

The hottest available

25-Hydroxy [23,24-³H] cholecalciferol
60-100Ci/ mmol TRK.558

L-[³⁵S]Methionine SJ.204

The specific activity of the last ten batches
has been 550-820Ci/mmol, with an
average of 627Ci/mmol.

Please enquire for further details



The Radiochemical Centre Amersham

The Radiochemical Centre Limited, Amersham, England.
Tel: Little Chalfont (024 04) 4444.

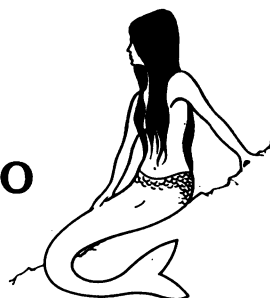
In the Americas: Amersham/Searle Corp, Illinois 60005.
Tel: 312-593-6300.

In W. Germany: Amersham Buchler GmbH & Co, KG,
Braunschweig. Tel: 05307-4693-97.

SYMPOSIA No. 41

BIOCHEMICAL ADAPTATION TO ENVIRONMENTAL CHANGE

Edited by **R. M. S. Smellie** and **J. F. Pennock**



240 pp. (ISBN 0 904498 01 8) £10.00 (U.S. \$20.00)

As biochemists have become more interested in the pathways of metabolism and mechanisms of control in a wider range of living systems, it has become apparent that, although there are many features in common to organisms inhabiting different environments, a variety of adaptations or refinements has been necessary so as to enable particular species to perform efficiently under the widely differing and often rapidly changing conditions to which they are exposed. Some of the more fully documented examples of these adaptations, including modifications in enzyme structure, function and activity, alteration in membrane lipids and performance and the substitution of one class of carrier molecule by another, are discussed in this volume.

List of contents and authors:

Chairman's Introduction by C. J. Duncan.

Design of Metabolic and Enzymic Machinery to Fit Lifestyle and Environment by P. W. Hochachka.

Temperature: A 'Shaping Force' in Protein Evolution by G. N. Somero and P. S. Low.

Temperature Adaptation in Fish by M. W. Smith.

Substrate Cycles in Metabolic Regulation and in Heat Generation by E. A. Newsholme and B. Crabtree.

Biochemical Adaptations for Flight in the Insect by B. Sacktor.

Facultative Anaerobiosis in Molluscs by A. de Zwaan, J. H. F. M. Kluytmans and D. I. Zandee.

Metabolic Consequences of Submersion Asphyxia in Mammals and Birds by A. S. Blix.

Adaptations with Respect to Salinity by E. Schoffeniels.

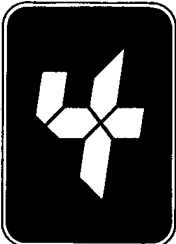
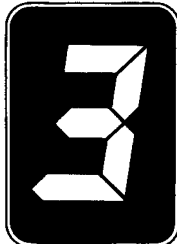

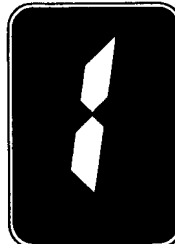
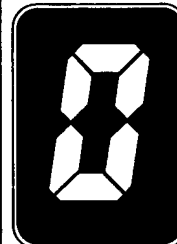
Adaptations of Enzymes for Regulation of Catalytic Function by D. E. Atkinson.

THE BIOCHEMICAL SOCIETY BOOK DEPOT

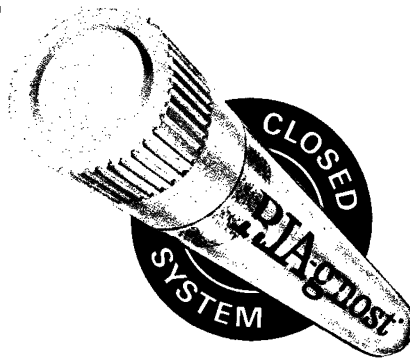
P.O. Box 32, Commerce Way, Colchester CO2 8HP, Essex.

RIA-gnost*

In thyroid hormone assay...

				
T4	T3	2 predispensed reagents	1 accurate pipetting only required	0 closed system for incubation, separation and counting

count on



Precisely!

