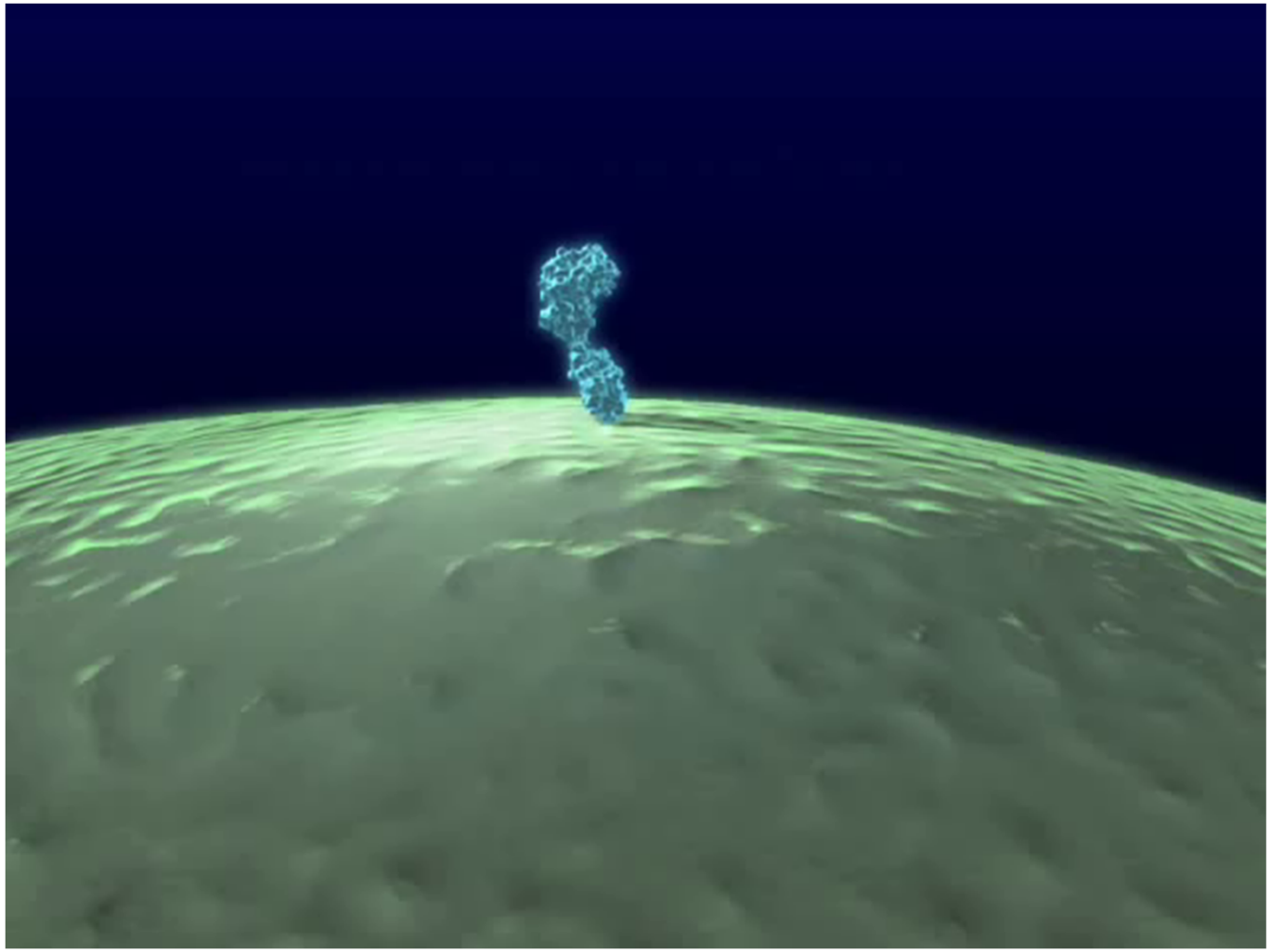
Interactions on the Octet Platform

ReNaFoBis 2018

Florian Bossard, Ph.D.

Sales Manager WE

Its all about Interactions...

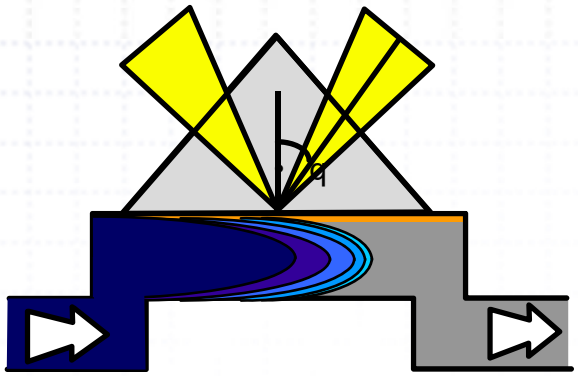


http://www.youtube.com/watch?v=Ms_ehUVvKKk

PALL ForteBio®

Real Time, Lable-free Platfrom : OCTET

Label-free , Real-time Techniques

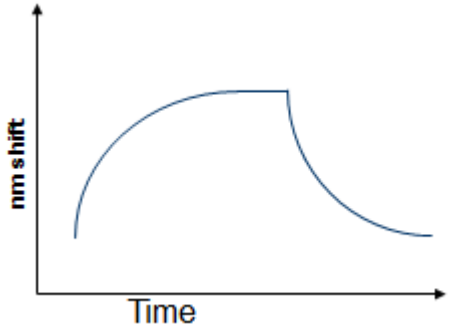


Mainstream

- BLI (Bio Layer Interferometry)
- SPR (Surface Plasmon Resonance)

Others

- QCM (Quartz Crystal Microbalance)
- SAW (Surface Acoustique Wave)



- They differ in decetion method, but they all provide « Sensograms »
- They largely differ in speed, throughput, sample compatibility, usablility

