Progress in Nucleic Acid Research and Molecular Biology, Volume 27

Edited by W.E. Cohn

Academic Press; London, New York, 1982
xvi + 304 pages. £37.00

This series is now sufficiently well known as to call for no special comment. Almost anyone engaged in research on nucleic acids, nucleotide coenzymes and related fields may count on finding something of direct interest, and vol.27 is no exception.

Several reviews have recently centred on poly(adenosine diphosphate ribose), poly(ADPR). The chapter by Mandel and coworkers, who first reported poly(ADPR) polymerase activity in 1961, covers the period 1977–1980, and discusses the possible role of the polymer in such events as DNA replication, DNA repair, and differentiation. Included is a section on new chemical and immunological techniques potentially applicable also to the in vivo studies required for elucidation of the precise biological function of this polymer which, for the moment, appears to be consistent with rapid transient modifications of proteins in defined regions of chromatin.

The mRNA species from various biological sources contain non-translated regions at the 5′- and/or 3′-termini. Two of the chapters in this volume complement each other in reviews on the properties and potential functions of the 3′-terminal sequences. That by Littauer and Soreq deals largely, but not exclusively, with the poly(A) tracts of 50–250 residues at the 3′-termini of most eukaryotic mRNA species; whereas the one by Haenni, Joshi and Chapeville, on tRNA-like structures in the genomes of a number of plant RNA viruses, assesses results obtained with viral RNA genomes in which the poly(A) tracts are replaced by non-translated heteropolymeric sequences of 200 or more residues with a C–C–(A) terminus. It was the facile enzymatic aminoacylation of this terminus, originally noted by the authors in 1970, which furnished new perspectives for investigations on the role of these non-translated regions. Such tracts do not contain the modified nucleotides found in tRNA species, nor do their structures fit the classical cloverleaf model of tRNA. But they are efficiently recognized by a number of tRNA-specific enzymes which play a key role in transfer of genetic information. This is indirect, but fairly cogent, evidence that the modified residues in tRNA species do not play a key role in recognition by tRNA-specific enzymes. While the foregoing applies principally to some plant viral RNA genomes, there are now at least two examples of partial aminoacylation of animal virus RNA genomes, but preceded by prior fragmentation. Both reviews discuss at length the possible regulatory roles of the poly(A) and tRNA-like non-translatable regions.

The chapter on the mechanism of interferon action, by G.C. Sen, is fairly comprehensive, with a detailed account of the function of double-stranded RNA in inhibition of translation via the protein kinase and endonuclease pathways, and its relevance to the antiviral action of interferon.

The isolation, by Alberts and Frey in 1970, of phage T4 gene-32 protein, led to the discovery of a variety of DNA helix-destabilizing proteins and their role in replication and recombination. Our knowledge of analogous RNA helix-destabilizing proteins is rather fragmentary by comparison. Thomas and Szer extensively cover this field, starting with a description of some aspects of RNA metabolism which point to the need of such proteins, followed by detailed descriptions of the properties of the two best-known of these, the ribosomal S1 protein from *Escherichia coli*, and the HD40 protein from the hnRNP particles of the brine shrimp *Artemia salina*. It is also shown how the in vitro activities of both of these may be correlated with their biological functions. The properties of some other RNA helix-destabilizing proteins are also described.

The final two chapters, on nucleotide cyclases by Bradham and Cheung, and on cyclic nucleotide control of protein kinases by Sharma, naturally complement each other. The continued interest in these fields is testified to by the almost 750

references embraced by both of them.

Like previous ones, this is a timely and useful reference volume. A more extensive subject index would undoubtedly have enhanced its value. There is no author index, apparently in line with recent policy of total elimination from the text of authors' names, replaced by reference numbers in the bibliographies. While this may contribute to economy of space, and perhaps in keeping down the cost of the volume, it does appear to detract from the readability, notwithstanding the excellent print.

David Shugar

The Nuclear Envelope and the Nuclear Matrix

Edited by G.G. Maul

Alan R. Liss; New York, 1982
x + 324 pages. $34.00

This volume reports the proceedings of the second Wistar Symposium held in September 1981. There is a widespread view that the proceedings of meetings should not be published; I have considerable sympathy with this attitude. Too often these reports are ephemeral and in addition they lack the detail given in conventional journals. Moreover, of course, they are not refereed.

The present example is an exception – perhaps for a specific reason. Nuclear–cytoplasmic transport and the structure and physiology of the nuclear matrix have been hazy areas of research which have not attracted the fashion-conscious scientific public. I suspect that the contradictions in the literature, the imprecise techniques and the novelty of the ideas have all contributed to the disfavour with which these areas have been regarded. The recent renaissance of interest in the cytoskeleton is paralleled by a resurgence of studies of transport across the nuclear membrane and of the physiology of the intranuclear skeleton, but it would be premature to expect a review of these topics at this time.

This book does, however, provide a state-of-the-art account of these topics. It may be divided roughly into 8 contributions concerned with the nuclear envelope, 3 concerned with transport and 10 articles on the nuclear matrix; but there is considerable integration within the articles.

The contributions concerned with the nuclear envelope describe efforts to analyse the structure of the nuclear pore complexes, the enzymes of the nuclear envelope and the evidence relating to transport across the nuclear envelope.

The work on the nuclear matrix is both stimulating and irritating. Several excellent contributions describe the progress in the characterisation of the nuclear matrix which is slow but steady. The most stimulating section of the book, in my view, consists of 4 contributions which relate newly-replicated DNA to the nuclear matrix. The evidence for this association is clearly set out by the original workers and readers can judge for themselves the strength of the evidence. By contrast, the suggestion that transcription is coupled to the nuclear matrix is not supported by persuasive evidence. The book ends with a thoughtful and provocative article on the evolution of the nuclear matrix and envelope.

This is a very useful book because it brings together a disparate set of authors and their work. Interested people will find in this volume an up-to-date, clear and reasonably concise exposition of what little we know of the nuclear envelope and matrix. I anticipate that this book will be much quoted as this field expands in the near future.

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