The BIOCHEMICAL JOURNAL

The Biochemical Society, London © 1992

Volume 282, part 1 15 February 1992

Editorial Board

Chairman
A. J. Turner (*Leeds*)

Deputy Chairmen
W. H. Evans (*London*), *reviews editor*
G. H. Elder (*Cardiff*)
S. J. Higgins (*Leeds*)
K. Siddle (*Cambridge*)
W. L. R. Stalmans (*Leuven*)
M. A. Kerr (*Dundee*)
V. A. Zammit (*Ayr*)

Managing Editor
A. S. Beedle

B. H. Anderton (*London*)
D. J. Anstee (*Bristol*)
G. Banting (*Bristol*)
T. Berg (*Oslo*)
S. J. W. Busby (*Birmingham*)
G. M. W. Cook (*Cambridge*)
A. P. Dawson (*Norwich*)
H. R. de Jonge (*Rotterdam*)
A. H. Drummond (*Oxford*)
J. Feeney (*London*)
D. A. Fell (*Oxford*)
M. A. J. Ferguson (*Dundee*)
S. J. Ferguson (*Oxford*)
J. B. C. Findlay (*Leeds*)
G. F. Gibbons (*Oxford*)
J. P. Goddard (*Glasgow*)
L. Hall (*Bristol*)
B. Halliwell (*Sacramento*)
D. G. Hardie (*Dundee*)
T. E. Hardingham (*London*)
D. Häussinger (*Freiburg*)
H. Holmsen (*Bergen*)
R. F. Irvine (*Cambridge*)
U. Lindahl (*Uppsala*)
J. P. Luzio (*Cambridge*)
B. Mannervik (*Uppsala*)
S. B. Marston (*London*)
J. G. McCormack (*Edinburgh*)
J. D. McGivan (*Bristol*)
M. A. McNurlan (*Aberdeen*)
H. G. Nimmo (*Glasgow*)
I. A. Nimmo (*Edinburgh*)
Y. Nishizuka (*Kobe*)
V. M. Pain (*Brighton*)
P. Parker (*London*)
A. E. Pegg (*Hershey*)
N. C. Price (*Stirling*)
C. G. Proud (*Bristol*)
H. Prydz (*Oslo*)
P. J. Reeds (*Houston*)
A. J. Rivett (*Leicester*)
S. P. Robins (*Aberdeen*)
S. B. Shears (*Research Triangle Park*)
H. Sies (*Düsseldorf*)
A. R. Slabas (*Durham*)
B. E. Smith (*Brighton*)
J. B. Smith (*Philadelphia*)
A. K. Soutar (*London*)
P. G. Strange (*Canterbury*)
L. M. G. van Golde (*Utrecht*)
M. J. O. Wakelam (*Glasgow*)
M. Wallis (*Brighton*)
M. Watford (*New Brunswick*)
A. S. Whitehead (*Dublin*)

- The Biochemical Journal is published and distributed by Portland Press Ltd. on behalf of the Biochemical Society, and appears twice monthly.
- Editorial and Publishing Offices: The Biochemical Journal, 59 Portland Place, London W1N 3AJ, U.K.
- Subscriptions Department: Portland Press Ltd., P.O. Box 32, Commerce Way, Colchester CO2 8HP, U.K.
- All rights reserved. Apart from any fair dealing for the purposes of research or private study, or criticism or review, as permitted under the Copyright, Designs and Patents Act, 1988, this publication may be reproduced, stored or transmitted, in any forms or by any means, only with the prior permission in writing of the publishers, or in the case of reprographic reproduction in accordance with the terms of licences issued by the Copyright Licensing Agency. Inquiries concerning reproduction outside those terms should be sent to the publishers at the abovementioned address.
- Although, at the time of going to press, the information contained in this publication is believed to be correct, neither the authors nor the editors nor the publisher assume any responsibility for any errors or omissions herein contained.
- Second-class postage paid at Rahway, NJ, U.S.A.
- U.S. Postmaster: send address changes to The Biochemical Journal, c/o Mercury Airfreight International Ltd, 2323 Randolph Avenue, Avenel, NJ 07001, U.S.A. (US mailing agent).

