

# iMSPR

## Pro Series

The Most Sustainable  
Molecular Interaction  
Analysis system

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# iMSPR Pro Series

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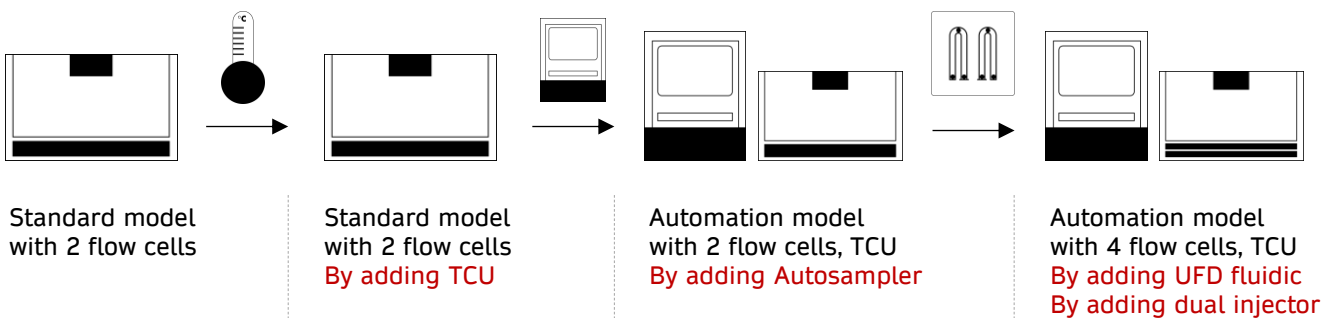
## Fully automated interaction analysis without labeling



**iMSPR Pro series** is a **fully automatic analysis system** that can analyze intermolecular bindings based on SPR phenomena **in real time without labeling**. Pro series is a very suitable system for **high-volume screening of drug candidates 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 to 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 Pro series 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.

# Why iMSPR

**Most sustainable SPR system** You can start small to fit your budget. As time goes by, your needs grow, and your budget expands, you can simply upgrade to add new, powerful, and diverse features without having to buy a new product. If you choose the iMSPR Pro series, it means that it was the latest product when you first started, and you can still use the latest product today.



## Add applications

Yes/No  
Affinity  
Kinetics

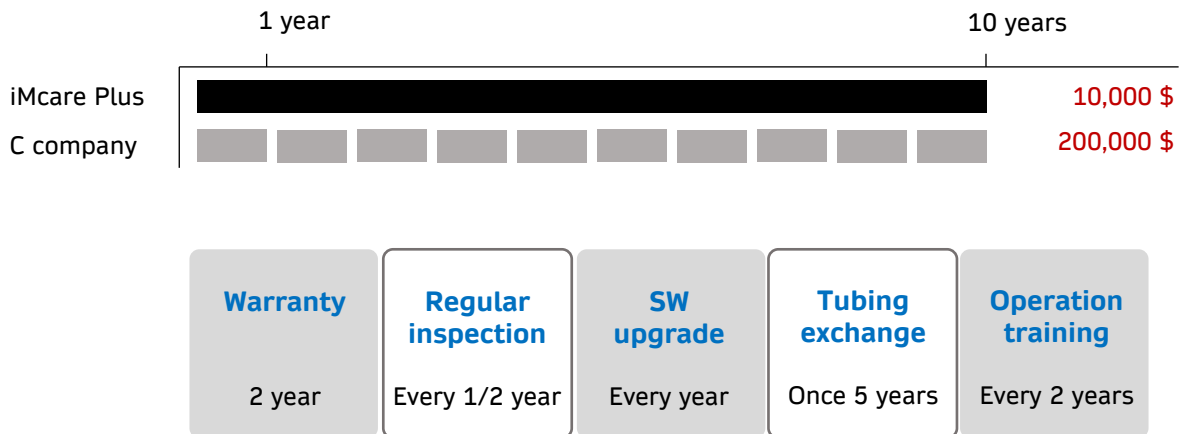
Yes/No  
Affinity  
Kinetics  
Thermodynamics

Yes/No  
Automatic and accuracy  
evaluations  
- Affinity  
- Kinetics  
- Thermodynamics  
Immobilization level  
control  
Screening (Max 15  
samples/hr)

Yes/No  
Automatic and accuracy  
evaluations  
- Affinity  
- Kinetics  
- Thermodynamics  
Immobilization level  
control  
Screening (Max 30  
samples/hr)  
2 experiments  
simultaneously

