iCLUEB!O

iMSPR-ProX

Fully automated SPR system

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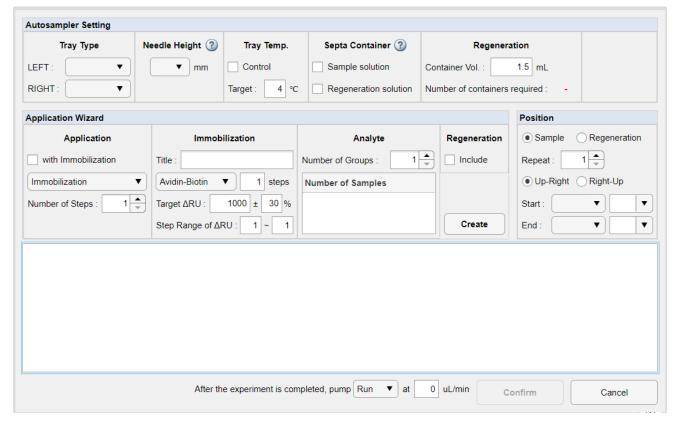# Fully automated label-free interaction analysis

iMSPR-ProX is a **fully automatic analysis system** that can analyze intermolecular bindings based on SPR phenomena **in real time without labeling**. This model is a very suitable system for **high-volume screening of candidate drugs and characterization of intermolecular binding**, which is an early stage of drug development. Of course, it can be used for various basic research related to intermolecular binding. Analytical materials range from proteins, peptides, nucleic acids, and even small molecule compounds. In addition to this, the size spectrum of analytes is very wide, from large cells such as tumor cells, bacteria, viruses, and exosomes to small molecules with a size smaller than nanometers. The iMSPR-ProX has very few consumables that need to be replaced frequently due to the application of very robust and concise parts. This means that annual maintenance costs can be kept to a minimum.
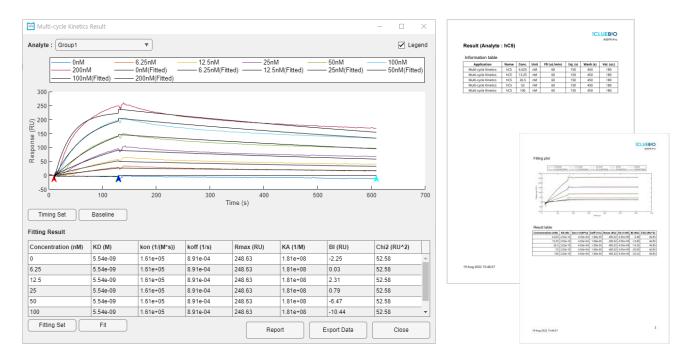
Sample to Answer In the iMSPR-ProX model, you simply prepare a sample and mount it on the autosampler, and the device will produce the desired result according to the set sequence, flow rate and channel mode.
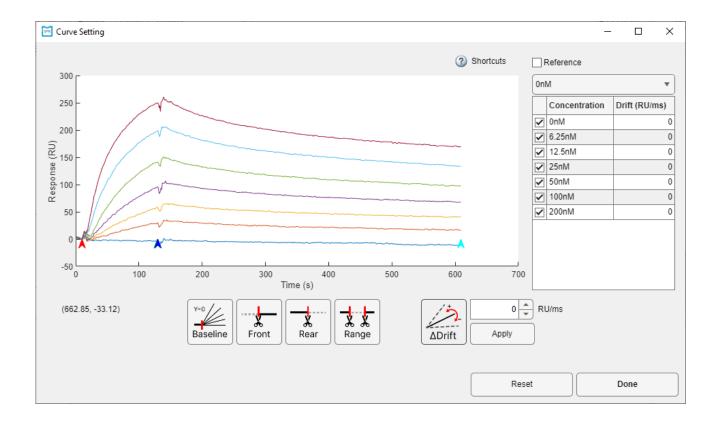
High-throughput Prepare reagents and ligands for immobilization in the standard rack of the autosampler, and prepare all kinds of samples for analysis. The standard 48 vials rack can accommodate up to 48 standard tubes in one tray. If you have more samples, you can use an additional rack to prepare them. The autosampler of iMSPR-ProX can be used with a 96 well plate as well as a 48 vials rack. It can also mount two racks or plates at the same time, processing up to 192 samples at a time.

Setup application wizard You just need to write the experimental protocol according to the prepared samples and immobilization reagents. If your sample is protein and you plan to run overnight experiments, turn on the autosampler tray temp. control function. It will help you proceed with the analysis while keeping your sample as safe as possible. And then write a wizard according to the immobilization method and the number of samples. Add regeneration if a regeneration step is required between samples. Through the smart program of iMSPR-ProX, detailed experimental protocol can be written and kinetics evaluation can be performed automatically.