INSTRUCTIONS TO AUTHORS

General policy

The *Biochemical Journal* publishes papers in English in all fields of biochemistry, provided that they make a sufficient contribution to biochemical knowledge. Papers may include new results obtained experimentally, descriptions of new experimental methods of biochemical importance, or new interpretations of existing results. Theoretical contributions will be considered equally with papers dealing with experimental work. All work presented should have as its aim the development of biochemical concepts rather than the mere recording of facts. Preliminary, confirmatory or inconclusive work will not be published.

Submission of a paper implies that it has been approved by all the named authors, that all persons entitled to authorship have been so named, that it reports unpublished work that is not under consideration elsewhere, and that if the paper is accepted for publication the authors will transfer to the Biochemical Society the copyright in the paper, which will then not be published elsewhere in the same form, in any language, without the consent of the Society. Authors will be required to sign an undertaking to these effects.

The *Biochemical Journal* will not publish material that has been wholly or largely published elsewhere, even as a preliminary communication or in unrefereed symposium proceedings; equally, fragmentation of research into the "least publishable unit" is discouraged. In order that the reviewers can consider these problems, all submitted papers must be accompanied by duplicate copies of the author's relevant published work and of all related papers in press or under editorial consideration in this or other journals.

Authors may suggest potential reviewers for their papers, but the journal is under no obligation to follow such suggestions. Authors may also specify the names of those they wish to be excluded from the review process, and such wishes are usually respected unless, in the opinion of the journal, such a request unreasonably excludes all the expertise available to it in that scientific area.

The paragraphs below are a summarized version of the journal's complete Instructions to Authors [*Biochem. J.* (1992) **281**, 1–19], of which copies are available free of charge from the editorial office.

The following types of paper are included in the journal.

Research Papers are the normal form of publication, and may be of any length that is justified by their content. However, because of pressure for space in the journal, no paper, whatever its scientific merits, will be accepted if it exceeds the minimum length required for precision in describing the experiments and clarity in interpreting them. As a guide, most Research Papers published in the *Biochemical Journal* are of between six and eight printed pages. A concise well-written paper tends to be published more rapidly.

Research Communications are short (maximum four printed pages) papers bringing particularly novel and significant findings to the attention of the research community. It is intended that a decision on acceptance or rejection will be made within 2 weeks of receipt, and publication of accepted Communications will follow within 2 months. Research Communications receive full but accelerated reviewing and the criteria of "novelty and significance" are strictly enforced; Communications are not a path to accelerated publication of sound but non-urgent material. Authors must include in their letter of submission a *brief* statement of why they believe their Communication merits accelerated treatment, and should submit *four copies* of their article.

BJ Letters are short (two printed pages or less) items of scientific correspondence intended to provide an opportunity to discuss, criticize or expand particular points made in published work, or to present a new hypothesis. They should not contain extensive new data (which would best be placed in a regular paper) and are not a vehicle for publication of preliminary results. If a letter is polemical in nature, a reply may be solicited from other interested parties.

Reviews will usually be solicited, although unsolicited reviews will be considered for publication. Prospective writers of reviews should first consult the reviews editor, via the editorial office, and should enclose a short (one typed page) summary of the area they propose to cover.

Procedure for submission

Before preparing papers for the journal, authors should consult a current issue to make themselves familiar with the general format, such as the use of cross-headings, layout of tables and figures and citation of references.Typescripts should be double-spaced throughout (particularly references and table and figure legends) on numbered sheets of uniform size (preferably ISO A4) with wide margins. Output from low-quality dot matrix printers is not acceptable. A full page of text in the *Biochemical Journal* contains approximately 1200 words; when calculating the printed length of papers, allowance must be made for the space occupied by tables and figures and the number of text words reduced accordingly.

Either the Harvard system or the numerical system of references may be used. A reference to "unpublished work" should be accompanied by the names of all persons concerned; a reference to a "personal communication" must be supported by written permission for the quotation from the person or persons concerned; both of these types of citation are permitted in the text only, not in the list of references.

