

SwitchSENSE

The dynamic response of protein interactions

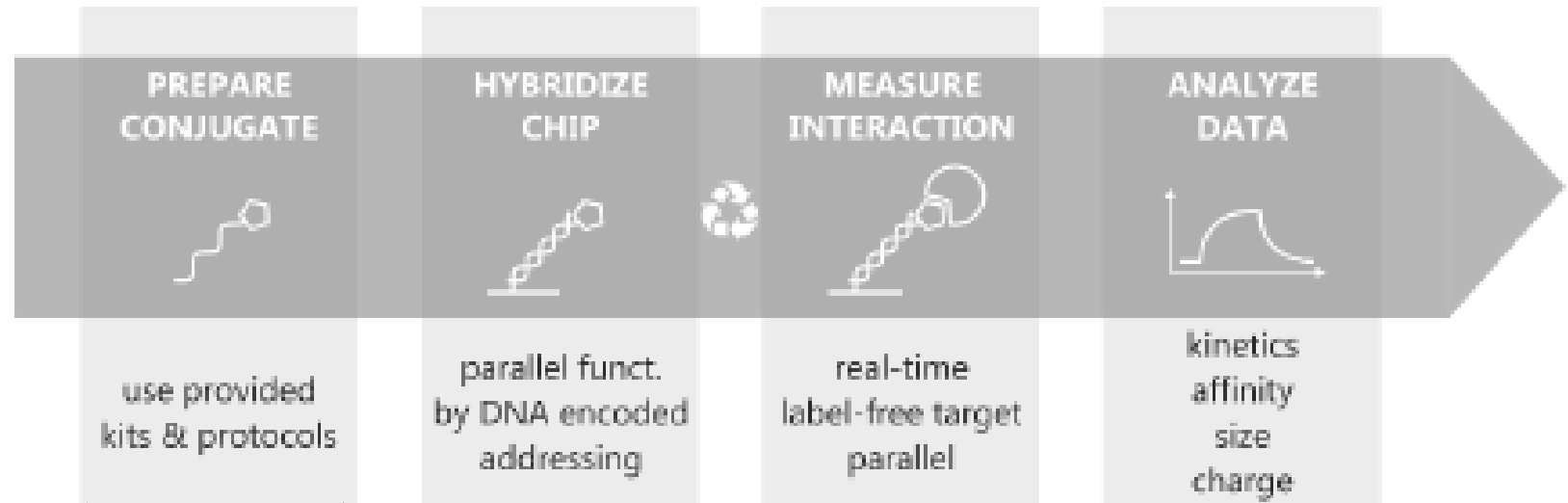


SwitchSENSE: principle



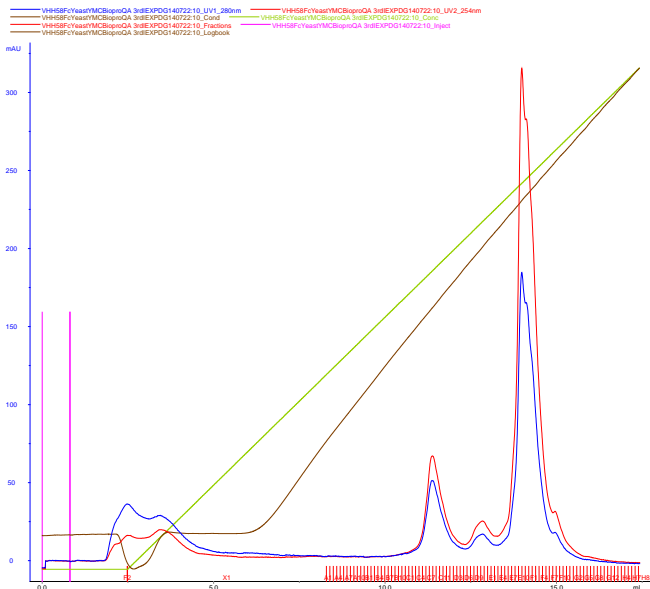
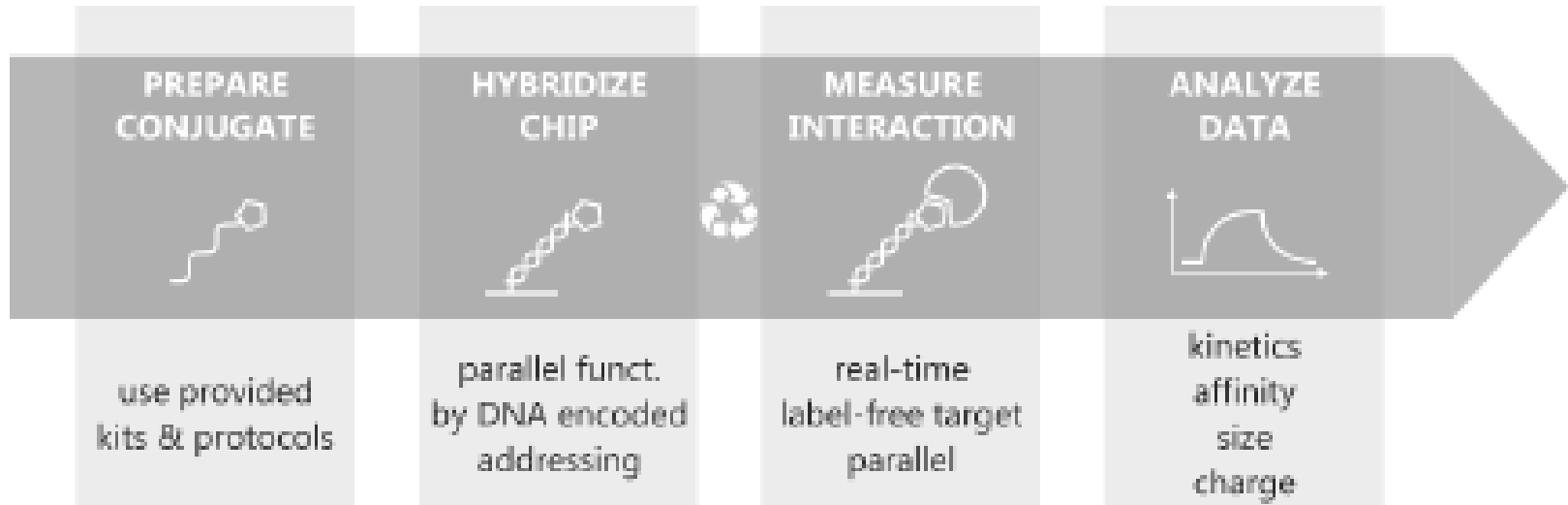
- High frequency voltage is applied on microelectrodes
- Orientation of the levelers (switching)
Monitored by time resolved single photon counting (Fluorescence quenching close to electrode surface)
- Binding of analyte
 - ↔ increased friction slows down the switching
 - ↔ surface under the fluorescence curve (i.e. dynamic response) goes down

