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BOOK REVIEW

"Enzyme Kinetics and Mechanism" by Paul F. Cook and W. W. Cleland

This book, designed primarily as a text for graduate students and a possibly a teaching manual for the senior investigator, describes the utilization of various enzyme kinetic techniques to elucidate the mechanisms of enzymatic reactions. The preface encapsulates the essence of this excellent treatise on elucidating enzyme mechanisms. The book is systematically organized in a tutorial format and follows a logical order of what experiments an investigator would do while performing mechanistic characterization of an enzyme, initiating with kinetic techniques. The underlying principles for experimental design, data acquisition and analyses, as well as the practice of compiling the kinetic data to construct a plausible reaction mechanism, are clearly presented so that the reader can readily follow and develop the necessary skills to tackle more complex and sophisticated enzyme mechanisms.

Chapters 1 to 4 can be categorized as the introductory chapters. The Cleland nomenclature system, widely used in the field of enzyme kinetics, is introduced in Chapter 1. Chapter 2 provides an overview of the commonly encountered kinetic principles in enzymology. The material presented in Chapter 3 provides practical information for designing kinetic assays, which is logically followed by Chapter 4 which covers data analysis, and the underlying principles that govern the mathematical treatment of the experimental data obtained in Chapter 3. It is quite impressive that the authors have taken the time to provide the reader with the necessary mathematical background to guide them through the derivation of rate equations. These sections are beneficial for both novices and experts in field of enzymology.

Chapters 5 and 6 logically build upon the background provided in the first four chapters. These two chapters provide a concise account of the commonly encountered enzyme mechanisms, again using a tutorial format to explicitly describe the material. As in earlier chapters, the authors have placed a substantial amount of effort to clearly explain the "how to" aspects of data acquisition and analysis. Rather than providing an exhaustive overview of diagnostic patterns of all possible enzyme mechanisms, the authors systematically explain the rationale for deducing the enzyme mechanism and the associated rate equations using specific and clear examples. When available, primary references associated with these specific examples are provided so that the reader may explore these mechanisms in further detail. The inclusion of practical considerations further underscores the "teaching" aspect of this book. Coverage of inhibition studies, especially on explaining the underlying principles and the types of inhibition, is comprehensive.

Chapters 7 to 10 provide additional techniques for deducing enzyme mechanisms. Chapter 7 provides a survey of transient kinetic methodologies that can be used to further define the microscopic steps defined in a kinetic mechanism using the approaches presented in Chapters 5 and 6. Chapters 8 through 10 offer more in-depth coverage of the utilization of isotopes as complementary tools to solve the kinetic and chemical mechanisms of enzymatic reactions. The execution of pH rate-profile studies as well as the interpretation and usage of the associated data are taught in a very reader friendly manner. Examples are provided that illustrate the approaches and provide helpful guides for the readers through the entire learning process.

After completing the tutorial process outlined in this book, the reader will have obtained an excellent grasp on the rational for designing and executing proper kinetic experiments which will culminate in the construction of a plausible enzymatic reaction mechanism from the deduced kinetic data. The approaches taught in this text will serve a good self-tutorial guide as well as a good text for an introductory course in enzyme kinetics.

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