Hoechst



Behring Diagnostics,
Hoechst Pharmaceuticals,
(A Division of Hoechst U.K. Limited), Hoechst House,
Salisbury Road, Hounslow, Middlesex TW4 6JH. Tel: 01-570 7712

* Trade Mark

JOHN WILEY & SONS LTD



LONDON · NEW YORK · SYDNEY · TORONTO

TOPICS IN ANTIBIOTIC CHEMISTRY 1 The Aminoglycosides and the Ansamycins

edited by P. G. Sammes, The City University, London.

"TOPICS IN ANTIBIOTIC CHEMISTRY" will provide authoritative reviews on different aspects, written by specialists who are actively involved in the subject. The contributions will not be restricted to the chemical aspects, but are planned to also include such features as methods for screening antibiotics, resistance mechanisms etc. This first volume contains two reviews: the first covers recent chemistry of the aminoglycosides, the second surveys the ansamycins, which include the rifamycin group of antibiotics.

085312 059 5 approx. 200 pages In Press approx. £12.00/\$22.80

Published by Ellis Horwood Ltd., Chichester, and distributed by John Wiley & Sons Ltd.

THE SYNTHESIS OF PROSTAGLANDINS

by A. Mitra, Columbia University.

A comprehensive review of the new synthetic methods and reactions used to construct prostaglandins. Each synthesis is depicted as a flow chart. Collectively, these syntheses emphasize the extensive number of strategies available for resolving specific problems.

0471 02308 6 approx. 370 pages In Press approx. £13.35/\$22.95

CYCLIC NUCLEOTIDES AND THE REGULATION OF CELL GROWTH

edited by M. Abou-Sabe, Rutgers University.

Presents recent advances in cyclic nucleotide research and discusses the current view of cyclic nucleotide involvement in the regulation of cell growth in different cell systems. Provides the first detailed analysis of cyclic nucleotide regulation of prokaryotic cell growth.

0470 98953 X 312 pages March 1977 £15.00/\$26.00

Published by Dowden, Hutchinson & Ross Inc., and distributed by John Wiley & Sons Ltd.

ADVANCES IN ENZYMOLOGY And Related Areas of Molecular Biology Vol. 45

edited by A. Meister, Cornell University Medical College.

This series reviews the progress made in the various branches of this rapidly expanding science, and has become essential to all those who wish to keep abreast of the literature. (Series: *Advances in Enzymology*)

0471 02726 X approx. 464 pages In Press approx. £17.25/\$29.20

MICROBIAL PRODUCTION OF NUCLEIC ACID-RELATED COMPOUNDS

edited by K. Ogata, Kyoto University; S. Kinoshita, Kyowa Hakko Kogyo Co. Ltd.; T. Tsunoda, Ajinomoto Co. Inc., and K. Aida, Institute of Applied Microbiology, University of Tokyo.

Includes details of various newly established techniques for the industrial production of nucleotides, and of studies on the production of nucleic acid-related compounds.

0470 15167 6 366 pages November 1976 £18.25/\$30.00

Published by Kodansha Ltd., and distributed by John Wiley & Sons Ltd.

BIOCHEMICAL INSECT CONTROL: Its Impact on Economy, Environment and Natural Selection

by M. S. Quraishi.

A comprehensive summary of the current status of insecticides and alternative chemicals that have either proved effective or are under investigation for insect control. Deals with the biochemistry, toxicology, mode of action, metabolism, and break down products of insecticides and their effects on the environment and non-target organisms.

0471 70275 7 approx. 304 pages In Press approx. £15.10/\$24.10

INDUSTRIAL MICROBIOLOGY

edited by R. W. Thoma, E. R. Squibb & Sons Inc.

Covers a wide range of bioengineering subjects: fermentation, water disposal, food preservation, and production of antibiotics. Focuses on new methods, approaches and concepts. (Series: *Benchmark papers in Microbiology Vol. 12*)

0470 98938 6 approx. 400 pages In Press approx. £18.75/\$31.75

Published by Dowden, Hutchinson & Ross Inc., and distributed by John Wiley & Sons Ltd.

JOHN WILEY & SONS LTD

Baffins Lane · Chichester · Sussex PO19 1UD · ENGLAND

CHARACTERIZATION OF PROTEIN AND FUNCTION

RESIDENTIAL SCHOOL—WYE COLLEGE, KENT
5–9 SEPTEMBER 1977

This School follows naturally the two previous ones which dealt specifically with the binding of small molecules and ions by biological macromolecules. It is once again aimed at Scientists with some experience in protein research, or division and section heads wanting to acquaint themselves with the current state of knowledge.

