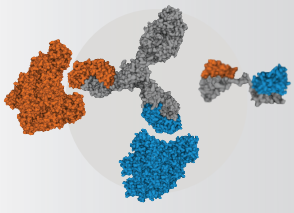
dynamic
BIOSENSORS

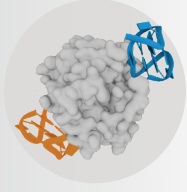
Kinetics of multispecific molecules

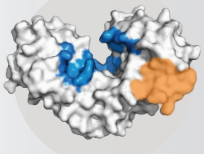
Analysis of cooperative binding with switchSENSE®



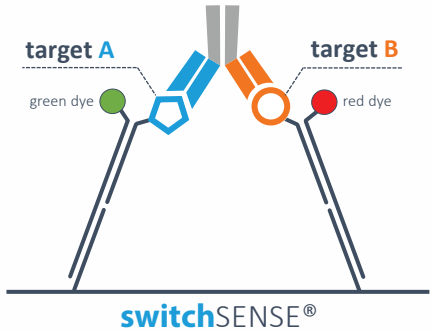
Multispecific
Antibody Formats

Bifunctional
Aptamers





Multiple
Binding Sites



switchSENSE®
bispecific surface

Biosensors for the Analysis of Multispecific Molecules

switchSENSE® FEATURES

Cooperativity / avidity, affinity and kinetic rates determination for potency profiling.

In-vitro **half-life analysis** of biphasic dissociation events.

Efficient microfluidics for the resolution of a **wide range of affinities**.

Automated, **pre-configured** assay setup and analysis options.

heliX® line of
biosensor instruments

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

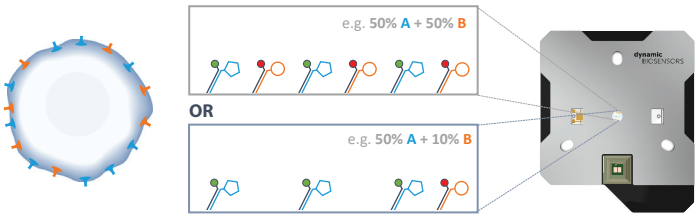
dynamic
BIOSENSORS

www.dynamic-biosensors.com

Target surface modelling in a biosensor

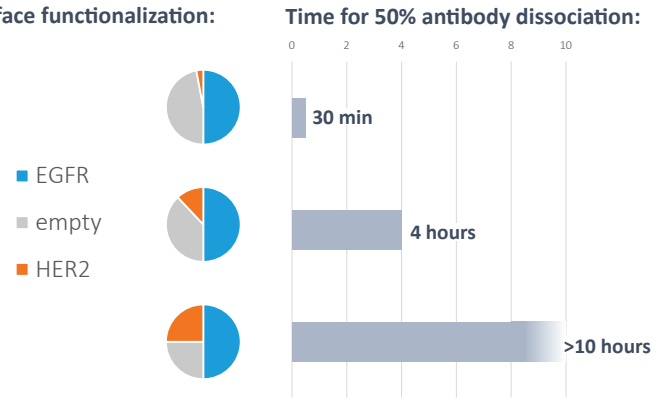
Ligand density, for example on a cell surface, affects the probability of cooperative binding and therefore the actual surface half-time of the analyte.

switchSENSE® variable chip surface modification allows imitation of *in vivo* target distribution by controlled adjustment of the distance and ratio of multiple ligands.



average DISTANCE between nanolevers:
50 nm ... >500 nm

Antigen density-dependent half-time

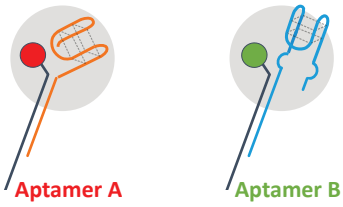


*Half-time analysis of a bispecific antibody from surfaces with different ratios of EGFR and HER2 reveals **potency** of antibody on different target cells.*

