

Biacore™ 8K – kinetic possibilities in all directions

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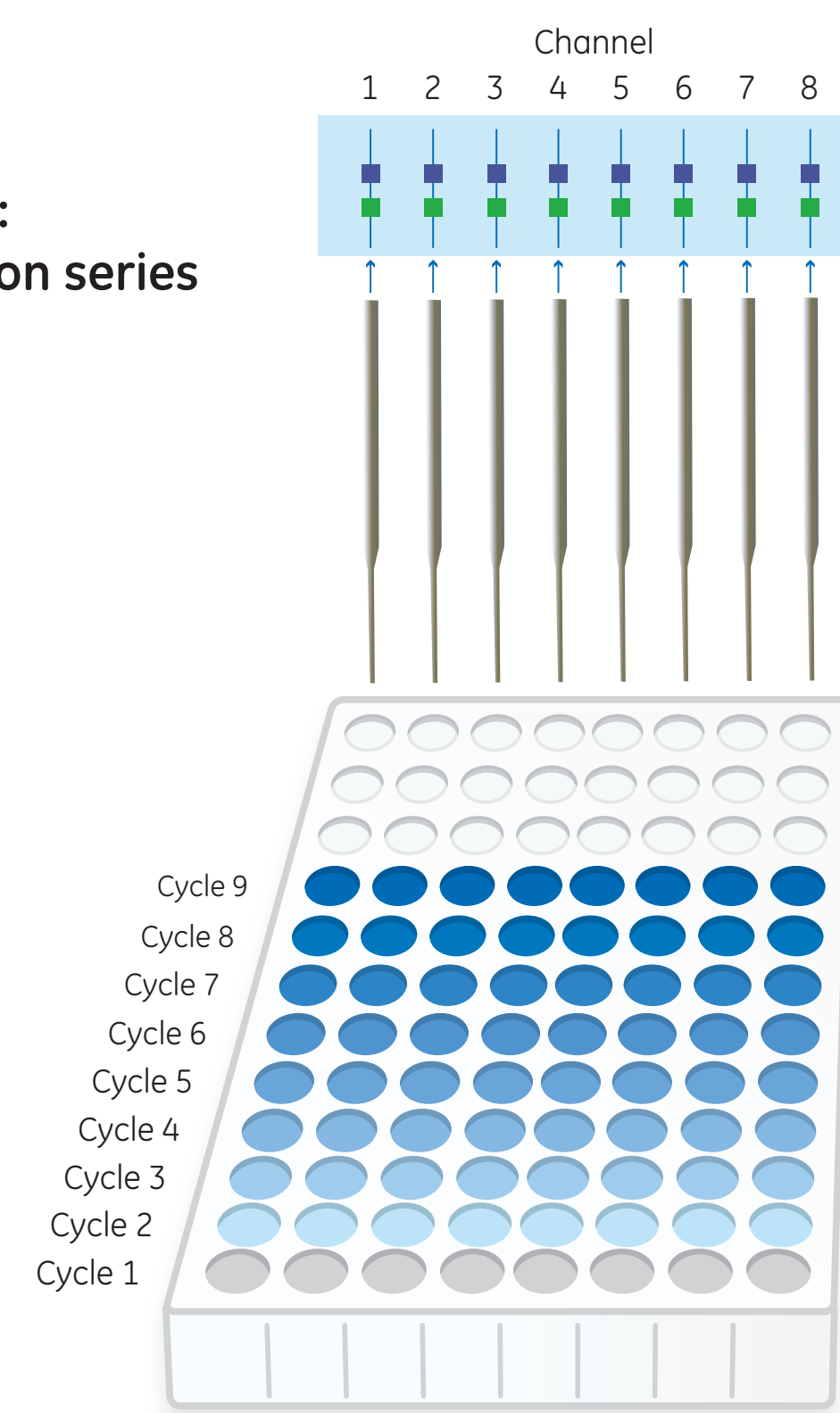
Introduction

Binding kinetic studies with a Biacore system is feasible over a wide dynamic range, making it possible to determine the binding kinetic rate constants for basically all biological interactions. The experimental setup for kinetic analysis in current Biacore systems is based on one sample concentration per cycle, multi-cycle kinetics (MCK), or analysis of all sample concentrations in one cycle, single-cycle kinetics (SCK). The latter has proved to be the preferred choice for many applications where no regeneration is available.