In particular, attempts will be made to emphasize the chemical, structural and conformational aspects of protein function.

The School will feature review lectures, and a selection of small group tutorial/discussions dealing with the detailed aspects of experimental techniques and the behaviour of proteins *in vivo* and *in vitro*. One session will be set aside for the presentation and discussion of original contributions by participants. A trip to Canterbury will be arranged on Wednesday afternoon.

Lectures will provide reviews of the main protein functions and the factors which influence protein conformation and aggregation behaviour.

LECTURE PROGRAMME:

FUNCTIONAL CLASSIFICATION OF PROTEINS
STRUCTURAL FUNCTIONS
TRANSPORT PROTEINS
SOLVENT MEDIATED INFLUENCES ON CONFORMATION AND ACTIVITY
CHEMICAL/MECHANICAL ENERGY TRANSDUCTION
CATALYTIC FUNCTIONS
DEFENCE PROTEINS
THE CONFORMATION AND STABILITY OF FOLDED GLOBULAR PROTEINS
SELF-ASSEMBLY AND FUNCTIONS OF MULTI-SUB-UNIT STRUCTURES
BIOLOGICALLY MODIFIED PROTEINS—GLYCOPROTEINS AND LIPOPROTEINS

There will be many lecturers and speakers at the course from Universities, Institutes and large industrial concerns in Europe, United States of America and the United Kingdom.

SEMINAR PROGRAMME:

1. ANALYTICAL TECHNIQUES APPLIED TO THE STUDY OF PROTEIN FUNCTION:

Fluorescence Spectroscopy
NMR Spectroscopy
Immunochemical Techniques
Thermodynamic Methods
Chemical Modification
Theoretical Techniques
Affinity Labelling

2. CONFORMATIONAL PROPERTIES AND INTERACTIONS OF PROTEINS IN VIVO AND IN VITRO:

How do Globular Proteins Fold Up?
Chromosomal Proteins
Hormone-receptor Interactions
Protein Hydration, Conformation and Binding of Small Molecule Species
Fibrillar Proteins
Structural Proteins
Membrane Proteins
Contractile Systems
Active Site Chemistry
Glycoproteins

There will be a total of up to 50 sessions (10 per day for 5 days, i.e. most topics will be dealt with on three sessions). Each participant will be able to attend five of the seminars offered.

A fully descriptive leaflet and application form are obtainable from:
**Miss Sara Urwin, The Chemical Society, Burlington House,
London W1V 0BN. Tel: 01 734-9971 Ext. 60.**

The Organization and Expression of the Eukaryotic Genome

edited by

E. M. Bradbury and K. Javaherian

May/June 1977, xvi + 516 pp., £13.50/\$26.50 0.12.123550.5

This book deals with one of the most important and rapidly-developing areas of contemporary biochemistry. It records the proceedings of an International Symposium held in Tehran in 1976 and attended by a distinguished body of scientists. Some of the main topics under discussion were the overall arrangement of DNA in eukaryotes, where much new information has been obtained on the interspersed of repeated and unique sequences, and, at the level of individual genes, the arrangement of sequences in ribosomal RNA structural gene clusters. The structure and function of chromatin and the control mechanisms of prokaryotes are also thoroughly examined, together with many other subjects which have recently stimulated interest and investigation.



Academic Press

London New York San Francisco

A Subsidiary of Harcourt Brace Jovanovich, Publishers

24-28 Oval Road, London NW1, England
111 Fifth Avenue, New York, NY 10003, USA

96 ¹²⁵I samples counted in 6 minutes!



**NUCLEAR
ENTERPRISES
LIMITED**



SIGHTHILL, EDINBURGH EH11 4EY, SCOTLAND

Telephone: 031-443 4060

Cables: Nuclear, Edinburgh Telex: 72333

Associate Companies

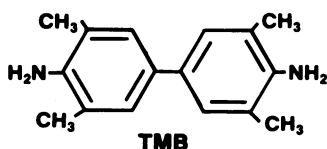
Nuclear Enterprises GmbH, Schwantalerstrasse 74,
8 Munchen 2, Germany. Tel: 53-62-23. Telex: 529938.

Nuclear Enterprises Inc., 935 Terminal Way, San Carlos,
California 94070. Tel. 415 593 1455. Telex: 348371.