BLI=fast, accurate, easy / SPR=extreme sensitivity

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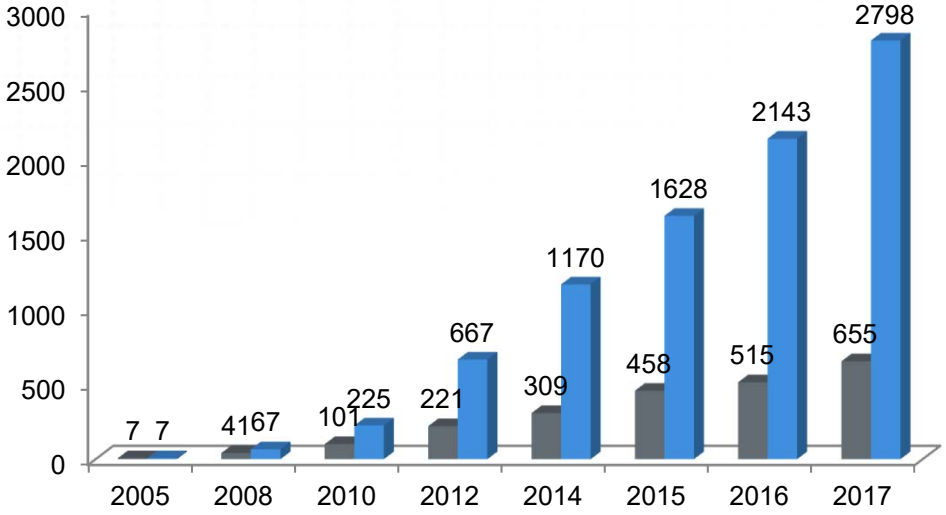
BLI: Trending towards 3000+articles in 2018



Yearly and cumulative publications ; source Google scholar

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Very strong Industry acceptance
Pharma, Biotech, Diagnostics

Molecular interactions in Biopharma

Discovery & Basic research

- Specificity = Which molecule?
  - Targets
  - Signalling mechanisms
- Affinity = How strong is the binding?
- Kinetics = How fast if will act?
- Mapping = Where it will bind?

Bioprocess development / recombinant proteins

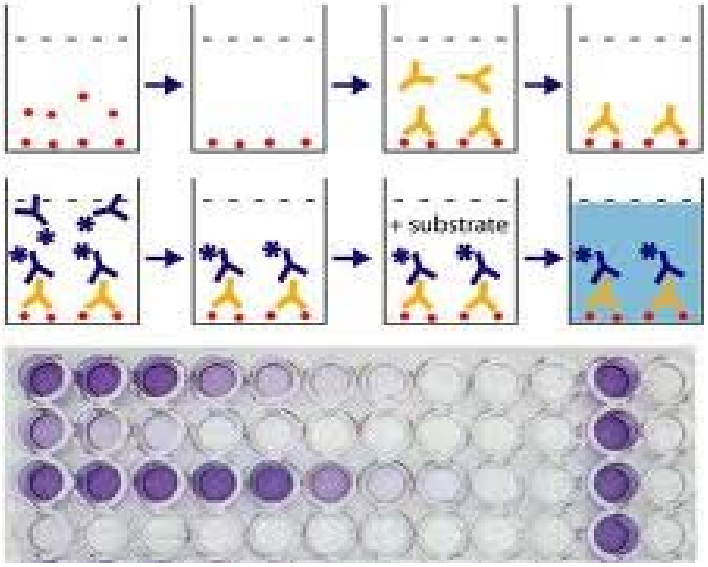
- Concentration = Do I have enough?
  - Clones, cell cultures conditions
- Purity = Safe to use?
- Formulation (Stability & Activity)

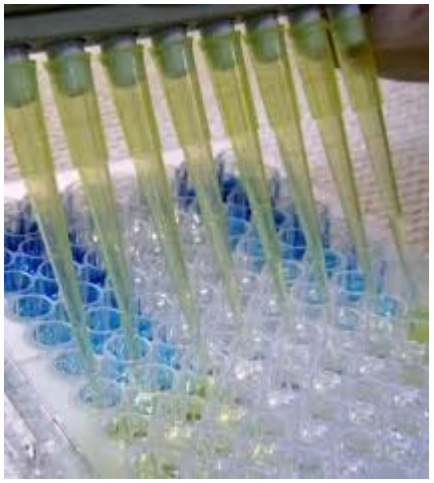
Clinical development

- Action or Immune reaction
- ADA

Traditional routes to answers: with label and at equilibrium

Protein Quantitation with ELISA:

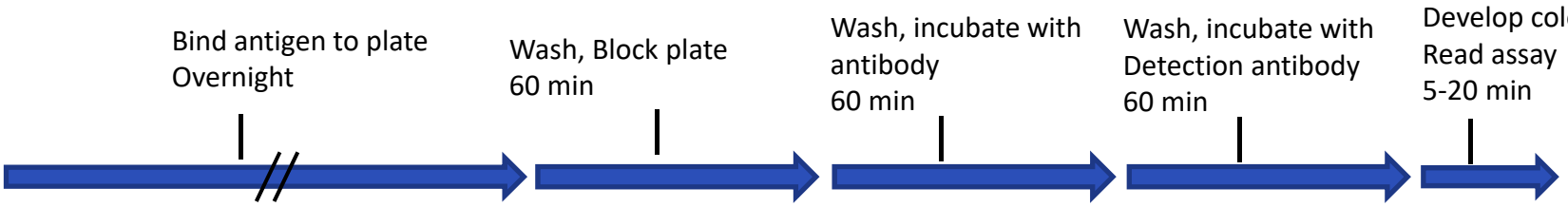




Total assay time: 3-4hours plus overnight incubation

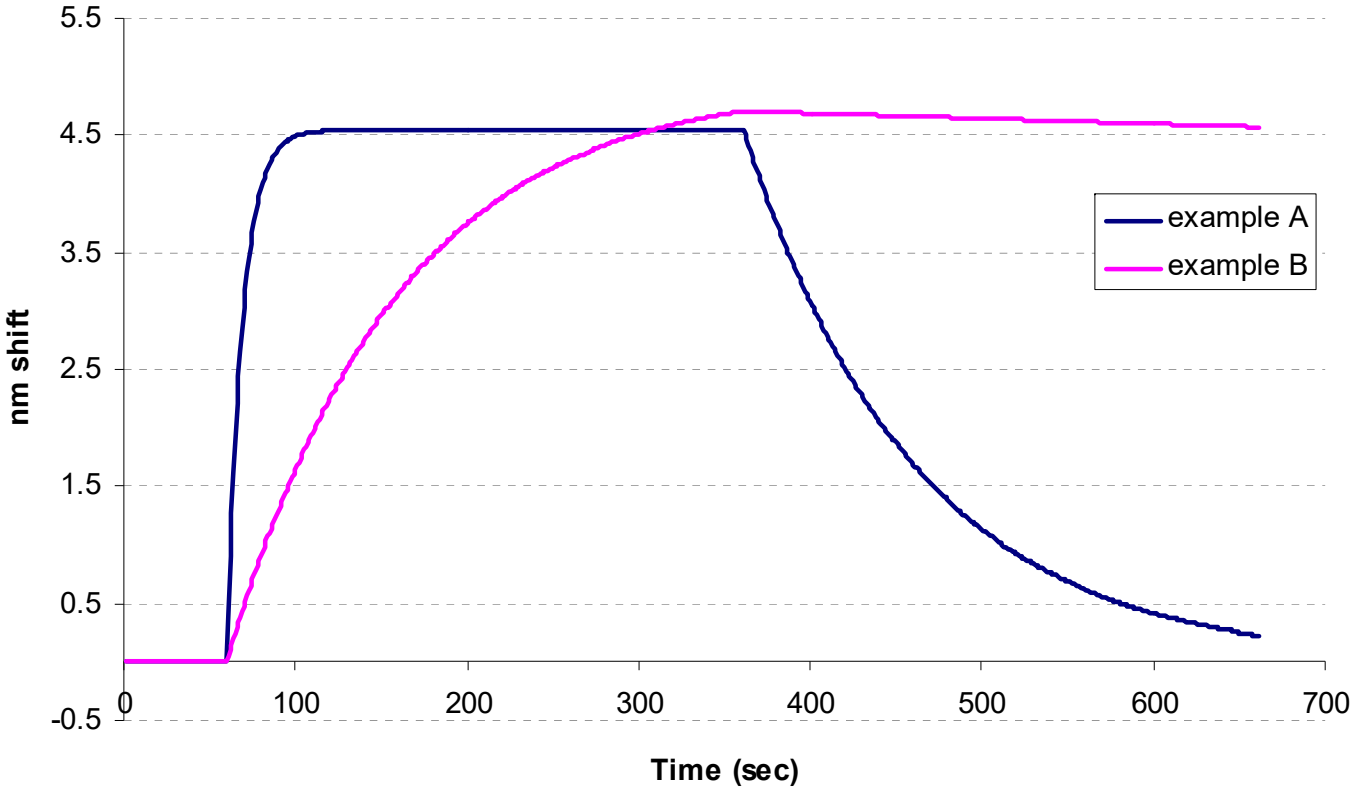
Requires 100-200 ul sample

Target-specific antibodies

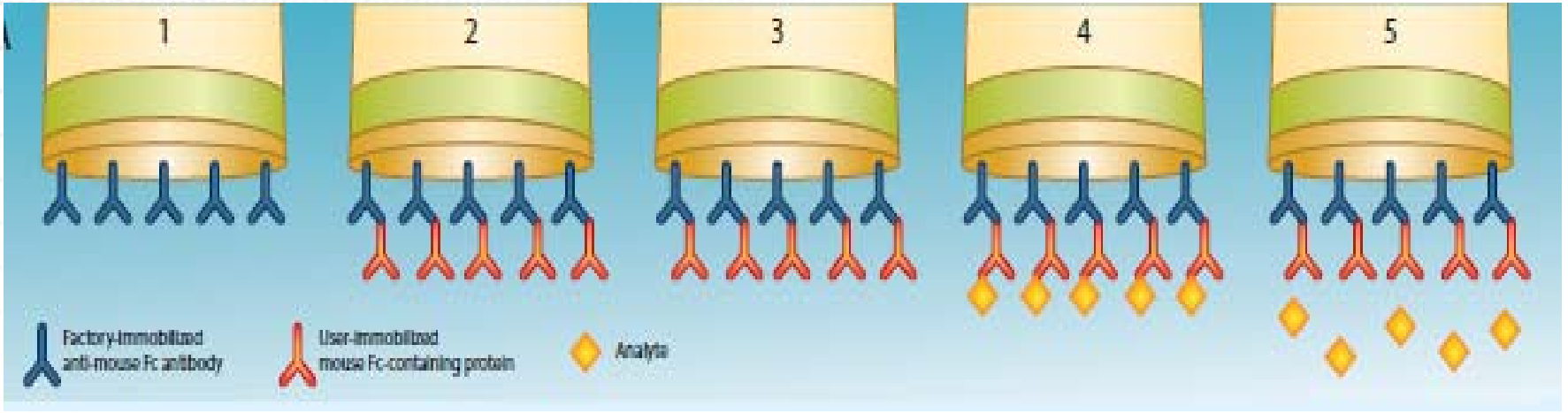


Real time approach : More Infomative

	Association	Dissociation	K_D = Affinty
Example A	1.00E+04	1.00E-02	**1.00E-06**
Example B	1.00E+02	1.00E-04	**1.00E-06**