Three copies of the typescript (four copies for Research Communications), with a brief covering letter to which should be attached an additional copy of the synopsis, should be sent to:

The Managing Editor
The Biochemical Journal
59 Portland Place
London W1N 3AJ
U.K.

(telephone 071-637 5873; fax 071-323 1136; from overseas the international code for the U.K. is 44 and the leading 0 should be omitted).

The typescript should indicate the name, address, telephone number and fax number of the person to whom correspondence should be addressed. The top copy of the typescript should be marked as such and should have attached to it the original figures; for the other copies of the typescript, glossy prints (*not* photocopies) of the half-tone figures should be provided, but photocopies of line drawings will suffice. A short (page-heading) title of not more than 75 characters should be provided, and authors should indicate the preferred section in the table of contents for their paper:

Proteins
Enzymes
Carbohydrates and lipids
Gene structure and expression
Regulation of metabolism
Membranes and bioenergetics
Receptors and signal transduction
Cell biology and development

Submission by fax

Research Communications and BJ Letters that do not contain half-tone figures may be submitted by fax to the number above. Only one copy of the typescript need be transmitted. Acknowledgment of receipt and the review decision will be returned by fax to the author. The current Instructions to Authors contains full details of this procedure.

Submission on diskette

Authors may submit a diskette containing the final version of the text; this should be in addition to, not as a replacement for, the required number of copies. If the paper is accepted, every effort will be made to use the diskette during typesetting, but this cannot be guaranteed. Authors wishing to submit their text in this way should consult the editorial office for advice before preparation of their paper.

OTHER INFORMATION

The *Biochemical Journal* is published and distributed by Portland Press Ltd on behalf of the Biochemical Society. It is published twice monthly; in 1992 volumes 281–288 (three parts each) will appear. The subscription also includes the annual compendium of *Biochemical Journal Reviews* and an author and keyword index.

Subscription rates

Institutional subscription rates for 1992 are shown below. Subscribers to the *Biochemical Journal* can subscribe additionally to *Biochemical Society Transactions* on a joint subscription, saving $25.00 (North America) or £15.00 (rest of the world). Terms are cash with order (£ sterling for subscribers other than in North America, or US$ equivalent at current rate of exchange), or against proforma invoice. Orders should be sent to the address below, or through your usual agent.

	North America	Rest of the world
One year (8 volumes)	US$ 1460	£775
Single issues	US$ 65	£33

The subscription rates for North America and Japan include elements for airfreight and Accelerated Surface Post respectively. Subscribers may opt for air-mail delivery at additional cost; details are available on application.

Microfiche and back issues

Volumes 102–280 of the *Biochemical Journal* are available on microfiche. Back issues are also available. Further details may be obtained from the address below.

Subscription department

Portland Press Ltd
P.O. Box 32, Commerce Way
Colchester CO2 8HP, Essex, U.K.
(telephone 0206-46351; fax 0206-549331;
after 17 August 1992 telephone 0206-796351)

Advertising

Advertising is accepted in the *Biochemical Journal*. For information contact the Advertising Department, Portland Press Ltd, 59 Portland Place, London W1N 3AJ (telephone 071-637 5873; fax 071-323 1136).

INDEX OF AUTHORS

The BIOCHEMICAL JOURNAL

The Biochemical Society, London © 1992

Volume 282 1992

Editorial Board

Chairman
A. J. Turner (*Leeds*)

Deputy Chairmen
W. H. Evans (*London*), *reviews editor*
G. H. Elder (*Cardiff*)
S. J. Higgins (*Leeds*)
K. Siddle (*Cambridge*)
W. L. R. Stalmans (*Leuven*)
M. A. Kerr (*Dundee*)
V. A. Zammit (*Ayr*)