SwitchSENSE: workflow

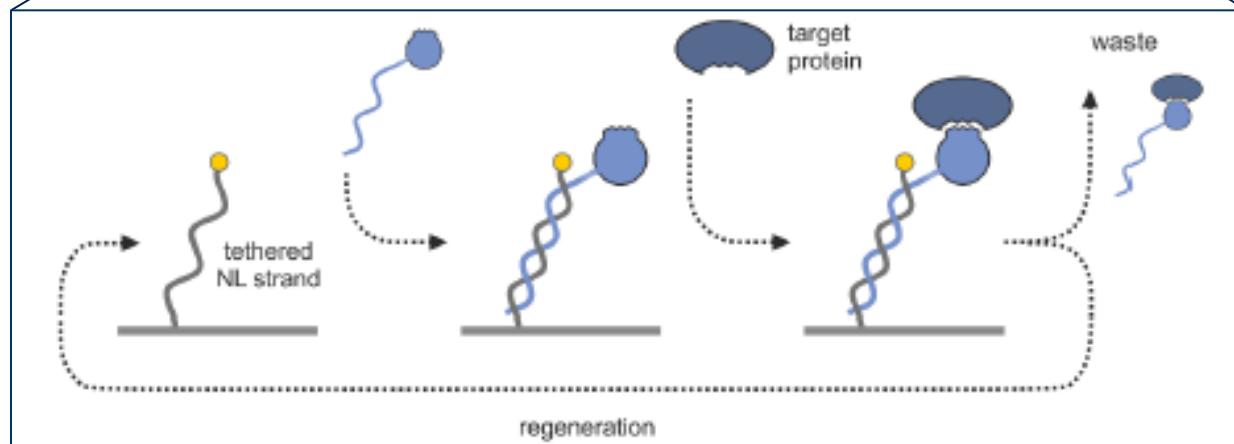
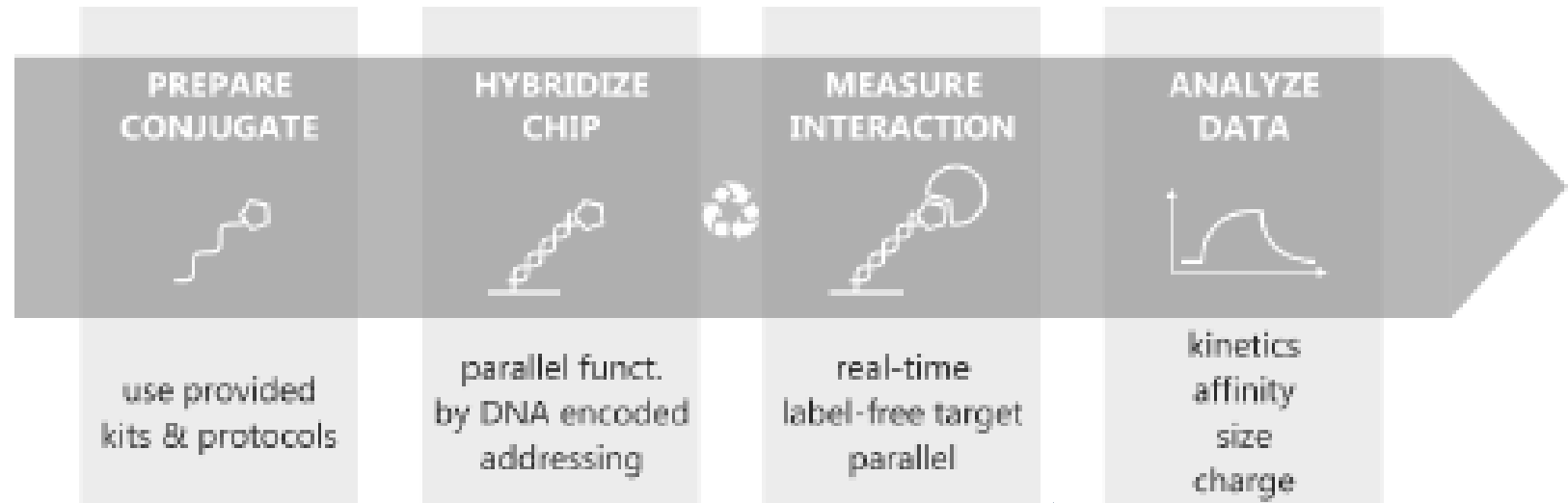


- Amine-coupling
- Thiol-coupling
- Protein A
- Streptavidin - Biotin

SwitchSENSE: workflow

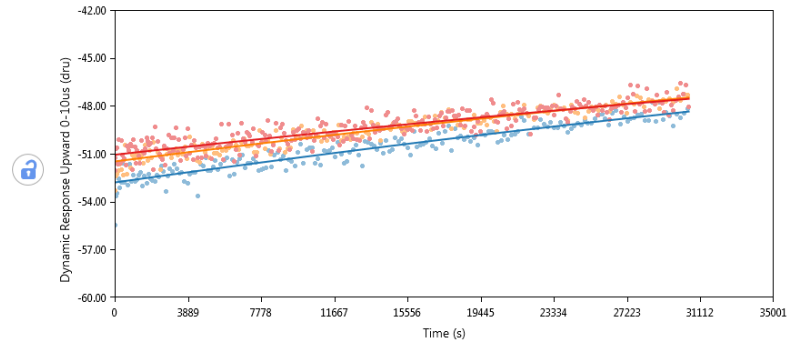
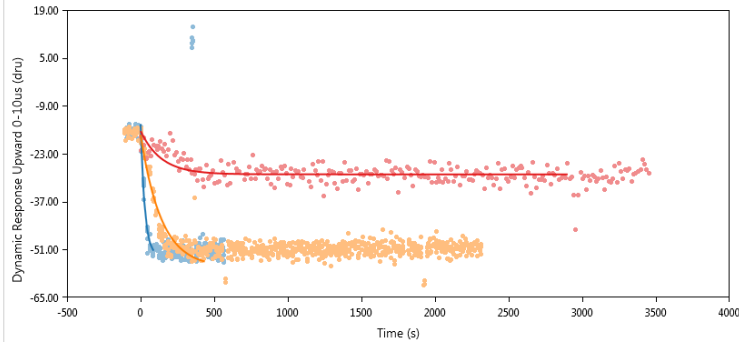


