

KEEPING KINETICS REAL

Measure interactions, not interference

Creoptix WAVEsystem

THE WAVE OF THE FUTURE IN KINETICS

Kinetics in hours instead of days

Modern label-free technology meets no-clog microfluidics and automated software to provide superior affinity and kinetic data quality and challenging sample compatibility.


WAVE
creoptix
sensors


REAL SAMPLES
REAL DATA

The Creoptix WAVEsystem puts a breakthrough level of kinetics analysis at your fingertips by pushing the boundaries of affinity range and sample compatibility. The system's exceptionally high data quality, sample compatibility and automated software facilitates drug discovery and enable new inroads into R&D.

AUTOMATED SOFTWARE

Move seamlessly moves from sample to data in a simple stepwise process, generating outputs at the touch of a button. The intuitive workflow and software wizards guide the user through experimental set up, kinetic evaluation and report generation, with open access formats supporting both LIMS integration and export of data files.

- waveRAPID - Kinetics (on-rate, off-rate, affinity and Rmax) from a single well
- DIrect Kinetics - automated data evaluation

INNOVATIVE MICROFLUIDIC CARTRIDGE

Innovative design and patented microfluidic cartridge to support crude samples, pathogenic samples, harsh solvents, and large particles up to 1000 nm normally only achieved with plate-based assays for kinetic analysis not possible before

- No-clog for crude samples
- Chemical-friendly for harsh solvents
- No valves for fast transitions

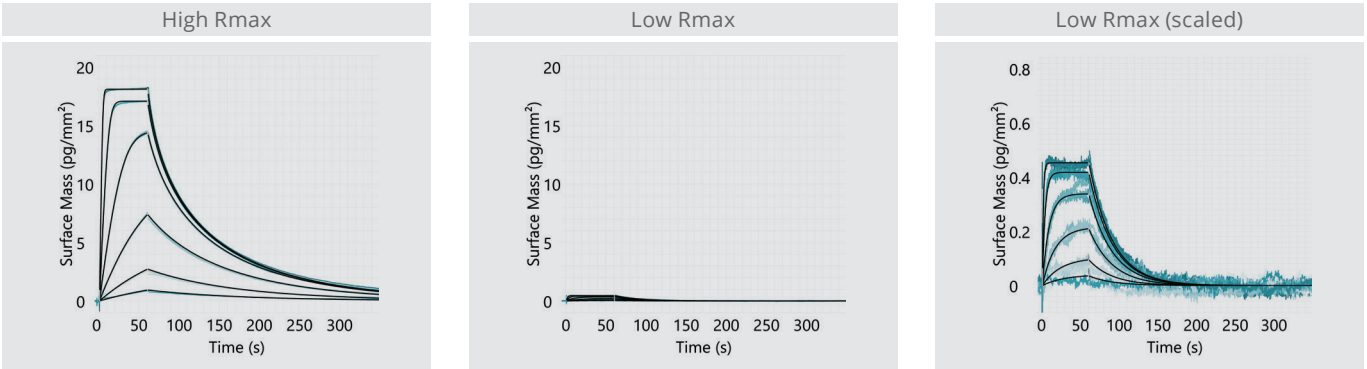
HIGH SIGNAL-TO-NOISE RATIO FOR HIGH SENSITIVITY

Engineered around a proprietary Grating-Coupled Interferometry (GCI) technology, the Creoptix WAVE system builds on waveguide interferometry to achieve superior resolution in signal and time. With low limits of detection, the WAVEsystem generates accurate kinetic rates, affinity constants, and concentrations of label-free biomolecular interactions, even at low analyte abundance, with no loss of definition.

- Work with low immobilization levels
- Work with large ligand-to-analyte molecular weight (MW) ratios

SMALL MOLECULES CAN'T HIDE ANYMORE

With the industry's fastest kinetics and utmost sensitivity, the WAVEsystem offers a whole new level of previously unattainable interaction data.



Ligand: CAII (29 kDa) at two different immobilization levels
Analyte: Acetazolamide (222.25 Da)

MEASURE BIOLOGICAL INTERACTIONS IN RELEVANT CONTEXTS FAST

Confidently detect and quantify biological interactions in real-time, for high-quality kinetic data across a broader range of samples than traditional equipment.

WAVEcontrol

Featuring waveRAPID®, the new way of measuring kinetics to boost throughput. Instead of relying a titration series in conventional kinetics, waveRAPID injects a single concentration, pulsing the sample over the sensing surface at increasing durations. From a single well, kinetics can be derived: the on-rate, off-rate, affinity and R_{max}. With no need for serial dilutions or DMSO corrections, set-up time is significantly reduced, runs are faster, and wells are freed up to run more samples.