Immobilization & observation



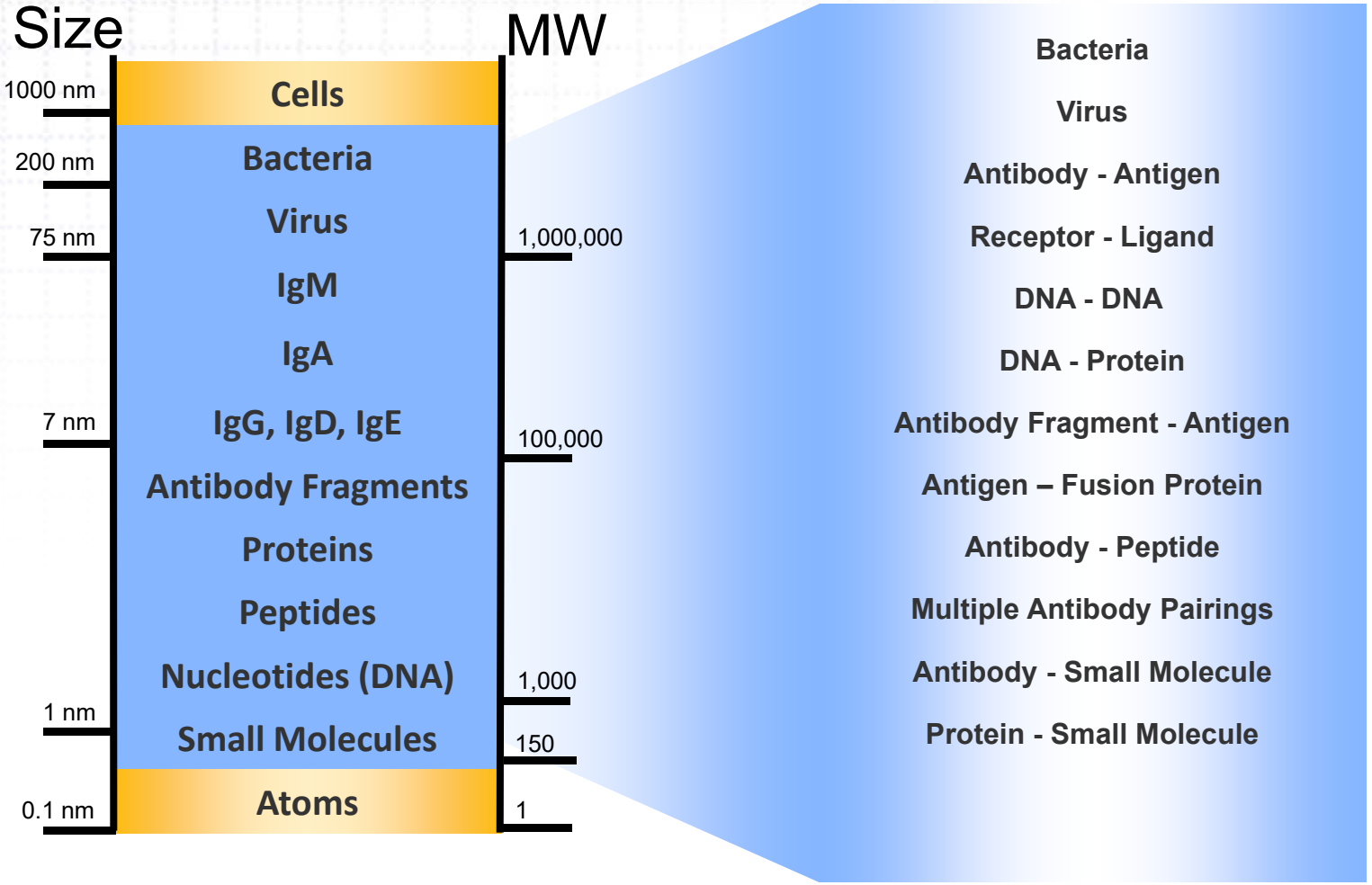
$$A + B \underset{k_d}{\overset{k_a}{\rightleftharpoons}} AB$$

$$A + B \underset{k_d}{\overset{k_a}{\rightleftharpoons}} AB$$

- Protein Concentration
- Association rate
- Dissociation rate
- Binding Affinity

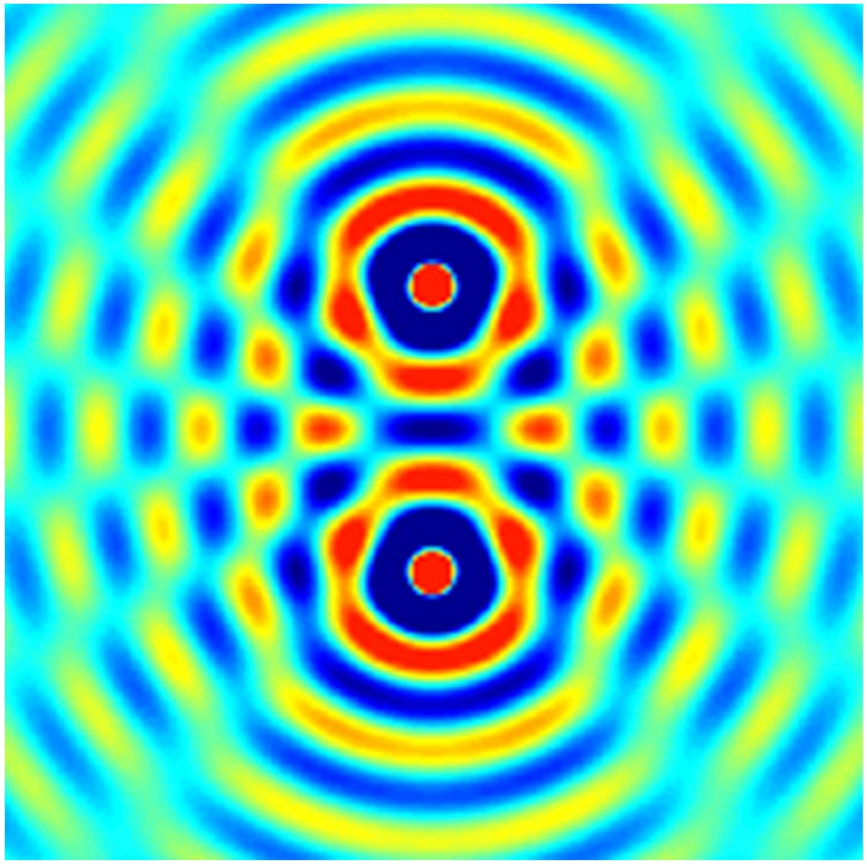
Myszka et. al. *Direct Comparison of Binding Equilibrium, Thermodynamic and Rate Constants Determined by Surface- and Solution-based Biophysical Methods* Protein Science 2002, 11 (5), 1017-1025.

