OpenSPR

Publish faster with real-time binding kinetics & affinity data

nicoya

OpenSPR

Label-free binding kinetics & affinity data at your benchtop.

Overview

Obtain high-quality data and publish with confidence using OpenSPR, the world's first benchtop surface plasmon resonance (SPR) instrument. For a fraction of the cost of existing solutions, OpenSPR provides real-time, label-free analysis of affinity and kinetics data for a wide range of biomolecular applications. Our unique nanotechnology-based sensors, which produce a localized SPR (LSPR) phenomenon, work seamlessly with an intuitive software interface and robust hardware to generate publication-quality data. Choose between OpenSPR, a two-channel solution ideal for new or occasional users, and the OpenSPR-XT, an automated system for users looking to upgrade to hands-free operation.

Benchtop

Accelerate your research with publication-ready binding data obtained right from your bench.

User-Friendly

Maximize efficiency with a system that adapts to any skill level and has no need for a dedicated technician.

Real-Time

Enrich your analysis with real-time monitoring of binding that quantifies both affinity and kinetics.

Low-Maintenance

Save time and money with a durable system that lowers your cost of owning SPR.

Academia

OpenSPR has helped researchers publish in several high-impact journals and is currently being used in over 500 innovative research labs worldwide. By integrating nanotechnology into our systems, we have greatly reduced the cost of obtaining quantitative data that is critical for publishing. Eliminate the costs and inconvenience of using a shared instrument or enlisting a CRO by adding OpenSPR to your own lab.

Biopharma

SPR is a highly valued technique used for biotherapeutic discovery and development. Our unique nano-structured sensor surface allows you to obtain high-quality and repeatable binding kinetics and affinity data for a wide variety of applications. With OpenSPR's ease-of-use, you can get started on your experiments in a matter of hours.

Education

The leading biopharmaceutical companies rely on SPR to advance their pipelines. Keep your students ahead by providing hands-on experience early on. From discovering new drugs to gaining a better understanding of diseases, thousands of researchers in both industry and academia are using SPR as their gold standard technique for interaction analysis. Students who graduate with experience using cutting-edge techniques like SPR will be well-prepared to advance to the next stage of their careers.

"What impressed me most about the OpenSPR was the ease of use and relatively low cost combined with a sophisticated, modern technology that was portable and did not require dedicated personnel for its operation."

- Dr. George Espie
Professor of Biology
University of Toronto

What is Localized Surface Plasmon Resonance (LSPR)?

LSPR is a label-free technique used to detect biomolecular interaction in real time.

LSPR has been widely adopted in pharmaceutical and life science research as a central tool for characterizing and quantifying biomolecular interactions, helping researchers determine which molecules interact, how strongly they interact (affinity), and their rate of interaction (kinetics). The detailed insights provided by LSPR have been critical in advancing our understanding of human diseases and how to treat them.

Many researchers have continued to rely on methods that simply investigate yes/no binding or qualitatively measure binding, as kinetics has historically proven to be challenging and difficult to measure. LSPR is one of the few techniques that allows for accurate and real-time determination of binding kinetics, providing researchers with more detailed information about the molecules and systems being studied.

Figure 1: A cross-section of a ligand-analyte interaction occurring on an LSPR sensor.

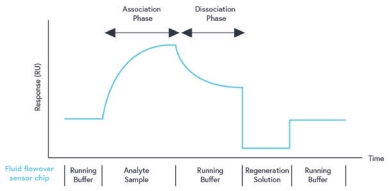

Figure 2: A typical LSPR plot of response against time, also known as a sensorgram.

Why LSPR?

Real-Time Monitoring: Observe interactions in real-time to better understand why and how they occur.

Label-Free Detection: Avoid spending time and money on expensive labeling reagents and protocols that can impact the accuracy of your measurements.

Reliable Kinetics: Obtain accurate quantitative results due to minimized bulk sample effects.

Robust and Reproducible: Simplified optical hardware means LSPR systems are more robust against artifacts like temperature drift and vibration, compared to conventional SPR systems.

Low Sample Consumption: Conserve precious samples and save on lengthy purification steps in screening applications.

Affordable Sensors: LSPR sensors use nanotechnology to reduce manufacturing costs and improve reusability.

Applications

With it's user-friendly interface and compact bench footprint, users of any experience level can easily adopt OpenSPR in their labs to advance interaction analysis in a wide range of research applications.

Hundreds of researchers are using OpenSPR and OpenSPR-XT every day to advance novel discoveries and breakthroughs in our understanding of fundamental biological processes, disease progression and prevention, and biotherapeutic discovery and development.

Supported Assays

- Kinetics/affinity characterization
- Kinetics/affinity screening*
- Yes/no binding
- Concentration analysis
- Competition assays
- Epitope mapping

** Upgrade to OpenSPR-XT Recommended*

Compatible Molecules

- Proteins
- Peptides
- Antibodies
- Antibody variants
- Nucleic acids
- Lipids
- Adeno-associated viruses (AAV)
- Virus-like particles (VLPs)
- Hormones/cytokines
- Small molecules (application dependent)

Case Studies

Infectious Diseases

The analysis of binding kinetics with SPR plays a critical role in our understanding of COVID-19, as it can help elucidate the viral infection mechanisms to develop more effective therapeutics, vaccines, and diagnostic tools.

