Surface acoustic wave technology as a tool for functional characterization of new compounds

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Principle of SAW biosensors

### APPLICATION I

SAW biosensors allow the users to detect label-free binding events in the liquid phase, giving information on affinity ($K_D$), kinetics ($K_{on}$ and $K_{off}$), viscoelastic effects and conformational changes. Therefore, one of the interaction partners (ligand) is immobilized on a sensor chip. After analyte interaction, changes in the surface-bound material and configuration result in a modified oscillation of the surface acoustic wave. The phase of the wave is shifted on mass changes. Viscoelastic and conformational characteristics are indicated by a change in amplitude. Both effects can be differentiated and are detected independently for interaction analysis.

### OBSERVATIONS

**SAW responses are proportional to the molecular weight of the bound analyte,** which allows the users to detect label-free binding events in the liquid phase, giving information on affinity ($K_D$), kinetics ($K_{on}$ and $K_{off}$), viscoelastic effects and conformational changes. Therefore, one of the interaction partners (ligand) is immobilized on a sensor chip. After analyte interaction, changes in the surface-bound material and configuration result in a modified oscillation of the surface acoustic wave. The phase of the wave is shifted on mass changes. Viscoelastic and conformational characteristics are indicated by a change in amplitude. Both effects can be differentiated and are detected independently for interaction analysis.

### APPLICATION II

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### CONCLUSION

** Immobilization of hGHAB and initial binding experiments were successful.** Although the affinity of the hGHAB for somatropin was not reported, the measured $K_D$ value is within the expected affinity for antibodies to their antigens. In future experiments, the affinity of different NOTA-somatropin batches for hGHBP will be evaluated.

**Application I:** Functional quality control of different chemically-modified somatropin batches. Different batches of chemically-modified somatropin will be evaluated for their binding to the human growth hormone antibody (hGHAB) and later-on the human growth hormone binding protein (hGHBP).

**Application II:** Functional quality control of small molecules and peptides. SAW responses are proportional to the molecular weight of the bound analyte, which allows the users to detect label-free binding events in the liquid phase, giving information on affinity ($K_D$), kinetics ($K_{on}$ and $K_{off}$), viscoelastic effects and conformational changes. Therefore, one of the interaction partners (ligand) is immobilized on a sensor chip. After analyte interaction, changes in the surface-bound material and configuration result in a modified oscillation of the surface acoustic wave. The phase of the wave is shifted on mass changes. Viscoelastic and conformational characteristics are indicated by a change in amplitude. Both effects can be differentiated and are detected independently for interaction analysis.

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