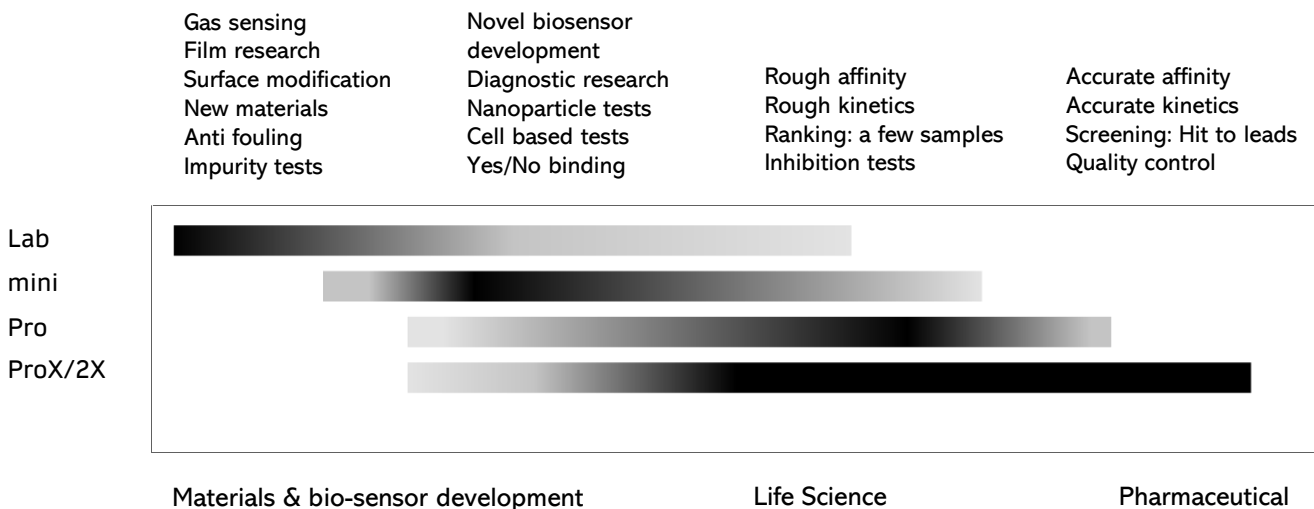
## Long-life use by small maintenance

We've built all of our components to be durable so that you can use your iMSPR for as long as possible, or almost a lifetime. If you choose iMcare Plus, you can receive care for 10 years at a very small cost. It includes a two-year warranty, regular inspections every six months, software upgrades every year, one tubing replacement, and regular training every two years. (This is the standard within Korea, and each country has different iMcare policies.)



## The best choice for various applications

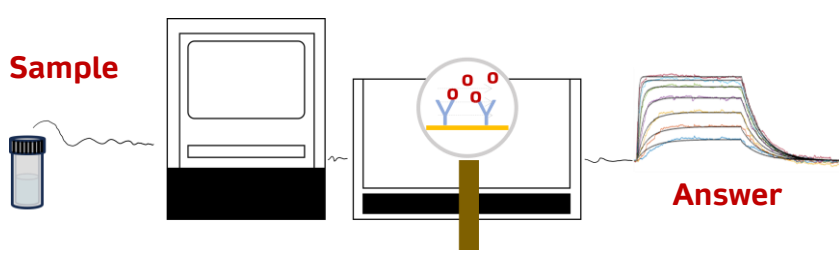
The iMSPR series consists of a variety of models to accommodate a variety of applications. From new material characterization to new drug development and drug quality control, choose the iMSPR model that fits your needs.



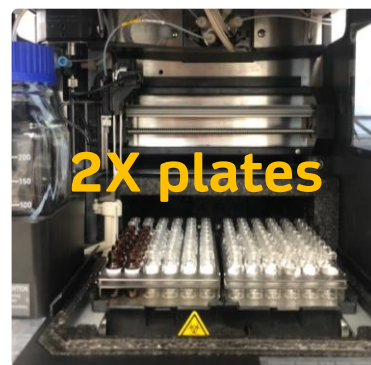
# Core Features

## Sample to Answer

In the iMSPR-Pro series, you simply prepare samples and inject them into a sensor chip using an autosampler and a syringe, and the device will produce the desired result according to the set sequence, flow rate and channel mode.



**Sample: 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.



**Experiment Wizard** Simply write your experiment protocol according to your desired applications. 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. 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 the iMSPR Pro series, detailed experimental protocols can be written and various evaluations can be performed automatically.

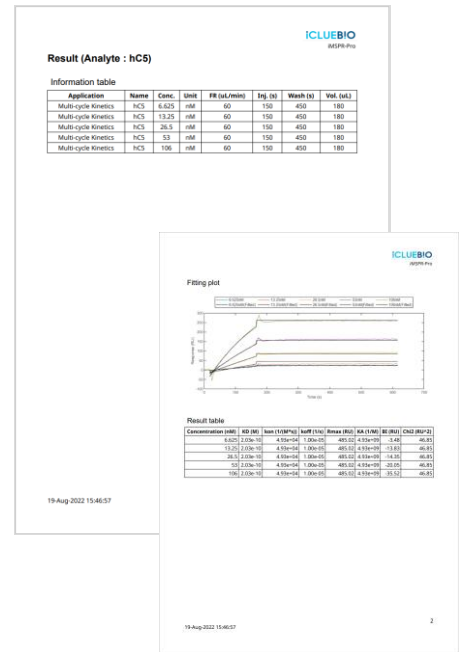
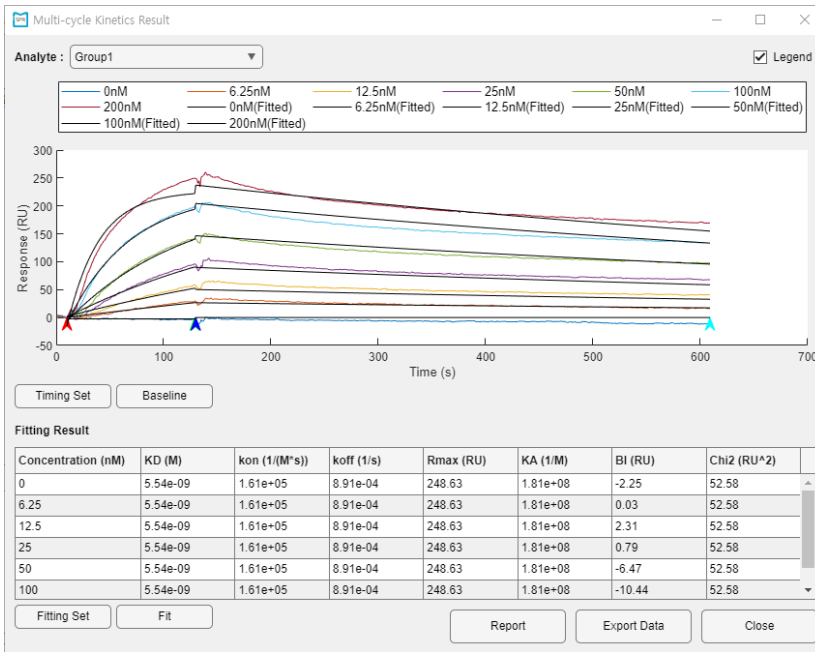
Autosampler Setting				
<b>Tray Type</b>	<b>Needle Height</b> ?	<b>Tray Temp.</b>	<b>Septa Container</b> ?	<b>Regeneration</b>
LEFT : <input type="text"/>	<input type="text"/> mm	<input type="checkbox"/> Control	<input type="checkbox"/> Sample solution	Container Vol. : <input type="text"/> 1.5 mL
RIGHT : <input type="text"/>		Target : <input type="text"/> 4 °C	<input type="checkbox"/> Regeneration solution	Number of containers required : -

