

switchSENSE® – Comprehensive biophysical information, in one measurement

Multi-parameter analysis

Binding parameters:

k_{on} , k_{off} , K_d , avidity
protein-protein interactions,
nucleic acid binders, small molecules,
riboswitches, and more.



Multi-specific binders:

ternary complexes, affinity, avidity,
stability, $t_{1/2}$, multispecific antibodies,
PROTACs,...



Enzymatic activity:

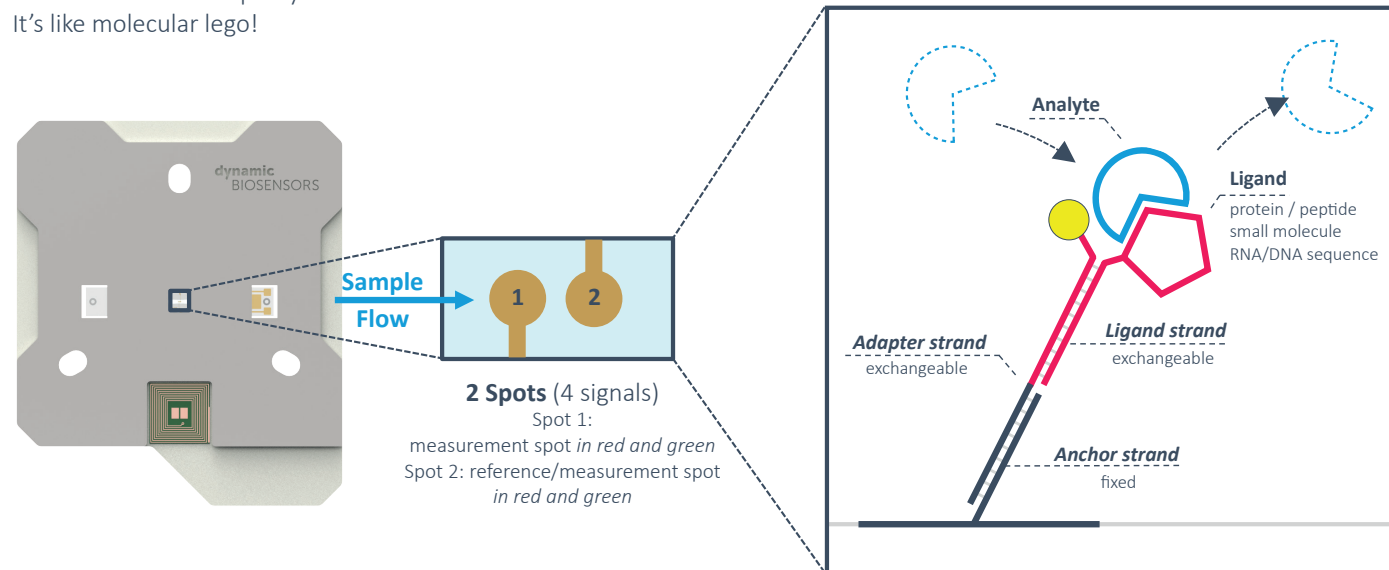
k_{on} , k_{off} , K_d , k_{cat} , K_M , IC_{50}
transcriptases, polymerases,
helicases,...