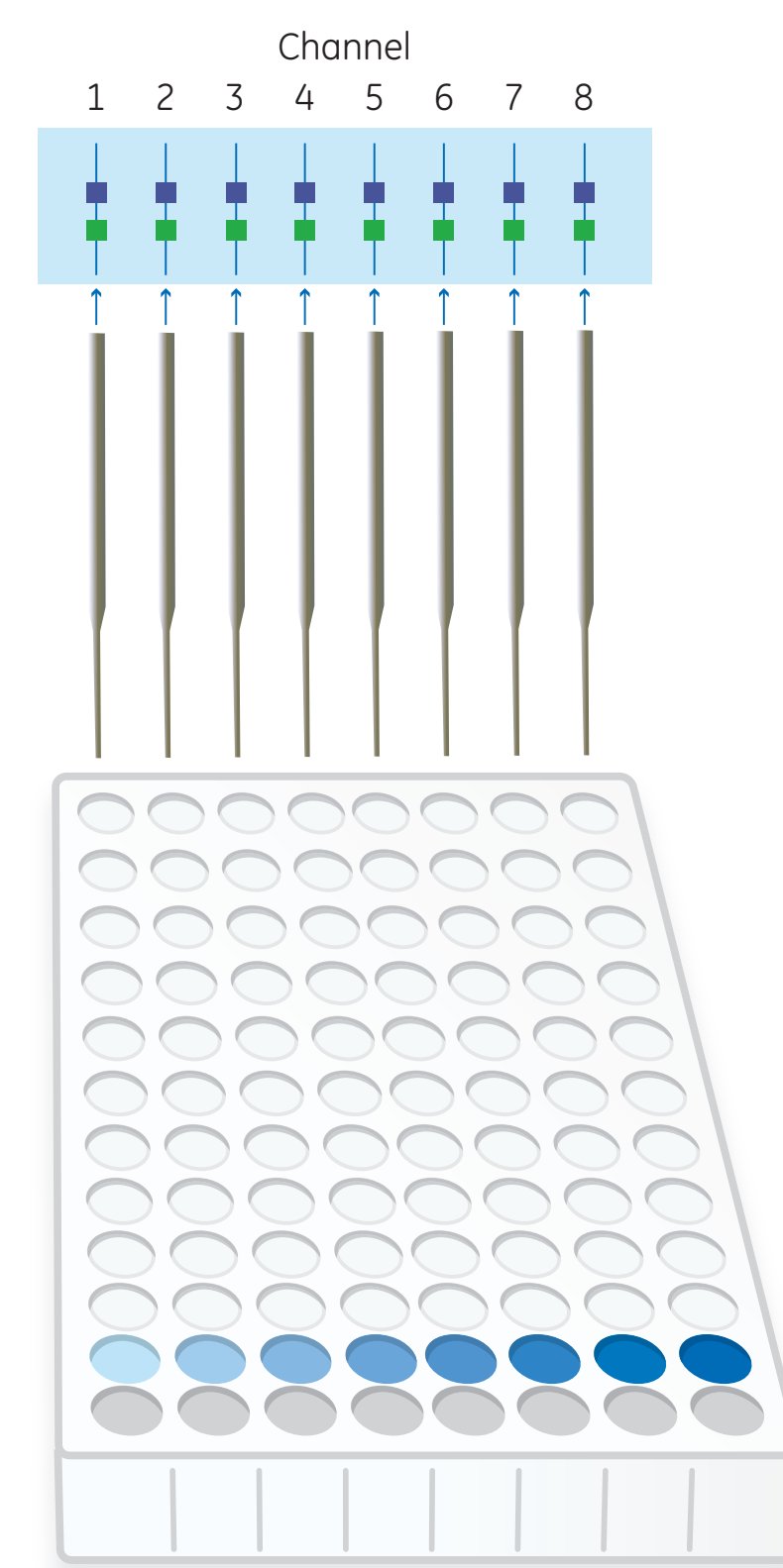
The emergence of Biacore 8K system opens up new possibilities for performing kinetic analysis. This eight needle, high-sensitivity surface plasmon resonance (SPR) system not only shortens time to results by up to eight-fold compared to single-needle systems, it also allows for kinetic analysis in parallel. For instance, the new 2D kinetics functionality offers detailed kinetics from only one sample cycle, thereby significantly reducing assay development time.

