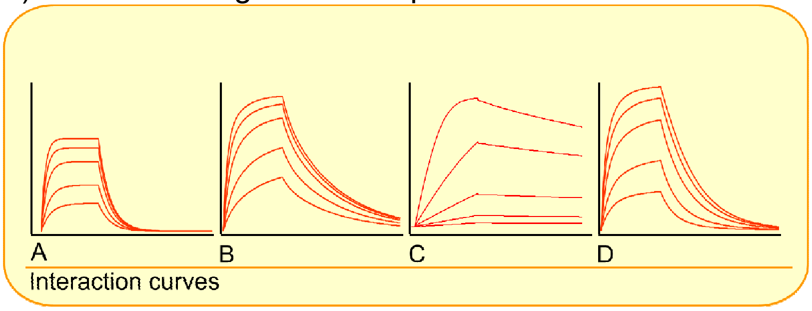
SPR PAGES

Sensorgram quiz answers.

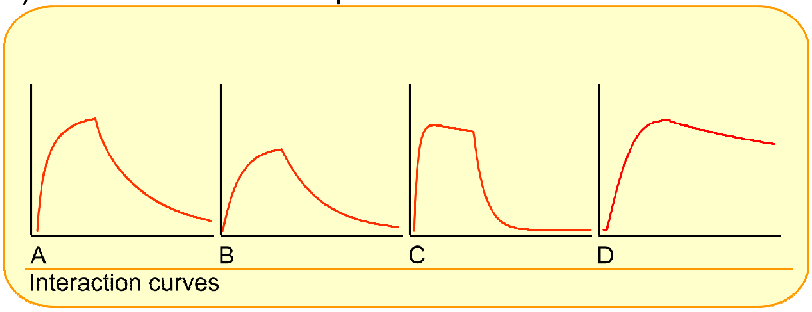
1) Which sensorgram has exponential interaction curves?



Interaction curves

A: exponential B: heterogenic C: mass transport   D: conformational change

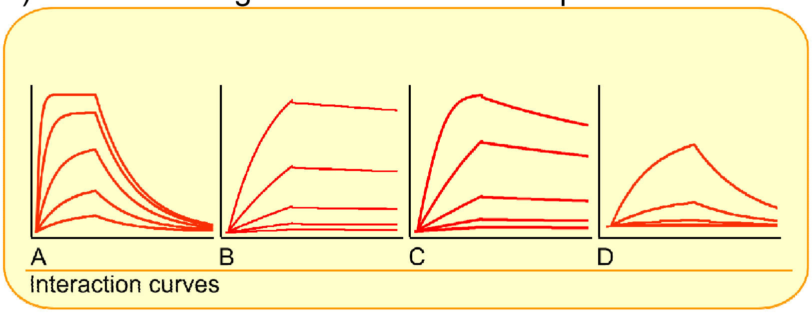
2) Which curve is an exponential interaction curve with mass-transfer?



Interaction curves

A: hetrogeneic B: exponential C: mixed analyte D: mass transport

3) Which sensorgram does not have exponential interaction curves?



Interaction curves

A: exponential B: exponential C: mass transport   D: exponential

4) What is wrong with this sensorgram ?

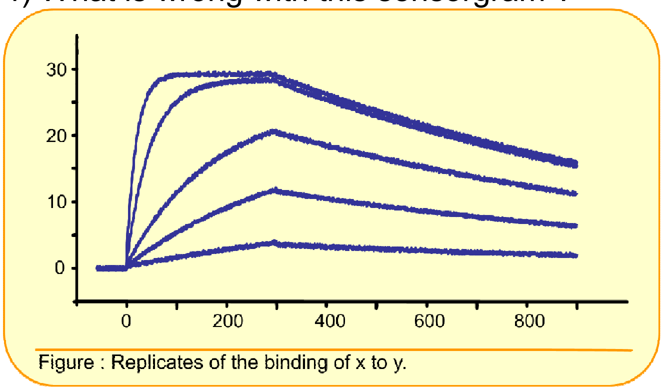


Figure : Replicates of the binding of x to y.