SwitchSENSE: workflow

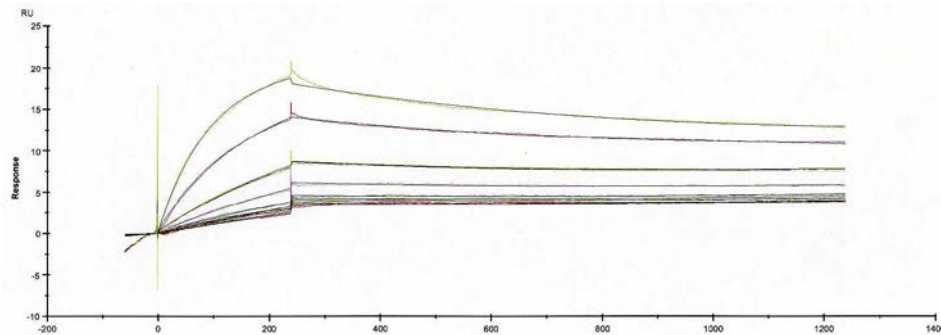


SwitchSENSE: comparison

SwitchSENSE

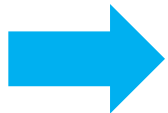
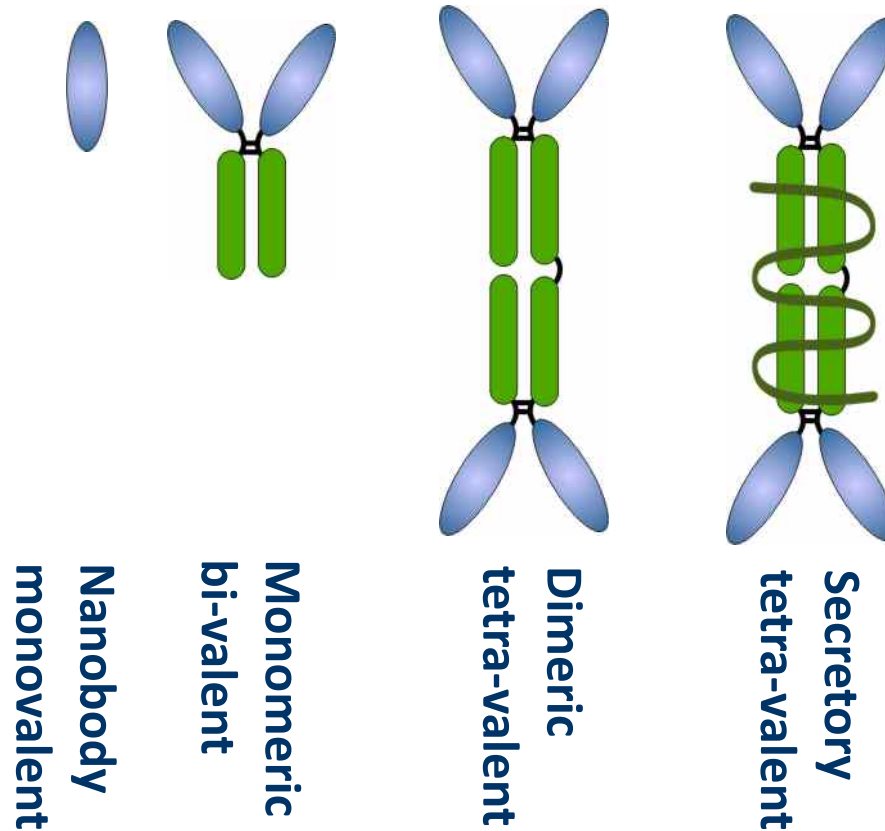
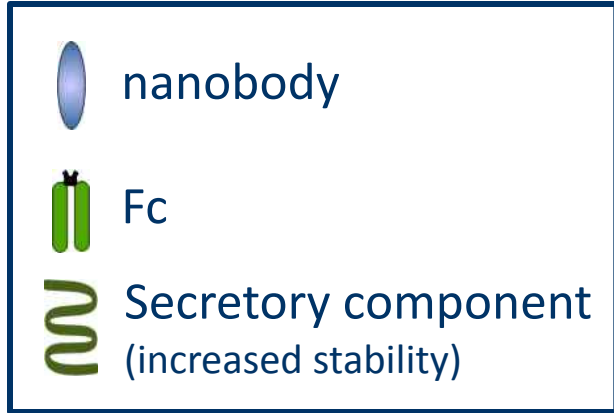