With the WAVEcontrol software, every step from assay setup over data evaluation to report writing is simplified with an intuitive design that mirrors the way you work

- Design. Smart design for your experiment before you begin, with our built-in optimizer to simulate data.
- Set-up. Use our wizards for a fast and efficient experimental set-up or manually edit for full flexibility.
- Evaluate. Apply our predefined models to evaluate the results of your experiments. Adjustments can be fully fine-tuned. Evaluate your data with traditional (global) fit or let Direct Kinetics evaluate the data for you
- Report. Get access to raw data and export your results in a customizable PDF or Word format with just a few clicks.

WAVEchips

No-clog microfluidics accommodates of a broad range of sample types to preserve activity and biological context, saving time from detrimental purification steps and clogging that takes other systems offline.

Fast kinetics (150 msec transition time) facilitate reliable analysis of off-rates of up to 10 s^{-1}. Sharp parallel injections are synchronized on all flow channels for accurate referencing.

- WIth no-clog microfluidics, minimize downtime.
- Discover kinetics in physiologically relevant conditions (e.g. 100% serum or plasma).
- Study membrane proteins without time-consuming sample preparation or purification.
- Experiment with non-traditional solvents, including high percentages of acetonitrile and DMSO
- Variety of chip surfaces available

WAVEcore

The WAVEcore houses our patented Grating-Coupled Interferometry (GCI) technology. Together with a temperature-controlled autosampler that can handle 2x 48-vial racks, 96- or 384-well plates or combinations thereof, the WAVEcore offers the sensitivity to work with low immobilization levels and large ligand-to-analyte molecular weight (MW) ratios.

The patented GCI design leverages and enhances the intrinsic benefits of waveguide interferometry to exceed the sensitivity levels of traditional SPR.

In contrast to SPR, GCI provides an evanescent field that penetrates less into the bulk and extends the light-to-sample interaction length for superior signal-to-noise ratios (<0.015 pg/mm^2).





LABEL-FREE DATA LIKE YOU'VE NEVER SEEN BEFORE



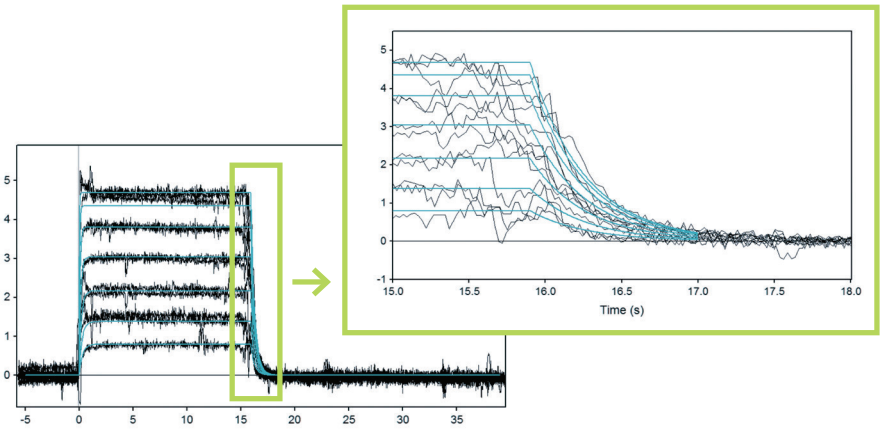
CONFIDENCE IN KINETIC MEASUREMENTS

Real is measuring kinetics of biological interactions in relevant contexts. Only the WAVE innovative microfluidic cartridge tolerates native, physiological and harsh conditions, providing access to new data not possible before.

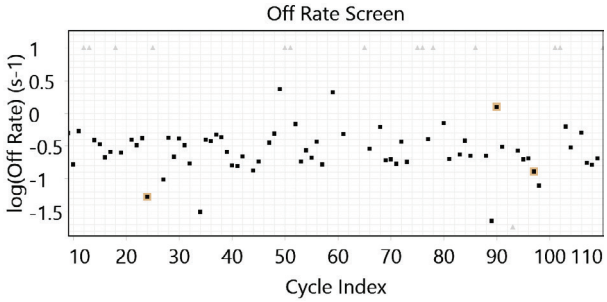
real is crude
SMALL MOLECULE DEVELOPMENT

Capture fast off-rates of weakly binding fragments and high-quality low potency leads for more successful drug discovery.