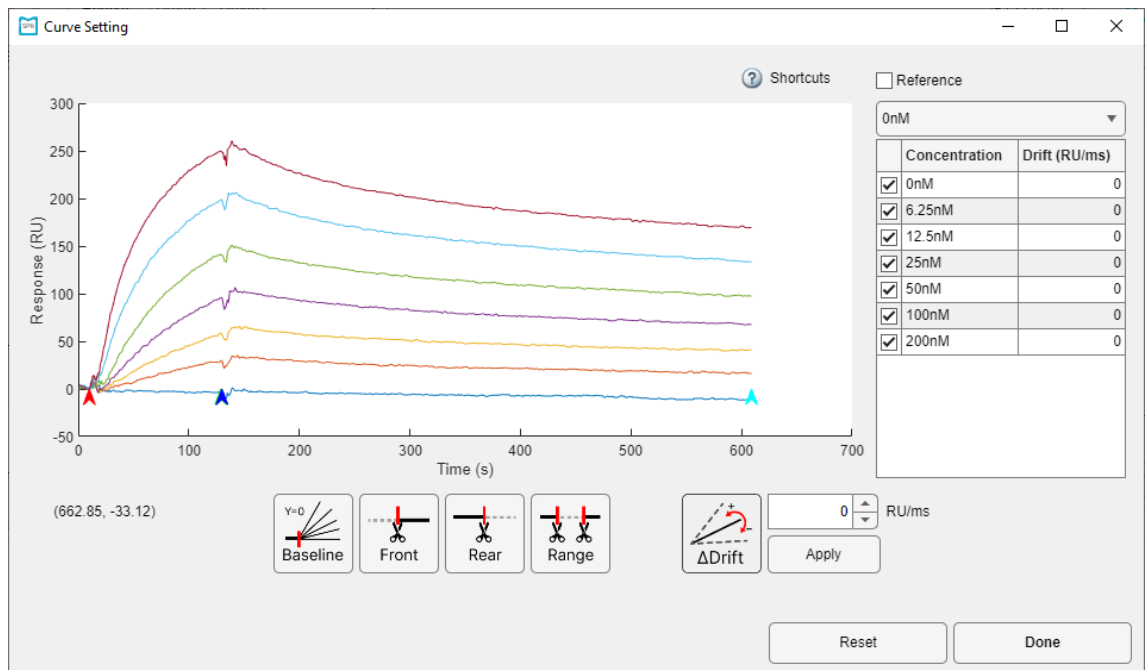
Application Wizard				Position
<b>Application</b>	<b>Immobilization</b>	<b>Analyte</b>	<b>Regeneration</b>	<input checked="" type="radio"/> Sample <input type="radio"/> Regeneration
<input type="checkbox"/> with Immobilization	Title : <input type="text"/>	Number of Groups : <input type="text"/> 1	<input type="checkbox"/> Include	Repeat : <input type="text"/> 1
Immobilization <input type="text"/>	Avidin-Biotin <input type="text"/> 1 steps	Number of Samples <input type="text"/>		<input checked="" type="radio"/> Up-Right <input type="radio"/> Right-Up
Number of Steps : <input type="text"/> 1	Target ΔRU : <input type="text"/> 1000 ± <input type="text"/> 30 %		<b>Create</b>	Start : <input type="text"/> <input type="text"/>
	Step Range of ΔRU : <input type="text"/> 1 ~ <input type="text"/> 1			End : <input type="text"/> <input type="text"/>

After the experiment is completed, pump  Run  at  0 uL/min



**Answer: Automatic evaluation** At the end of the experiment, iMSPR's smart analysis tool automatically performs a kinetics evaluation or steady state affinity evaluation after overlaying the sensorgrams of all the concentrations of the analytes you have run. After checking the result, you can print the result through the report button.