The heliX® chip

DNA nanolevers for limitless versatility

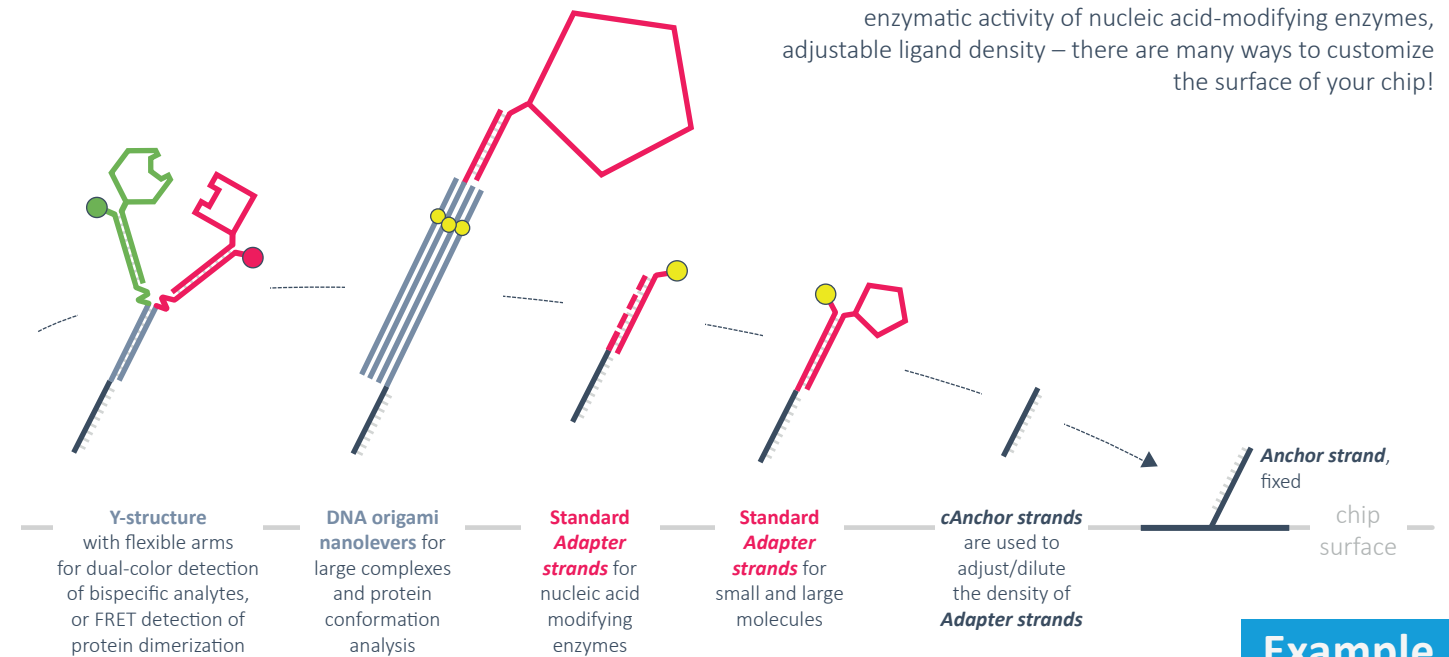
switchSENSE® is based on customizable DNA nanolevers on a chip surface. Each chip contains two electrodes ("Spots") with 2 different anchor strand sequences. The anchor strands remain fixed on the surface – the rest is up to you. It's like molecular lego!



dynamic
BIOSENSORS

We know that each research project comes with unique challenges and needs. That is why the **heliX®** chip is not designed as a one-size-fits-all assay.

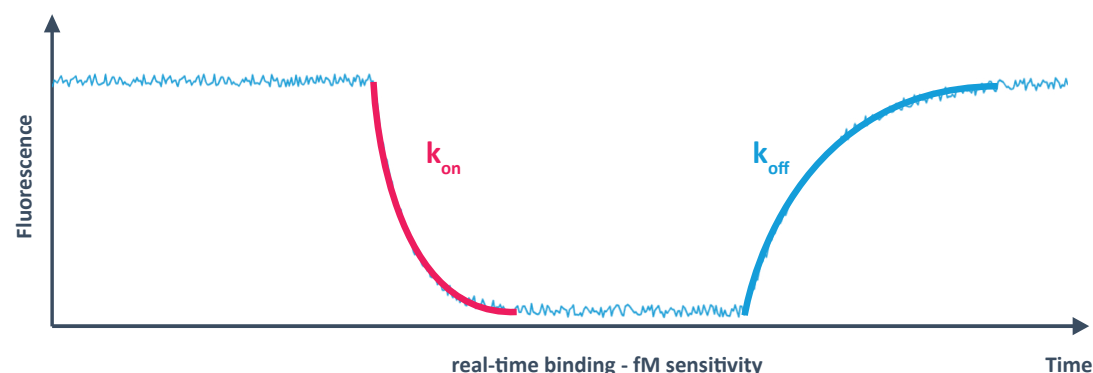
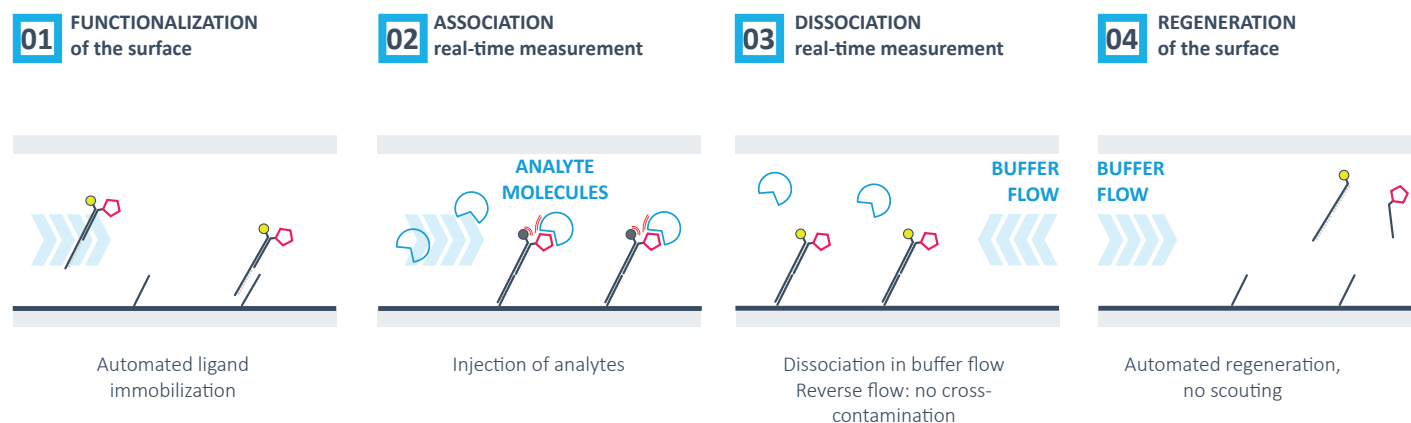
Specialized DNA-nanostructures, nanolevers to probe enzymatic activity of nucleic acid-modifying enzymes, adjustable ligand density – there are many ways to customize the surface of your chip!



