

alto

The world's first
digital high-throughput
benchtop SPR system.

Accelerate your
drug discovery with Alto.

 nicoya

Contents

Alto Instrument	1
Alto Cartridges	6
Alto Software	7
Digital Microfluidics	8,9
About Us	10,11
Contact Info	12



Surface Plasmon Resonance Powered by Digital Microfluidics.

Alto is the world's first SPR instrument to integrate digital microfluidics (DMF), artificial intelligence (AI), and nanotechnology to provide high quality, label-free interaction analysis. DMF technology enables all fluidics to be disposable, allowing for precise handling of 2uL sample volumes, crude sample compatibility and zero maintenance. Alto's compatibility with automation for both hardware and software provides sample-in/answer-out data, industry leading throughput, and 24/7 runtime. Every aspect of Alto is designed with user-friendliness and accessibility in mind - from the flexible 16 channel design to the intuitive data analysis platform.

*Alto is capable of supporting operation in GXP and 21 CFR Part 11 in compliance with regulatory demands.





Industry-Leading Data Quality

- Precisely measure and analyze interactions with digital microfluidics, minimizing noise and dispersion while maximizing accuracy
- The fastest recorded rise times in the industry at $<0.1s$



High-Throughput Powered by Automation and AI

- Accelerate your research with features only available on Alto: intelligent assay design/optimization, on-chip fluid handling, automated serial dilutions and compatibility with plate handling robots
- Eliminate tedious maintenance of outdated fluidics - save time and money with Alto's 24/7 runtime and zero downtime between experiments



Sample-Friendly

- Save precious samples with only 2uL required for full kinetics - 500X less sample than is required in traditional SPR instruments
- All fluidics are disposable - analyze crude samples with ease and say goodbye to tedious cleaning cycles



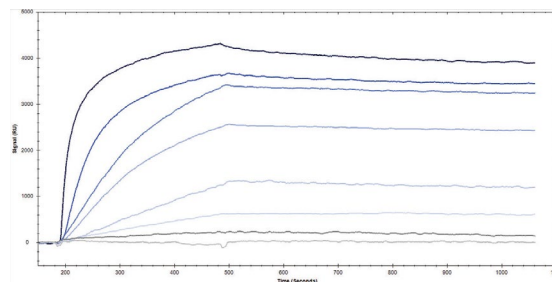
User-Friendly

- Advanced data analysis with intelligent and customizable software for novice to expert users
- Forget about expensive service contracts & training - Alto is free of high maintenance fluidic components and obsolete software



Applications

- Kinetics/Affinity Characterization
- Kinetics/Affinity Screening
- Competition Assays
- Yes/No Binding
- Concentration Analysis
- Thermodynamics
- Epitope Mapping/Binning



Protein-antibody binding curves generated with Alto for kinetics/affinity analysis

Compatible with:

- Proteins
- Antibodies
- Nucleic Acids
- Small Molecules
- Carbohydrates
- Lipids
- Cells
- Viruses
- Nanoparticles

Accelerate your drug discovery research

Alto's flexibility enables it to be a true one-size-fits-all instrument, reducing the time and cost of your research.



Technical Specifications

Attribute	Specification
Sample Volume	2µL
Rise Time	<0.1s
Association rate (k_{on})	<1e ⁹ 1/(M*s)
Dissociation Rate (k_{off})	1e ⁻⁶ to 1.0 (1/s)
Affinity Range (K_D)	1e ⁻¹² to 1e ⁻⁴ (M)
Automation	Compatible with robots for 24/7 runtime
Compliance	GXP and 21 CFR Part 11*
Operating Environment	15°C–35°C 20–80% RH Non-Condensing 0m–2000m Altitude
# Optical Channels	16 independently addressable
Reference : Standard	1:1 standard, any combination possible
Ligands	Up to 16
Analytes	Up to 64 Analytes/Cartridge
Dilutions	Automated Serial Dilutions
Crude Compatibility	Yes
Hands on Time	<30 mins
Temperature Control	8°C–50°C in sensor area 8°C in sample storage area
Instrument Size	13.7W x 19.9D x 15.9H (inches)
Instrument Weight	<40lbs

Preliminary specifications - subject to change

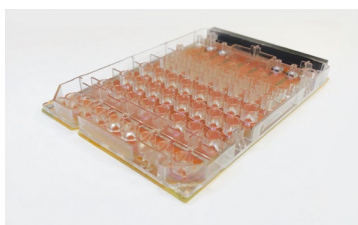
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ALTO CARTRIDGES

Optimize easily with Alto Cartridges - the first ever SPR sensor integrated with fluidics.