- Separate binders from non-binders with off-rate kinetic analysis of crude reaction mixtures
- Resolve weak binders with off-rates as fast as 10 s^{-1}.
- Measure in non-traditional solvents, including high percentages of acetonitrile and DMSO.
- More space in the well plate to measure full kinetic data with only one injection using waveRAPID.
- Kinetic information in hours instead of

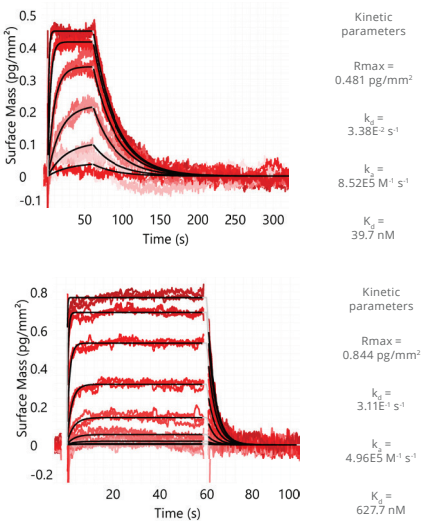


Ligand: Carbonic Anhydrase II (29 kDa), Analyte: Methylsulfonamide (95.1 Da), k_{off} = 2.79 s^{-1}



Push the limits and generate high-quality binding kinetics with our sensitive GCI technology and resolve data at very low responses.

- Kinetics analyses of molecules with dramatically different size ratios.
- Reliable kinetics at R_{max} below 1 pg/mm^2.

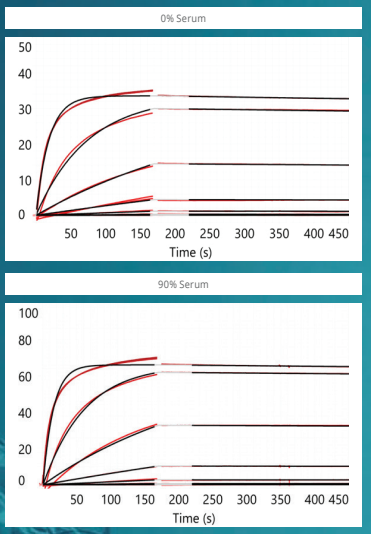


real is (less) diluted

SEROLOGY - SERUM, PLASMA AND MORE

Measure antibody kinetics in (un)diluted serum and plasma while reducing cross-contamination and potential clogging. Accurately measure binding kinetics in conditions closer to real life and confidently characterize the tightest binders in:

- 100% blood serum or plasma
- Cell extracts
- Cell culture supernatant



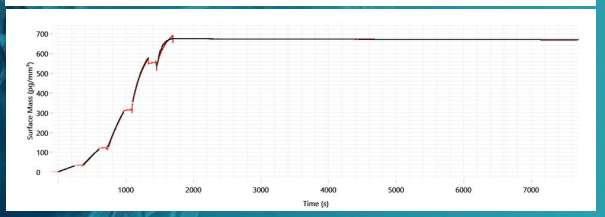
real is natural

BIOLOGICS DEVELOPMENT

Measure more than just affinity, even in the low pM range, while confirming and enrich ELISA data.

- Slow off-rate analysis of high-affinity binders
- Detection of anti-drug antibodies (ADA) in the low ng/ml range
- Identify the most effective antobody pairs in diagnostic development

Kinetics analysis with 24h dissociation of an antibody with low pM affinity



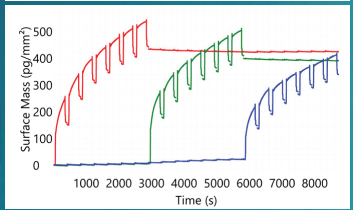
real is native

MEMBRANE PROTEINS

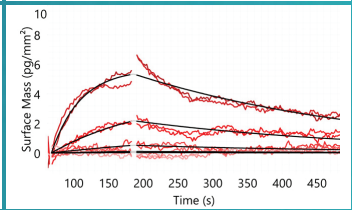
Stay close to native state in cell membrane and study interactions with large binding partners. Study bind ing kinetics onto membrane proteins and retain their conformation and activity for more successful drug discovery

- Push the limits and generate high-quality binding kinetics and resolve data at very low responses
- Save time and precious samples by studing membrane protein pharmacology using only partially solubilized, unpurified material

Crude membranes capture via biotin



Nanobody kinetics on GPCR



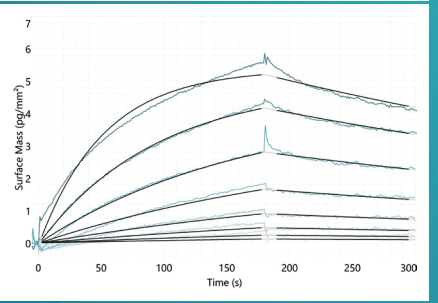
Kinetic parameters	Rmax = 6.435 pg/mm²	k_a = 7.1E^5 M^{-1} s^{-1}	k_d = 2.87E^{-3} s^{-1}	K_D = 406.7 nM

Virus-like particles, liposomes, and nanodiscs present unique challenges

The resultant size of these structures - used to preserve membrane protein integrity and activity - combined with a tendency to aggregate, can cause microfluidics channels to clog. They can be run reliably and repeatedly on the WAVEsystem with no impact on performance or sensitivity to:

- Valveless microfluidics to analyze and characterize larger molecules.
- Ensure more reliable data by protecting the sensor from inadvertent handling.