This poster presents the high flexibility in assay setup offered by Biacore 8K when determining binding rate constants while still obtaining similar results.

Biacore 8K
Serial setup:
concentration series
per channel



Biacore 8K
Parallel setup:
concentration series
per cycle

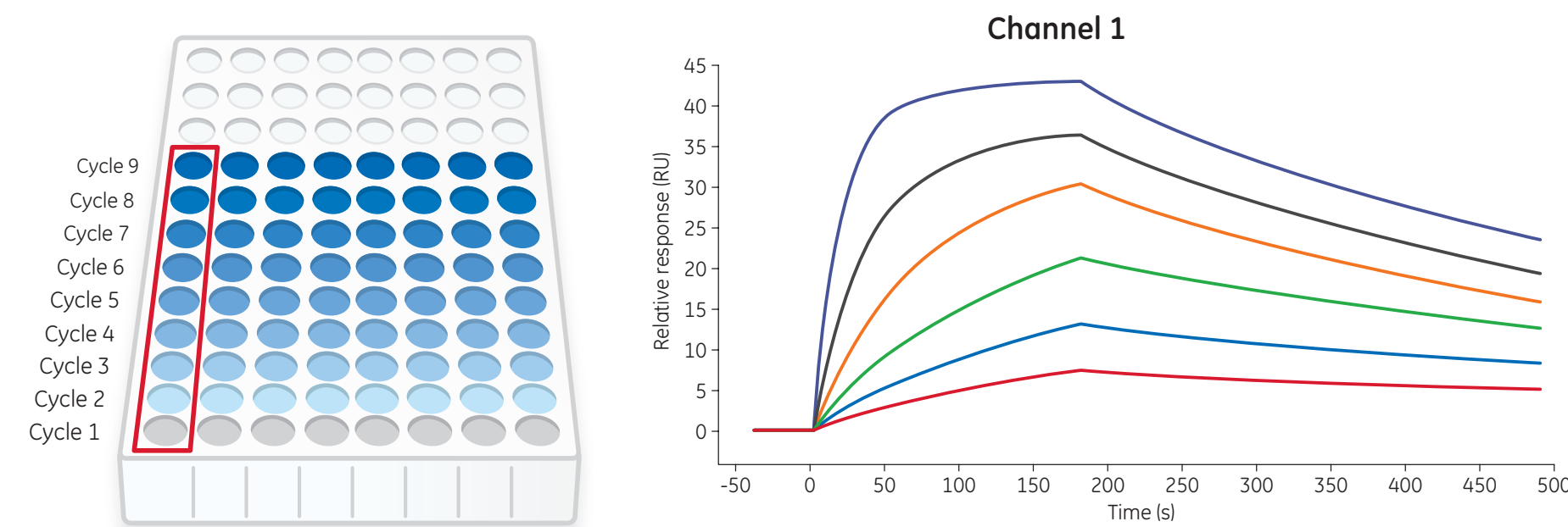


Biacore 8K: binding kinetics approaches

Depending on the user's preferences and the circumstances of each assay, kinetic analysis can be performed in four different ways.