Automatic kinetics evaluation

At the end of the experiment, iMSPR's clever analysis tool automatically performs a kinetics evaluation after overlaying the sensorgram of all the concentrations of the analytes you have run. After checking the result, you can print the result through the Report button.

Sensorgram Editing
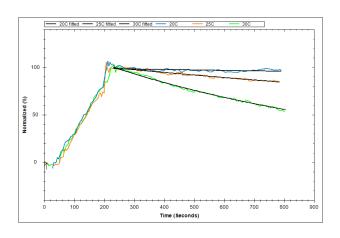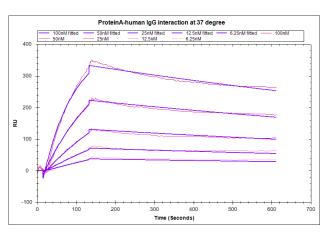
Now, there is no need to cumbersomely edit and analyze graphs in a separate analysis tool after the experiment is over. Utilizing the built-in iMSPR analysis tool, referencing can be done with a blank concentration graph, and drift correction is possible. In addition, you can easily remove elements that may affect the results by removing spikes in the graph and using various editing functions.
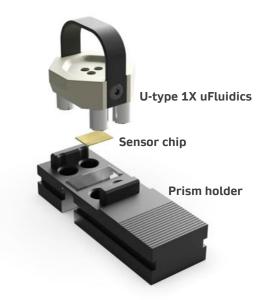
The most compact and fastest temperature control module

The iMSPR-ProX can be equipped with the world's first contact-based temperature control module. Even if this device is additionally introduced, the size of the device is the same as the model without this module, and it can change the environment from room temperature to 37℃ in 15 minutes.

Thermodynamics and Physiological tests The TCU module can be set from 10 °C to 40 °C. Accordingly, you can proceed with kinetics evaluation at various temperatures, and as a result, obtain thermodynamic properties such as enthalpy and entropy as well as kinetics constants. And the interaction evaluation of drug candidates in a physiological environment will further lower the probability of clinical failure.

U-type 1X uFluidics

Sensor chip

Prism holder

Most robust and simplest fluidics module

The SPR analysis system basically immobilizes the ligand (substance A) on the sensor surface and allows the analyte (substance B) to pass over the ligand surface to generate a reaction and acquire a real-time sensorgram accordingly. Therefore, in the SPR analysis system, the fluidics module plays a very important role, which allows the material to be precisely transferred to the sensor surface.

iMSPR's fluidics module can be used intuitively by users. And it is designed with the **most robust and simplest design** for **maintenance free**.

Special features for more perfect experiments

Sensor chip QC
The SPR analysis system uses a metal thin-film sensor chip with a high-tech membrane laminated surface. The iMSPR-ProX automatically evaluates the condition of the sensor chip and notifies you whether the new sensor chip is installed correctly, the surface is OK, and there are no bubbles trapped.

Minimizing interval
The offset is performed by automatically calculating the sample injection timing between channels so that you can check the more accuracy subtracted data in real-time during your experiment.

Real-time removing bubble and alarm of leakage
When analyzing SPR, the researcher should always be on the lookout for bubbles to be injected into the channel. iMSPR-ProX not only completely removes bubbles with its built-in real-time bubble removal system, but also informs researchers about leaks occurring during the experiment using a self-developed algorithm and helps them to cope.

Specifications

Including	iMSPR-ProX main system (1ea), Autosampler (1ea), 48 vials rack (1ea), 2 channels U-type Fluidics module (1ea), Prism holder (1ea), Detach tool (1ea), PC (1ea), Tracedrawer SW (1cp) Flat tweezer (1ea), Matching oil (3ml), USB cable (1ea) Sensor chip storage kit (1ea)
Warranty	1 years

iMSPR-ProX main system

SPR type	Angular interrogation, Prism coupling
Channels/ Channel volume	Channel 1: Ligand channel, Channel 2: Reference channel Channel 2-1 (Connected mode), 500 nL
Light source	770 nm LED
Detector	2D CMOS image sensor, 1/1.8", 1.3MP
Polarizer control	Auto
Incident light range	6˚
RIU range	1.32 ~ 1.38
Association (k_a)/Dissociation (k_d)/Affinity range(K_D)	10^3 to 10^7 M^{-1}s^{-1} / 10^{-5} to 1 s^{-1} / 10^{-3} to 10^{-12} M
Noise level (single channel)	0.1 RU
General analysis time/sample	2~15 min
Main application	Yes/No binding, Rate on/off constants / Equilibrium constant Drug screening (discovery), Pharmaceutical QC, Thermodynamics (optional)
Analytes	Proteins, DNA/RNA, Peptides, Small compounds, Polysaccharides, Lipids, Viruses, Cells
Temperature range (TCU built-in model)	±10˚C of ambient temperature
Size	360 x 466 x 262 (mm), 18kg
Power	AC100-240V
Materials	Aluminum (more 90%), PEEK

