

extensive chapter on this area is most welcome. At this stage one must criticise the absence of a similar chapter on glycoproteins, which only receives 3 pages over the two volumes. A further short chapter covers the restraints imposed and problems involved in purifying proteins for sequence analysis. The impact of DNA technology on protein purification is clearly defined in an informative chapter on engineering proteins for purification.

The remainder of the book, approximately one-third, is devoted to examples of protein purifications, the examples selected giving a broad overview of the approaches and

methodologies available for the purification of a range of protein types.

An extensive list of suppliers and their addresses and a comprehensive index complete the volume.

The volume is presented in the usual format for this series, basic principles being described together with detailed protocols and sections on troubleshooting. Taken together, these two volumes provide a very welcome collection that updates the reader in the majority of methodologies available for protein purification.

John M. Walker

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**The Analysis of Peptides and Proteins by Mass Spectrometry;** Edited by C.J. McNeal; John Wiley and Sons; Chichester, 1988; 322 pages; £39.95

'The Analysis of Peptides and Proteins by Mass Spectrometry' is an edited volume, containing the proceedings of the Fourth Texas Symposium held at College Station on April 17–20, 1988. The stated objective of this symposium was to attempt to develop a dialogue between mass spectroscopists and researchers active in the life sciences. The volume consists of 25 articles concerned with mass spectrometry and its application to biological problems. The symposium took place before the importance of electrospray and of matrix-assisted laser desorption as methods of ionization was widely recognised, and neither of these methods is covered in the proceedings. Consequently, the volume viewed from the perspective of 1990 seems peculiarly deficient.

There are 9 articles on plasma desorption, 8 of which are experimental and 1 is purely theoretical. At that time, plasma desorption was the method of choice for the ionization of high-mass biological molecules (relative molecular mass (RMM) >10000), as electrospray and matrix-assisted laser desorption were still techniques in their infancies. There are 9 articles describing work in which the method of ionization was keV-atom bombardment (fast atom bombardment or liquid secondary ion mass spectrometry), and 3 articles concerning thermospray. There is one article in the volume on laser desorption and ionization. Two articles are concerned with detectors for mass spectrometers. An article entitled 'The Oxime-Based Segment Synthesis of Cro' points out ways in which mass spectrometry could be even more useful in protein chemistry, in particular emphasising the desirability of a technique for quantitation of peptide mixtures.

Many of the papers on keV-atom bombardment are concerned with tandem mass spectrometry, and that by Biemann, Costello and colleagues provides fine examples of peptide sequencing by 4-sector mass spectrometry. Hunt and colleagues describe peptide sequencing using laser-induced photodissociation of ions trapped in a Fourier transform ion cyclotron resonance (FT ICR) spectrometer. The peptide ions were brought into the cell from an external ion source via quadrupole lenses. This exciting FT ICR technique does not seem to have been developed greatly in the intervening 2 years between symposium and this review, which contrasts sharply with the very considerable growth over the same period in the use of 4-sector mass spectrometry for peptide sequencing.

The articles by Geno and Macfarlane and by Mahoney and colleagues on detectors are among the most valuable in the volume, not having 'aged' since they were presented. Both address the problems of detecting efficiently very high-mass ions which by virtue of their masses have low velocities on approaching detectors. Finally, Grottemeyer presents a succinct yet thorough coverage of laser desorption (as of April 1988) and multiphoton ionization for mass spectrometry of peptides and proteins. Indications of the approaching importance of laser desorption from matrices are given in the coverage of Tanaka and colleagues first work with fine-metal containing matrices.

Overall, the volume is recommended as a nice summary of the state of the art in biological mass spectrometry in the summer of 1988.

P.J. Derrick

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**Colony Stimulating Factors: Molecular and Cellular Biology;** Edited by T.M. Dexter, J.M. Garland and N.G. Testa; Marcel Dekker; New York, 1990; xvi + 475 pages.  
\$135.00 (U.S.A. and Canada), \$162.00 (other countries)

The emergence of the haemopoietic colony stimulating factors (CSFs) from biological activities to recombinant proteins of enormous clinical promise is one of the most impressive achievements in modern molecular cell biology.