Biacore



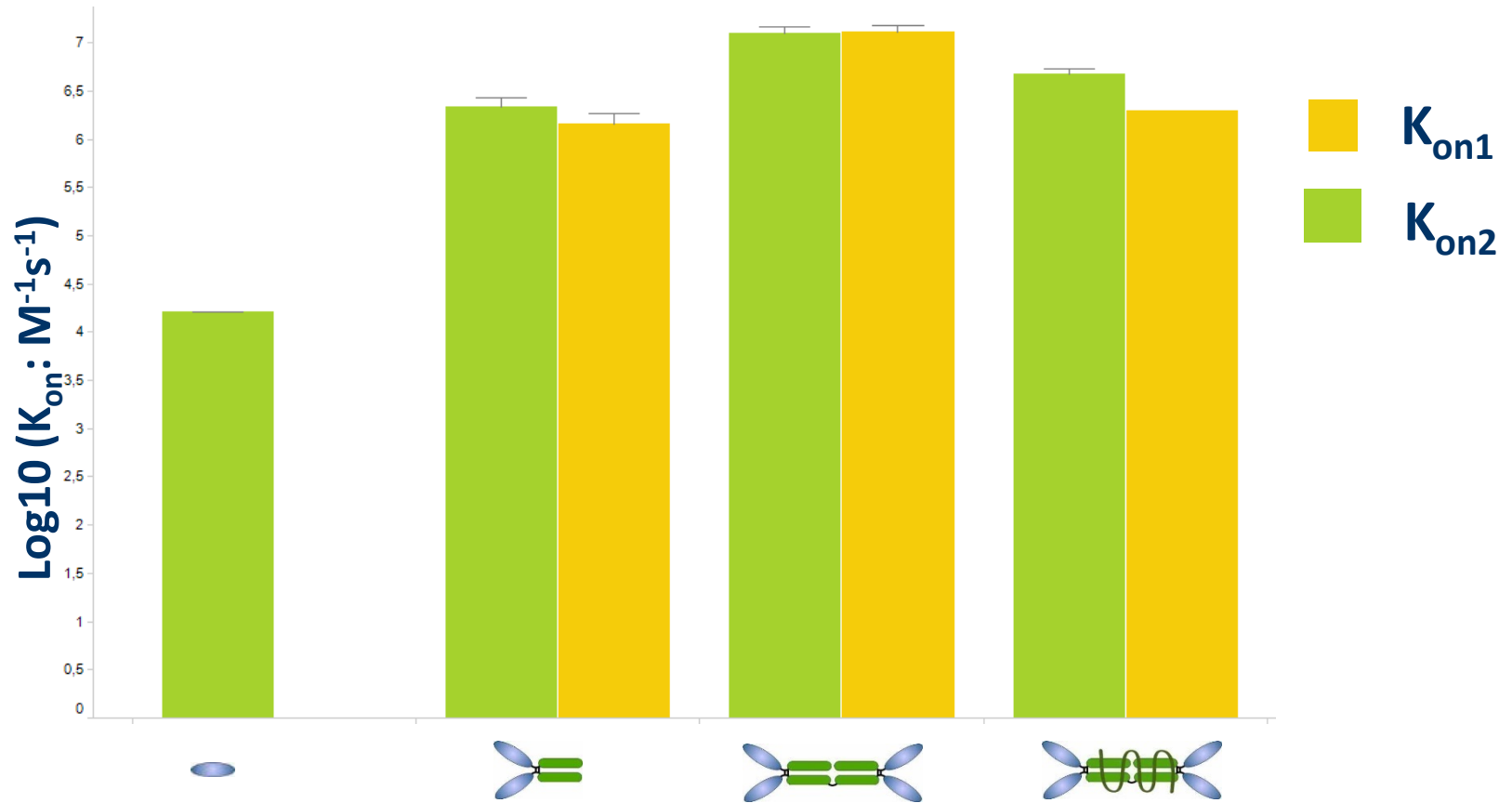
Interaction pair	Technology	K_{on} ($M^{-1} s^{-1}$)	K_D (M)
mTNF / anti-mTNF IgG	SwitchSENSE	$7,13E+05$	$1,27E-11$
	Biacore	$1,07E+06$	$8,87E-10$
rGFP / anti-rGFP nanobody	SwitchSENSE	$2,88E+06$	$1,98E-10$
	Biacore	$7,68E+05$	$2,30E-10$

