

Heat Shock; Edited by B. Maresca and S. Lindquist; Springer-Verlag: Berlin, Heidelberg, New York, 1991; xiv + 320 pages; DM 138.00. ISBN 3-540-54111-x.

Back in 1962, the December issue of *Experientia* included a brief submission with the title "A new puffing pattern induced by temperature shock and DNP in *Drosophila*" by F. Ritossa. This turned out to be the beginning of a trail that led to the analysis of a cellular stress response that was shared by all organisms from bacteria to man. After three decades of intensive study, this stress response (sometimes called the heat-shock response) has now emerged as a vital homeostatic mechanism that seems to enable cells to survive a variety of environmental stresses. For a while the heat-shock response was studied in a wide variety of organisms as a model system to analyse control mechanisms regulating the synthesis of heat-shock proteins, providing important general insights into the regulation of gene expression. However, a spectacular revelation which has captured the attention of a very wide range of biologists was the appreciation that heat-shock proteins are major players in an extraordinary variety of normal cellular processes. These include protein trafficking, signal transduction, DNA replication, transcription, protein synthesis and the assembly of a diverse range of complex protein structures.

Books on the latest research findings related to the heat-shock proteins are now appearing quite regularly. This is important as it is now a fascinating field which moves rapidly and in many directions simultaneously. This present volume is a collection of

chapters representing the state of knowledge presented at a meeting held in Italy in late 1990. Whilst, in principle, it is therefore a little dated it nevertheless serves very adequately to introduce readers who have not kept abreast of the field to the new and exciting research directions that have considerable implications for medical research. These embrace immunology, infectious diseases, chronic degenerative disease, as well as cancer and cancer therapy.

In all there are some 34 contributions sectioned as follows: analysis of heat-shock regulation; heat-shock protein functions in *E. coli* and yeast; analysis of heat-shock protein functions; heat-shock proteins and translocations; immunological aspects and medical applications of heat-shock responses. In summary, despite its production time, it probably represents the most up-to-date 'collection' of contributions representative of the very extensive field that this has become. Because of this it will be a useful guide to the wide range of biologists becoming interested in the considerable ramifications of heat-shock protein function. Certainly we will all need another volume of recent findings in this area by next year, but for the present this will serve as a very useful 'progress report'.

Roy H. Burdon

Prokaryotic Structure and Function: A New Perspective (Society for General Microbiology Symposium, Volume 47); Edited by S. Mohan, C. Dow and J.A. Cole; Cambridge University Press; Cambridge, 1992; xii + 440 pages; £60.00. ISBN 0-521-41570-5.

This volume reports the proceedings of the 47th Symposium of the Society for General Microbiology, held at the University of Edinburgh in April 1991. The book sets out to reassess the topic of prokaryotic structure and function, last reviewed at an SGM Symposium thirteen years previously. Its fifteen chapters are wide-ranging in their subject matter and reward careful reading. However, the material is not quite so wide-ranging as the editors suggest in their Preface; although their book aims to include the topic of environmental sensing by bacteria, important omissions include signal transduction via histidine protein kinase/response regulator systems, chemotaxis and outer membrane structure.

The chapters break down into several themes and this is reflected in the order in which they appear in the book. In the first chapter, Doolittle et al. present an erudite discussion of the evolution of gene and genomic structure in which they highlight the naivete of the (common) assumption that eukaryotes have evolved by recent additions to an earlier *E. coli*-like molecular biology. In addition to providing an excellent review of Archae biology, they demonstrate how this cellular type has contributed to our understanding of which differing features of bacteria and eukaryotes are primitive and which are derived. In the second chapter, Rouvière-Yaniv and co-authors review the bacterial nucleoid and DNA supercoiling, and discuss the structure, biochemistry and genetics of histone-like protein, HU, and its role

in nucleoid architecture, chromosome segregation, DNA replication, transposition, site-specific recombination and transcription control. These topics lead naturally to a consideration of the bacterial cell cycle and Thomas and Jagura-Burdzy consider the subjects of DNA replication and segregation under the cover of a re-evaluation of the Replicon Hypothesis. Their chapter, which covers both bacterial plasmids (their own speciality) and the chromosome, is particularly detailed and includes a wealth of references. The cell cycle theme is taken up in later chapters by Bi and Lutkenhaus (the genetics of cell division) and by Wheals (a comparative study of the bacterial and eukaryotic cell cycles). This theme is developed further by Nanninga et al. who consider the spatial and temporal organisation of cell envelope growth in *E. coli*.