Managing Editor
A. S. Beedle

B. H. Anderton (*London*)
D. J. Anstee (*Bristol*)
G. Banting (*Bristol*)
T. Berg (*Oslo*)
S. J. W. Busby (*Birmingham*)
G. M. W. Cook (*Cambridge*)
A. P. Dawson (*Norwich*)
H. R. de Jonge (*Rotterdam*)
A. H. Drummond (*Oxford*)
J. Feeney (*London*)
D. A. Fell (*Oxford*)
M. A. J. Ferguson (*Dundee*)
S. J. Ferguson (*Oxford*)
J. B. C. Findlay (*Leeds*)
G. F. Gibbons (*Oxford*)
J. P. Goddard (*Glasgow*)
L. Hall (*Bristol*)
B. Halliwell (*Sacramento*)
D. G. Hardie (*Dundee*)
T. E. Hardingham (*London*)
D. Häussinger (*Freiburg*)
H. Holmsen (*Bergen*)
R. F. Irvine (*Cambridge*)
U. Lindahl (*Uppsala*)
J. P. Luzio (*Cambridge*)
B. Mannervik (*Uppsala*)
S. B. Marston (*London*)
J. G. McCormack (*Edinburgh*)
J. D. McGivan (*Bristol*)
M. A. McNurlan (*Aberdeen*)
H. G. Nimmo (*Glasgow*)
I. A. Nimmo (*Edinburgh*)
Y. Nishizuka (*Kobe*)
V. M. Pain (*Brighton*)
P. Parker (*London*)
A. E. Pegg (*Hershey*)
N. C. Price (*Stirling*)
C. G. Proud (*Bristol*)
H. Prydz (*Oslo*)
P. J. Reeds (*Houston*)
A. J. Rivett (*Leicester*)
S. P. Robins (*Aberdeen*)
S. B. Shears (*Research Triangle Park*)
H. Sies (*Düsseldorf*)
A. R. Slabas (*Durham*)
B. E. Smith (*Brighton*)
J. B. Smith (*Philadelphia*)
A. K. Soutar (*London*)
P. G. Strange (*Canterbury*)
L. M. G. van Golde (*Utrecht*)
M. J. O. Wakelam (*Glasgow*)
M. Wallis (*Brighton*)
M. Watford (*New Brunswick*)
A. S. Whitehead (*Dublin*)

Portland Press Ltd
59 Portland Place
London W1N 3AJ, U.K.

ISSN 0264-6021

Printed in Great Britain by the University Press, Cambridge

Biochem. J. (1992) 282, I–III (Printed in Great Britain)

Nomenclature Committee of IUBMB (NC–IUBMB) and IUPAC–IUBMB Joint Commission on Biochemical Nomenclature (JCBN)

Newsletter 1992

The nomenclature committees of IUBMB* hope that their newsletters, designed to inform scientists about the work of the committees, may help the biochemical community. Comments on any item in this newsletter, or any other aspect of biochemical nomenclature, may be sent to any member of the nomenclature committees, or to their secretary, Dr A. J. Barrett, Biochemistry Department, Strangeways Research Laboratory, Worts Causeway, Cambridge CB1 4RN, U.K.

The Newsletter 1989 was published in Arch. Biochem. Biophys. **272**, 262–266 (1989), in Biochem. Int. **20**, 209–214 (1989), in Biochem. J. **265**, I–IV (1990), in Biol. Chem. Hoppe-Seyler **370**, 1153–1156 (1989) and in Eur. J. Biochem. **183**, 1–4 (1989).

CURRENT MEMBERSHIP

NC–IUBMB: C. R. Cantor (U.S.A.), G. P. Moss (U.K.), W. Saenger (Germany), and N. Sharon (Israel).

NC–IUBMB and JCBN: C. Liébecq (Belgium), K. F. Tipton (Ireland), P. Venetianer (Hungary), and J. F. G. Vliegenthart (The Netherlands; chairman of both committees).

JCBN: A. J. Barrett (U.K.; secretary of both committees), M. A. Chester (Sweden), and D. Coucouvanis (U.S.A.).

In addition, P. Karlson (Germany), K. L. Loening (U.S.A.) and E. C. Webb (Australia) are associate members of NC–IUBMB; H. B. F. Dixon (U.K.) and J. C. Rigg (The Netherlands) are associate members of JCBN.

