10nM-1µM)
5. Save the recorded video file of the assay
6. Load recorded experimental video file and perform data analysis via the Analysis Software

Lectin Array Applications

The Nanocapture Lectin Chip can be used towards a variety of samples, and is suitable for a vast range of applications. Glycosylation is one of the most common post-translational protein modifications, thus lectins play a key role in many different biological functions. They are involved in pathogen masking, immune system, and cell and protein recognition pathways. Our high throughput analysis is useful for all phases of glycobiomarker discovery. The Lectin Chip's potential exceeds our four demonstrated applications, and its screening capacity can be used for pathogen detection, bacteria tropism studies, cancer stem cell markers discoveries, and altered glycan structure characterization.

- **G**lycoform characterization of individually purified glycoproteins. The antibody is injected to verify the identity of the glycoprotein. It does not interfere with lectin binding to the glycoprotein.

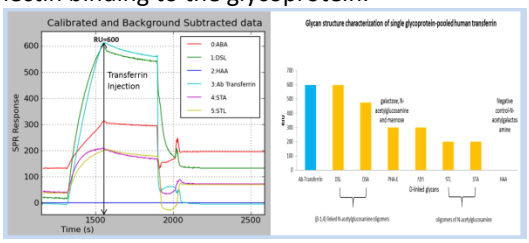


Fig.1. Transferrin injection over the lectin array chip, and subsequent analysis of its glycan structure and characterization.

- **C**ell glycome profiling of complex protein mixtures such as cell lysate. This allows high-throughput profiling of cell membrane glycoprotein forms and intracellular glycoprotein. Elucidate researchers on glycome post translational modification.

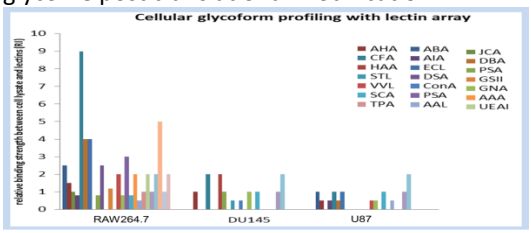


Fig.2. Cell lysate injections over the lectin array chip, and subsequent profiling of different cellular glycan structures.

- **H**igh through-put serum glycosylation comparison for disease-relevant glycol-biomarker discoveries. Extensive study of these glycan structures can enhance biomarker specificity and accuracy.

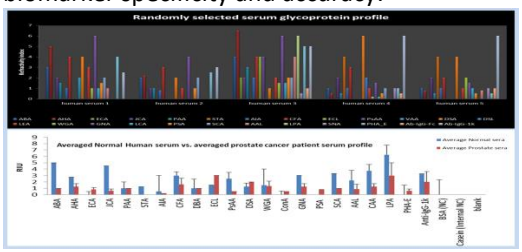


Fig.3. Undepleted human serum injections over the lectin array chip, and sequent profiling and comparison of different human serums.

- **S**creening very low abundance proteins in sample mixtures. This allows us to boost surface resonance signal and verify analyte glycoform identity by injecting an antibody over the captured lectin-analyte or lectin over a captured antibody-analyte complex.

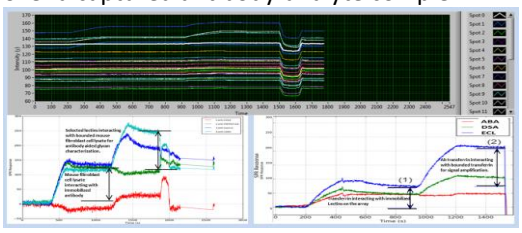


Fig.4. Cell lysate or serum injection over the Lectin Chip, and subsequent antibody or lectin addition to boost SPR signal

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