Bacterial transport systems are covered in one chapter (Pugsley) which deals with systems involved in uptake and those concerned with export. This chapter considers transporters ranked within superfamilies as defined by sequence similarities their components. It reviews the general secretion pathway and signal peptide-independent protein secretion. The section on the 'ABC' transporter family also covers medically important eukaryotic members. There is a useful chapter on bacterial storage polymers (by Dawes) and several chapters on aspects of cellular compartmentalization and development. These include material

on intra-cytoplasmic membranes (Drews), developmental gene expression within forespores of *Bacillus subtilis* (separate chapters by Moir and by Stragier), the bacterial periplasm (Ferguson) and multi-cellularity in the cyanobacteria (Adams). Inevitably, there is some overlap between the two chapters on gene regulation in *B. subtilis* forespores; of the 31 references in Stragier's chapter, 13 also appear in Moir's. Social behaviour and differentiation in bacteria are dealt with in chapters in fruiting body development in *Mycobacterium xanthus* (Shimkets) and actinomyete differentiation (Hodgson).

Publications such as Microbiological Reviews (American Society for Microbiology) and Annual Reviews (Annual Reviews Inc.) frequently cover subsets of the material in this book in greater detail and provide far more comprehensive lists of references. However, the authors of the present volume have done

a commendable job of making their chapters highly readable, and the editors have chosen the topics carefully to give a broad review of the state of knowledge in this area. The illustrations in the book are almost uniformly clear and well chosen.

Unfortunately, the utility of this book has been compromised severely by the absence of an index. This is a particularly grievous omission given the overlaps in theme between so many of the chapters. Furthermore, the general appearance of the book is marred by typographical errors, some of which occur in highly prominent positions. These include a misspelling of an editor's name on the title page and inaccurate entries in the table of contents. Despite these shortcomings, this volume should make a useful addition to the bookshelves of many of those working in the field of prokaryotic biology.

C.J. Dorman

Liver Pathology and Alcohol (Drug and Alcohol Abuse Reviews, Volume 2); Edited by R.R. Watson; Humana Press; Clifton, New Jersey, 1991; xii + 620 pages; \$89.50 (\$99.50 outside USA). ISBN 0-89603-206x.

This interesting book aims to summarize current knowledge of the mechanisms by which alcohol can cause liver damage. A range of experts has been brought together to discuss all aspects of the problem. In Chapter One, Potter discusses alcohol effects on hepatic iron metabolism. Roll then introduces the reader to the basics of the inflammatory process, with particular attention to the role of neutrophils in liver injury. Rottenberg discusses the effects of chronic ethanol consumption on cell membrane composition and Reyes gives an interesting account of the foetal alcohol syndrome. Reinke and McCay critically discuss the confusing literature on the role of free radicals in ethanol-induced liver injury, a chapter followed by that of Mitchell et al. on alcohol-induced changes in glutathione metabolism.

Mufti discusses the role of alcohol as a causative agent in liver cancer. Lin and Lumeng review acetaldehyde modification of proteins and Bora and Lange the relation of ethanol to formation of fatty acid ethyl esters. Lakshman et al. present a chapter on the effects of alcohol on lipoprotein metabolism in relation to fatty liver. Other subjects covered are ethanol and the splanchnic circulation (Knych), interactions of ethanol with glucocorticoid action (Kletzien), alcohol metabolism in *Drosophila* (Geer et al.), regulation of alcohol dehydrogenase gene expression (Duester),

the role of xanthine oxidase in liver damage (Soranno and Sultatos), polymorphisms of alcohol and aldehyde dehydrogenases (Yoshida and Shibuya), effects of alcohol on antioxidant defences (Odeleye and Watson) and histological effects of ethanol abuse (McCuskey). Van Thiel and Tarter discuss the effects of liver disease on brain metabolism.

The book contains some chapters that do not fall under its main theme. Sonnet et al. review the effects of alcohol abuse on skeletal muscle, Denaro and Benowitz discuss liver caffeine metabolism (do heavy drinkers consume more coffee?), Bornheim writes about marijuana induction of liver enzymes, and Shuster describes morphine-induced hepatic damage.

Overall, the book is well presented and the chapters are usually informative and well written, although their order is somewhat illogical. I prefer the logical sequence of describing gross anatomical changes, followed by histology, biochemistry and then molecular biology. My major criticism (apart from the fact that any book of this type soon goes out of date) is the sketchy index. Despite this, the book will be very useful to all with more than a passing interest in alcohol metabolism, and I recommend it.

B. Halliwell