

dynamic BIOSENSORS



switchSENSE[®]

Multi-parameter biophysical analysis
of molecular interactions

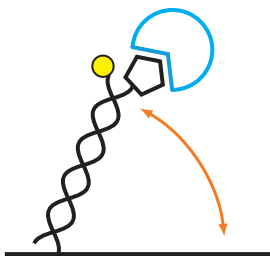
k_{ON} | k_{OFF} | K_D | IC_{50} | D_H | T_M | ΔG | ΔH | ΔS | k_{CAT} | K_M | U

switchSENSE®

switchSENSE® technology utilizes a novel electro-switchable biosurface to provide researchers and commercial laboratories the ability to characterize interactions between molecules in real-time. This technology is unlike existing methodologies in that it combines high sensitivity kinetics with structural information on size, shape and conformation providing a new depth and understanding of the interaction.

Studies are performed on a re-usable biochip, generated using familiar coupling and hybridization methods. Within this biochip, DNA levers are embedded onto a series of gold electrodes. These nanolevers serve either as target for molecular interactions themselves, or hold other interaction partners. To characterize interactions, the DRX instrument is used to bring about deliberate movement of these nanolevers by altering the voltage across the gold surface. When interactions occur, these movements are affected and in turn, used in the calculation of kinetic and biophysical information.

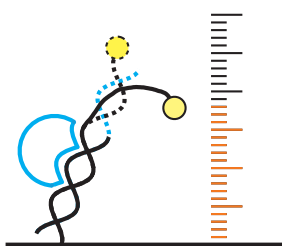
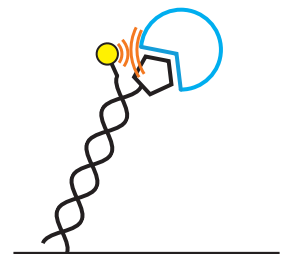
Measurement Modes



switchSENSE® combines three measurement modes:

The high frequency dynamic electrical switching mode probes the hydrodynamic friction and serves to analyze the size and shape of biomolecules.

The fluorescence proximity sensing mode reveals the binding of molecules in real-time through changes in the dye's local environment.



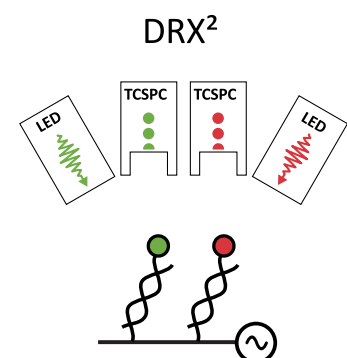
The molecular ruler mode utilizes a long-ranged energy transfer to gauge the height of the fluorophore above the surface with sub nanometer accuracy.

www.dynamic-biosensors.com/switchsense/

Dual-Color

The DRX² instrument is the first biosensor to offer the analysis of two molecular probes on the same detection spot.

Each sensor spot carries two lever sequences, one with a red tag, and one with a green tag. The instrument tracks the movement and position of the different levers separately and simultaneously. The two levers can either be in 1:1 ratio at ~50 nm separation or users can readily define ratio and surface density.



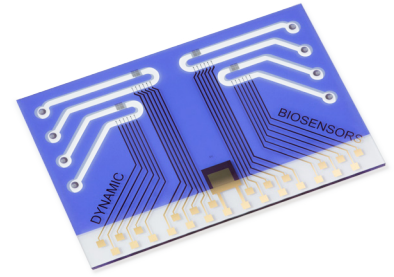
Schematic of a dual-color switchSENSE® experiment

Biochips

switchSENSE® biochips are designed for flexibility and adaptability featuring 20 microelectrodes, arranged in 4 separate on-chip flow channels for maintenance-free operation.

The microelectrode surfaces are supplied with electrically switchable ready-to-use DNA nanolevers. A number of different conjugation protocols and kits are available to functionalize the nanolever layers with molecules of interest.

The biochip may be regenerated many times using automated routines and can be configured in three levels of multiplexing, allowing the use of up to 6 different capture molecules in parallel in each flow channel.



switchSENSE® Biochip

www.dynamic-biosensors.com/biochips/

DRX Series Instruments

Single DRX and dual-color DRX² analyzers are electro-optical instruments specifically designed for automated **switch**SENSE® measurements. Instruments feature automated liquid handling and temperature control.

www.dynamic-biosensors.com/instruments/



DRX Instrument

Data Generation

switchSENSE® Technology can be used to generate the following data:

Binding Kinetics	Nuclease & Polymerase Activity
Binding Affinity	Bispecific Binders & Avidity
Protein Diameter	Melting & Thermodynamics
Conformational Change	Multimers & Aggregation

