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Revvity Signals Research Suite Data Processing - SPR

SPR Data Analysis Software Addresses Unmet Needs

Scientists who run Surface Plasmon Resonance (SPR) experiments are often hampered by inflexible instrument software that requires extensive reconfiguring to make their data presentable. Larger groups, running multiple SPR instrument types, face steep learning curves for new and junior users. Plus, inconsistencies in data analysis across instruments are not uncommon. Signals Research Suite Data Processing - SPR allows the analysis of multiple popular SPR instruments in one easy-to-use platform, promoting consistency of analysis from day to day, within and across departments. Integration with Spotfire®, an unparalleled visualization software, provides interactive and dynamic visualizations and greatly expanded graphic output choices. Reading data files directly from the instruments and integration into Spotfire® promote data integrity by eliminating the need for cutting and pasting between software programs. Customization to link to electronic notebooks and databases further improves data integrity.

Improve SPR Data Integrity

- One interface to analyze data from many popular SPR instruments and the ability to save analysis templates increases consistency of SPR data analysis from day-to- day, person to person, and across groups

- Integration with Spotfire data tables promotes data integrity by eliminating potential human errors as a result of cutting and pasting and re-configuring data from instrument software

- Customization allows for direct connections to electronic notebooks and corporate databases further increasing data integrity and traceability

Identify Higher Quality Leads

- Comparing results from multiple experiments within one analysis allows you to draw better conclusions and reduce false positives

- The Hit Selection App provides filtering on relevant SPR parameters such as kd, ka, KD, and Rmax to select hits for annotation or export

Zero in on Data of Interest

- Lasso data points with ideal parameters on an isoaffinity plot to bring corresponding sensorgrams and compound names and associated kinetic values into view

- Filter by inputting a desired kinetic parameter range to bring corresponding sensorgrams into view

Expanded Graphic and Output Choices

- Integration with Spotfire® greatly expands graphic output choices, allowing presentation of SPR data in the most impactful way to improve decision making

- Export functions allow choices in what you export for reporting

- Direct export of figures and data to ppt, excel, word, pdf

- Customization allows for direct connections to electronic notebooks and corporate databases further increasing data integrity and traceability
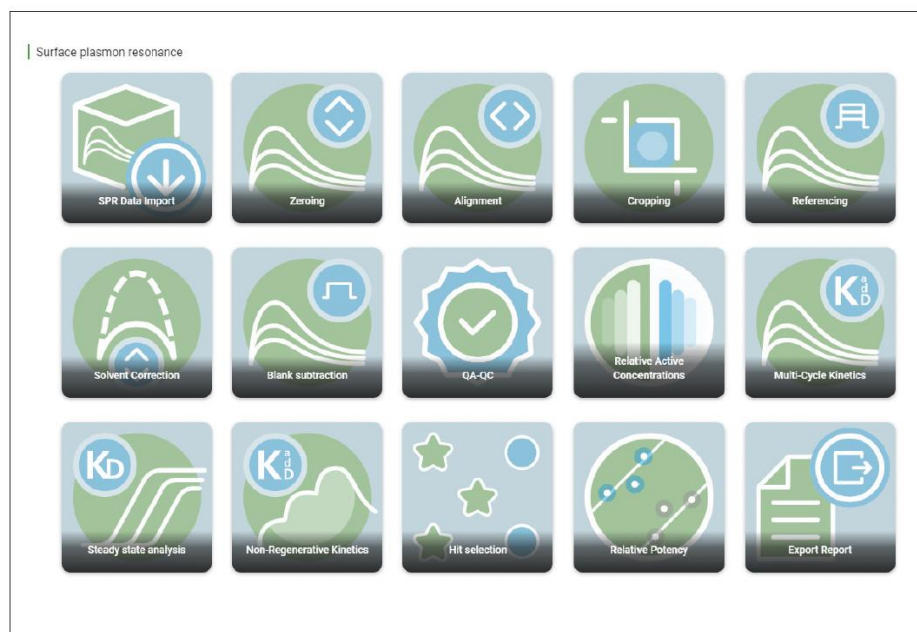

Figure 1: Signals Research Suite Data Processing SPR Apps.

