stage process of oncogenic transformation. As these early changes are likely to determine the subsequent path of tumour progression, apoptin might target the Achilles heel of cancer cells.

The role of neuropeptides in the cell–cell communication in brain/endocrine system is well studied. Neuropeptides are synthesized from protein precursors (termed proneuropeptides or prohormones) that require proteolytic processing primarily within secretory vesicles that store and secrete the mature neuropoeptide to regulate control target cellular or organ systems. In the chapter on 'Proteases for processing proneuropeptides into peptide neurotransmitters and hormones', Hook *et al.* describe the interdisciplinary strategies that have elucidated two primary protease pathways for prohormone processing consisting of cysteine protease and subtilisin-like proprotein convertase pathway that together support neuropeptide biosynthesis. Furthermore, this review discusses important areas of current and future interest, like the biomedical neuropeptide research with respect to biological regulation, inhibitors, structural features of proneuropeptide and protease interactions, and peptidomics combined with proteomics for systems biological approaches.

Metabolomics is the study of metabolism at the global level. This rapidly developing new discipline has important implications for pharmacological sciences. A critical metabolomics concept is that a biomarker that predicts disease or helps monitor drug therapy is most often not a single molecule, but rather a pattern of several molecules. The metabolomic studies take into consideration all the biochemical reactions taking place in a cell, tissue or organ or biological fluid followed by the application of informatic techniques to define metabolomic signatures. These can lead to enhanced understanding of disease mechanisms and to diagnostic markers as well as advanced understanding of mechanisms for drug effect and increased ability to predict individual variations in drug response. Initial metabolomic signatures have already been reported for several disease states, including motor neuron disease, depression, schizophrenia, Alzheimer's disease, cardiovascular and coronary artery disease, hypertension, diabetes, liver cancer and Huntington's disease. These signatures are made of tens of metabolites that are deregulated with concentrations that are modified in the disease state or after drug exposure. Analysis of these signatures can provide information on the pathophysiology of the disease. Metabolic signatures that change following drug treatments have also been identified.

I found the book particularly useful for briefly introducing the reader to the recent vocabulary added to the science of pharmacology. In some chapters, the authors have focused on the 'Future issues', wherein we get a glimpse of what the future might hold. Most of the chapters contain excellent coloured illustrations with imaginative and novel efforts to get across to the reader, and 'Biomarkers of acute kidney injury' is a case in point. The reference work is as recent as it can get. Occasional brief and refreshingly apt comments in the margin are a great value-addition. Such comments in the references, highlighting the major contribution of a paper, create interest in what is otherwise a mundane reading. I strongly recommend the book for its depth and range.

N. K. SUBHEDAR

Department of Pharmaceutical Sciences,
R. T. M. Nagpur University,
Nagpur 440 033, India
e-mail: nksubhedar@hotmail.com

Annual Review of Biochemistry, 2007. Kornberg *et al.* (eds). Annual Reviews, 4139 El Camino Way, P.O. Box 10139, Palo Alto, California 94303-0139, USA. vol. 76. 864 pp. Price not mentioned.

Biochemistry earns the distinction of being the most interfacial of all sciences, and the volume under review once again provides a firm basis for this fact. The review presents articles on a wide range of contemporary topics to rejuvenate the excitement of discovery. A number of articles discuss the molecular mechanisms of some of the key processes directly involving nucleic acids. The opening article, for example, reviews the understanding of the role and the molecular mechanism of somatic gene diversification processes in the production of vertebrate antibodies. Somatic hypermutational studies have provided evidences for programmed changes in the DNA coding information through targetted base modification. The biochemistry and the mechanism of nonsense-mediates mRNA decay (NMD) is reviewed by Chang *et al.* NMD is an evolutionarily conserved housekeeping mechanism that selectively degrades mRNAs containing nonsense codons. Translation of such mRNAs and thus production of truncated proteins could produce deleterious gain-of-function activities. The authors discuss the current understanding of the constituent proteins, the NMD assembly, and the molecular interactions that define nonsense codons. Housekeeping is also performed by the tmRNA system by degrading proteins in the regulation of transcriptional circuits. In addition, tmRNA rescues stalled ribosomes that can neither terminate nor continue with translation. This field is visited by Moore and Sauer.

Establishing the relationship between structure and mechanism of biological molecules and molecular assemblies is central to designing molecules and ligands, and to achieve control over molecular functions. The advent of powerful molecular modelling methods and a variety of structural tools has greatly facilitated structure–mechanism studies. The volume promotes several articles based on this. The chapter on 'Structure and mechanism of helicases and nucleic acid translocases' by Singleton *et al.* and the discussion of 'Structure and mechanism of 6-deoxyerythronolide B synthase' by Khosla *et al.* exemplify these articles. An interesting related area is the role of mass spectrometry in structure elucidation of protein complexes. This area is reviewed by Sharon and Robinson. The authors have also included a concise introductory section on the methodological aspects of mass spectrometry for readers who are not quite familiar with the subject. The authors then discuss structural studies of protein assemblies.

A relatively new research area is single-molecule and single-event studies that have been augmented by emerging spectroscopic, and electrophysiology and imaging techniques. There are several advantages to such studies. For example, measurement of macroscopic behaviour reports only on the average, and this average behaviour is not associated with any of the members of the population. Also, interpretations of the results of macroscopic measurement cannot be unambiguous. Single molecule studies re-

move the ambiguities. There are, however, pitfalls in single-event detection. These issues are discussed in detail by Wennmalm and Simon. The examples and illustrations provided by the authors should help researchers assess how amenable a biological system is to such studies.