Multi-cycle kinetics (MCK)

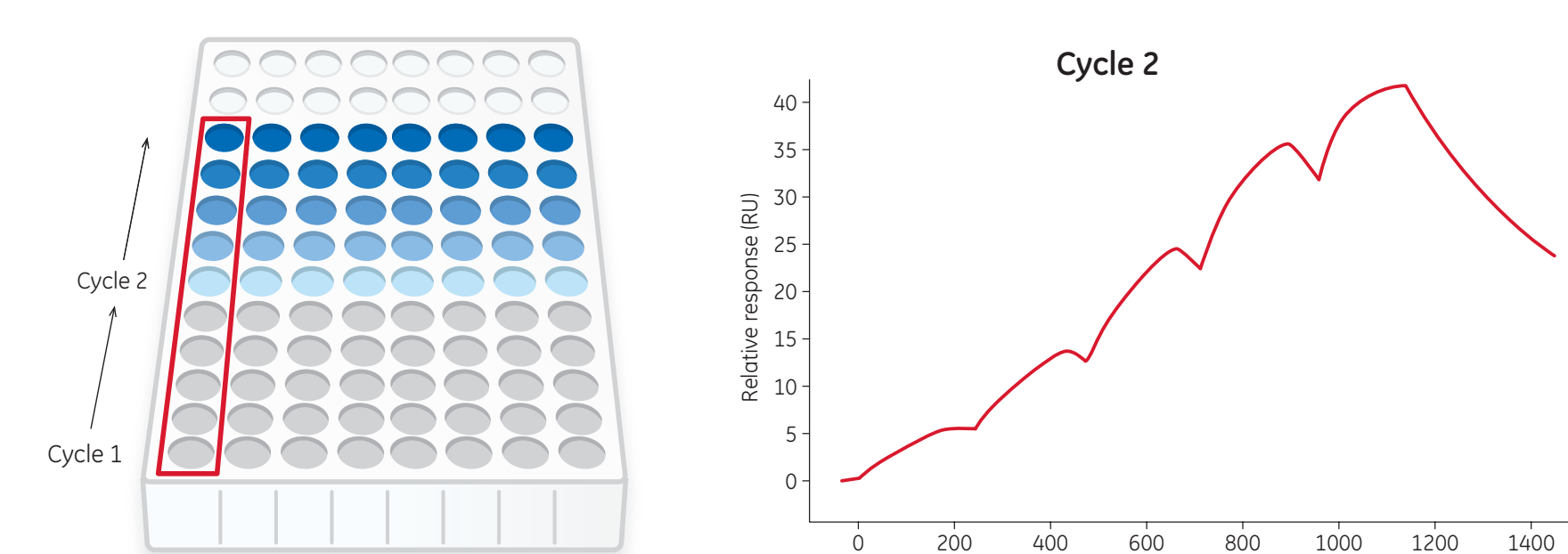
- Suitable for many samples against one ligand
- Suitable when different ligands are to be immobilized



Ex. Cycles 1-9: sample concentrations and blanks are placed per channel

Single-cycle kinetics (SCK)