Alto Cartridges

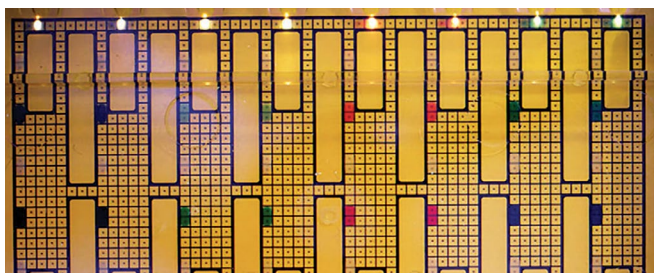
Alto Cartridges have completely revolutionized the interaction of fluidics and sensors for SPR. A Cartridge is a well-plate sized consumable that integrates reagent/sample storage, fluid handling, and sensor surfaces. Samples, buffers and reagents are contained in wells on the cartridge, and dispensed towards the sensor in software-controlled nanodroplets. Precise volumes and automated serially diluted concentrations interface with a fiber optic sensor tip, manufactured with the same quality and consistency (<2% CV) as our existing localized SPR sensors.



Alto Cartridges are well-plate sized consumables that integrate fluidics and sensors

Surface Chemistries

Alto Cartridges offer a wide variety of functional surface chemistries to reduce the time and effort needed for immobilization, while ensuring high repeatability. Non-functionalized gold sensors are also available for custom surface functionalization.



Alto Cartridges' fiber optic sensors feature a wide variety of surface chemistries

Sensor Chip

Coated for immobilization of:

Carboxyl	any amine group using EDC/NHS coupling
NTA	histidine tagged targets
Streptavidin	biotin tagged targets
Biotin	streptavidin coupled targets
Protein A	IgG based antibodies
Liposome Binding (LIP)	liposomes/membrane proteins
Hydrophobic (MEM)	lipid monolayer
Thiol	thiol or maleimide tagged targets
Gold	non-functionalized and perfect for custom surface chemistry development and targets with thiol groups

Cloud-based and AI-powered to streamline your experiments.

Alto Software Suite

Alto features an end-to-end software suite that is powered by AI, built directly into the instrument, and leverages the power of the cloud. Flexible and intelligent assay design and optimization enables efficient planning of experiments. Serial dilutions are fully automated and controlled by software, reducing hands-on time and human error. With cloud connectivity, real-time data and wizards will clearly communicate experiment progress and can be accessed by any licensed device connected to the internet.

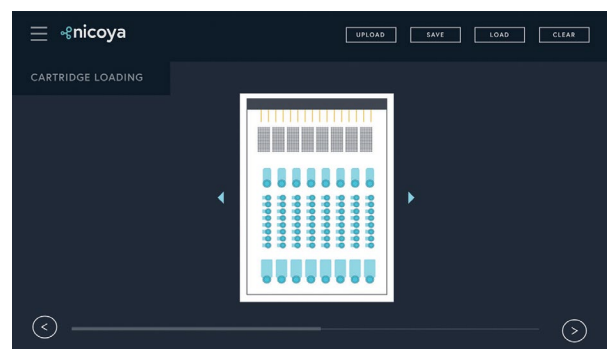
Features

- Intuitive and easy-to-operate built in PC with customizability based on level of SPR experience
- Guided setup, quality control and shutdown procedures
- Software Wizards to guide experiment set-up, optimization and quality control
- Full test automation with the ability to create, save and load test templates
- Real-time 16-channel data of binding interactions featuring error warnings & experiment suggestions
- Seamless and flexible transition of real-time data into data analysis software
- Multiple instruments can be networked together and controlled easily from 1 interface

*Alto is capable of supporting operation in GXP and 21 CFR Part 11 in compliance with regulatory demands. Subject to change.

Kinetic Analysis Models

- 1:1 Binding Kinetics
- 1:2 Binding Kinetics
- Steady-state Affinity / EC50
- Bivalent Interactions
- Kinetics Competition
- Concentration Analysis
- Thermodynamics
- Screening
- Epitope mapping



Alto Software

DMF

An Introduction to Digital Microfluidics.

What is Digital Microfluidics (DMF)?

DMF is a liquid-handling technology capable of accurately controlling and manipulating discrete nanodroplets with electricity. Fluidics are contained on a microwell plate and individual droplets can be split, mixed, merged and dispensed to achieve a variety of sophisticated assay protocols.



Cross Section of DMF Cartridge

Why DMF?

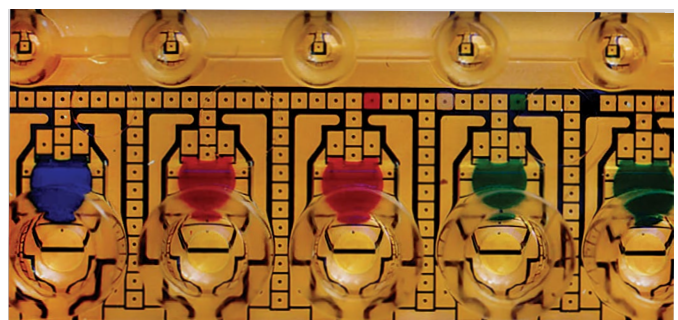
DMF solves the major limitation of scaling up throughput and automation of SPR technology, which is in the fluidic handling. The complexity of the fluidic system increases exponentially as you scale the number of samples/channels and level of assay automation - affecting the accuracy of the data and the long-term reliability of the instrument. This leads to significant instrument downtime and service costs, and limits applications to only using purified samples.

