

PREFACE

The first textbook in structural biology may have been the one produced by Dickerson and Geis in 1969 entitled, *The Structure and Action of Proteins*. It was an excellent book covering most of what was known about protein structure. At that time, the first protein structure, myoglobin, had been known for ten years and only a few additional structures had been determined. The structure of DNA was derived from fiber diffraction data in 1953, but very little additional knowledge about nucleic acid structure was available. The exciting research of the initial phase is well covered by RE Dickerson in his recent book, "Present at the Flood. How Structural Molecular Biology came about." Now, almost forty years and numerous textbooks later the situation is very different. The very useful textbooks by Branden and Tooze, *Introduction to Protein Structure* (1991 and 1999) could naturally not cover the exciting developments that have taken place during the last ten years. The amount of structural information available from the Protein Data Bank (PDB), is now very extensive and is growing rapidly. The rate of the work has benefited very significantly from very dramatic technical developments, a key one being the use of synchrotrons as radiation sources. The scientific research in the field has since long ago not only been an academic effort, but very extensive work has also been extensively carried out in the pharmaceutical and biotechnological industries. In addition, the development of structural genomics laboratories has refined the laboratory protocols to the benefit of everybody and the rate of structure determination is steadily increasing.

In this flood of information a selection has to be made. Our selection has been made on the basis of our teaching experiences of what students would most benefit from. The central knowledge about protein, nucleic acid and membrane structure is described in relation to central systems in biology. Our research experience covers a broad range of structural biology and our personal research foci have had some influence on the selections. Moreover, since recent research also shows that

membrane lipids play an important, active role in cell function, like in the regulation of membrane enzymes and channels, and formation of domains like rafts, a thorough chapter on the physical properties and functions of lipids has been included in this textbook.

In producing a textbook on structural biology, we have depended on the kindness of many colleagues, in reviewing parts of the text, providing expert opinions and permitting us to use their published or sometimes unpublished material. We cannot list them all without the risk of forgetting some. However, we are very grateful for all assistance. We are exceedingly grateful to Terese Bergfors for her very careful reading of the manuscripts and correction of both facts and language. Most illustrations of the book are produced using the programs Molscript (<http://www.avatar.se/molscript/molscript.html>, Kraulis, PJ (1991). Molscript: a program to produce both detailed and schematic plots of protein structures. *J Appl Cryst* **24**, 946–950, Molray (Harris M, Jones TA (2001). Molray — a web interface between O and the POV-Ray ray tracer. *Acta Cryst D* **57**: 1201–1203) and PyMOL (<http://pymol.sourceforge.net/>). We are grateful for being given permission to use these programs.