A: the legend is missing
B: there are no replicates
C: the bulk effect is too big
D: not all curves go to steady state

Answer A.

5) What is wrong with this sensorgram?

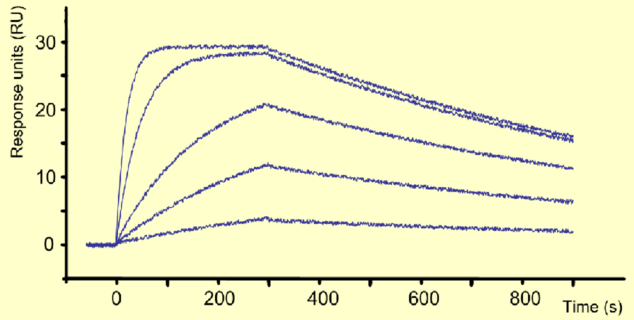


Figure : Interaction of x to y.

A: the legend is missing
B: there are no replicates
C: the concentration range is too narrow
D: not all curves go to steady state

Answer B

6) What is wrong with this sensorgram?

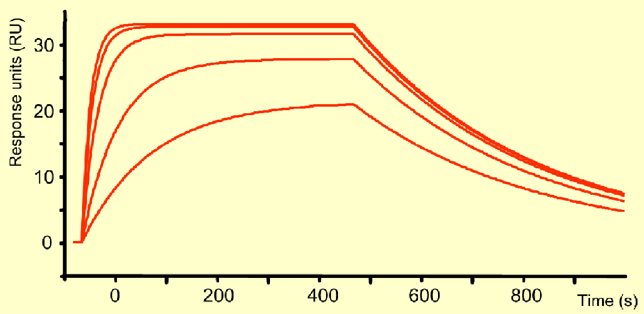


Figure : Replicates of the binding of x to y.

A: the legend is missing
B: there are no replicates
C: the concentration range is too narrow
D: not all curves go to steady state

Answer C:

The lower range (0.1 – 1 times K_D) is missing.

7) What should be solved first before fitting?

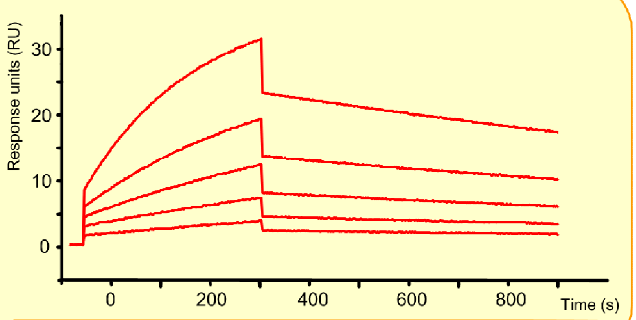
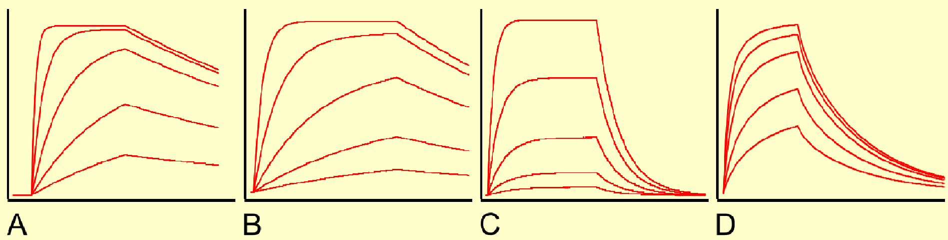


Figure : Replicates of the binding of x to y.

A: Association time should be longer
B: These are not exponentials
C: Make dissociation time longer
D: Match flow and analyte buffer

Answer D
There is a difference between flow buffer and analyte buffer causing a jump.