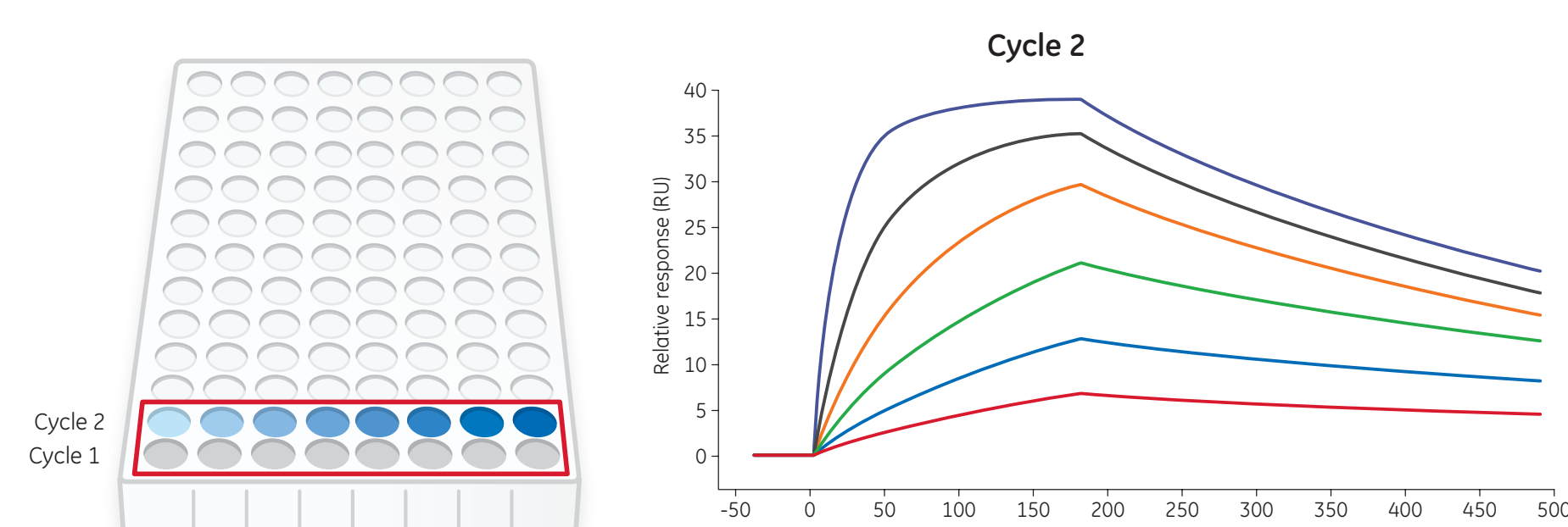
- Fast run time
- No regeneration needed
- 2-5 concentrations per injection
- Beneficial for long dissociation times and kinetic screen



Ex. Cycle 2: 5x sample conc. (Cycle 1: 5x blank conc.)

Parallel kinetics

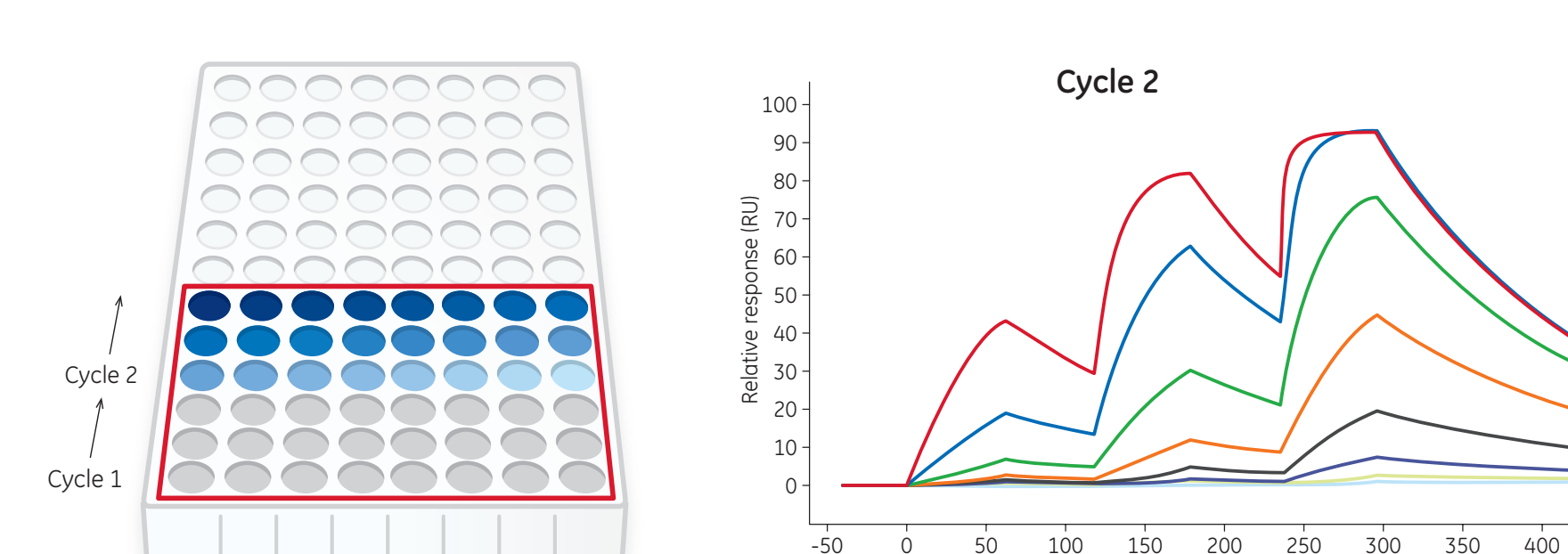
- Short run time for few samples
- Kinetic analysis in only two cycles (one blank cycle)
- Beneficial for samples with long dissociation times
- Alternative setup: two samples, four concentrations