PRONUNCIATION OF PREGN-4-ENE

In the recently published recommendations on steroid nomenclature [1], the locant of a double bond is always inserted directly in front of the syllable(s) -ene, -diene, etc. (section 3S-2.5, note 1). This change results in a problem in the pronunciation of the names of compounds with one double bond when the parent has a consonant that is normally pronounced as part of the ending -ane. In particular, pregnane and oestrane pose this problem. To aid pronunciation, an additional 'a' is often inserted in speech, e.g. pregn(a)-4-ene. The 'a' in parentheses is used only for pronunciation and should not be used in the written form. Similarly, oestr-4-ene is pronounced as oestr(a)-4-ene.

This proposal is an extension of the existing form used for steroids with more than one double bond, e.g. pregna-4,6-diene.

MURAMIC ACID: A CORRECTION

Our attention has been drawn by Dr D. Keglevic, Ruder Boskovic Institute, Zagreb, Croatia, Yugoslavia, to an error which appeared in our recommendations for the nomenclature of glycoproteins, glycopeptides and peptidoglycans [2]. In 'Section 2.3. Peptidoglycans', muramic acid is referred to as 2-amino-3-*O*-[(*S*)-1-carboxyethyl]-2-deoxy-D-glucose, instead of 2-amino-3-*O*-[(*R*)-1-carboxyethyl]-2-deoxy-D-glucose.

It may be that the present error originates from an earlier paper by Jeanloz & Walker [3] in which they characterized the configuration of the lactate† side chain as (D) or (*S*); this was also stated on page 247 in [4]. In a later paper [5], the authors gave additional evidence for the D-configuration of the lactate side chain and stated in a footnote that they erroneously referred to the compound as (*S*) instead of (*R*). Definite assignment for the D-configuration, i.e. the (*R*)-configuration, was given by X-ray structure analysis [6]. The correction has appeared in [7].

This structure is often written as 2-amino-3-*O*-[D-1-carboxyethyl]-2-deoxy-D-glucose, but the nomenclature committees of IUBMB believe that use of the D,L system is best restricted to amino acids and monosaccharides, because in other cases the reference structure is insufficiently clearly established for the usage to be easily understood.

N-GLYCAN/N-LINKED

In the same recommendations for the nomenclature of glycoproteins, glycopeptides and peptidoglycans [2], the prefix N- appears in both normal and italic style, e.g. *N*-glycan, etc.; N-linked or *N*-linked. The nomenclature committees of IUBMB suggest that N- be italicized only when it is used as a locant, e.g. *N*-acetyl-, *O*-acetyl-, *N*-glycolyl-, etc. and not in N-linked, O-substituted, N-glycan, etc.

LIGANDS IN BIOCHEMISTRY AND INORGANIC CHEMISTRY

The definition of 'ligand' approved by chemists (see page 233 in [8]) is: "If it is possible to indicate a 'central' atom in a polyatomic molecular entity, the atoms or groups bound to that atom are called ligands. The term is generally used on connection with metallic 'central' atoms."

The Nomenclature Committee of IUBMB believes that the wider biochemical usage is covered by changing the first sentence—italicizing the words that change the meaning—to read: "If it is possible or *convenient* to regard *part of* a polyatomic molecular entity as central, then the atoms, groups *or molecules* bound to that part are called ligands."

Biochemical usage is thus wider, in that the central entity can be polyatomic. Thus H^+ may be a ligand for proteins and for citrate as well as for O^{2-}. It may even be a ligand for a univalent entity such as acetate: in other circumstances, AcO^- may be the ligand for H^+, since the definition makes clear that the view of which entity is central may change for convenience. Thus four calcium ions are ligands for calmodulin, when the protein is regarded as central; four carboxylate groups of calmodulin ligate (are ligands of) each calcium ion when this ion is regarded as central. It is the ligand that is said to ligate the central entity, which is said to be ligated.

When the hormone binding to a receptor is called a ligand, the receptor is thus regarded as the central entity.

Biochemists should bear in mind that the usage in inorganic chemistry has been that ligands bind only single atoms, so they should be cautious in fields such as bioinorganic chemistry where confusion may be possible.

* The International Union of Biochemistry (IUB) has been renamed the International Union of Biochemistry and Molecular Biology (IUBMB).

† Often but misleadingly called 'lactyl' in the past.

