

### Advances in Polyamine Research, Volume 3

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(Editors)

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The reviewer very much welcomed the opportunity to review this book. Being on the staff of a university hard hit by the University Grants Council's cuts there would be little prospect of obtaining such a book (price \$74.80) for the library. Even the more well endowed institutions may think twice about purchasing a fairly specialized book in times of stringency. The book is the third in the series *Advances in Polyamine Research*, the first and second volumes appearing in 1978, and is one of a number of books devoted entirely to polyamines. That the subject of polyamines is becoming more important in biochemical and medical research is clear from the fact that within the last 12 months there have been three international conferences on polyamines and another is scheduled for 1982.

The term polyamine is somewhat misleadingly used to include naturally occurring diamines, triamines and tetra-amines such as putrescine, spermidine and spermine. These compounds occur ubiquitously in living organisms, and although their molecular functions are still not clear, they are generally considered to be concerned with growth and its regulation. During the period up to about the mid-1970s, much research in this area was devoted to establishing the biosynthetic pathways and to correlating the synthesis of polyamines with that of proteins and nucleic acids. The latter studies were often aimed at trying to establish the function of polyamines. The emphasis in the last 5 years has begun to change, and this is clear from the articles in Volume 3, which are fairly representative of current research in this field. The book contains 42 contributions which were originally presented at an international symposium held in Rimini (Italy) in September 1980. The editors and publishers are to be commended on the speed with which this volume has followed the conference. Some of the papers are review articles, but most are original research papers. Most papers are well-presented, although in a few cases some further editing would have been a great help. A minor irritation is the excessive and inconsistent use of trivial abbreviations which should have been eliminated, e.g. PA (polyamine), CA (cancer), PBD (polyamine biosynthetic decarboxylases) and putrescine is abbreviated to pu, PU, put, PT and PTC in different articles.

The main topics which are covered by this volume fall into three categories: (i) enzymology of polyamine metabolism,

including conjugation; (ii) the development and application of inhibitors of polyamine biosynthesis; and (iii) polyamines and disease. There is only one article which is primarily concerned with the molecular functions of polyamines, and this is an interesting hypothesis presented by Morris and Lockshon. The possible link between polyamines and the regulation of growth has led to a surge in interest in the question 'If polyamine biosynthesis can be selectively inhibited, could this provide a means of selective control of growth?' and also an interest in the area of polyamines and disease generally. The early work on polyamines and disease proved rather unrewarding in terms of practical results, but there are now signs that, in selected areas, polyamine metabolism and its inhibition may be of relevance to medicine.

The book contains five articles on aspects of regulation of ornithine decarboxylase. One is left with the feeling that ornithine decarboxylase, which may represent less than one-millionth of the cell's protein, is far from a typical regulatory enzyme. It shows no allosteric properties, it turns over very rapidly and is regulated in some cells by high-molecular-weight (5000–50000) activators and inhibitors (antizymes) and by an unusual form of post-translational modification in others. There are good reviews on the regulation of *S*-adenosylmethionine decarboxylase (Mamont & Danzin) and on the mechanism of propylamine transfer reactions (Zappia *et al.*). Although the principal biosynthetic route to spermidine and spermine is well established, the importance of acetylation of polyamines and the importance of transglutaminase in catalysing the formation of polyamine-protein conjugates is only now being realized. These topics are well reviewed by Williams-Ashman and by Fink and Folk. The development of inhibitors of polyamine biosynthesis is discussed by Abdel-Monem and by Pegg and Coward and the potential of these inhibitors in controlling diseases is clear from the articles by Jänne *et al.* and McCann *et al.* There are a number of articles on polyamines in virus-infected cells, in transformed cells and in plant cells and tissues. The final section of the book is devoted to clinical studies.

The book will be primarily useful for research workers in the field rather than for newcomers seeking an overall appraisal of the subject. It is a useful reference work and a desirable acquisition for libraries and institutes where there is an interest in this area of research.

L. STEVENS

### The MSH Peptides

A. J. THODY

*Academic Press, London and New York, 1980, pp. 162, £16.00 or \$38.50*

Dr. Thody's book, as the title suggests, concerns itself with those peptides derived from the pro-opiomelanocortin precursor which have the ability to cause pigment migration in the chromatophores of lower vertebrates and hence have earned the name of melanocyte-stimulating hormones (melanotropins; MSH). Only passing reference is therefore given to corticotropin, lipotropins and endorphins where specific studies are useful in drawing parallels with MSH peptides. The further main selection of material has been to concentrate on those areas which relate to the possible functions of MSH peptides in mammals.

Background information is given on the anatomy of the main peripheral site of MSH production, the pars intermedia of the pituitary gland, on the currently rapidly expanding field of investigations into the biosynthetic pathway of MSH produc-

tion, and on the distribution and source of MSH in the central nervous system. There follows a very short review of MSH assay procedures which seems somewhat out of place in relation to the main theme of the book. Successive chapters deal with the factors that have been demonstrated to influence MSH secretion in mammals and on the evidence for specific actions, both peripheral and central, for MSH peptides. Subject areas included under the latter headings are pigmentation, sebaceous-gland activity, behavioural activity and possible roles in the foetus. The experimental material is presented in all its contradictory glory, which leaves the reader to perform his own selection of what might be important on a first reading of the book. Dr. Thody, however, draws some of the loose ends together in a final chapter which attempts to place the disparate studies on MSH peptides into perspective. He particularly emphasizes how the integration of apparently unrelated peripheral and central actions of MSH peptides could be important in allowing an animal to adopt to its environment.

Although the book never sets out to provide a comprehensive

In book: Advances in Polyamine Research, Edition: Vol. 3, Chapter: Polyamine Derivatives in Growing Cells, Publisher: Raven Press, Editors: C. M. Calderera, et al, pp.213-223. Cite this publication. Wai-Yee Chan. Although a number of biochemical alterations have previously been associated with this anemia (1), the recent report of a five- to tenfold elevation in blood polyamine levels (2) is especially noteworthy because the polyamines can alter the normal electrokinetic properties of the red blood cell membrane (3). These observations may help explain the abnormalities of the erythrocyte membrane and decreased red. Abstract Early studies on plant polyamine research pointed to their involvement in responses to different environmental stresses. During the last few years, genetic, transcriptomic and metabolomic approaches have unravelled key functions of different polyamines in the regulation of abiotic stress tolerance. Recent advances in the cross talk between polyamines and abscisic acid are discussed and integrated with processes of reactive oxygen species (ROS) signalling, generation of nitric oxide, modulation of ion channel activities and Ca<sup>2+</sup> homeostasis, amongst others. Keywords Polyamine metabolism · Abiotic stress · Plant tolerance · Abscisic acid · Signalling.