# Questions for Self Study Lesson: Challenge 1 linking dynamic metabolite data and mechanistic models

**Question 1:** In the section on flux balance analysis you have learned that metabolite concentrations and metabolic fluxes are essentially independent of one another. Specifically we said that a high (low) concentration of metabolite did not necessarily imply a high (low) metabolic flux through that metabolite.

In this lesson we are now discussing metabolite concentrations as the key factors that determine metabolic fluxes (i.e. reaction rates).

At first, this may seem like a contradiction. Please explain why this is not.

**Question 2:**  In figure 1 of the Handout you see how various factors that affect metabolic flux patterns can be mapped onto the components of the Michaelis-Menten equation. Which parameters would be affected in the case of a) a competitive inhibition b) a non-competitive inhibitions and c) the degradation of the enzyme.

**Question 3:** Parameter fitting for ODE models is much simpler if these ODEs are linear. While the effect of Enzyme concentrations on the reaction rate is generally linear, the effects of metabolite concentrations on reaction rates are frequently non-linear. In what type of reaction is this the case?

**Questions 4:** Consider the use of a metabolic model in flux balance analysis and compare this to the role of the model in the section "What if the model cannot describe the data?". How has the role of the model changed in these two research contexts?