

ular mechanisms for the high selectivity of these peptides for the μ - and δ -opioid receptors in light of NMR conformational analysis. The extensive similarities between prepro regions of precursors encoding these peptides, dermaseptins and other peptides with different structure and biological activity from various amphibian species are also discussed. The authors suggest that the genes encoding these peptides are all members of the same family. The last chapter of this section by Huberman and Aguilar deals with crustacean hyperglycemic hormones. In the third section and based on their own work, Volkman and Heck propose an attractive mechanism of action for *Agelenopsis aperta* isomerase, a novel cofactor-independent serine isomerase. Although this protein, which shares high homology with known serine proteases, is the only isomerase discovered so far, it is likely to provide important clues to explain the incorporation of single D-amino acid residues within a peptide chain. The introduction of this chapter overlaps somewhat with the previous section. Nevertheless, these two sections represent a good overview of D-amino acid-containing peptides found in a variety of animal species. As suggested by Amiche et al., the obvious question whether such peptides might exist in mammals is still left unresolved.

The following section deals with the appearance of D-amino acids during ageing. Since the original hypothesis of Köggl and Erxleben in 1940, the question of the presence of D-amino acids in tumors has remained controversial. In his chapter, G.H. Fisher relates the story of this controversy and summarizes recent data that suggest that

D-amino acids are absent in tumors. In the second chapter of this section, Ingrosso and Perna review the phenomenon of spontaneous postbiosynthetic modifications in ageing erythrocytes, also termed 'protein fatigue', which includes the formation of isomerized and/or racemized aspartyl residues. They discuss in detail the role of protein L-isoaspartyl (D-aspartyl) O-methyltransferase in the repair of ageing protein. The next brief chapter by Yamada and Kera is devoted to the proteolytic susceptibility of D-amino acid-containing peptides and D-amino acid-hydrolyzing enzymes.

The final section by Bonner comes back to homochirality and life. Why are L-amino acids present in proteins and D-sugars in nucleic acids? The author reviews in detail the various hypotheses compatible with a realistic prebiotic environment that have been proposed to account for the origin of homochirality on earth.

Although the search for novel D-amino acid-containing peptides in higher organisms and the understanding of their biosynthesis is an extremely exciting and rapidly expanding field, the literature reviewed in several chapters of this book, unfortunately, covers very few publications after 1996. Nevertheless, this book provides the reader with a large and comprehensive overview of the knowledge gained in the field of D-amino acids and D-amino acid-containing peptide in multicellular organisms.

G. Guichard

Lysozymes: Model Enzymes in Biochemistry; Edited by P. Jollès, Birkhäuser; Basel, 1996. viii+449 pp. DM 238.00 (hb). ISBN 3-764-35121-7

Reading this book, we again recognize how the technologies of protein science continue to develop through research of lysozyme as a model protein. Is there any other protein that has been investigated as extensively over as wide a range of research fields? The fields that use lysozyme are quite diverse, including evolution, chemistry, biology, biophysics and pharmacology, which are covered in 22 chapters contributed by 25 authors. Although there are several books describing a particular protein, *Lysozymes: Model Enzymes in Biochemistry and Biology* is one of the best documented books ever written by top senior researchers in the respective fields.

There are several aspects to describe lysozyme as a model protein. Topics are carefully chosen according to the key words 'Biochemistry and Biology'. One of the unique points of lysozyme is the existence of this enzyme in several species ranging from phage to mammal. The book starts by reviewing vertebrate lysozymes and then expands to the phage, bacterial, plant and insect lysozymes sufficiently to make researcher acquire an overall knowledge of these lysozymes. There are also two reviews of evolution of c-type lysozyme, enabling us to see how the function of this enzyme diverged to adapt to the surroundings from an evolutionary point of view.

This book also reminds us how X-ray crystallography has contributed to the development of the protein science field. In fact, lysozyme is one of the earliest enzymes in which the tertiary structure was determined by X-ray crystallography. The availability of the tertiary structure information was the most important factor in the study of lysozyme enzymology, protein folding, and thermal stability. In fact, many important investigations on the catalytic mechanism have been

done based on this structural information. The book summarizes how chemical modification and genetic engineering were employed to identify the role of catalytic site residues, which were interpreted by tertiary structural information using X-ray crystallography. The book also reviews how theoretical calculation using molecular dynamics simulation was first applied to understand the catalytic mechanism of an enzyme, which is one of the unique applications of the structural information of lysozyme.

From the point of view of molecular recognition, the application of X-ray crystallography to investigate the binding of lysozyme with antigen binding fragment is quite noteworthy. Two reviews cover the kinetic and thermodynamic character of the binding of lysozyme and antigen binding fragment and the determination of the epitope of lysozyme by X-ray crystallography. I believe the structural determination and thermal stability of lysozyme should have been covered in greater detail.

Very recently, lysozymes were found to possess antiviral activity against HIV, reminding us of the importance of the constant study of a protein. Conversion of the catalytic mechanism has been successful in lysozymes. Although these topics should be added in the near future, these important findings also indicate that research on lysozymes is still very active. Using lysozyme as a model protein, this book is a valuable tool in providing an overall understanding of the key techniques of protein research.