8) Which dataset can you use for equilibrium analysis?



Interaction curves

Answer D: only in C all the curves come to steady state.

9) What should be optimized before fitting?

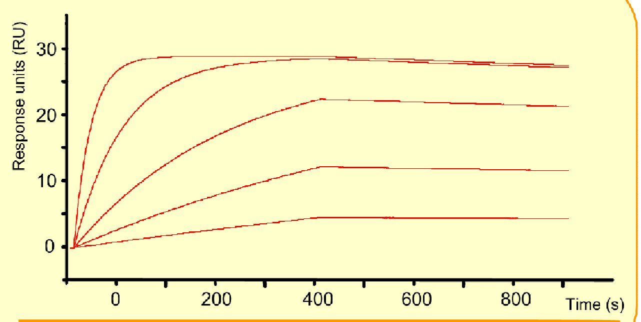


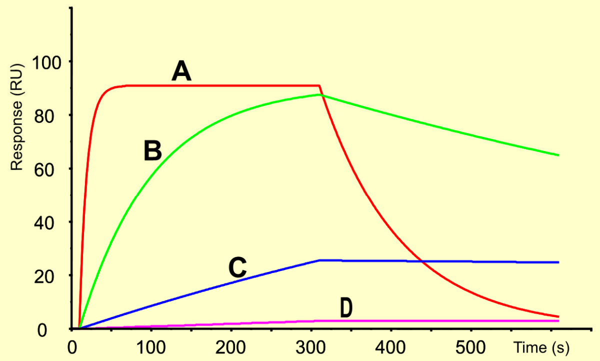
Figure : Interaction of x to y.

A: association time longer
B: longer dissociation time
C: use higher analyte concentrations
D: use lower analyte concentrations

Answer B.

For a reliable dissociation measurement at least 5% of the response should be dissociated.

10) Which curve has the fastest dissociation?
11) Which curve has the fastest association?



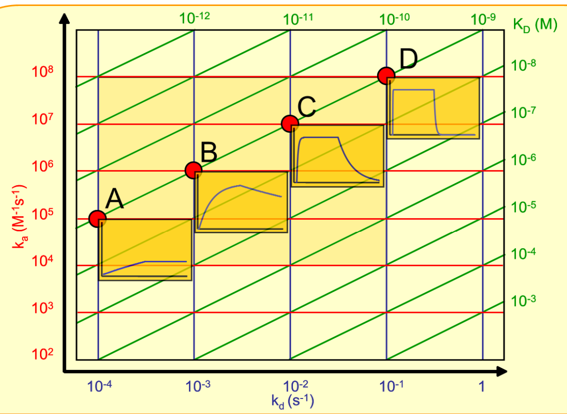
Different kinetics (same affinity)

A: curve A
B: curve B
C: you should know the analyte concentration
D: you should know the Rmax

10) because dissociation is concentration independent you can deduce it is A.

11) because association is concentration dependent you can not say anything about the association by looking at a curve.
The answer is C.

12) Which curve has the fastest association?
13) Which curve has the highest equilibrium constant?



Affinity plot

A: A
B: They are all the same
C: D
D: C is higher than B

12) just follow the lines C = 10^7 and D is 10^8 $M^{-1}s^{-1}$

13) they all lie on the same green line of K_D = 10^{-9} M

14) Which fitting result should you report?

k_a	k_d	K_D
($M^{-1}s^{-1}$)	(s^{-1})	(M)
1.1±0.1 E5	4.7±0.2 E-3	4.27 E-8

A

k_a	k_d	K_D
(1/Ms)	(1/s)	(M)
1.1±0.1 10^{5}	4.7±0.2 10^{-3}	4.27 10^{-8}

B

k_a	k_d	K_D
($M^{-1}s^{-1}$)	(s^{-1})	(M)
1.1±0.1 10^{5}	4.7±0.2 10^{-3}	4.27±0.46 10^{-8}