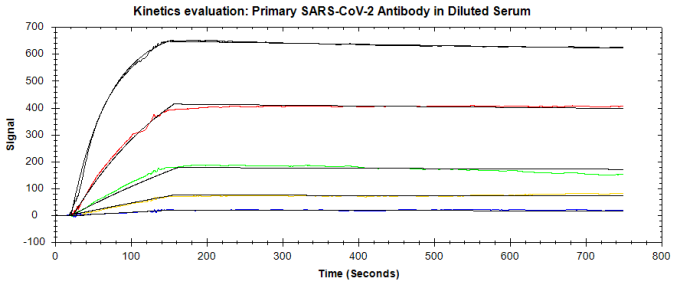

Figure 3: OpenSPR-XT was used to detect and measure the binding kinetics of a SARS-CoV-2 monoclonal antibody to the SARS-CoV-2 spike protein RBD.

Complex Samples

Antibody screening is critical to the development of vaccines and other immunotherapies, but often involves screening animal sera as the analytes for these applications are typically found in complex matrices.

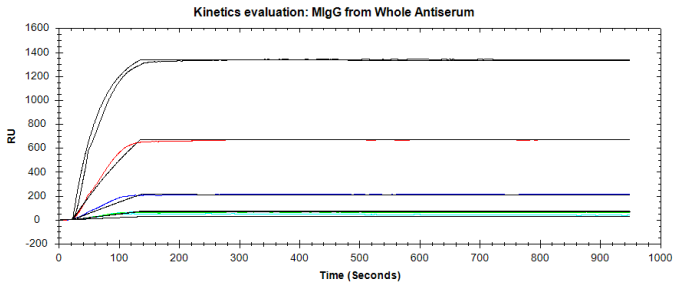

Figure 4: OpenSPR was used to detect and measure the kinetics of anti-MIgG from diluted antiserum.

Enzyme Analysis

Lysozymes are enzymes that damage bacterial cell walls via glycoside hydrolysis, and are a part of our innate immune system. SPR is a powerful technique for characterizing the interaction between lysozymes and other target molecules.

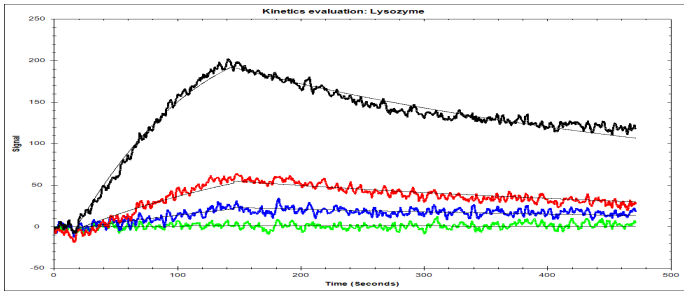

Figure 5: OpenSPR was used to analyze the affinity and kinetics of an aptamer–lysozyme interaction.

Sensors

Run your assays with confidence using our nanotechnology-based sensors. At half the price of traditional sensors, our sensors are manufactured to the highest quality to ensure consistent and repeatable measurements, and stability in a variety of solvents, buffers and reagents.

Compatible with both OpenSPR and OpenSPR-XT, our sensors achieve less than 5% CV on all optical properties and are available in a variety of functional surface chemistries. Our Standard Sensors ensure high repeatability for a wide range of biomolecules, while our High Sensitivity Sensors provide increased sensitivity for your toughest SPR applications.

- Carboxyl
- NTA
- Biotin
- Streptavidin
- Protein A
- Amine
- Liposome Binding
- Hydrophobic
- Gold

Figure 6: Standard Sensor

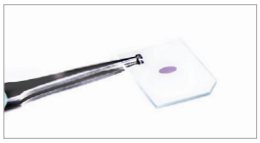

Figure 7: High Sensitivity Sensor

Figure 8: OpenSPR benchtop system.

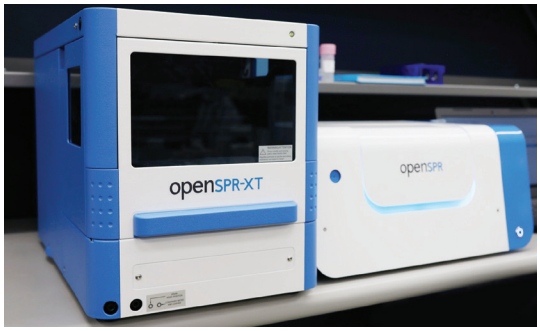

Figure 9: OpenSPR-XT autosampler and benchtop system.

Specifications

	OpenSPR	OpenSPR-XT
Overview		
Fluidic Channels	2	
Flow Rate	5 - 200 µL/min	
Sample Capacity	1 (manual injection)	2x96-well plates
Injection	Semi-Automated	Automated
Injection Volume	50, 100, 250, or 500 µL (100 µL standard)	100 µL
Sample Volume	Injection volume + 50 µL	200 µL
# of Running Buffers	3, automated switching	
Analysis Temperature	4°C – 40°C (lower limit 10°C below ambient temperature)	
Analysis Temperature Precision	+/- 0.25°C	
Reagent Storage Temperature	-	Cooled from 22°C – 4°C
Unattended Run Time	-	24 hrs
File Output	CSV, TXT compatible with TraceDrawer	
Performance		
Association Range	10^3 – 10^7 1/M*s	
Dissociation Range	10^{-5} – 0.1 1/s	
Affinity Range	pM - mM	
Molecular Detection Limit	Application dependent	
Data Collection Rate	10 Hz	
Hardware		
Power Requirement	100 - 240 V, 50/60 Hz	
Dimensions (W x D x H)	46 x 34 x 21 cm	78 x x 57.5 x 36 cm
Weight	17 kg	17 kg (OpenSPR) 21 kg (Autosampler)
Computer Requirements		
Communications	USB 2.0 or 3.0	
Platform	Windows 10 or higher, 64-bit	
Memory	4 GB RAM	
CPU	Dual Core	

Join us on our mission to
improve human life

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