Large application range

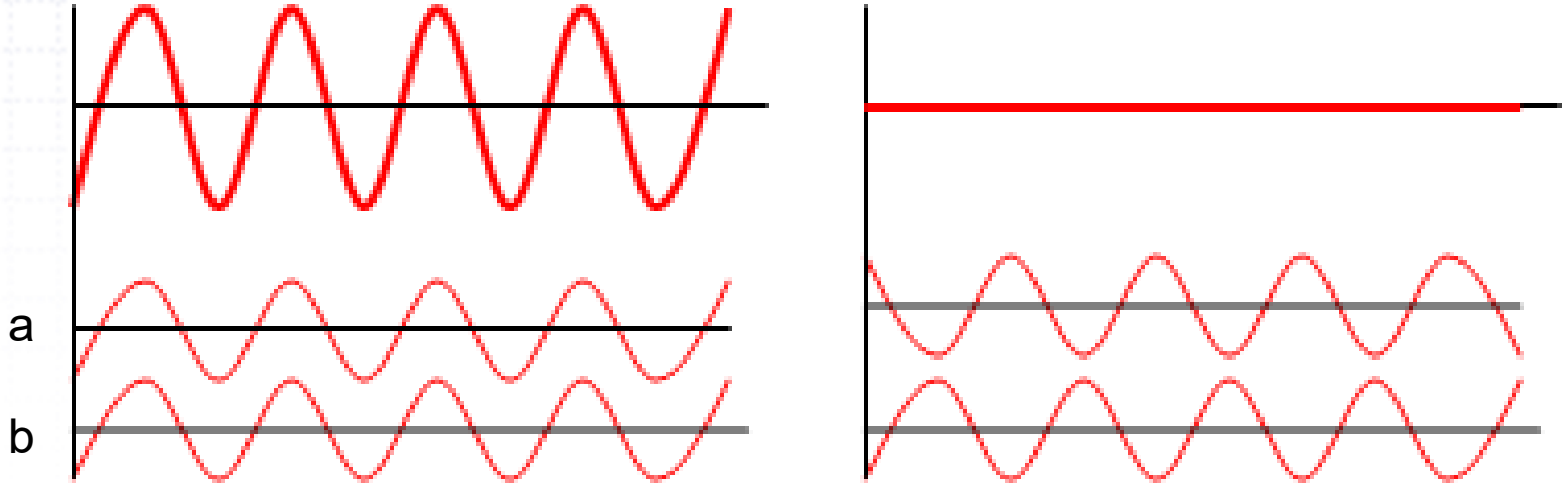


Current Octet assays within blue area

What is Interferometry?