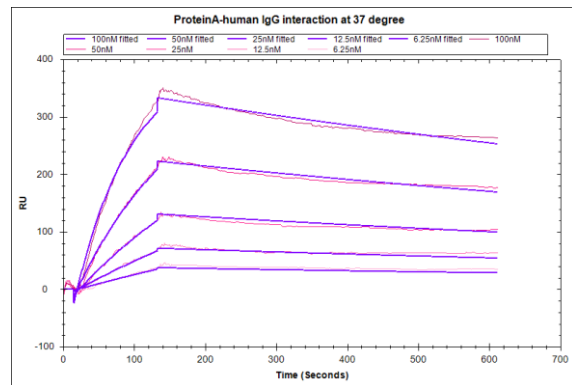
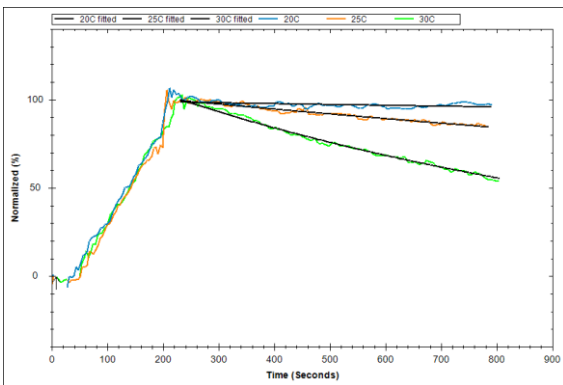


**Easy to edit for more accuracy evaluation** Now, there is no need to cumbersome edit and analyze curves in a separate analysis tool after the experiment is over. Using the built-in iMSPR analysis tool, a curve referencing can be done with a blank concentration data, and drift correction is possible. In addition, you can easily remove outliers that may affect the results by removing spikes in the curve and using various editing functions.



## The most compact and fastest temperature control unit (TCU)

The iMSPR-Pro series can be equipped with the world's first contact-based temperature control module. Even if this module 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°C in 15 minutes.

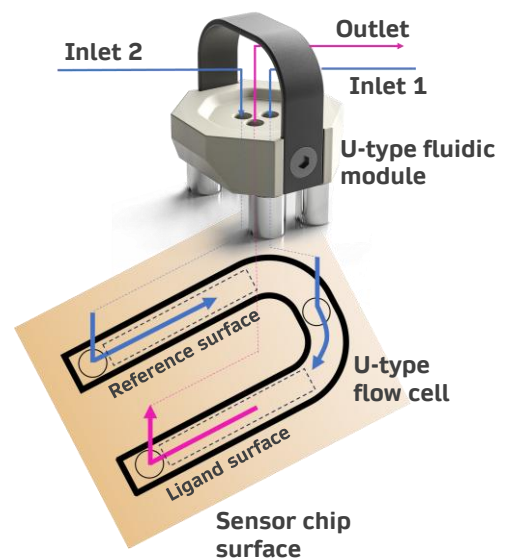


## Thermodynamics and Physiological tests for additional information

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.

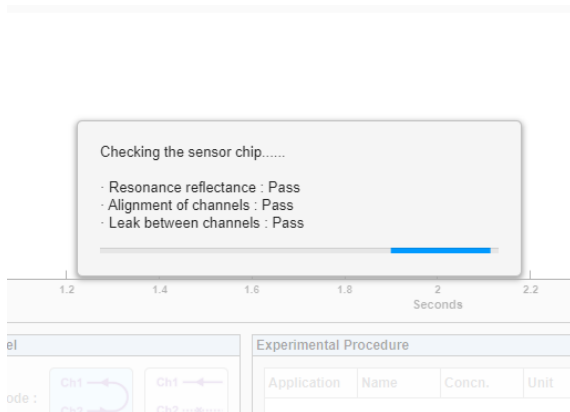
## Most sustainable and sophisticated U-type fluidic module

The SPR analysis system basically immobilizes the ligand on the sensor surface and allows the analyte to pass over the ligand surface to generate a reaction and acquire a real-time sensorgram accordingly. Therefore, in the SPR analysis system, the fluidic module has a very important role, which allows the material to be precisely transferred to the sensor surface. iMSPR's U-type fluidic 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

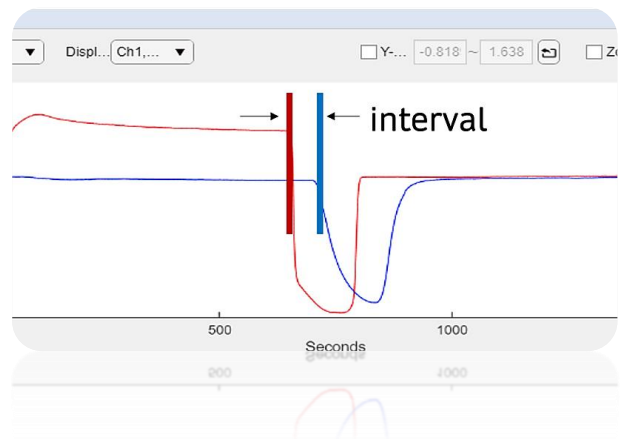


### Sensor chip QC

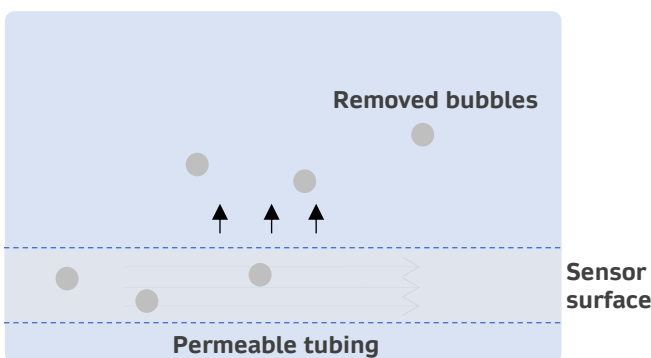
The SPR analysis system uses a metal thin-film sensor chip with a high-tech membrane laminated surface. The iMSPR Pro series automatically evaluates the condition of the sensor chip and notifies you whether the new sensor chip is installed correctly, the surface is OK, and there are no bubbles trapped.