Ligand: CXCR4 - VLP Analyte: anti-CXCR4 antibody



CREOPTIX WAVE



MODELS & SPECIFICATIONS

GENERAL	
Noise (RMS)	<0.01 pg/mm^2 @ 1 Hz
Drift	<0.3 pg/mm^2/min
Readout Frequency	1 Hz, 10 Hz or 40 Hz
Association Const. Range	k_a = 10^3 – 5x10^7 M^{-1} sec^{-1} (small molecules) k_a = 10^3 – 3x10^9 M^{-1} sec^{-1} (large molecules)
Dissociation Const. Range	k_d = 10^{-5} – 10 sec^{-1}
Analysis temperature range	15°C – 40°C
Molecular Weight Limit	No lower limit
waveRAPID Functionality	No
FLUIDICS	
Flow Channels / Path	2, parallel
Channel Referencing	1-4 and 4-1 or 2-3 and 3-2
Flow Cells	Sealed, disposable, integrated into disposable WAVEchip
Flow Rate	1 – 400 µl/min
Crude Sample Robustness	Yes
SAMPLE HANDLING	
Sample Capacity	2x microtiter plates (96 or 384 well, standard or deep well) or vial racks (48 positions of 1.5ml)
Buffer	1 buffer
Degasser	Built-in
Injection Volume	< 450 µl, 100 µl typical
Sample Volume Required	Injection volume plus 15-50 µl (application dependent)
Sample Storage Temperature	Ambient or 4°C – 20°C regulated
Sample Recovery	Yes
Automation	120h of unattended operation
DATA TREATMENT	
Information Provided	Kinetic affinity (k_a, k_d, K_D)
Graphs	Real-time curves, multiple curve overlays, fit, report point plots
Data Extraction	Curves, k_a, k_d, K_D tables, graphs, reports
Data Analysis	Fully automated data evaluation
Kinetic Models	Predefined models including 1:1 interaction, mass transport, heterogenous ligand, conformational change and bivalent
Direct Kinetics	Yes

CREOPTIX WAVEdelta



GENERAL	
Noise (RMS)	<0.01 pg/mm² @ 1 Hz
Drift	<0.3 pg/mm²/min
Readout Frequency	1 Hz, 10 Hz or 40 Hz
Association Const. Range	$k_a = 10^3 – 5x10^7$ M^{-1} sec^{-1} (small molecules) $k_a = 10^3 – 3x10^9$ M^{-1} sec^{-1} (large molecules)
Dissociation Const. Range	$k_d = 10^{-5} – 10$ sec^{-1}
Analysis temperature range	4°C – 45°C (max 20°C below ambient)
Molecular Weight Limit	No lower limit
waveRAPID Functionality	Yes
FLUIDICS	
Flow Channels / Path	4, parallel
Channel Referencing	Any combination of the 4 channels
Flow Cells	Sealed, disposable, integrated into disposable WAVEchip
Flow Rate	1 – 400 µl/min
Crude Sample Robustness	Yes
SAMPLE HANDLING	
Sample Capacity	2x microtiter plates (96 or 384 well, standard or deep well) or vial racks (48 positions of 1.5ml)
Buffer	Automatic switching between 4 buffers
Degasser	Built-in
Injection Volume	< 450 µl, 100 µl typical
Sample Volume Required	Injection volume plus 15-50 µl (application dependent)
Sample Storage Temperature	Ambient or 4°C – 20°C regulated
Sample Recovery	Yes
Automation	120h of unattended operation
DATA TREATMENT	
Information Provided	Kinetic affinity (k_a, k_d, K_D)
Graphs	Real-time curves, multiple curve overlays, fit, report point plots
Data Extraction	Curves, k_a, k_d, K_D tables, graphs, reports
Data Analysis	Fully automated data evaluation
Kinetic Models	Predefined models including 1:1 interaction, mass transport, heterogenous ligand, conformational change and bivalent
Direct Kinetics	Yes

kinetics in hours instead of days



To make the most out of your WAVEsystem,
contact our team at support@creoptix.com

label-free data
like you've never seen before

Creoptix AG | Zugerstrasse 76 | 8820 Wädenswil | Switzerland (HQ)
Creoptix Inc | 60 Prescott Street | Worcester MA-01605 | USA
www.creoptix.com | +41 44 533 26 60

©2020 Creoptix Sensors/Creoptix, WAVEchip, WAVEcore and waveRAPID are trademarks of Creoptix AG, All goods and support services sold by Creoptix are subject to our terms and conditions. Please visit our website or contact your local Creoptix representative for the most up-to-date information.