NUMBERING OF STEROID-SIDE-CHAIN ATOMS

Additional alkyl substituents attached to a steroid skeleton are numbered using the locant of the attachment position and a superscript number indicating the number of atoms from the attachment position. Now that the numbers 28, 29 and 30 are assigned to the additional methyl groups at C-4 and C-14 in triterpenoids, such as lanosterol, the additional carbon atoms at C-24 of ergostane, campestane, poriferastane, stigmastane and gorgostane are also numbered using a superscript number, i.e. 24^1, 24^2. When it is necessary to identify these atoms in naming a steroid using one of these parents the appropriate locant is used. For example, fecosterol is 5α-ergosta-8,24(24^1)-dien-3β-ol [formerly 5α-ergosta-8,24(28)-dien-3β-ol]. It may alternatively be called 24-methylene-5α-cholest-8-en-3β-ol. In all other cases the use of a locant modified by a superscript number is intended for identification purposes, e.g. ^{13}C-n.m.r., and not as a basis for further substitution. For example, oxymethalone (an international non-proprietary name) is 17β-hydroxy-2-(hydroxymethylene)-17α-methyl-5α-androstan-3-one, not 2^1,17β-dihydroxy-17α-methyl-2-methylene-5α-androstan-3-one.

SUGGESTIONS ON THE NOMENCLATURE OF SIALIC ACIDS

A short article was presented by Reuter & Schauer at the Japanese–German Symposium on Sialic Acids held in Berlin in 1988. The article appeared in the proceedings of the symposium and in [9]. It contains a table listing suggested names and abbreviations for naturally occurring sialic acids.

CURRENT ACTIVITIES

The nomenclature committees of IUBMB are currently addressing the following topics:

1. Nomenclature of glycolipids: to update the glycolipids section of the Recommendations 1976 on the nomenclature of lipids [10];
2. Nomenclature of carbohydrates: to update the Tentative rules 1969 for carbohydrate nomenclature, part 1 [11] and various subsequent documents on unsaturated and branched chain monosaccharides, and polysaccharides;
3. Nomenclature of ligands and neoligands: a new document:
4. Prostaglandins and thromboxanes, leukotrienes and related compounds: a new document.

Biochemists interested in commenting upon these documents when available for general discussion are invited to write to any member of the committees or to their secretary.

PLANS FOR FUTURE ACTIVITIES

Protein nomenclature

The nomenclature of proteins is an outstanding example of a problem that is in need of solution but which has seen little or no progress towards a solution during the many years of existence of the successive nomenclature committees of IUBMB. At first sight the EC system of classification of enzymes [12] might seem to provide a way of naming proteins, if coupled with the established nomenclature of amino acids and peptides [13]. Unfortunately, however, it does not, because the EC system names functions, not structures: a name like superoxide dismutase (EC 1.15.1.1) for example, may refer to two or more entirely different chemical structures with little in common beyond the fact that they catalyse the same reaction; conversely, a single molecule may appear in *Enzyme Nomenclature* under two or more different and non-equivalent names, such as homoserine dehydrogenase (EC 1.1.1.3) and aspartokinase (EC 2.7.2.4), if it catalyses more than one reaction.

Thus one cannot use an enzyme name as the name of a chemical structure unless it is qualified in some way. In any case, there are many non-enzyme proteins, such as receptors, hormones, structural proteins, etc., that are in just as much need of systematic nomenclature as enzymes.

Although the Nomenclature Committee of IUBMB has been unable to progress significantly with this problem and sees little prospect of being able to do so in the near future, it would be unduly pessimistic to conclude that systematic naming of protein structures cannot be done. Biochemists are accordingly invited to suggest—by writing to any member of the nomenclature committees or to their secretary—systems that they believe might prove to be generally applicable.

Enzyme nomenclature

The new edition of *Enzyme Nomenclature* will appear at the beginning of 1992. It will be the last one prepared by E. C. Webb. Subsequent editions will be co-ordinated by K. F. Tipton, Biochemistry Department, Trinity College, Dublin 2, Ireland.