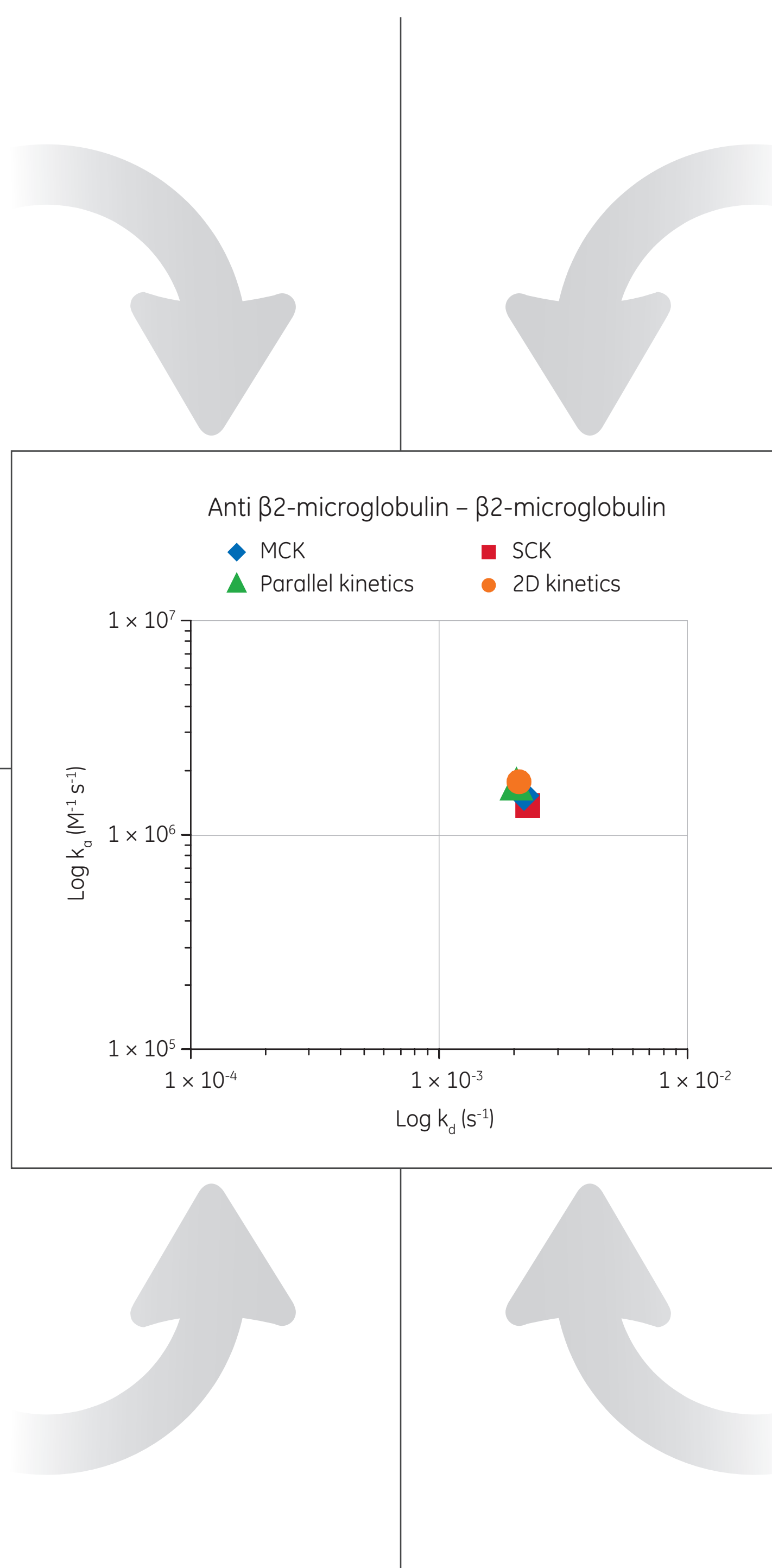
Ex. Cycle 2: sample in 8 concentrations (Cycle 1: blank cycle)