SwitchSENSE: project

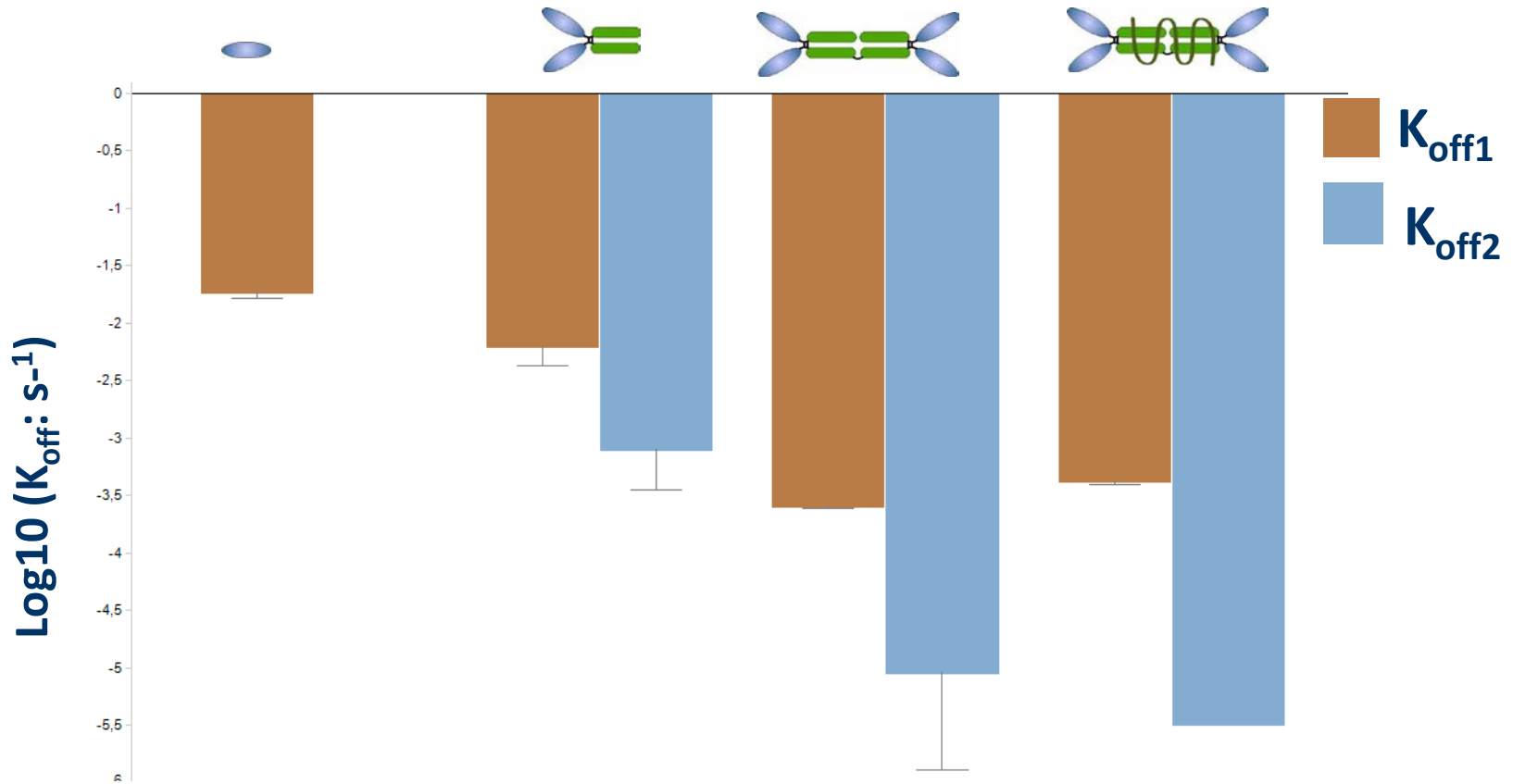


Influence on binding kinetics?