Understanding interactions in unrivaled detail with

Fluorescence Proximity Sensing

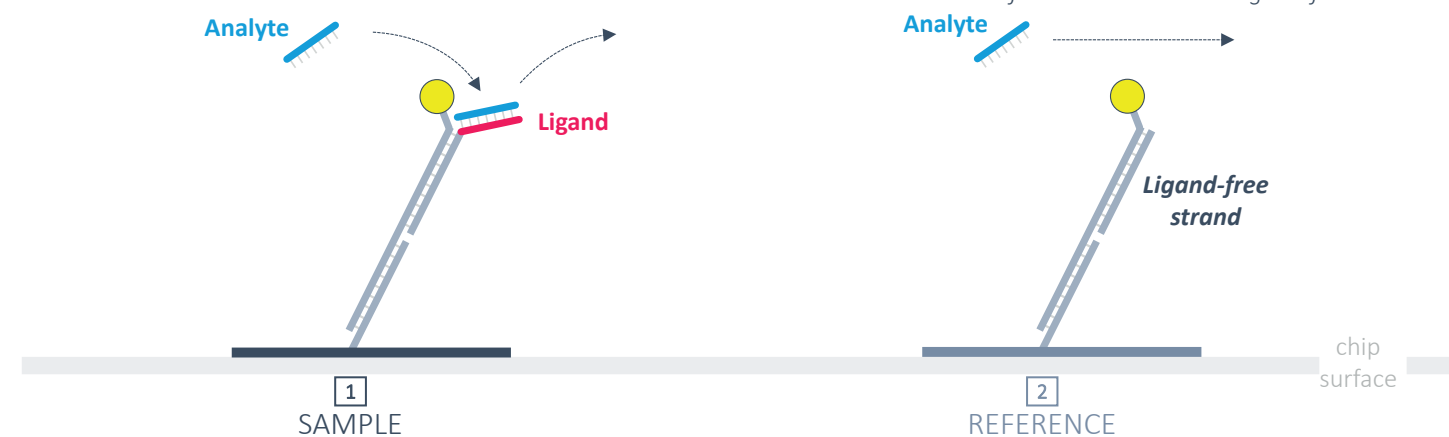
The dye fluorescence is **quenched** in the presence of analyte molecules. Changes in fluorescence directly report on **association** and **dissociation**.



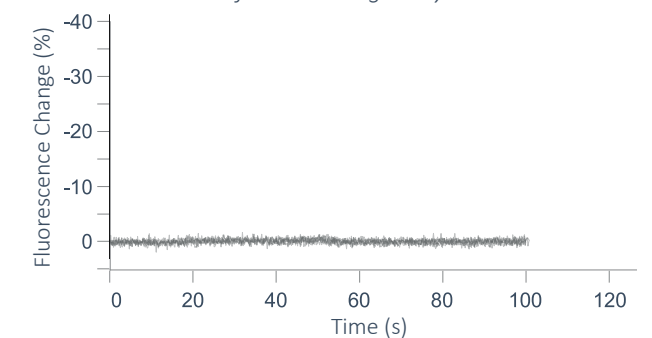
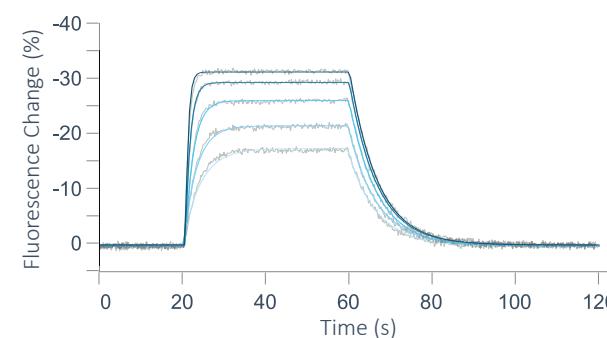
www.dynamic-biosensors.com

Example

This example shows the binding kinetics of a DNA-DNA interaction. Spot 1 of the **heliX®** chip was functionalized with a DNA nanolever carrying the ligand, Spot 2 was used as a reference spot and functionalized with a ligand-free strand.