### Minimizing interval

The offset correction 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.






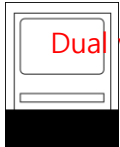
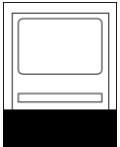

### Vacuum chamber



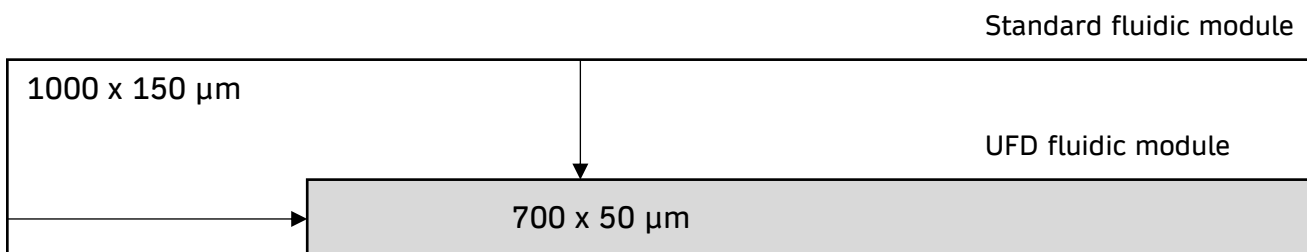
### Real-time removing bubble and alarm of leakage

When analyzing SPR, the researcher should always be on the lookout for bubbles to be injected into the channel. iMSPR Pro series 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.

# What are the differences

	Pro2X	ProX	Pro
Sample flow channel	4 Two experiments per chip	2 One experiment per chip	2 One experiment per chip
Fluidics module	<b>UFD fluidic module</b> with dual U-type flow cells 	Standard fluidic module With mono U-type flow cells 	Standard fluidic module With mono U-type flow cells 
Sample injection	Autosampler with dual injection valve 48 vial rack x 2 96 well plate x 2 384 well plate x 2  Dual valves	Autosampler with mono injection valve 48 vial rack x 2 96 well plate x 2 384 well plate x 2 	Syringe One by one injection 
Sample volume (200 µl sample loop)	Max 200 µl Partial injection available 30 ~ 75 µl dead volume	Max 200 µl Partial injection available 30 ~ 75 µl dead volume	Max 200 µl Partial injection available 30 ~ 60 µl dead volume
Screening capacity (Maximum)	300 samples per day	150 samples per day	Not recommended

## UFD fluidic module



Compare with standard fluidics

- 200 nl, 80% reduction of channel volume
- Interval-less referencing
- Lower consumption of sample
- More accurate leveling of immobilization

# Specifications

	Pro2X	ProX	Pro
What's in the package (commons)	iMSPR-Pro main body (1 set), Prism holder (1 ea), Detach tool (1 ea), PC (1 pkg), Flat tweezer (1 ea), Matching oil (3 ml), USB cables, Power cable (1 ea)		
What's in the package (individuals)	UFD fluidic module (1 ea), autosampler with dual injection valve (1 pkg), 48 vials rack (1 ea), vials of 750 $\mu$ l (100 ea)	Standard fluidic module (1 ea), autosampler (1 pkg), 48 vial rack (1 ea), vials of 750 $\mu$ l (100 ea)	Standard fluidic module (1 ea), syringe of 250 $\mu$ l (1 ea)
Warranty	1 year		

## Main system (All model)



SPR type	Angular interrogation, Prism coupling
Light source	770 nm LED
Detector	2D CMOS image sensor, 1/1.2", 2.35MP
Polarizer control	Auto
Incident light range	10°
RIU range	1.32 ~ 1.39
Association ( $k_a$ )/Dissociation ( $k_d$ )/Affinity range( $K_D$ )	$10^3$ to $10^8$ M <sup>-1</sup> s <sup>-1</sup> / $10^{-5}$ to $0.5$ s <sup>-1</sup> / $10^{-3}$ to $10^{-13}$ 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)	4 ~ 40°C ( $\pm 10^\circ$ C of ambient temperature)
Size	360 x 466 x 262 (mm), 18kg
Power (Power consumption)	AC100-240 V (130 W)
Materials	100% recyclable Aluminum (more 90%), PEEK

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

Autosampler (ProX and Pro2X)



Capacity	48 vials x 2 96 well plate x2 384 well plate x2
Pump type, volume	Syringe, 500 uL
Injection valve, loop volume	6 ports - 2 ways, 200 uL (option 100, 500, 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 (Power consumption)	100-240 V (200 W)
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