C

k_a	k_d	K_D
($M^{-1}s^{-1}$)	(s^{-1})	(M)
1.1±0.1 10^{5}	4.7±0.2 10^{-3}	4.3±0.5 10^{-8}

D

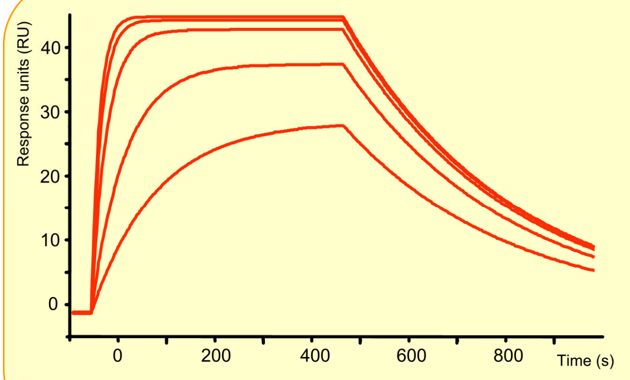
Fitting results

Answer D

Absolute correct would be

k_a: mol L^{-1} s-1

15) What is bad in this sensorgram presentation ?



A: Injection time too long
B: Concentration range not balanced
C: Response too high
D: Not all curves reach steady state

Answer B

16) What can you do when you have this sensorgram?

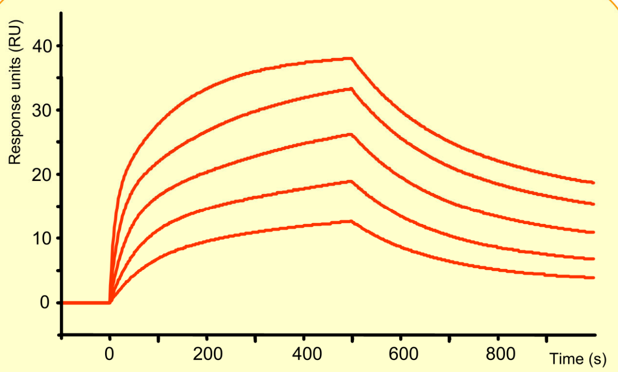


Figure 16: Interaction between A and G

A: check the analyte for purity
B: reverse the ligand and analyte
C: A + B
D: make the flow rate faster

Answer C

17) What can you do when you have this sensorgram?

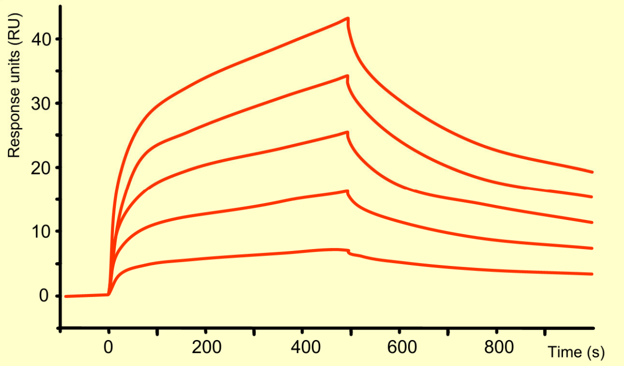


Figure 17: Interaction between B and C

A: check the analyte for purity
B: reverse the analyte and ligand
C: try an other immobilisation technique
D: A + B + C

Answer D

18) What can you do to optimize this interaction?

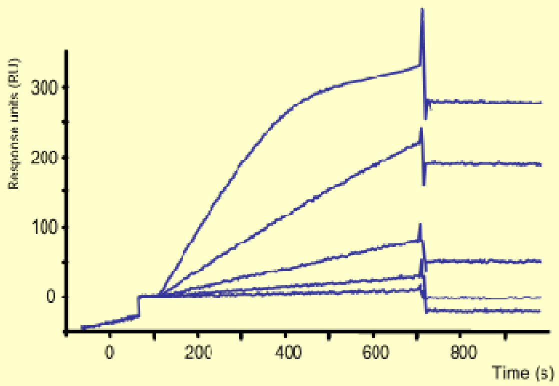


Figure 18: Interaction between Abc and Kln.

