
Metabolic data and mathematical models

Josephine Donaghy*¹

¹University of Exeter – United Kingdom

Abstract

The availability of different types of metabolic data has had a significant influence on the construction of mathematical models of metabolism. In this paper I will examine distinctions between different metabolic data types in the 1970's and 1980's. Researchers commonly distinguish stoichiometric and kinetic data. Stoichiometric data pertains to the composition of metabolic systems and the structural relations between those components. These were widely assumed to be general and stable properties of the metabolic systems of particular species. By the early 1970's researchers considered this information to be almost complete. Kinetic data pertains to how the rate of individual reactions responds to changes in context such as substrate availability. In some cases these properties were assumed to be general and stable properties of reactions, in others these properties were assumed to be specific to the context of a reaction in a particular metabolic system. In both cases researchers considered there to be insufficient kinetic data available and devised modelling strategies which compensated for this. In the current situation of data intensive biology mathematical modelling plays an increasingly important part of biological research. It is important to understand how mathematical modelling is shaped by differences in the availability of data types and the different assumptions about the biological properties to which those data types pertain.

*Speaker