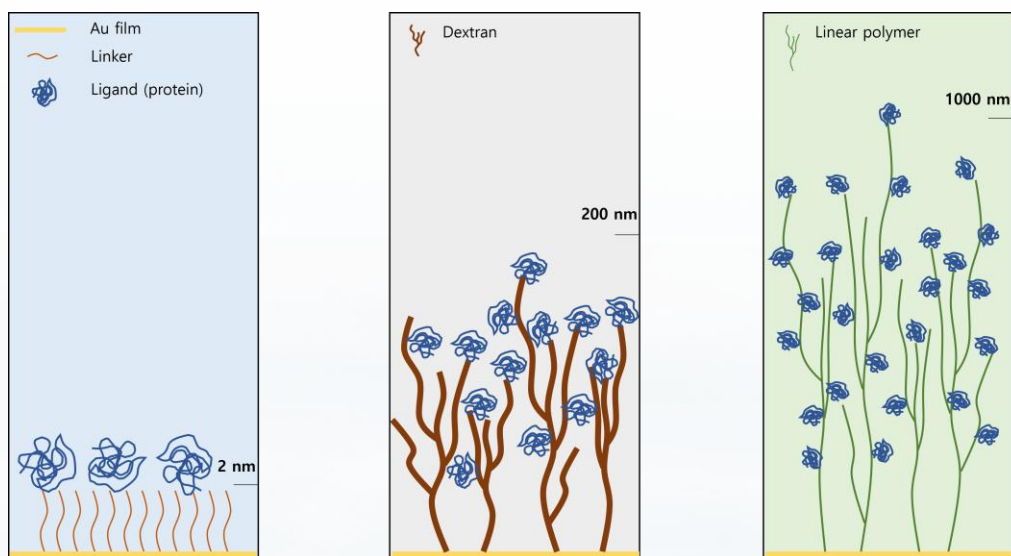


CPU	i5
RAM	16G
Operation	Window
Power	AC100~240V

**iMSPR-ProX and Pro2X is capable of supporting operation in GXP and 21 CFR Part 11 in compliance with regulatory demands.**

# Sensor chips guide

icluebio sensor chips are 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 has to be determined the type of analyte, the size of the analyte, the ligand immobilization method, non-specific adsorption, etc.

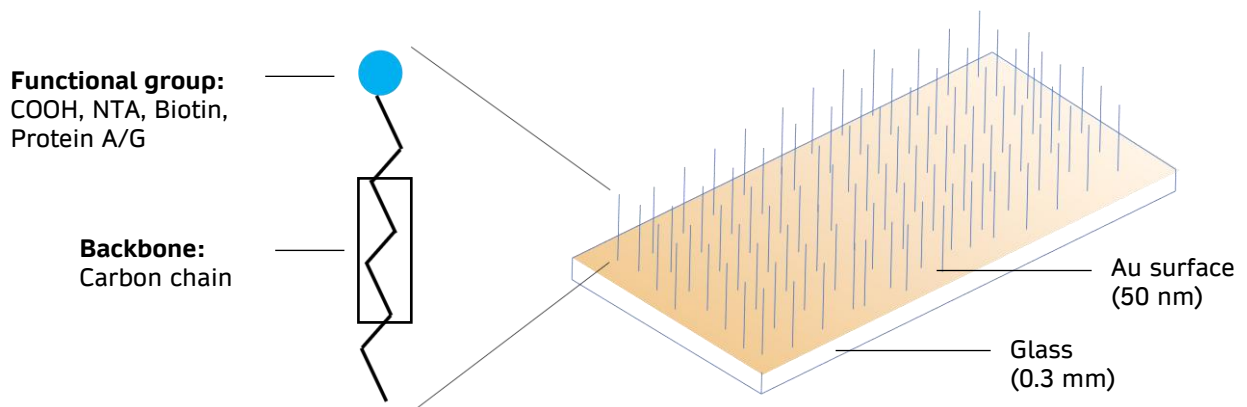


	2D surface	3D-Dextran	3D-Linear hydrogel
Linker	Self-assembled monolayer	Dextran	Linear polymer
Thickness	< 10 nm	100 nm	> 100 nm
Functional group	Bare, COOH, Biotin, NTA	COOH, Protein A/G	COOH, NTA
Glass Size	14x10x0.33 mm	14x10x0.33 mm	12x12x0.33 mm
Glass material	BK7	BK7	BK7
Adhesive	Cr	Cr	Cr
Metal layer	Au	Au	Au
Linker material	Alkan-thiols	Dextran	Linear polymer
Immobilization level	Low	High	High+
Non-specific adsorption	Moderate	Low	Low

# Alkanthiols based planar sensor chips

Since the iSPR system has sufficient sensitivity, satisfactory results can be obtained even on a sensor chip (Planar Au sensor chip) formed with a monolayer of linker material that can immobilize the ligand in the case of a molecule with a relatively large size (about 5 kDa or more) – protein, cell, bacteria, virus, exosome, etc. In particular, in the case of antibody drugs, it is a very suitable application field because the signal is large and the affinity is high.

## Structure



## Immobilization level (Max.)

100 ~ 2000 RU (molecule type and MW dependent)