2D kinetics

- In-depth analysis in only one sample cycle
- Sample diluted directly into plate
- Sample diluted in two dimensions to cover a wide range
- No preknowledge of affinity or regeneration needed

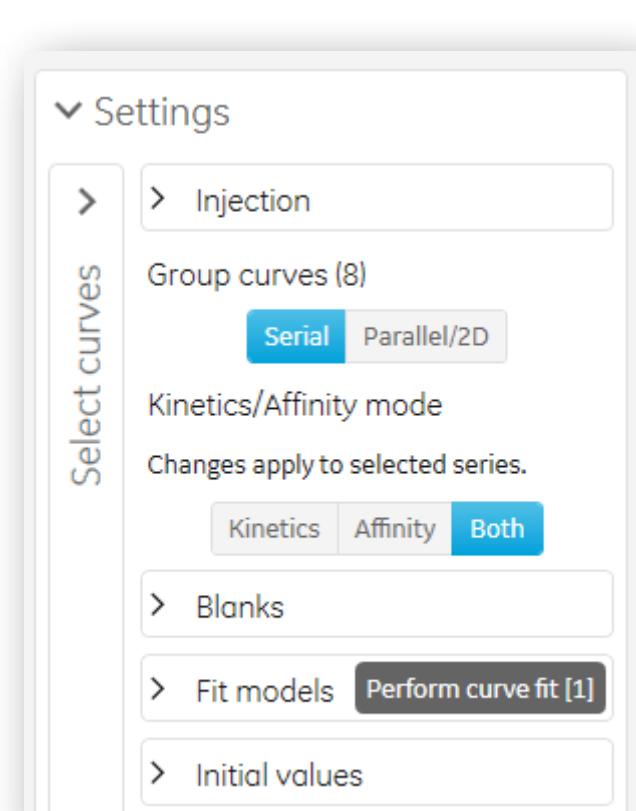


Ex. Cycle 2: sample in 24 concentrations (Cycle 1: blank cycle)



Data evaluation

- Evaluation of kinetic data from all of the above assay setups is supported in Biacore 8K Evaluation Software.
- Curves are grouped either in Serial or Parallel/2D mode prior to curve fitting.



Conclusion

- Biacore 8K supports several different approaches for performing kinetic studies, depending on analysis demand and/or preference.
- Provides flexibility in the assay setup depending on number of ligands, samples, run time, etc.
- New 2D kinetics allows for detailed kinetic analysis of an unknown interaction in a single sample cycle with minimal assay development.
- Biacore 8K allows confident determination of kinetics over an extensive kinetic range; k_{on} 10^3 to 10^7 $M^{-1} s^{-1}$ (10^9 for proteins), and k_{off} 10^{-6} to $0.5 s^{-1}$.