One way of continuing would be to create a working group for each class of enzymes: dehydrogenases and oxidases (could be subdivided), oxygenases, methyltransferases, acyltransferases, glycosyltransferases, glycosyltransferases, phosphokinases, esterases and lipases, glycosidases, phosphatases, peptidases, lyases, isomerases, and ligases.

Suggestions for group convener and panel members for each group of enzymes are welcome and should be sent to K. F. Tipton or to any member of the committees.

Other fields of interest

The nomenclature committees of IUBMB believe that the following fields should be covered in the future by new documents or revision of existing documents. They wish to know if this opinion is shared by the biochemical community. They welcome comments and suggestions for names and possible convenors and of members of the future panels.

The fields are: phycobiliproteins, junctions in nucleic acids, protein kinases and phosphatases, phosphorus-containing compounds, neurotransmitters and their analogues, and cyclic peptides.

PUBLICATIONS

From the International Union of Biochemistry and Molecular Biology

1. Nomenclature of electron-transfer proteins, Recommendations 1989 of the Nomenclature Committee of IUB (NC–IUB): Eur. J. Biochem. **200**, 599–611 (1991); also in *Enzyme Nomenclature, Recommendations 1992* (see below).

2. *Biochemical Nomenclature and Related Documents, A Compendium*, 2nd edn. (Liébecq, C., ed.), Portland Press Ltd, London, 1992.

This volume has been prepared for IUBMB by its Committee of Editors of Biochemical Journals (CEBJ). It contains most—but not all—the nomenclature documents published in the first edition (1978), updated if revised since; it also contains the new documents published since 1978 and references to other important nomenclature documents.

3. *Enzyme Nomenclature, Recommendations 1992*, Academic Press Inc., Orlando, Florida.

Since the publication in 1984 of the *Recommendations of the Nomenclature Committee of the International Union of Biochemistry on the Nomenclature and Classification of Enzyme-*

catalysed Reactions, three supplements of 'corrections and additions' to the enzyme list have been produced by the Nomenclature Committee of IUBMB, and published in the European Journal of Biochemistry. These changes have been incorporated, together with further amendments and additions, into a new edition of *Enzyme Nomenclature*, which will be published early in 1992. The draft revision was prepared for the International Union of Biochemistry and Molecular Biology by E. C. Webb, who prepared several previous editions, and was approved by the Nomenclature Committee of IUB in May 1991.

The new enzyme list will contain 3384 entries, of which 314 are cross-references to deleted or transferred entries, so that there will be 3070 'live' entries. This is an increase of 24% on the 1984 edition. However, use of a new format for the list, which might be described as 'dictionary style' rather than tabular, will ensure that the new edition will not be larger in size than the last one.

Additions and changes are spread throughout the various sections of the list. However, one group has undergone a particularly thorough revision by an expert panel convened by A. J. Barrett: this is section EC 3.4, the peptidases. The Nomenclature Committee of IUBMB are initiating similar substantial reviews of some other groups of enzymes for use in a future edition. One such group is that of the protein kinases and protein phosphatases.

From the International Union of Pure and Applied Chemistry

It is appropriate to draw biochemists' attention to the availability of recent editions of five compilations of IUPAC's recommendations, all published by Blackwell Scientific Publications, Oxford.

1. *Compendium of Chemical Terminology* (Gold, V., Loening, K. L., McNaught, A. D. & Sehmi, P., eds.), 1987.
2. *Compendium of Analytical Nomenclature*, 2nd edn. (Freiser, H. & Nancollas, G. H., eds.), 1987.
3. *Quantities, Units and Symbols in Physical Chemistry* (Mills, I. M., Cvitas, T., Homann, K. H. & Kuchitsu, K., eds.), 1988.
4. *Nomenclature of Inorganic Chemistry*, 3rd edn. (Leigh, G. J., ed.), 1990.
5. *Compendium of Macromolecular Nomenclature* (Metanomski, W. V., ed.), 1991.

Other publications of interest

1. Diekmann, S. (1989) Definition and nomenclature of nucleic acid structure, EMBO J. **8**, 1–4.
2. Francis, C. W. & Mosesson, M. W. (1989) Terminology for fibrinogen γ-chains differing in carboxyl terminal amino acid sequence, Thromb. Haemostasis **62**, 813–814.
3. Glatz, J. F. C. & Van der Vusse, G. J. (1990) Nomenclature of fatty-acid-binding proteins, Mol. Cell. Biochem. **98**, 231–235.