Measuring of interactions between waves

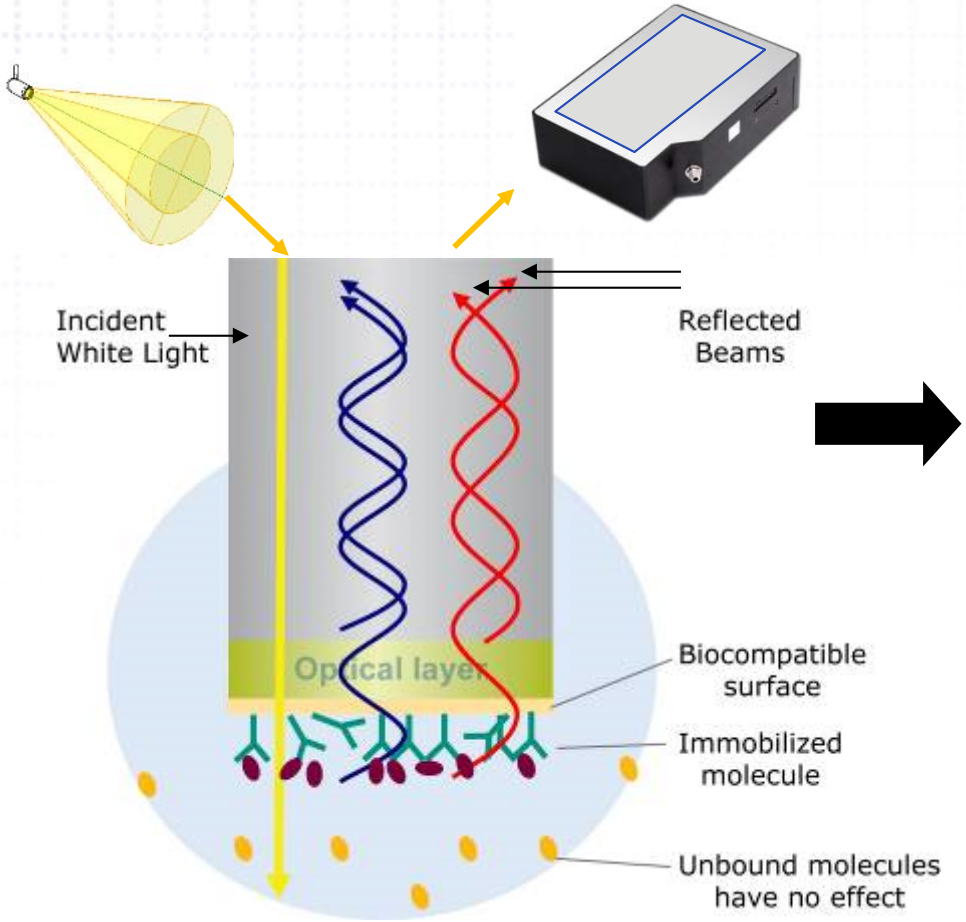


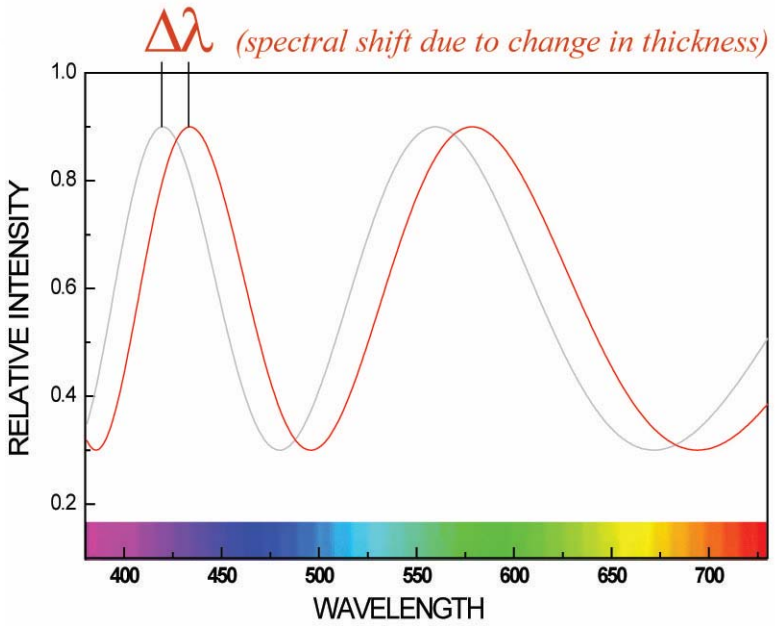
Two waves in phase
➔ Constructive interference

Two waves 180° out of phase
➔ Destructive Interference

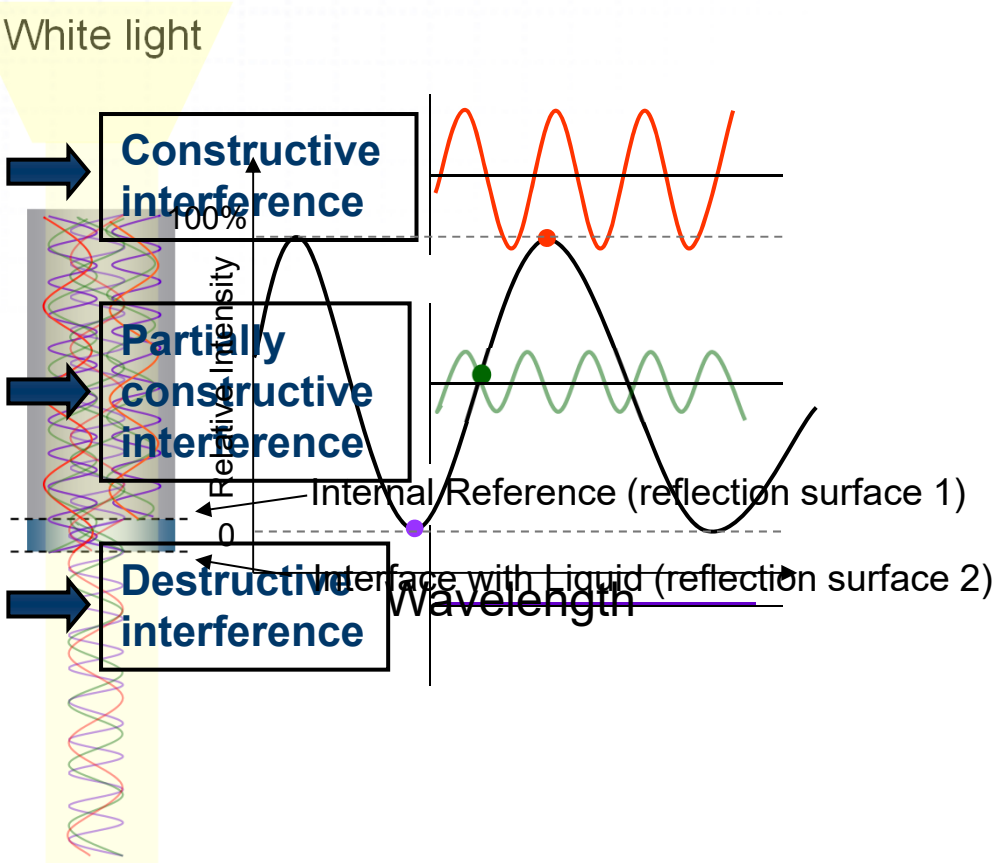
http://en.wikipedia.org/wiki/Interference