Some articles are based on putative structures of large protein assemblies. Discussions are also provided on the prediction vs reality of membrane protein structure, Elofsson and Heijne point out that *ab initio* high-resolution 3D structure predictions are still not feasible for membrane proteins, and that homology-based structure modelling of membrane proteins holds as good as homology modelling of globular proteins.

The volume presents five articles grouped under the 'mitochondrial theme', and Gottfried Schatz already concisely reviews the chapters under 'The magic garden'. The 'mystic mitochondria' is not only the powerhouse of the cell equipped with its own genetic system, but is also central to the programmed cell death, and possibly other vital processes yet to be determined. Indeed, mitochondria offer plenty of avenues to discovery, and the five articles presented hint at this. Virtually everything about mitochondria appears unique – the structure, genome make-up, mechanisms of DNA replication and transcription, mode and inheritance pattern of DNA, mechanism of mitochondria division, and the way it communicates with other parts of the cell. Recent discoveries in these areas are elegantly presented.

The volume effectively brings forth the recent developments in the core areas of biochemistry. The print offset and figure contrasts have been impressive. Each review article concludes with summary points and future issues. Those interested in biochemistry and biophysics will undoubtedly find themselves enlightened, whether they are research students or scientists.

ABANI K. BHUYAN

Schools of Chemistry and Life Sciences,
University of Hyderabad,
Hyderabad 500 046, India
e-mail: akbsc@uohyd.ernet.in

Systematics and Biodiversity Conservation. T. C. Narendran and M. Balakrishnan. Agrobios (India), Jodhpur 342 002. 2008. 280 pp. Price: Rs 695, US$ 46.

In the last two decades, in addition to its traditional meaning of referring to richness and abundance of organisms, the term 'biodiversity' has come to include a commitment for the natural environment and a concern for its conservation. The rate of extinction of biological materials noted at the end of the 20th century[1] has, in fact, pushed us humans to realize that conservation of the natural environment is a normal adjunct to the better understanding of biodiversity. This realization has made us come to terms with the awareness that we are an integral part of the natural world, our future existence would nearly be impossible without biodiversity[2], and a preferred quality of life depends on the goodness of biological wealth, the value of which, however, cannot be measured in any valuable currency. Based on this realization, many Governments have established departments and authorities to monitor and manage biodiversity in their respective countries[3,4], so that any alteration to the natural world would be minimal and manageable, further damage would be mitigated appropriately, and development would progress sustainably.

In such a context of expanding appreciation of and value addition to biodiversity, I was glad to receive this book for review. Because the jacket identifies it as a textbook and the contents are designed for use by university-level biology students, this review will assess the volume as a textbook. Contemporary framework for a university-level textbook is twofold[5]: (i) should clarify the principles that underscore the selected theme and (ii) should serve as the basic resource, enabling the learner to learn relevant information and to interpret that information meaningfully. Further to explaining and discussing the subject matter (i.e. theory with appropriate and contemporary examples)[6] robustly, a university-level textbook needs to explicitly display a few key textual and physical characteristics: the textual characteristics refer to preferences applied by the author(s) relative to the structure and consistency in style and presentation; the physical characteristics refer to affordability and inclusion of elements that would facilitate easy comprehension via interactive and self-directed learning.

The first chapter introduces concepts relevant to systematics and biological diversity; the second explains contemporary understanding of biodiversity in a global context; the third refers to systematics and its importance in biodiversity studies; chapters 4–8 deal with the subtler aspects of taxonomy, such as the theory underlying biological nomenclature, collection, storing and identification, principles underpinning biological classification, taxonomic publications and ethical practice. The ninth chapter deals with protected areas for biodiversity conservation, and the tenth refers to principles of conservation biology. The last chapter outlines some of the widely practised methods in basic ecology and biological-diversity studies. The book also includes references, additional reading materials, plus author and subject indices.

An acceptable volume of information relative to taxonomy and biodiversity is available. Starting with explanations of basic terms (e.g. species diversity, species richness and species management), the chapters elaborate on diverse aspects of conservation of organisms, including ecology of extinction and details of taxa that face extinction in the near future. Chapter 10.6 refers to the IUCN categories of threatened species – a worthwhile inclusion, in which Baillie *et al.* (2004), a vital resource, has been cited. Information pertaining to criticality of taxonomy as a science *per se*, diverse micro-dimensions of taxonomy (e.g. rules and definitions that govern biological nomenclature), and taxonomic basis in understanding biodiversity is also included. Chapter 11 (Methods in ecological monitoring – a better title than what exists?) includes useful tips and descriptions of methods in ecological monitoring – appropriate for an undergraduate learner – although most of the examples provided are from Mammalia. I am aware that including examples from other organisms (e.g. insects, birds, reptiles and aquatic organisms) is hard in a handbook sort of book. But weaving examples from other groups, in a purported-to-be-textbook, would contribute substantially to widening of learning of university-level learners.

I enthusiastically read the chapter 'Systematics and its importance in biodiversity studies', because I hoped this would link 'systematics' and 'biodiver-