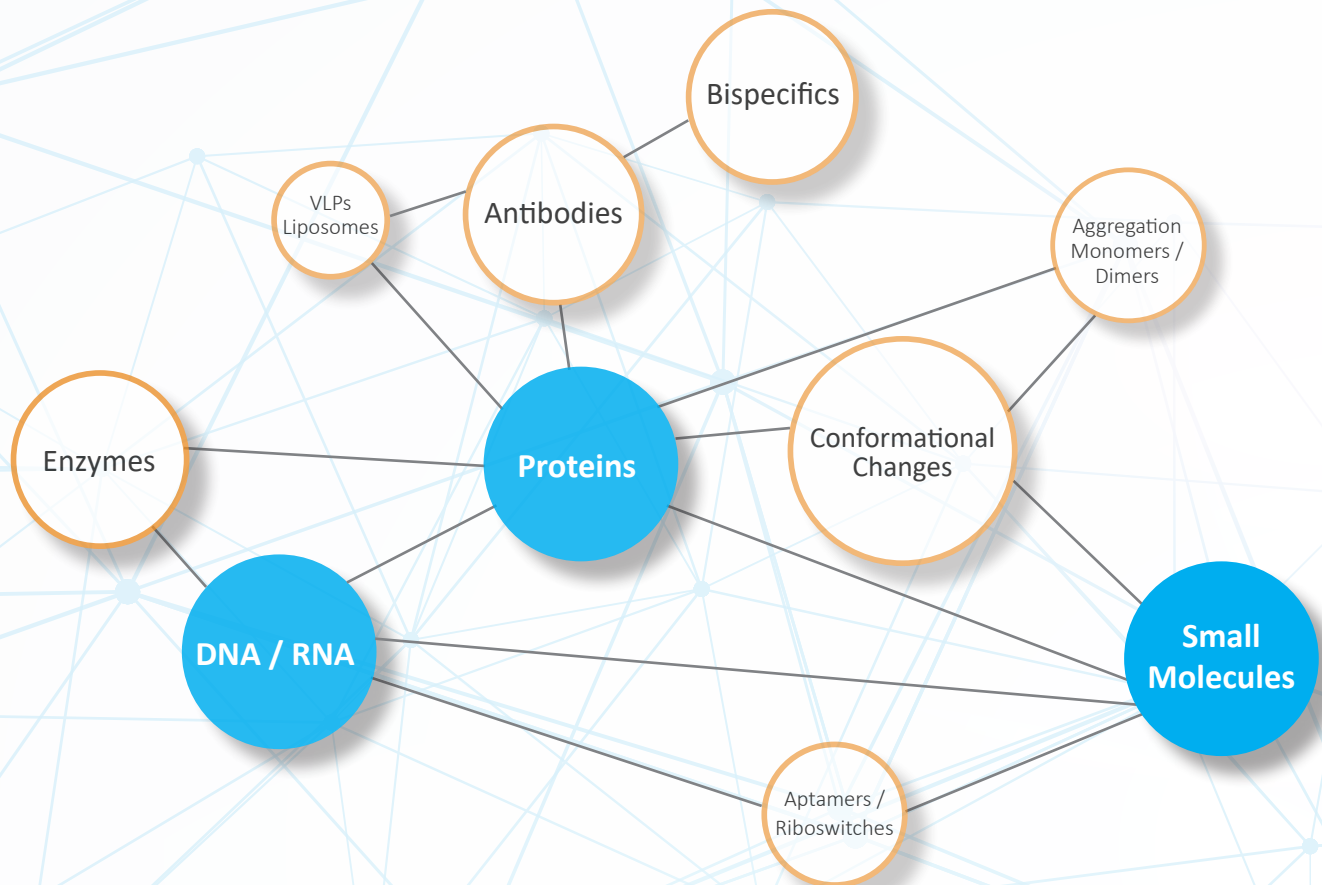
Performance Specifications

Limit of detection 10fM	Dissociation rate constant 1E-6 – 1E0/s
Dissociation constant 50fM – 1 mM	Hydrodynamic diameter accuracy of 0.1 nm
Association rate constant 1E3 – 1E8/Ms	Temperature 8° – 75°C (chip), 10° – 40°C (autosampler)

switchSENSE® is a proprietary measurement technology by Dynamic Biosensors GmbH. Instruments and biochips are engineered and manufactured in Germany.

Research Areas

switchSENSE® is used in a wide range of research areas from early discovery stages within leading academic groups to drug development programs at large pharma companies.



„**switch**SENSE® allows us to measure affinity and kinetics of DNA-binding proteins which we are unable to analyze with any other method.“

*Michael Schraeml, PhD, Head of Protein and Enzyme Technologies
Roche Diagnostics GmbH – Penzberg, Germany*

For a list of recent publications please visit www.dynamic-biosensors.com/literature/

Contact info@dynamic-biosensors.com to speak to our application team about methodologies or to arrange a demonstration.