Signals Research Suite Data Processing-SPR Details

1. Instruments Supported
   a. Biacore 8K (Insight Export)
   b. Biacore T200/S200
   c. Carterra
   d. Biacore 4000
   e. ForteBio OctetRED
   f. IBIS MX96

2. Pre-Processing Steps
   a. Zeroing to y-axis
   b. Alignment to start of injection
   c. Cropping
   d. Reference subtraction
   e. Solvent correction
   f. Blank subtraction

On the Cropping App a user can magnify the region of interest and before and after cropping visualizations are present.
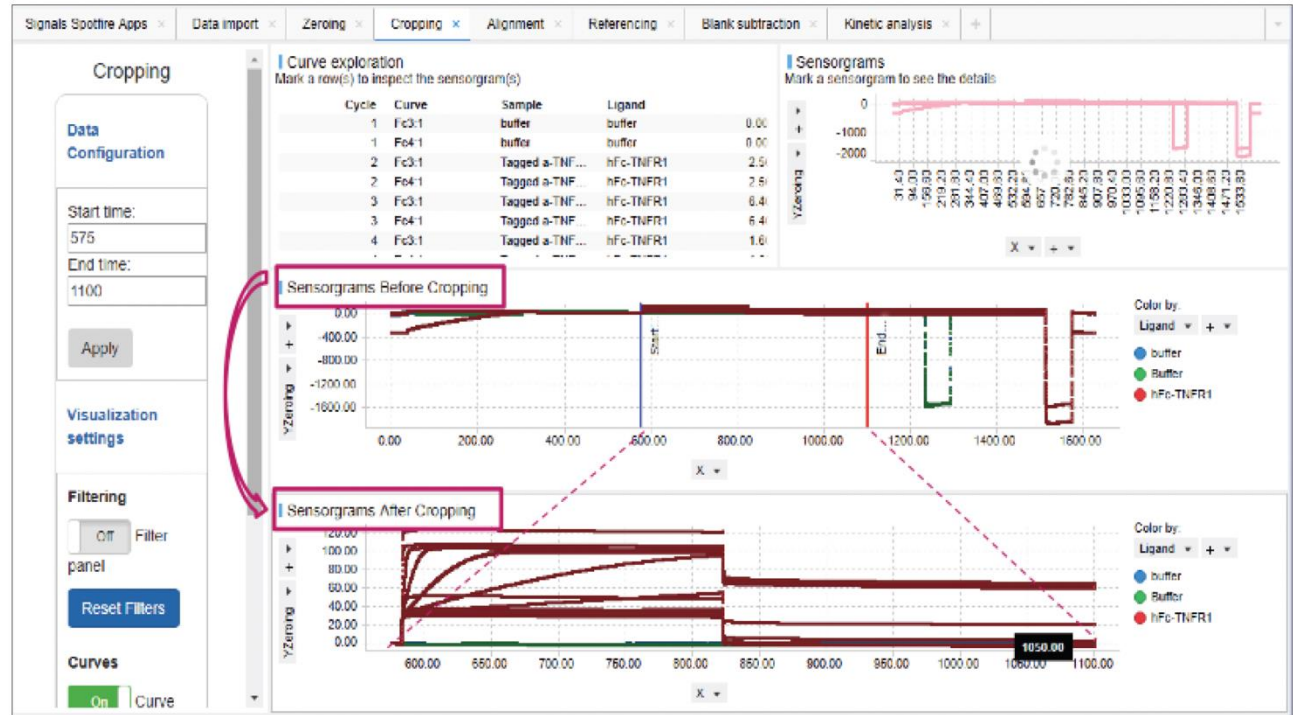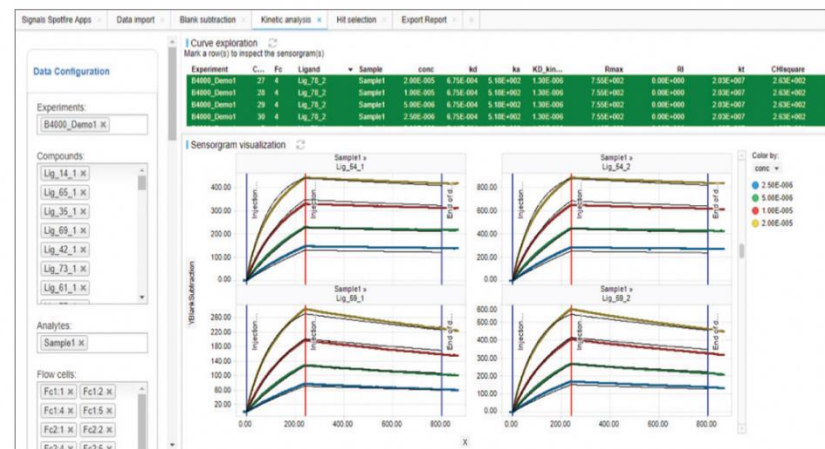

Figure 2. Signals Research Suite Data Processing-SPR Data Processing Apps - Before and After Visualizations.

