

book reviews

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Structural Aspects of Protein Synthesis. By Anders Liljas.
Pp. 290. Singapore: World Scientific, 2004. Price (paperback)
USD 44/GBP 27. ISBN 981-238-867-2.

The concerted application of the methods of X-ray crystallography and electron microscopy, combined with biochemical and various biophysical methods have provided a totally new understanding of the mechanisms which control the machinery of protein synthesis. The progress has been enormous, although many exciting questions still remain to be answered. 'Catching a rapidly moving target' is how the author describes his attempt to summarize the developments in the field of protein synthesis. Anders Liljas is one of the absolute pioneers in this field, who dedicated many years of his successful career to understanding the structural basis of the function of protein synthesis machinery. This makes the book pretty much a story told by an eye witness.

The book can be divided roughly into four parts. It starts with a historical introduction, which provides a short description of the experimental methods employed to address the mechanisms of protein synthesis. The experimental part is followed by an overall presentation of the main actors of the drama: mRNA, tRNA and the ribosome itself. Taken together, these two parts, although brief in nature, will be helpful for non-specialists who wish to follow the details of the system presented in the following chapters. The second part includes two chapters which deal with the fascinating three-dimensional structure of the ribosome. This also includes an overview of the various functional sites of the ribosome and the states, which arise from the activity/activation of these sites.

The next part deals with the catalysts, the translation factors, which have also been within the focus of the research

of the author. The whole story behind these factors, their conformational dynamics and interactions with the ribosome could easily make a separate book. However, in an elegant way the author manages to lead the reader through a jungle of experimental facts and observations, keeping the focus on essential structural and functional details. This chapter provides a summary of the steps of protein synthesis: initiation, elongation, termination and recycling. At this moment the reader should have a solid basis which will hopefully provide a thoughtful approach to the understanding of the complicated interplay between the ribosome, tRNA, mRNA and the translation factors. Additional chapters provide an overview of the effects of antibiotics on protein synthesis, of the role of the ribosome in protein folding and targeting, and of the evolution of the translation machinery. In my opinion the chapter on inhibitors of protein synthesis is somehow misplaced. It would probably have fitted better after the summary chapter on translation.

In summary, the book by A. Liljas is a well organised, clearly written overview of the structural basis of protein synthesis. The book will serve equally well as a teaching textbook for graduate and advanced undergraduate biology, biochemistry and biophysics students, as well as a reference for researchers working in the field of protein synthesis and related fields. Taking into account the rapid developments within the field, a new edition of the book is very much awaited.

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