Ryota Kuroki

Biocalorimetry: Applications of Calorimetry in the Biological Sciences; Edited by John E. Ladbury and Babur Z. Chowdhry, Wiley; Chichester, 1998. xiii+345 pp. £ 70.00 (hb). ISBN 0-471-97781-0

Biocalorimetry: Applications of Calorimetry in the Biological Sciences is intended to fill a void in biochemical/biological publishing. Although texts about calorimetry are common, books devoted to biological applications of calorimetry are almost non-existent. The most recent text, A.E. Beezer's *Biological Microcalorimetry* (Academic Press, London, 1980), is out of print and may be difficult to locate even in a university library. Some general biochemistry-oriented texts

may include brief sections about calorimetry, but in general, anyone wanting information about the subject has to rely on papers and reviews. This reviewer was thus excited to find theory and practice for differential scanning calorimetry (DSC), isothermal titration calorimetry (ITC), and microphysiometry united in one volume. While serviceable, the reality did not quite measure up to expectations. This new text is too detailed for a biocalorimetry novice,

but the short chapters may not provide enough information for experts.

This book, a collection of papers presented at the 1996 conference at St. Anne's College in Oxford, UK, is logically divided into sections on ITC and DSC; each section is further subdivided into chapters. This organization allows the reader to read the text from cover to cover, or to dip into sections of interest. Every section begins with two chapters of introduction and theory, then moves onto applications of the techniques. Either by accident or by design, the two theory chapters may be separated into one of rigorous detail and another of general interest. The section on DSC also includes two chapters on instrumentation. The chapters on experimental applications of DSC and ITC cover a wide range of topics, from analyses of DNA-drug and protein-ligand interactions to synthetic polymers. With so many examples of applications of biocalorimetry, the reader has a good chance of finding mention of a topic of interest.

This book's shortcomings are those of many collections of edited papers. There is a definite lack of cohesion and continuity, an abrupt change in style from chapter to chapter. This unevenness is especially apparent in the use of units and definitions. The authors state in the Preface that they decided to allow authors to present their work using the system of units adopted by their individual countries. Conversion from joules to calories, and dm^3 to liters, can be distracting and takes the reader's attention away from the text. Different authors use different definitions and conventions in describing their subjects. For example, variables and definitions are included in Chapter 1, an introduction to ITC written by Blandamer, that are not only never encountered again in this text, but are seldom seen in any of the

literature on ITC. These definitions may be useful in giving a full theoretical treatment, but can be confusing to the thermodynamics or calorimetry novice.

Another shortcoming is the wide variation in the quality of the chapters. Most chapters are clearly taken from longer works and do not function well as stand-alone entities; the original paper (or papers) is needed for even a cursory understanding. A chapter that included simple experimental examples would have been helpful. Most of the individual chapters deal with complex interactions and/or involved analyses, particularly in the DSC section, in which most of the experiments include irreversible thermodynamics. For this reason, many of the conclusions were either preliminary or largely theoretical. Such cutting-edge results are interesting to experts (who would be better served by reading the original papers), but their complexity limits this book's use as a biocalorimetry primer. With these problems, well-written chapters really stand out. Particularly noteworthy sections include the introduction to the ITC of biomolecules by Tame, O'Brien, and Ladbury (Chapter 2), the treatment of the folding energetics of heterodimeric leucine zippers by Jelesarov and Bosshard (Chapter 8), and the introduction to DSC by Leharne and Chowdhry (Chapter 12).

The final verdict? If detailed information on biocalorimetry is desired, this book cannot replace the excellent reviews and papers already in the literature. If the reader desires a one-book source for biocalorimetry theory and practice, this volume adequately fills a void in the biological calorimetry literature.

Kimberly M. Taylor and Ronald T. Raines

Trinucleotide Diseases and Instability; Edited by B.A. Oostra, Springer; Berlin, 1998. ix+169 pp. DM 168.00 (hb). ISBN 3-540-63993-4

Interest in the field of trinucleotide diseases has rapidly increased. Since 1991, more than a dozen human genetic diseases have been demonstrated to be caused by unstable expansion of trinucleotide repeats.

The editorial introduction to this book promises to present highlights both of the mechanisms of repeat instability in these diseases and of the functions of normal and mutated genes involved.

The book contains 24 chapters by nine authors, covering four main topics. Under the first one (six chapters, 46 pages) the fragile X syndrome and other fragile site disorders are discussed. The second part (eight chapters, 30 pages) is dedicated to Huntington's disease. The other CAG repeat diseases are confined to one chapter of this part. Myotonic dystrophy is the content of the third one (six chapters, 56 pages). The last topic (four chapters, 33 pages) concerns a general overview of factors and mechanisms involved in the instabilities of triplet repeats. For each disease, clinical features, genetics and transmission, gene structure and expression, and mechanism of pathogenesis are presented. There are 692 references up to 1997. Each chapter is illustrated with diagrams, graphs, tables and photographs.

Unfortunately, the rapid growth of the knowledge in this field renders it very difficult to give up-to-date information without the risk of missing important topics. This is the case with the pathogenesis of the CAG repeat diseases. Intranuclear inclusions are now clearly observed in almost all polyglutamine disorders. Even though it remains uncertain whether these aggregates are a cause or a consequence of pathogenesis, they are considered hallmarks in these processes. No mention of aggregates in these diseases is present in the book, perhaps because they were first described in 1997.

Another weakness is the lack of a specific presentation for Friedrich's ataxia. This trinucleotide disease is cited several times, but never described in detail. Since the molecular basis of the disorder has been described in 1996, the omission of this topic is surprising.

In summary, the book could be helpful as an introduction but other sources are needed for more extensive treatment and updated references.

Sergio Cocozza