All common SPR pre-processing steps are available:

- Zeroing to bring the data to a common point on the y-axis

- Aligning the start of injection of all the flow cells

- Cropping to remove data outside region of interest

- Ad-hoc exclusion of points or curves

- Referencing to subtract the data from reference flow cell

- Removing bulk solution artifacts

- Blank subtraction to subtract the data from buffer blank injections

3. SPR Data Analysis

a. 1:1 Binding with Mass Transport

b. 1:1 Dissociation Only

c. Steady State Affinity

d. Non-Regenerative Fitting

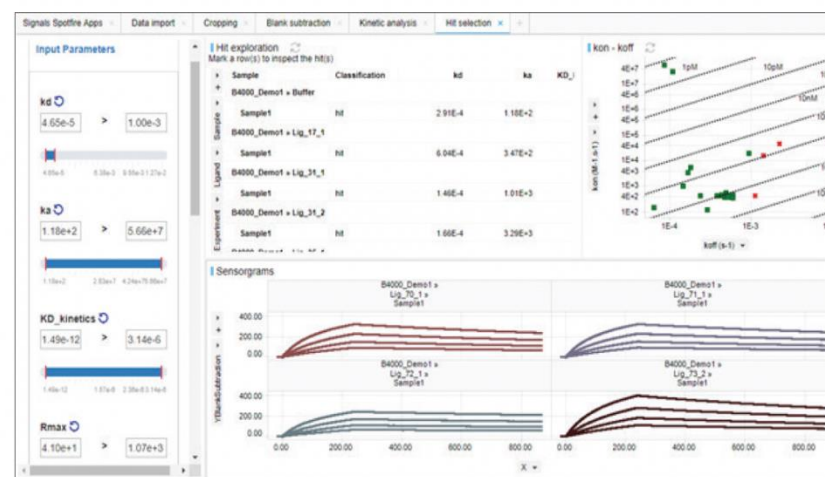e. Sensorgrams with curve fit overlay

f. Residual Plots

Figure 4. Signals Research Suite Data Processing – SPR Hit Selection App.

After the data are fit using a 1:1 interaction with mass transport model, the results, ka, kd, KD, Rmax, kt, Chi2 are displayed in the Curve Exploration table. Sensorgrams and the fit of the data can be inspected by scrolling through the sensorgrams or by highlighting compound names in the Curve Exploration Table.

4. Hit Selection

   a. Isoaffinity Plot

   b. Selecting and annotating hits for export

Signals Research Suite Data Processing - SPR Hit Selection App - contains an interactive isoaffinity plot to select hits of interest for sensorgram inspection and the ability to filter hits based on ka, kd, KD or Rmax values (left panel). Hits can be selected by typing in values, using the sliding scale, or lassoing values in the kon/koff isoaffinity plot. The visualizations are interactive, if a compound is selected in the Hit Exploration table or kon/koff isoaffinity plot, the sensorgram shows up below.

5. Export Function

   a. Export sensorgrams, plots and results tables to .ppt, .pdf, .csv, .html, etc.

Save Time

- Signals Research Suite Data Processing's single interface bypasses the need to learn multiple SPR analysis software programs, allowing new users to get up and running faster

- Once protocols are set up, subsequent data analyses are a snap, giving scientists more time to review and study the results

MAIN FEATURES AND BENEFITS

Features	Benefits
Protocol Templates- once a template is set up it can be used over and over.	- Time savings: subsequent data analyses are a snap - Data consistency: from day to day, between and across groups - Data integrity: Less human configuring, less human error
One software package for multiple instruments and assay types	- Time savings: Less time getting up to speed on multiple different instrument software packages - Data accuracy: Compare results from multiple instruments and formats together to make better conclusions and reduce false positives

Graphics driven by Spotfire®	▪ 1:1 Binding with Mass Transport ▪ 1:1 Dissociation Only ▪ Steady State Affinity ▪ Non-Regenerative Fitting ▪ Local/Global/Fixed Fitting Options ▪ Fitting parameters (ka, kd, KD, Rmax, kt) with Standard Error and Confidence Intervals ▪ Relative Potency
Reporting	▪ Filter hits for export ▪ Easily export graphics and tables directly to Powerpoint, .csv, Excel, .pdf
Customization	▪ If your instrument is not listed, responsive Revvity Signals software developers are available to layer it in ▪ If your instrument software is inflexible, let responsive developers at Revvity Signals bring new functionality to it ▪ Custom packages allow for integration with corporate databases and electronic notebooks

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