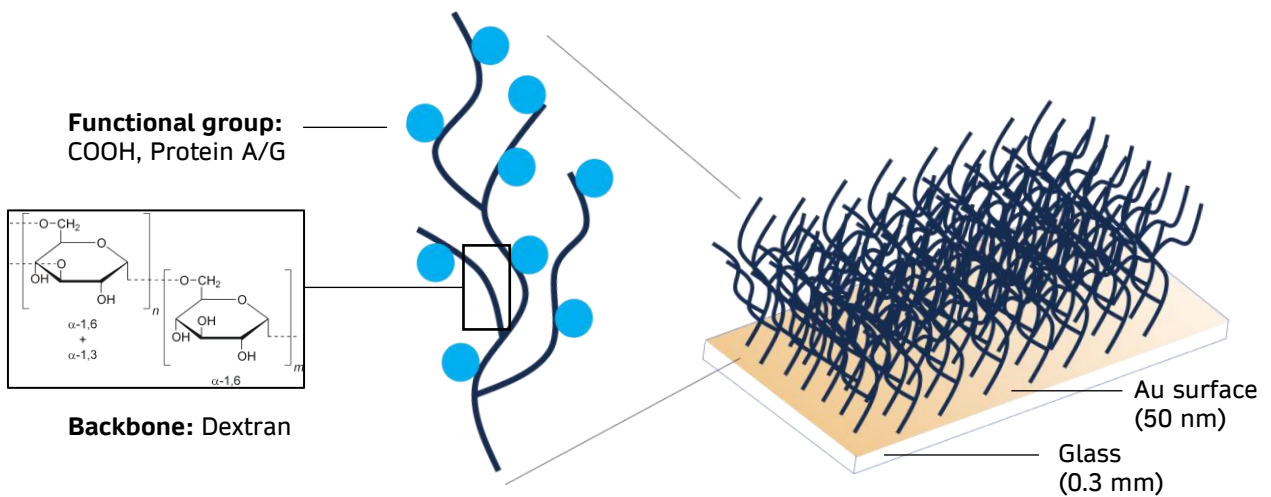
## Recommend analytes

	1 kDa	10 kDa	100 kDa	10~500 nm
Small compounds	Oligomers Peptides	Small proteins	Macro sized proteins Antibodies	Vesicles Virus Nano particles

# Dextran based membrane sensor chips

Dextran sensor chips were first commercially available in the early 1990s by applying solid surface technology well-optimized for affinity chromatography. Therefore, the largest amount of data has been accumulated using SPR to date. Therefore, there are many literatures and results that can be referenced, which is very advantageous for reproducing similar experiments. It is a universal sensor chip that can be used from large-sized proteins to small compounds.

## Structure



## Immobilization level (Max.)

1000 ~ 10000 RU (molecule type and MW dependent)

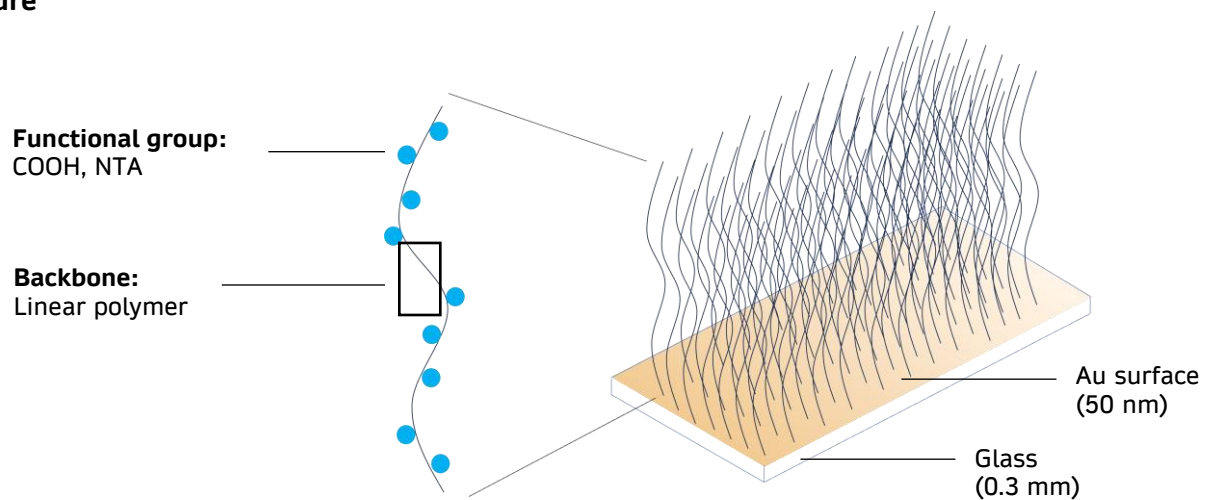
## Recommend analytes

	1 kDa	10 kDa	100 kDa	10~500 nm
Small compounds	Oligomers Peptides	Small proteins	Macro sized proteins Antibodies	Vesicles Virus Nano particles

# Linear polymer based membrane sensor chips

The linear polymer sensor chip developed this time is a sensor chip that complements the shortcomings of the dextran sensor chip while maintaining the performance of the membrane sensor chip. It can be fabricated more reproducibly, exhibits a higher signal-to-noise ratio, improves diffusion properties and reduces non-specific adsorption. A representative sensor chip is the HC1000. It is a sensor chip suitable for analyzing small molecular compounds.

## Structure



## Immobilization level (Max.)

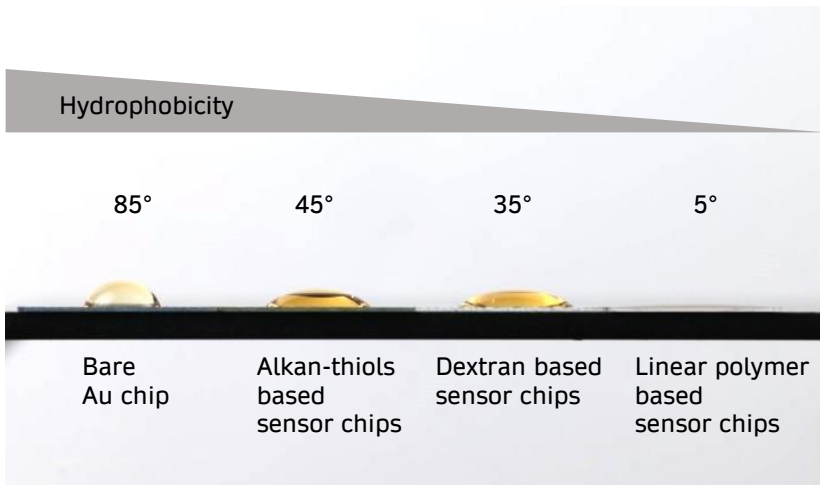
1000 ~ 20000 RU (molecule type and MW dependent)

## Recommend analytes

	1 kDa	10 kDa	100 kDa	10~500 nm
Small compounds	Oligomers Peptides	Small proteins	Macro sized proteins Antibodies	Vesicles Virus Nano particles



# Contact angle of sensor chips



Various sensor chips made by icluebio have different degrees of hydrophobicity depending on the back-born material structure. Instead of using just one chip, improve the quality of your analysis with sensor chips of various surfaces.