DMF fluidic handling technology removes the need for any physical pumps, valves, or tubes and replaces them

with a low cost disposable cartridge that is compatible with the standard well-plate form factor. DMF-powered SPR directly addresses the challenges associated with traditional SPR, enabling scientists to steer away from the conventional paradigm of transporting fluids through channels.

How does SPR work with DMF?

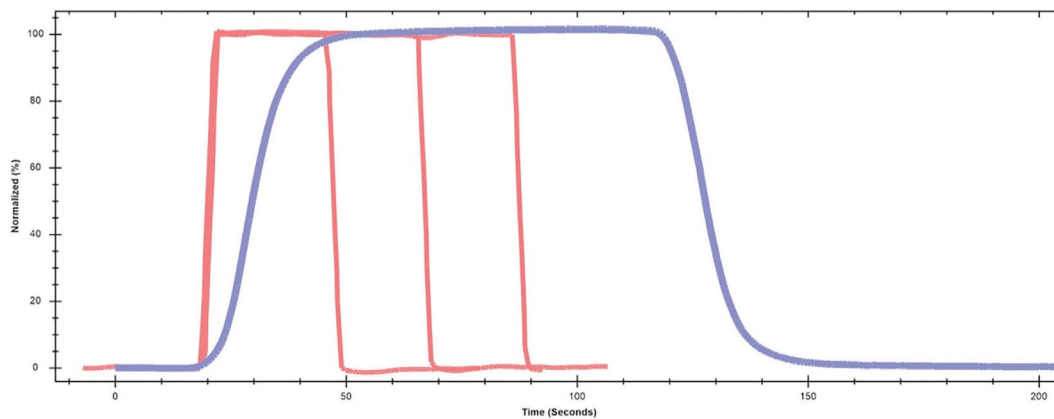
We've integrated our proprietary localized surface plasmon resonance (LSPR) sensors into DMF cartridges - creating 16 independently addressable channels on a single cartridge. DMF's superior liquid handling abilities paired with our flexible and customizable software enable researchers to have precise control over interaction time, automatic serial dilutions and data analysis. It also reduces the cost and complexity of the instrument, making it accessible to all scientists.



DMF offers precise liquid-handling with nanodroplets

Advantages of using DMF-powered SPR

- Decoupling of flow rate and sensor position from dispersion, increasing data quality
- 500X less sample volume required - get full kinetics from a 2ul sample volume
- Decoupling of interaction time from sample volume, increasing assay flexibility
- Automated serial dilutions - reducing human error and saving time
- Flexible high-throughput capabilities with many different assay formats available
- Ability to implement end-to-end assay automation
- No clogging, leaking, or contamination as there are no fluidic pathways in the instrumentation
- Near instantaneous transition times between buffer and sample
- Flexible fluidic processes enabling on-line, real-time optimization
- Minimal moving parts so extremely low possibility of mechanical failures
- No instrument cleaning or service needed

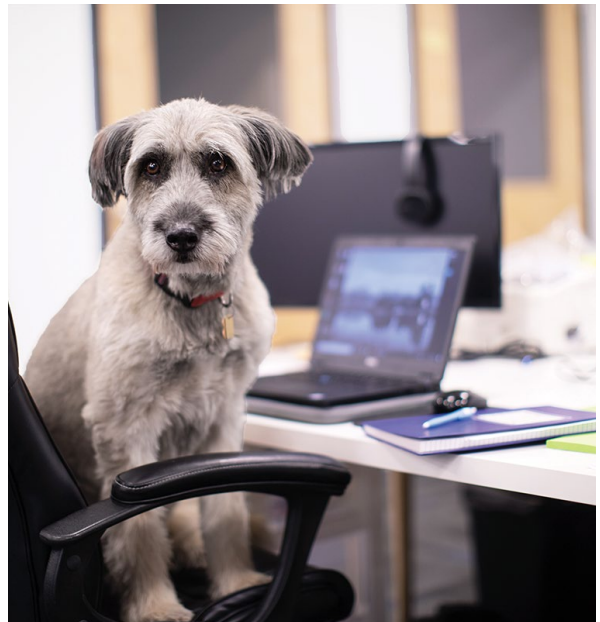


The instantaneous switching from buffer to analyte enabled by DMF-SPR produces record rise times and responses in data. Red is DMF, Purple is traditional SPR.



About Us

Nicoya is a Canadian biotechnology company whose mission is to improve human life by helping scientists succeed. Using nanotechnology and digital microfluidics, Nicoya created Alto™ - the world's first digital, high-throughput, benchtop SPR instrument. Nicoya supports hundreds of leading biotechnology and pharmaceutical organizations to accelerate their next big discovery.





Accelerate your drug discovery with Alto.

Speak to an Application Scientist Today:

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