Measuring of interactions between waves





Biolayer Interferometry Principle



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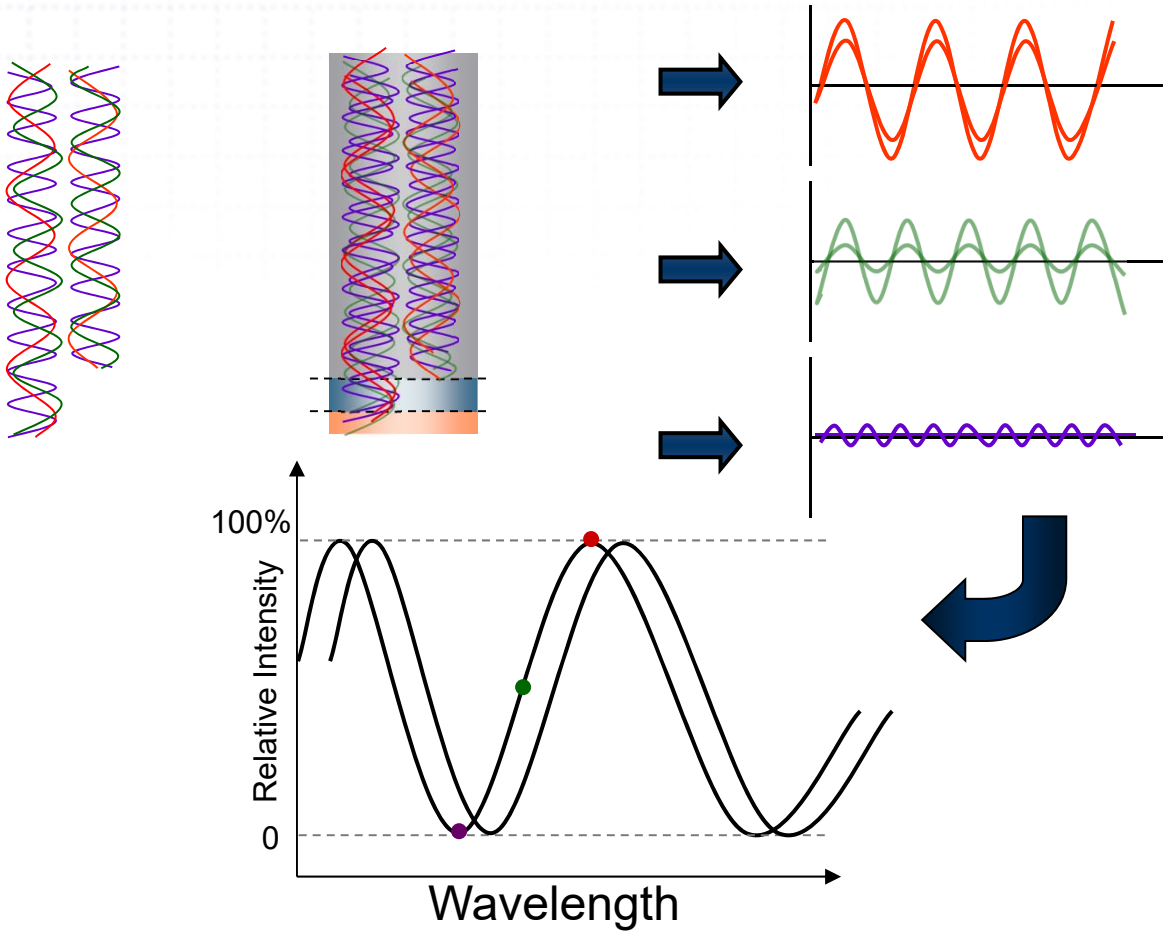
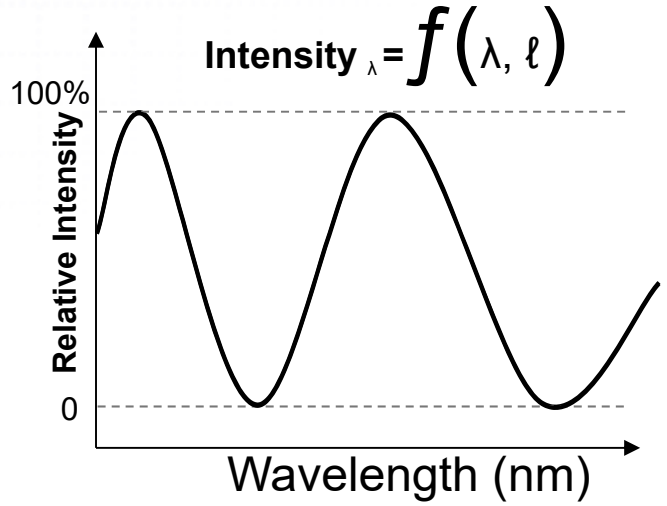
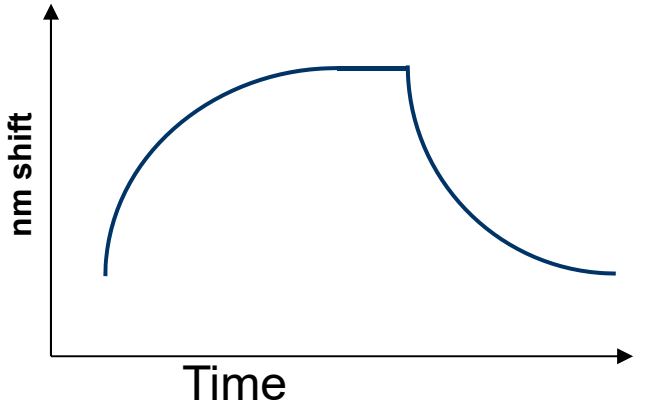


Monitoring the Interference Pattern vs. Time Provides Kinetic Data

Distance between the two reflecting surfaces = ℓ





- Kinetics
- Affinity
- Quantitation

Current Biosensors

Generic Biosensors:

- Streptavidin (SA)
- Super Streptavidin (SSA)
- High Precision Streptavidin (SAX)
- Amine Reactive 2nd Generation (AR2G)
- Aminopropylsilane (APS)

Tag Biosensors:

- Anti-Penta-HIS (HIS)
- Ni-NTA (HIS)
- Anti-GST

Current Biosensor Kits:

- Immunogenicity (ADA)
- Residual Protein A
- CHO HCP

Antibody Biosensors:

- Anti-Human IgG Fc (AHQ)
- Anti-hIgG Fc Capture Surface (AHC)
- Anti-Murine IgG Fv (AMQ)
- Anti-Murine IgG Fc Capture (AMC)
- Protein A
- Protein G
- Protein L
- Anti human IgG Fab