"Colony stimulating factors; molecular and cell biology" is a multi-author survey of the field which brings together, in a single volume, reviews on diverse aspects of these remarkable agents. The book opens with a discussion of the

microanatomy and biology of haemopoiesis, moves to accounts of the receptor technology and molecular biology of the principal colony stimulating factors and concludes with a series of chapters on the clinical applications of CSFs (with associated problems of large scale production of protein pharmaceuticals), CSF signal transduction and control of gene expression. "Colony Stimulating Factors" can therefore be highly recommended as a generally accessible and wide-ranging compendium of information on CSFs which conveys an excellent feel for the successes, problems and future directions of this exciting area of modern biology.

The book, however, is not without its faults. There is an inevitable duplication of information and unevenness of level; the 'splice sites' in certain chapters with multiple authors are painfully obvious and whereas some chapters are readable and informative, others are highly detailed and

somewhat indigestible. It is not clear, for example, how many readers will wish to wile away a long flight perusing the complete genomic sequence of GM-CSF. The other problem is that the book is already in certain areas out of date. It seems the book was completed in 1988 and developments in certain areas, particularly the cloning of CSF receptors, whilst anticipated in the editor's excellent summary chapter, are now a reality. For this reason, the most durable aspect of the volume may prove to be those chapters (e.g. Allen et al. on bone marrow biology and Steward et al. on clinical trials) with an analytical and broadly based approach. Finally, both the indexing and proofreading are firmly from the minimalist school of academic publishing, which is rather irritating for a volume costing \$162 (in Europe).

John K. Heath

**Molecular Control of Haemopoiesis: CIBA Foundation Symposium 148;** Edited by G. Bock and J. Marsh; John Wiley and Sons; Chichester, 1990; xi + 232 pages; £35.95

Haemopoiesis is one of the principal areas where molecular biology is beginning to make a direct impact on clinical medicine. A discipline that was firmly rooted in cell biology has warmly embraced the new molecular approach and this has increased the pace of progress towards an understanding of the mechanisms controlling both the normal and pathological aspects of this extremely complex process. In May 1989 the CIBA Foundation brought together many of the world's leading research workers in this field, not just from Europe and North America but also from the Southern hemisphere, since Australians have provided a major contribution to dissecting the regulation of haemopoiesis over the last 25 years. This book is the published proceedings of that symposium, and if it has an overall message, it is that however far the field has progressed, it has an awful lot further to go.

Haemopoiesis can be considered as a triangle, the base being all the mature cells of the peripheral blood (plus some cells in other tissues) and the apex the haemopoietic stem cell, a cell with the capability to differentiate down several different pathways and with an extremely high proliferative capacity. Our understanding about how the pluripotent stem cell ends up as a fully differentiated end cell remains limited and the best understood steps are those late in the pathway, towards the base of the triangle. Many of the growth factors needed for these steps have now been cloned (and therefore can be produced in relatively large amounts), as have a few of their receptors. Many of the haemopoietic growth factors are produced by the haemopoietic cells themselves and the

factors have pleiotropic effects, including influencing factor release from other haemopoietic cells. Clearly, therefore, haemopoiesis is no simple hierarchical process but rather a cascade of interactions and thus it is not surprising that our current understanding remains limited.

The molecular control of haemopoiesis may be complex and the basic biology of the system may only be known in outline but that has not prevented the use of some of the haemopoietic growth factors in treating disease. The use of recombinant erythropoietin in the treatment of the anaemia of renal disease is now almost routine in many countries and numerous groups are studying the beneficial effects of granulocyte colony stimulating factors on shortening the period of granulocytopenia following chemotherapy or bone marrow transplantation. These are early, somewhat empirical, trials which provide valuable data on the *in vivo* effects in man.

Many of these issues are addressed in this book, which is not a series of reviews (and suffers from the lack of an overview of the whole area), but rather, a series of random snapshots of various parts of haemopoiesis, authoritatively written and of a generally high standard, but lacking in cohesiveness. As such it is difficult to identify its intended readership, since the topics covered are somewhat selective. For those in the haemopoiesis field there will be lots to savour and for those in related areas it will provide a good flavour of where this rapidly moving field was in 1989.

W.G. Wood

**Cell Growth and Division: A Practical Approach;** Edited by R. Baserga; Oxford University Press; Oxford, 1989; xiv + 158 pages; £27.50

This volume in the successful "Practical Approach" series comprises 10 chapters presenting practical methodology used in studies on the growth and division of animal cells in

culture. Most of the information provided relates to specific cell lines: chapters are devoted to culture of mouse embryo cells, mouse fibroblast lines (C3H 10T1/2 and NIH 3T3),