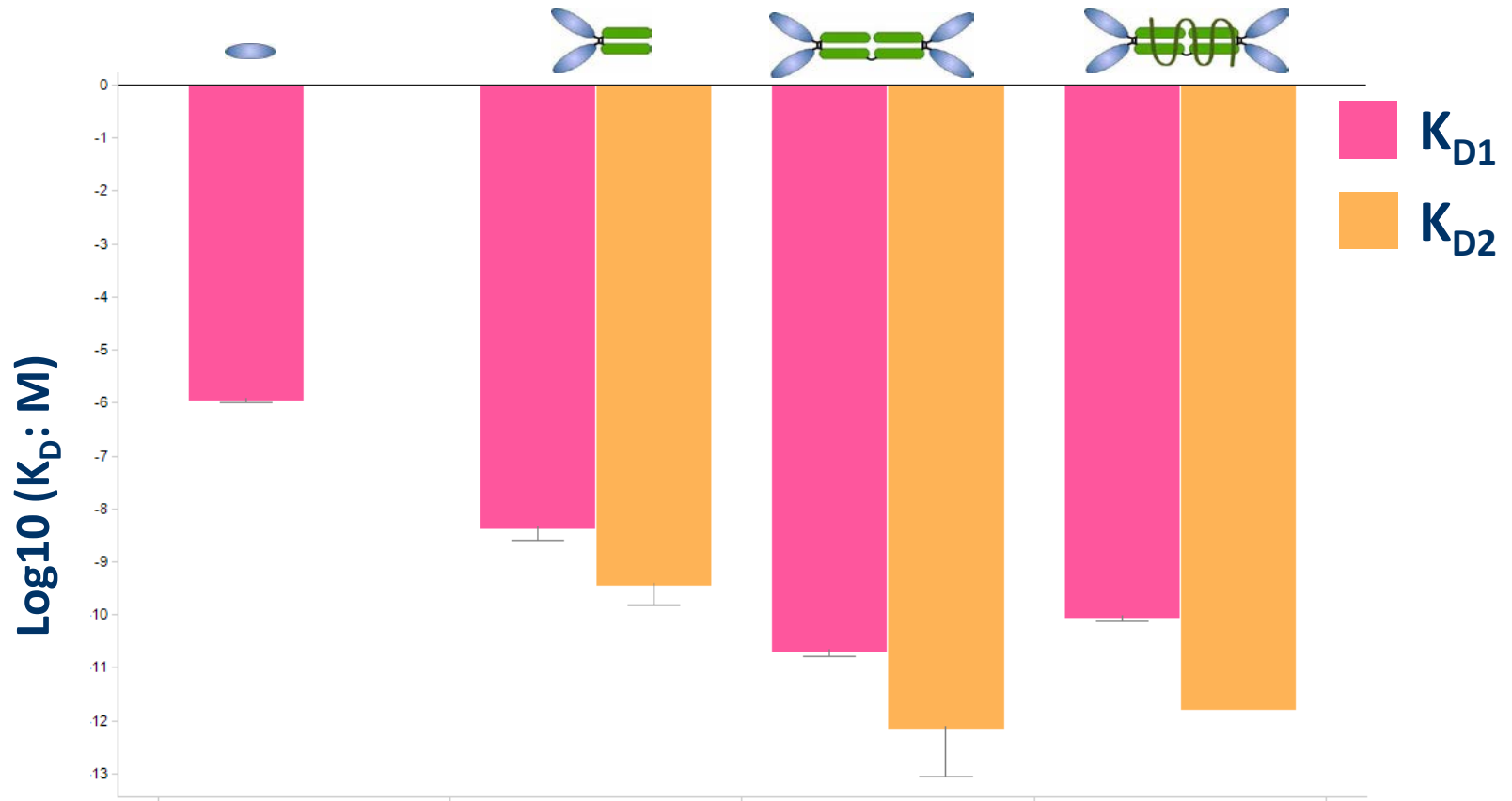
SwitchSENSE at PSF - VIB



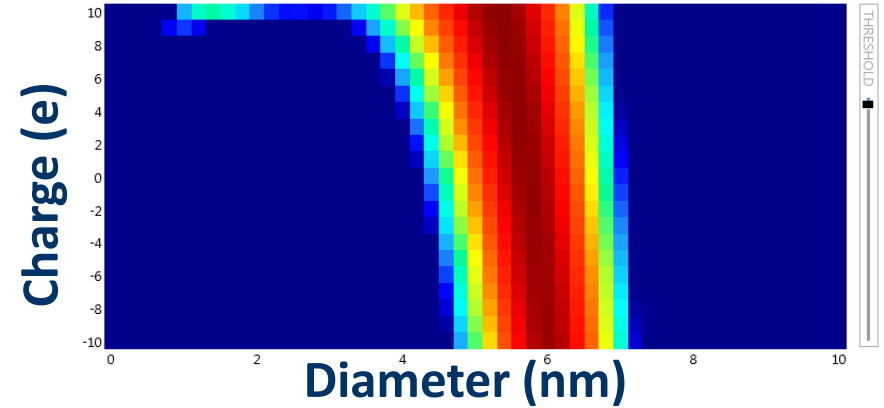
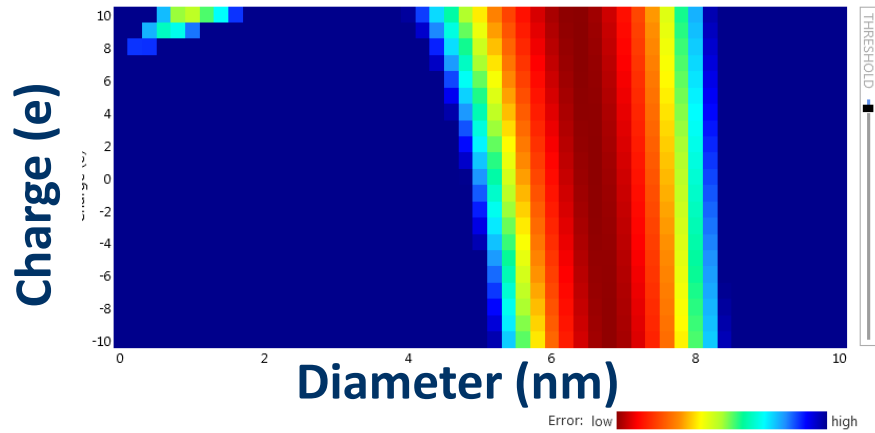
SwitchSENSE at PSF - VIB



SwitchSENSE: project



SwitchSENSE: sizing



Average Stokes diameter (charge: -8,5) = 5,78
Standard deviation = 0,57

SwitchSENSE: technology

Advantages

- Sizing of the protein (Stokes diameter)
- Conformational changes – aggregation
- Thermodynamic analysis (protein melting)
- Cheaper reagents vs. Biacore
- Chips are re-usable for different proteins (each time regeneration with fresh conjugate)

Disadvantages

- *In-vitro* conjugation and purification of the conjugate = time consuming
- Smallest compound needs to be conjugated (no freedom of orientation)

Come to us for your protein needs or to advice you!

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