Custom Sensors

- Custom Capture Sensor
- Custom HCP kit

Octet RED96e System

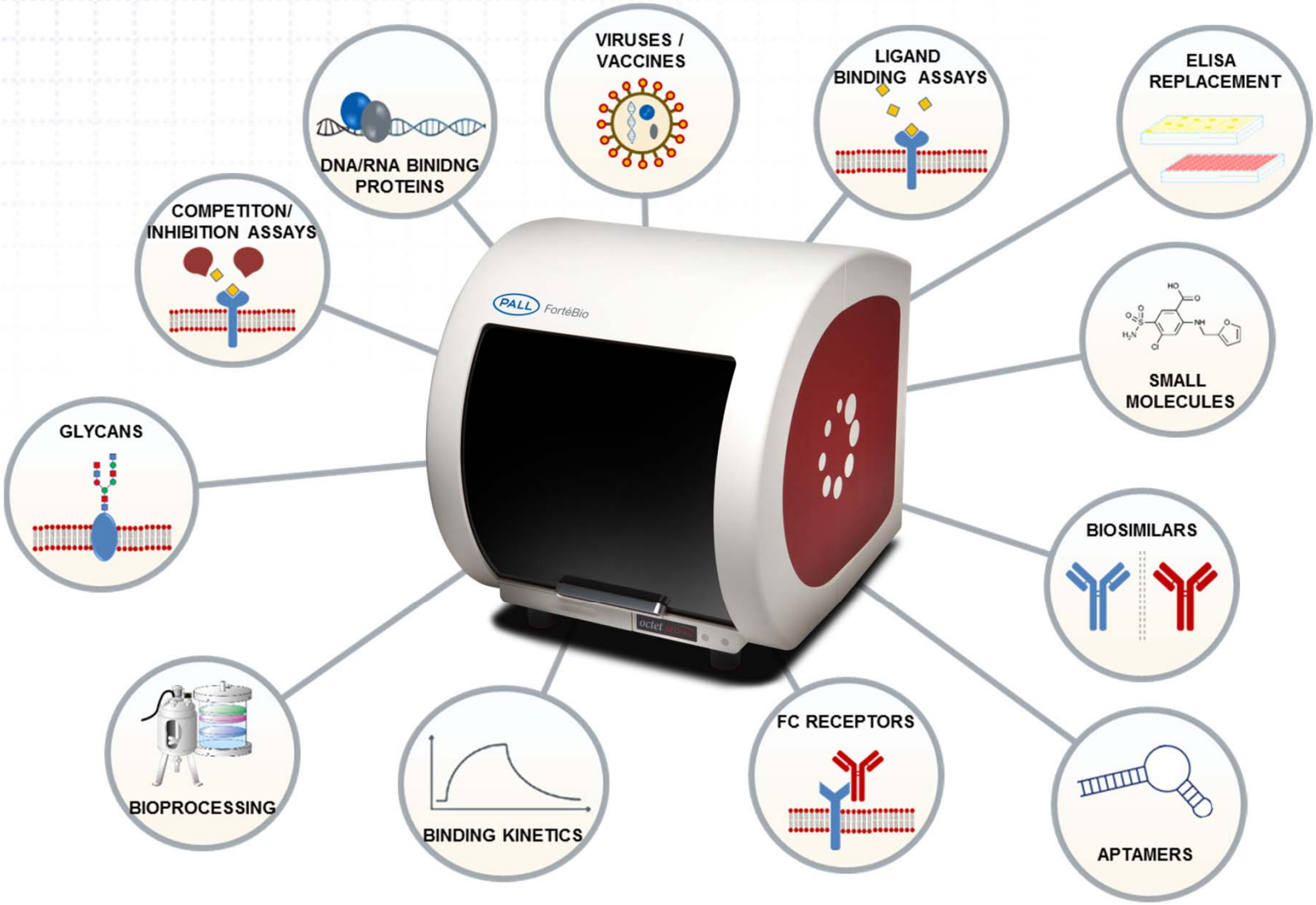
- 8-channel BLI system with an updated look to Octet enclosure and a semi-transparent door
- Expanded assay temperature control range 15°C-40°C
- Optional evaporation cover to minimize sample evaporation rate, extending unattended run time to 12 hours
- Installed with the new Data Analysis HT v10.0 software for multi-experiment analysis and customizable experiment report
- Lift bar addition for ease of installation
- Integrated power supply for a more compact footprint

Octet RED96e System Features

- 8-channel read head
- Acquisition rates: 2, 5 or 10 Hz
- Analyte MW for kinetics: 150 Da
- K_D range: 1 mM – 10 pM

- Semi-transparent cover
- Sample evaporation control
- Integrated power supply
- 1 Biosensor tray position
- Allows sensor re-racking
- Temperature control: 15 – 40 °C
- Orbital flow: 0 – 1500 rpm

Broad Utility of Octet RED96e System



Benefits of the Octet Platform

- **Higher throughput, fast workflow**
  - Concentration measurements **faster than ELISA or HPLC**
  - Screen more samples in less time than SPR
  - **Little** dilution or **sample preparation required**
  - **Full sample recovery**
  - Fixed volume allows long on/off rate determinations
- **Unparalleled ease-of-use**
  - Multiple users are easily trained to operate the system
  - **Microfluidics-free f**ormat and disposable biosensors
  - **No maintenance**, cleaning, or instrument prep time required
- **Versatility**
  - **Crude samples** can easily be measured
  - **Wider solvent** tolerance and assay flexibility
  - **Non-destructive** analysis
- **Price**
  - **Lower capital** acquisition cost than traditional SPR systems
  - Lower usage/maintenance costs SPR systems
  - **Lower cost per sample** than Protein A HPLC or commercial ELISA kits

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