Cooperation of affinities leads to avidity

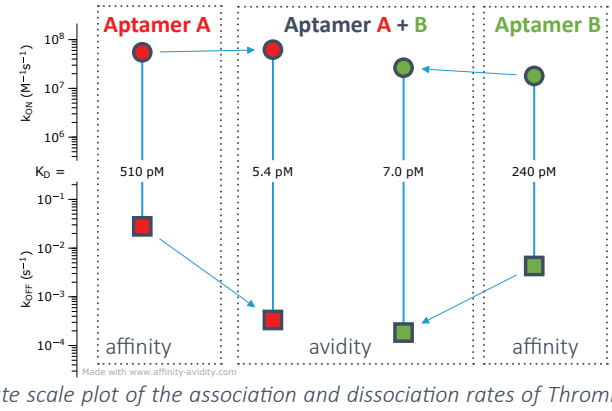
The combination of two individual binding events results in an unpredictable cooperation (avidity) that must be measured to fully understand the interaction.

switchSENSE® **color-codes two ligands** and thereby obtains both individual affinities and the combined avidity rates in **one single automated assay**.



Two color-coded aptamer ligands immobilized on the chip surface.

Affinity maturation by second aptamer



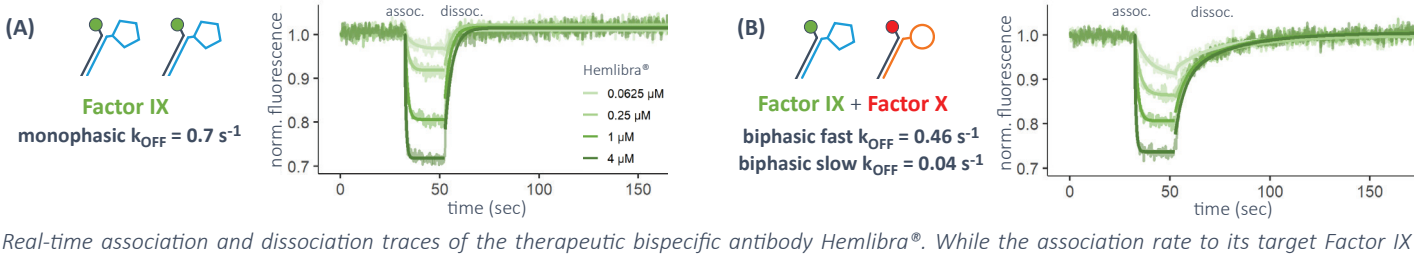
Rate scale plot of the association and dissociation rates of Thrombin to two Thrombin-binding aptamers. Individual high pM affinities (left and right) cooperate in a combined measurement to low pM avidity.

Resolving biphasic association and dissociation

switchSENSE® dissects binding kinetics of strong (pM) as well as weak (µM) binders.
Even biphasic behavior can be quantified directly and used for e.g. dissociation ranking.

Biphasic off-rate analysis

SURFACE FUNCTIONALIZATION



*Real-time association and dissociation traces of the therapeutic bispecific antibody Hemlibra®. While the association rate to its target Factor IX increases only slightly in the presence of Factor X (from 1.2 E+5 $M^{-1}s^{-1}$ to 5.9 E+5 $M^{-1}s^{-1}$), the weak binding to Factor IX alone (A) is stabilized by cooperative binding to Factor X as well, resulting in much slower **biphasic dissociation** and therefore longer residence times (B).*

Publications & Further Information

Kast, F., et al. Engineering an anti-HER2 biparatopic antibody with a multimodal mechanism of action. *Nat Commun* **12**, 3790 (2021).
Daub, H., et al. The trimer to monomer transition of Tumor Necrosis Factor-Alpha is a dynamic process that is significantly altered by therapeutic antibodies. *Sci Rep* **10**, 9265 (2020).
Webinar I Target selectivity of multispecific antibodies: practical analysis of binding kinetics and avidity I https://youtu.be/ACnTz93afeY (2021).
Online Tutorial I heliX® Bivalent and Bispecific Binders Tutorial I https://youtu.be/QY7R0tGzML0 (2021).

dynamic BIOSENSORS

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

www.dynamic-biosensors.com