

A close-up photograph showing a person wearing blue nitrile gloves using a black pipette to apply a liquid sample to a small, square, gold-colored biosensor chip. The chip is resting on a blue foam-lined tray. The chip has intricate circuitry and the words "DYNAMIC" and "BIOSENSORS" printed on it. The background is a clean, white laboratory setting.

# dynamic BIOSENSORS

Double the colors.

Discover the possibilities.

switchSENSE<sup>®</sup>

„**switch**SENSE® is one of the few new technologies which provide a clear value-added.“

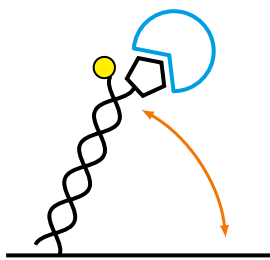
*Dirk Ullmann, PhD, Executive Vice President Lead Discovery  
Evotec AG – Hamburg, Germany*

## The World of **switch**SENSE®

**switch**SENSE® technology utilizes a novel electro-switchable biosurface to provide researchers and commercial laboratories the ability to visualize and 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, position 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 visualize 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.

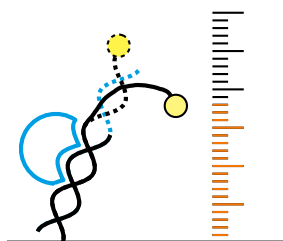
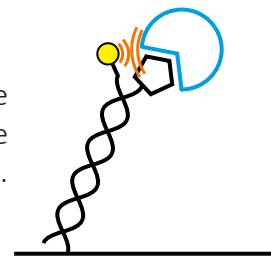
## **switch**SENSE® Measurement Modes



**switch**SENSE® 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/](http://www.dynamic-biosensors.com/switchsense/)

## Data Generation

**switch**SENSE® 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        |



## One Color & Double Color

In 2016, Dynamic Biosensors introduced the DRX<sup>2</sup> instrument and compatible biochips. This platform is the first biosensor ever 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. 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.

This technology offers novel methods of investigation including

- Same-spot controls – target levers residing next to control levers on the same electrode
- Dual binding modelling – presenting two targets within the same model system – ideal for bivalent / bispecific antibody design

[www.dynamic-biosensors.com/launchdrx2/](http://www.dynamic-biosensors.com/launchdrx2/)

## switchSENSE® 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.

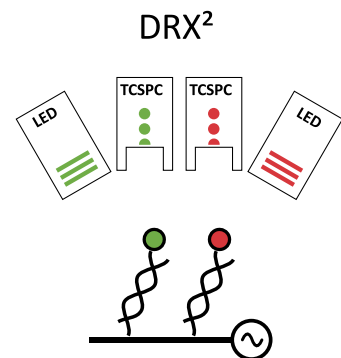
The biochip may be regenerated many times using automated routines and can be configured in three levels of multiplexing, allowing the use of up to 6 different capture molecules in parallel in each flow channel.

[www.dynamic-biosensors.com/biochips/](http://www.dynamic-biosensors.com/biochips/)

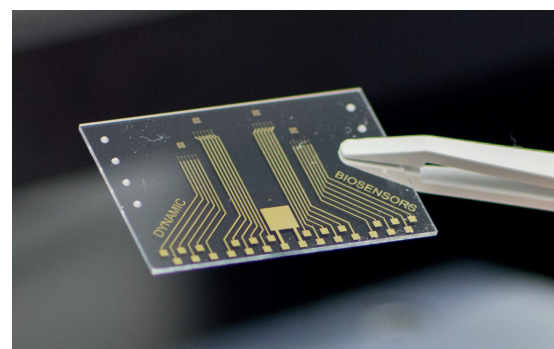
## DRX Series Instruments

One color DRX and double colour DRX<sup>2</sup> analyzers are electro-optical instrument specifically designed for automated switchSENSE® measurements. Instruments feature automated liquid handling and temperature control.

[www.dynamic-biosensors.com/instruments/](http://www.dynamic-biosensors.com/instruments/)



Schematic of a double color  
switchSENSE® Experiment



switchSENSE® Biochip



DRX Instrument

## switchSENSE® Performance Specifications

- Limit of detection 10fM
- Dissociation constant 50fM – 1mM
- Association rate constant  $1\text{E}3 - 1\text{E}8/\text{Ms}$
- Dissociation rate constant  $1\text{E}-6 - 1\text{E}0/\text{s}$
- Hydrodynamic diameter accuracy of 0.1 nm
- Temperature  $8^\circ - 75^\circ\text{C}$  (chip),  
 $10^\circ - 40^\circ\text{C}$  (autosampler)

## Research Areas

switchSENSE® is used in a wide range of areas from early research stages within leading University groups, through drug discovery screening programs to large pharma, Quality Control processes. The versatile nature of the biochip has enabled research in the following areas

- Protein: protein interaction kinetics
- Conformational change screening
- Monomer / dimer / aggregate modelling
- High affinity biologics including bispecific antibody design
- Liposomes and virus-like particles
- Small molecule interaction
- DNA binding proteins including enzymes (including polymerases and Cas9)
- Aptamers, riboswitches
- DNA encoded libraries

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

For a list of recent publications please visit [www.dynamic-biosensors.com/literature/](http://www.dynamic-biosensors.com/literature/)  
For company information please visit [www.dynamic-biosensors.com/dynamic-biosensors/](http://www.dynamic-biosensors.com/dynamic-biosensors/)

Contact [info@dynamic-biosensors.com](mailto:info@dynamic-biosensors.com) to speak to our application team about methodologies or to arrange a demonstration.