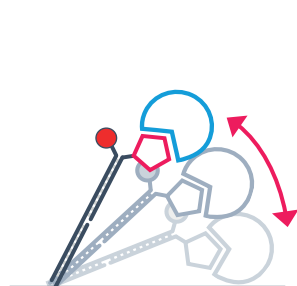


The measurement is repeated with five different analyte concentrations. The raw data is displayed in grey, global mono-exponential fit curves are displayed in shades of blue with darker colors for increasing analyte concentrations.



Different switchSENSE® measurement modes

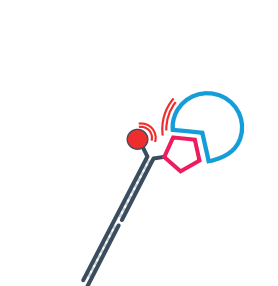
for a broad range of applications and molecular interactions



DYNAMIC mode

Hydrodynamic friction

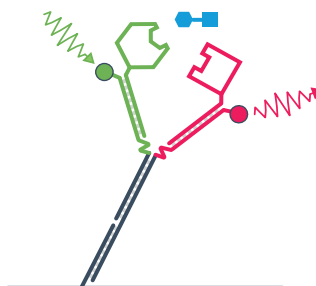
molecular size/shape
conformational changes



STATIC mode

Fluorescence proximity
sensing

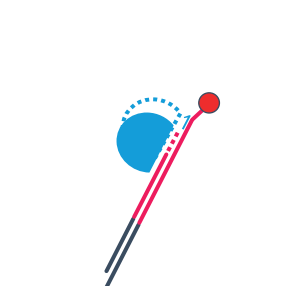
real-time binding
fM sensitivity



FRET mode

Förster resonance energy
transfer

multi-specific analytes
ternary complexes



ENZYME ACTIVITY mode

Surface energy transfer

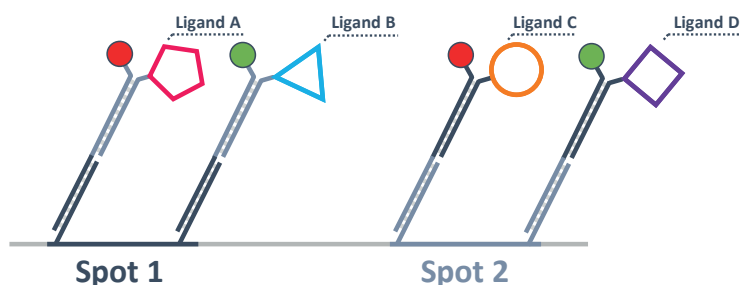
nucleic acid modifying
enzymes binding and
activity

2 Measurement spots with two-color detection

Multiplexing – bispecific analytes – ternary complex
formation – FRET assays





Two-color detection, red and green, from each sensor
spot.

Two detection spots in each flow channel for real-time
referencing of two colors or multiplexing of four inter-
actions.



Scalable throughput:

Combine as many **heliX**® modules as you need in one network

	 heliX	 heliX⁺	 2 heliX⁺	 4 heliX⁺
No. of chips, auto-exchangeable	1	5	10	20
No. of real-time signals	2	4	8	16
Real-time referencing	[1] same channel	[1] same channel	[1] same channel [2] different channels	
No. of well-plates / wells	1 / 96	1 / 384	2 / 768	4 / 1536
Fluorescence channels	One color	Two colors		
Sampling rate	1 datapoint/s	100 datapoints/s		
Temperature	[1] $T_{const.} = 25\text{ °C}$ or 37 °C	[1] any constant temperature from 15 °C - 40 °C [2] variable temperature, ramp speed up to 10 °C/min		
Measurement modes	[1] Molecular Dynamics [2] Fluor. Proximity Sens.	[1] Molecular Dynamics (molecular friction) [2] Fluorescence Proximity Sensing (FPS) [3] Förster resonance energy transfer (FRET)		
Kinetics	$k_{on} = 10^3 \dots >10^7\text{ M}^{-1}\text{s}^{-1}$ $k_{off} = 10^{-6} \dots 0.2\text{ s}^{-1}$ $K_d = 0.1\text{ pM} - 1\text{ mM}$	$k_{on} = 10^3 \dots >10^8\text{ M}^{-1}\text{s}^{-1}$ $k_{off} = 10^{-6} \dots 20\text{ s}^{-1}$ $K_d = 50\text{ fM} - 1\text{ mM}$		