Pump type	Peristaltic
Pump channel No.	1
Operation tubing	3-stop pharmed tubing, ID: 0.25 mm
Flow rate range	10~100 uL/min
Selection valve type	Solenoid
Degasser volume	100 uL

Autosampler	

Capacity	48 vials x 2 96 well plate x2
Pump type, volume	Syringe, 500 uL
Injection valve, loop volume	6 ports - 2 ways, 200 uL (option 100, 1000 uL)
Injection volume	1 (more 20 uL recommended) to 200 uL (maximum volume depend on loop volume)
Required sample volume	Normal mode: Injection volume + 30 uL Air gap mode: Injection volume +75 uL
Prime, cleaning type	Auto
Sample loading type	Normal & Air gap mode
Sample storage temperature (TCU built in model)	4°C below ambient temperature
Power	100-240V
Communication	RS232
Size	300 x 575 x 360 (mm), 21kg
Vials	t-LABs; 9-425 2 mL screw thread Autosampler glass Vial t-LABs; screw cap with 9mm PTFE/Silicone septa Scilab; 2 mL snap top glass Vial Scilab; snap-top PTFE/Sil 11mm septa Wheaton; Snap-/Crimp-Top pp Vial, 0.5~1 mL

PC	

CPU	i5
RAM	16G
Operation	Window
Power	AC100~240V

iMSPR-ProX is capable of supporting operation in GXP and 21 CFR Part 11 in compliance with regulatory demands.

iMSPR series

The iMSPR series is a real-time monitoring and analysis system for label-free intermolecular binding based on surface plasmon resonance (SPR) phenomenon. Through the iMSPR series, new biosensors, biomarkers, and receptors can be developed, or new drug candidates can be discovered. In addition, it can evaluate pharmaceutical quality and can be used for medical diagnosis. Experience the iMSPR series of various configurations, from the basic manual model iMSPR-mini to the fully automated advanced model iMSPR-ProX model.

What is your choice of iMSPR series

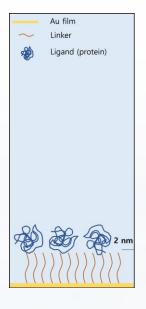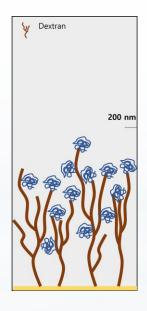| Model name	iMSPR-ProX	iMSPR-Pro	iMSPR-mini	iMSPR-Lab
Cat. No	INPX1000	INPR1000	INMN3000	INLB1000
Channels	2	2	2	2
Channel type	U type (connected)	U type (connected)	I type (individual)	I type (individual)
Degasser	Built in	Built in	No	No
Operation guide	Yes	Yes	No	No
Automatic kinetics evaluation	Yes	Yes	No	Not including
Temperature Control Unit for analysis	Yes (optional)	Yes (optional)	No	No
Sample injection	Autosampler	Manual injection using syringe	Manual injection using pump tubing	Manual injection using pump tubing
Noise level (single channel)	0.1 RU	0.1 RU	0.1 RU	0.1 RU
Incident angle range	6	6	6	40
Incident angle change	No	No	No	Yes
Applications	Drug Screening Concentration affinity Kinetics	Yes/No Affinity Kinetics	Yes/No Affinity Sensor development	Sensor development Gas sensing Film/solvent
GxP operation (21 CFR Part 11)	Yes (optional)	Yes (optional)	No	No
Recommended customers	Common facility Pharmaceutical company	Personal lab of university/ Research center	Personal lab of university/ Research center	Personal lab of university/ Research center

Sensor chips guide

icluebio is designed to be applied to a variety of applications. We offer a wide range of sensor chip surfaces - types, functional groups, densities and thicknesses. The surface of the sensor chip have to be determined the type of analyte, the size of the analyte, the ligand immobilization method, non-specific adsorption, etc.