## Sensor chip storage kit

### What's in the kit



Prism holder



S-type storage fluidic module

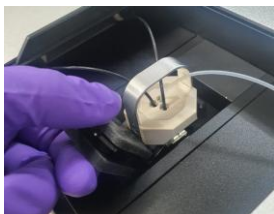


Storage buffer

It is an essential tool to keep your sensor chip running. After removing the used prism holder from the device, install the s-type fluidic module. Then fill with storage buffer and store in the refrigerator. The ligand material immobilized on the sensor chip can be safely stored until the next use.

### Steps

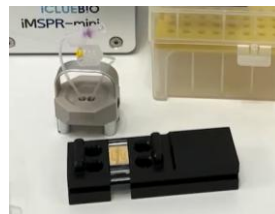
Detachment of U-type fluidic module and prism holder 1 after experiment



Assemble of S-type storage fluidic module and prism holder 1 and store at 2~8°C, you can perform another test using prism holder 2



Detachment of S-type storage fluidic module and prism holder 1



Assemble of U-type fluidic module and prism holder 1 and do experiment



## Representative Sensor chips

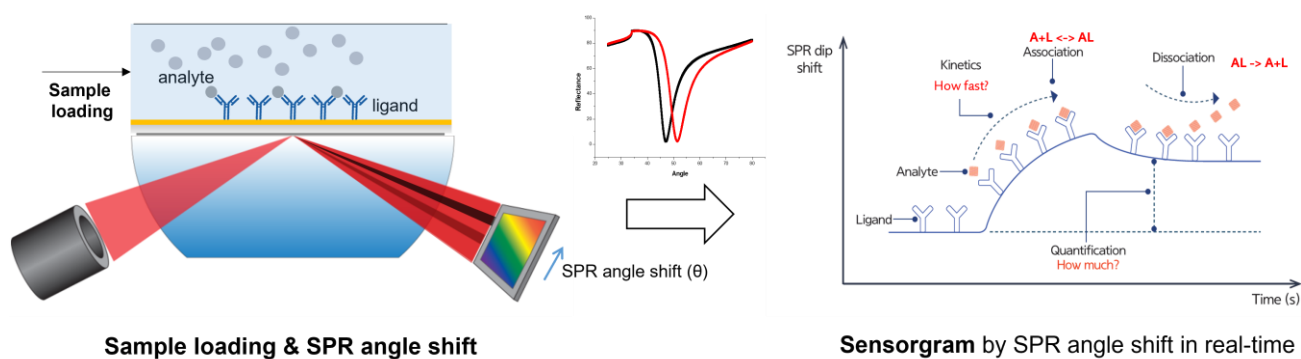
Application (ligand-analyte)	Suggested chips	Product Name
Proteins-Proteins	Planar carboxyl linker monolayer chip Carboxyl modified dextran chip	COOH-Au chip C-Dex100
Proteins-chemicals	Linear polycarboxylate chip Carboxyl modified dextran chip	HC1000 C-Dex100
Proteins-vesicles	Planar carboxyl linker monolayer chip	COOH-Au chip
Biotinylated (Avi-tag) proteins-Analytes	Avidin immobilized COOH sensor chips using Biotin-molecule capture kit	Biotin-Au chip COOH-Au chip C-Dex100 HC1000
His-tag 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 Avidin immobilized COOH sensor chips using Biotin-molecule capture kit	Biotin-Au chip COOH-Au chip C-Dex100 HC1000

## Capture kits

Product	Product #	Purpose of use
Starter kit 1 (Amine coupling)	IMSA1000	Operation kit using amine coupling for SPR starter
Amine coupling kit	IMAM1000	Covalent immobilization of ligand proteins
His-tag capture kit	IMNT1000	Immobilization of His-tag proteins
Biotin-molecules capture kit 1	IMNA1000	Immobilization of Biotinylated molecules
Biotin-molecules capture kit 2	IMBC1000	Immobilization of Biotinylated molecules
Fc-tag 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.



## 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 from 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**

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# Applications

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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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**icluebio**

icluebio was founded in Seoul, South Korea in 2017. Our mission is to create sustainable, well-balanced tools in terms of performance and cost that can impress customers and discover clues to life phenomena that can benefit mankind. Currently, we are devoting all our capabilities and passion to the Surface Plasmon Resonance-based analysis system, which enables simple, real-time observation of intermolecular bonds without labeling. We will do our best to be sustainable for products, people, company, and the earth.

# iCLUEB!O

**[www.icluebio.com](http://www.icluebio.com)**

icluebio's iMSPR series is manufactured in Korea and is finally delivered to the customer through precise quality inspection by a specialist. The device experts directly deliver, install free of charge, and perform IQ/OQ right on the spot. After all on-site tests are completed, you will receive training in operation from the education experts in the contents of the handbook.

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Youtube: <https://www.youtube.com/@icluebio>

Blog: <https://blog.naver.com/hipoo99>