REFERENCES

1. IUPAC–IUB Joint Commission on Biochemical Nomenclature (JCBN). The nomenclature of steroids, Recommendations 1989: Eur. J. Biochem. **186**, 429–458 (1989); Pure Appl. Chem. **61**, 1783–1822 (1989); also pp. xxx–lix in *Dictionary of Steroids* (Hill, R. A., Kirk, D. N., Makin,, H. L. J. & Murphy, G. M., eds.), Chapman & Hall, London, 1991
2. IUPAC–IUB Joint Commission on Biochemical Nomenclature (JCBN). Nomenclature of glycoproteins, glycopeptides and peptidoglycans, Recommendations 1985: Eur. J. Biochem. **159**, 1–6 (1986), correction in **185**, 485 (1989); Glycoconjugate J. **3**, 123–134 (1986); J. Biol. Chem. **262**, 13–18 (1987); Pure Appl. Chem. **60**, 1389–1394 (1988)
3. Jeanloz, R. W. & Walker, E. (1967) Carbohydr. Res. **4**, 504–506
4. Blix, G. & Jeanloz, R. W. (1969) in Amino Sugars, vol. 1A (Jeanloz, R. W. & Balazs, E. A., eds.), Academic Press, New York
5. Veyrières, A. & Jeanloz, R. W. (1970) Biochemistry **9**, 4153–4159
6. Knox, J. R. & Murthy, N. S. (1974) Acta Crystallogr. Sect. B **30**, 365–371
7. IUPAC–IUB Joint Commission on Biochemical Nomenclature (JCBN). Nomenclature of glycoproteins, glycopeptides and peptidoglycans, Correction to Recommendations 1985, Eur. J. Biochem. **185**, 485 (1989)
8. International Union of Pure and Applied Chemistry (1987). Compendium of Chemical Terminology (Gold, V., Loening, K. L., McNaught, A. D. & Sehmi, P., eds.), Blackwell Scientific Publications, Oxford
9. Reuter, G. & Schauer, R. (1988) Glycoconjugate J. **5**, 133–135
10. IUPAC–IUB Commission on Biochemical Nomenclature (CBN). The nomenclature of lipids, Recommendations 1976: Biochem. J. **171**, 21–35 (1978); Chem. Phys. Lipids **21**, 159–173 (1978); Eur. J. Biochem. **79**, 11–21 (1977); Hoppe-Seyler's Z. Physiol. Chem. **358**, 617–631 (1977); J. Lipid Res. **19**, 114–128 (1978); Lipids **12**, 455–468 (1977); Mol. Cell. Biochem. **17**, 157–171 (1977)
11. IUPAC Commission on the Nomenclature of Organic Chemistry (CNOC) and IUPAC–IUB Commission on Biochemical Nomenclature (CBN). Tentative rules for carbohydrate nomenclature, Part 1, 1969: Biochem. J. **125**, 673–695 (1971); Biochemistry **10**, 3983–4004 (1971); Biochim. Biophys. Acta **244**, 223–302 (1971); Eur. J. Biochem. **21**, 455–477 (1971), correction in **25**, 4 (1972); J. Biol. Chem. **247**, 613–634
12. International Union of Biochemistry and Molecular Biology (1992). Enzyme Nomenclature, Recommendations 1992, Academic Press, Orlando, Florida
13. IUPAC–IUB Joint Commission on Biochemical Nomenclature (JCBN). Nomenclature and symbolism for amino acids and peptides, Recommendations 1983: Biochem. J. **219**, 345–373 (1984); Eur. J. Biochem. **138**, 9–37 (1984), correction in **152**, 1 (1985); Int. J. Peptide Protein Res. **24**, following page 84 (1984); J. Biol. Chem. **260**, 14–42 (1985); Pure Appl. Chem. **56**, 595–624 (1984); Spec. Period. Rep. Amino Acids Peptides Proteins **16**, 387–410 (1985)