1: lower ligand concentration
2: match buffers better
3: equilibrate better
4: use higher flow rate

A: 1 + 2
B: 3 + 4
C: 1 + 2 + 3
D: 2 + 3 + 4

Answer C.

Not D: Although higher flow rates diminish mass transport it is better to lower the ligand concentration by making a new surface.

19) How much ligand should you immobilize for analyte concentration measurements?
20) How much ligand should you immobilize for kinetic analysis?

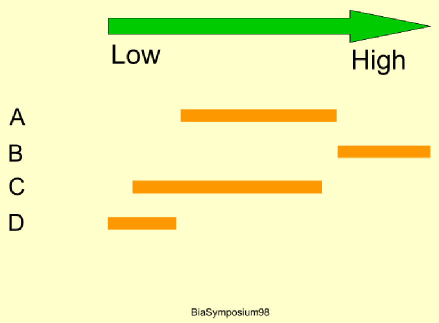
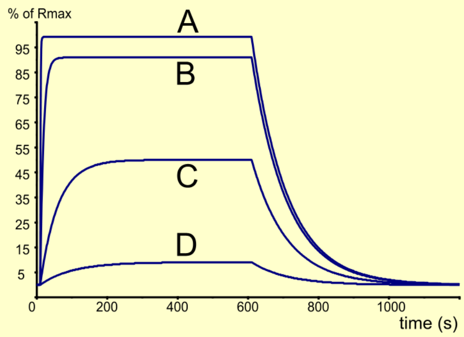


Figure 19: Immobilization level

A: low to high
B: high
C: low to medium
D: low

19) Answer B.
20) Answer D.

21) Which curve is at equilibrium (steady state)?
22) Which curve is saturating the ligand?
23) Which curve has an analyte concentration comparable to the K_D?



Equilibrium

A: curve A
B: curve B
C: curve C
D: all four curves

21) Answer D
22) Answer A
23) Answer C

24) When you have this fitting as a result. What can you do?

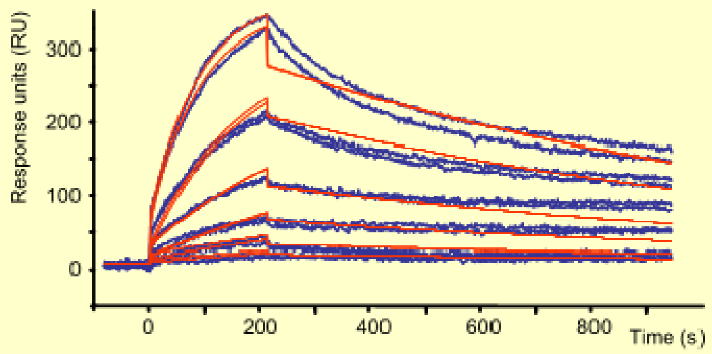


Figure 24: 1:1 fit of the interaction between Gh and SH

A: lower ligand concentration
B: check the ligand for purity
C: use higher flow rate
D: A + B

Answer D.

25) Are the values given in the inset plausible with this sensorgram?