Tetramethylbenzidine

A reported noncarcinogenic analog of benzidine



For many years benzidine has been used as a sensitive and specific reagent for the detection of blood.¹ However, its extreme carcinogenicity has curtailed its use in recent years. In fact, in 1974, the Occupational Safety and Health Administration banned its manufacture and use in the United States.²

Several chemical transformations are thought to be responsible for the carcinogenicity of aromatic amines. An early hypothesis involved possible *ortho*-hydroxylation.³ Later views suggested that N-oxidation is important. Since *o*-tolidine (3,3'-dimethylbenzidine) retains the sensitivity in the detection of blood, it seemed likely that 3,3',5,5'-tetramethylbenzidine (TMB) (in which *ortho*-hydroxylation is impossible) might also be an effective but *safe* substitute for benzidine.⁴ Indeed, it was found that subcutaneous injection of TMB into rats "produced no tumors specifically attributable to it, in doses greater than those in which benzidine or *o*-tolidine cause a high yield of neoplasms."⁴

The simple *Salmonella*/microsome microbial test (Ames test)⁵ for the detection of mutagenic activity showed TMB to be nonmutagenic.^{6,7} Results of these studies suggest that TMB is also noncarcinogenic.

Garner *et al.*⁸ have recently evaluated the use of TMB as a presumptive test for blood in forensic work. As might be expected from its structural similarity to benzidine, TMB, in various concentrations of glacial acetic acid, reacted with blood in the presence of hydrogen peroxide to form a colored product. Com-

parative studies with benzidine showed TMB to be equally sensitive in the detection of blood.

The specificity of TMB and its tendency to give a false positive reaction with substances known to interfere with the benzidine test for blood were examined using various vegetables and applying several methods of testing.⁸ The results indicate that TMB is as specific as benzidine. Also, TMB and benzidine reacted similarly to chemical oxidants and catalysts before addition of hydrogen peroxide.⁸

Since benzidine in solution is well known to lose its sensitivity with storage, the effects of time, light and heat on TMB solutions were studied.⁸ Results indicate that the stability of TMB is the same as that of benzidine.

The only significant difference observed between TMB and benzidine was in their solubilities in glacial acetic acid. The concentration of a saturated solution of TMB approaches 0.2M, while that for benzidine ranges between 0.7 and 1.0M.

Thus, the sensitivity, specificity, stability and apparent noncarcinogenicity of TMB are very important criteria in determining the usefulness of TMB as a substitute for benzidine in the detection of blood.

References:

- 1) B.J. Culliford and L.C. Nickolls, *J. Forensic Sci.*, **9**, 175 (1974).
- 2) Regulation H002, Occupational Safety and Health Administration, Washington, D.C., Jan. 29, 1974.
- 3) E.C. Miller, J.A. Miller, and H.A. Hartmann, *Cancer Res.*, **21**, 815 (1961).
- 4) V.R. Holland, B.C. Saunders, F.L. Rose, and A.L. Walpole, *Tetrahedron*, **30**, 3299 (1974).
- 5) B.N. Ames, W.E. Durston, E. Yamasaki, and F.D. Lee, *Proc. Nat. Acad. Sci. U.S.A.*, **70**, 2281 (1973).
- 6) R.C. Garner, A.L. Walpole, and F.L. Rose, *Cancer Lett.*, **1**, 39 (1975).
- 7) J. McCann, E. Choi, E. Yamasaki, and B.N. Ames, *Proc. Nat. Acad. Sci. U.S.A.*, **72**, 5135 (1975); J. McCann and B.N. Ames, *ibid.*, **73**, 950 (1976).
- 8) D.D. Garner, K.M. Cano, R.S. Peimer, and T.E. Yeshion, *J. Forensic Sci.*, **21**, 816 (1976).

86,033-6 3,3',5,5'-Tetramethylbenzidine (TMB)

1g \$14.00; 5g \$45.00

Aldrich Chemical Company, Inc.

Craftsmen in Chemistry

Corporate Offices:
Aldrich Chemical Co., Inc.
940 W. Saint Paul Ave.
Milwaukee, Wisconsin 53233
U. S. A.

Great Britain:
Aldrich Chemical Co., Ltd.
The Old Brickyard, New Road
Gillingham, Dorset SP8 4JL
England

Belgium/
Continental Europe:
Aldrich-Europe
B-2340 Beerse
Belgium

West Germany/
Continental Europe:
EGA-Chemie KG
7924 Steinheim am Albuch
West Germany