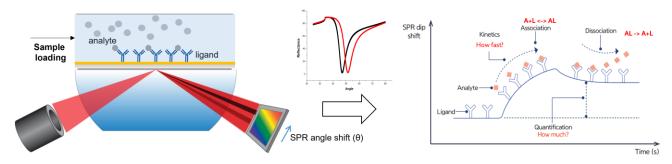|	**2D surface**	**3D-Dextran**	**3D-Linear hydrogel**
Linker	Self assembly monolayer	Dextran	Linear polymer
Thickness	< 10 nm	100 nm	1000 nm
Functional group	Bare, COOH, Biotin, NTA	COOH, NTA, Avidin	COOH, NTA, Avidin
Glass Size	14x10x0.33 mm	14x10x0.33 mm	12x12x0.33 mm
Glass material	BK7	BK7	BK7
Adhesive	Cr	Cr	Cr
Metal layer	Au	Au	Au
Linker material	Alkan-thiols	Dextran	Linear polymer
Immobilization level	< 2000 RU	< 20,000 RU	< 30,000 RU
Non-specific adsorption	Moderate	Low	Low

Representative Sensor chips

Application (ligand-analyte)	Suggested chips	Product Name
Proteins-Proteins	Planar carboxyl linker monolayer chip Carboxyl modified dextran chip	COOH-Au chip C-Dex100
Proteins-chemicals	Linear polycarboxylate chip Carboxyl modified dextran chip	HC1000 C-Dex100
Proteins-vesicles	Planar carboxyl linker monolayer chip	COOH-Au chip
Biotinylated (Avitag) proteins-Analytes	Neutravidin immobilized sensor chips	Avidin-Au chip A-Dex100 NAHC1000
Histag proteins-Analytes	NTA sensor chips	NTA-Au chip NiHC1000
Lipids-Analytes	Hydrophobic linker monolayer chip Lipophilic anchor dextran chip	HP-Au chip LD chip
Immobilization of DNA and Peptide on sensor chip	Requiring biotinylation of ligand DNA or Peptide Neutravidin immobilized sensor chip	Avidin-Au chip A-Dex100 NAHC1000

Capture kits

Product	Product #	Purpose of use
Starter kit (amine coupling)	IMSA1000	Operation kit for SPR starter
Amine coupling kit	IMAM1000	Covalent immobilization of ligand proteins
Histag capture kit	IMNT1000	Immobilization of Histag proteins
Biotinylated molecule capture kit	IMNA1000	Immobilization of Biotinylated molecules
Human IgG capture kit	IMPA1000	Immobilization of hFc tag or hIgG

What is SPR?

Surface Plasmon Resonance (SPR) is a phenomenon in which the reflected light disappears at a specific angle of incidence when light is incident on the side of the prism on which the gold thin film is placed. SPR biosensor is a powerful technique to measure biomolecular interactions in real-time without labeling materials. When biomolecules bind on the sensor chip, the surface refractive index changes and the angle of the reflected light shifts. Molecular interaction is monitored by acquiring sensorgrams that record this angle change in real time.

Sample loading & SPR angle shift   **Sensorgram** by SPR angle shift in real-time

How can monitor the interaction

1. The phenomenon that the reflected light disappears at a specific angle of incidence: **SPR angle**

2. The **SPR angle shifts** when the surface refractive index changes due to biomolecule bonding on the sensor chip.

3. The **sensorgram is acquired** by recording SPR angles in real-time

4. **Monitoring of intermolecular binding** through sensorgram

What are the uses of iMSPR

Biomolecular interaction analysis is not limited to proteins. The interactions between hybrid systems of DNA-DNA, DNA-protein, lipid-protein, small compound-protein and biomolecules and non-biological surfaces can be investigated.

iMSPR is used

• To **identify the binding** of two or more interactants to each other

• To find (**screening**) candidates of lots of molecules

• To determine the **affinity (K_D)** of the interactions

• To evaluate the actual **association (k_a) and dissociation rates (k_d)**

• To **quantify the concentration** of analyte in sample solution

• To analysis **thermodynamics**: **H, S**

Applications

Sample type	Proteins DNA/RNA Peptides Small compounds Polysaccharides Lipids Viruses Cells
Application	Yes/No binding Ranking, Screening Affinity (Equilibrium constants, K_D) Kinetics (Rate constants, k_a, k_d) Dissociation rate (residence time) Inhibition Quantification
Applicable fields	Drug discovery Drug quality control Immuno-Oncology drug Small compounds Protac Antibody therapeutics Antibody Drug conjugations (ADCs) Bispecific antibody Epitope mapping Immunogenicity Immunoassay based diagnostics

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iCLUBIO was founded in 2017 in Seoul, Korea. It is our mission to create the best tools that can impress customers and discover clues to life phenomena that can be helpful to mankind. Currently, we are putting all our capabilities and passion into an analysis system based on Surface Plasmon Resonance that can observe intermolecular bonds in real time without labeling. icluebio aims to develop, create, and provide innovative but honest and robust but precise tools that can analyze intermolecular bonds more conveniently and accurately. And we hope that you will be moved and surprised.

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