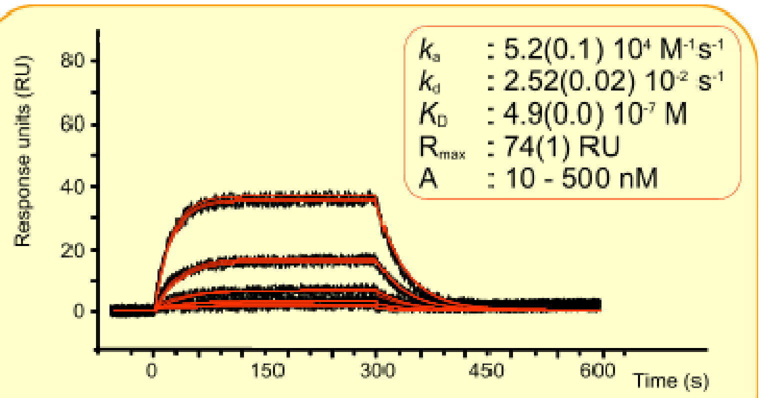


Figure 25: Fitting overlay of the interaction of A with B

A: yes
B: no, dissociation looks faster
C: no, dissociation looks slower
D: no, R_{max} is to high

Answer A.

D: you can not tell this because the curves show no saturation probably due to too low analyte concentration.

26) What do you want to change if you see this fitting?

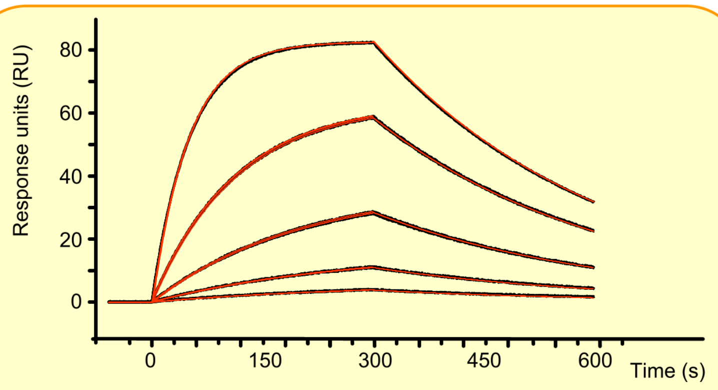


Figure 24: Fitting overlay of the interaction of A with B

A: nothing, this looks fine
B: make association time longer
C: make dissociation time longer
D: use higher analyte concentration

Answer A.

27) To calculate (fit) meaningful results you need curves

A: which go to R_{max}
B: which go to steady state
C: which have curvature
D: with a low response

Answer C

28) What can you tell about the R_{max}?

A: It is dependent on the k_a and k_d of an interaction
B: It is dependent on the surface capacity and molecular weight of ligand and analyte
C: It is dependent on de analyte concentration
D: It is dependent on the equilibrium constant K_D

Answer B

29) What can you say about this sensorgram?

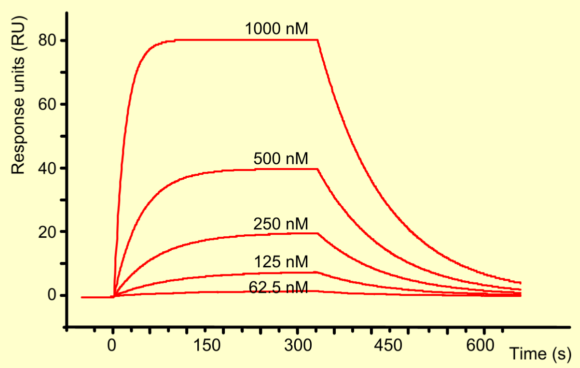


Figure 29: Interaction between A and L.

A: the analyte concentration range is not wide enough.
B: the response is not following exponential kinetics
C: there is mass transport limitation
D: this look a fine sensorgram

Answer D

B: you can't say that the response is following kinetics because the K_D is unkown and these analyte concentrations can below 1 x K_D. If you know the kinetic constants it is possible to deduce how many times the K_D the analyte concentration is and you can infer of the response is following kinetics.

30) The minimal requirements in a publication are:

A: sensorgram + fit overlay + kinetic values
B: sensorgram (replicates) + fit overlay + kinetic values
C: table with kinetic values and representative sensorgram
D: full method used in the experiments + B

Answer D.