
Biochemical Journal

The Biochemical Society, London © 1993

Volume 289, part 2
15 January 1993

Editorial Board

Chairman

A. J. Turner • Leeds

Deputy Chairmen

G. H. Elder • Cardiff

S. J. Higgins • Leeds

M. A. Kerr • Dundee

K. Siddle • Cambridge

W. L. R. Stalmans • Leuven

V. A. Zammit • Ayr

Reviews Editor

W. H. Evans • London

Managing Editor

A. S. Beedle

A. Aitken (London)

B. H. Anderton (London)

D. J. Anstee (Bristol)

G. Banting (Bristol)

T. Berg (Oslo)

N. J. M. Birdsall (London)

G. D. Birnie (Glasgow)

R. D. Burgoyne (Liverpool)

S. J. W. Busby (Birmingham)

A. M. Campbell (Glasgow)

S. Cockcroft (London)

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)

D. K. Granner (Nashville)

D. G. Hardie (Dundee)

T. E. Hardingham (London)

D. Häussinger (Freiburg)

H. Holmsen (Bergen)

D. J. Hopper (Aberystwyth)

R. F. Irvine (Cambridge)

D. S. Latchman (London)

R. C. Leegood (Sheffield)

A. R. Lehmann (Brighton)

J. P. Luzio (Cambridge)

B. Mannervik (Uppsala)

D. Marsh (Göttingen-Nikolausberg)

S. B. Marston (London)

P. P. McCann (Kansas City)

J. G. McCormack (Edinburgh)

J. D. McGivan (Bristol)

M. A. McNurlan (Aberdeen)

I. A. Nimmo (Edinburgh)

Y. Nishizuka (Kobe)

R. H. Pain (Newcastle upon Tyne)

V. Pain (Brighton)

A. J. Paine (London)

P. Parker (London)

N. C. Price (Stirling)

C. G. Proud (Bristol)

H. Prydz (Oslo)

A. J. Rivett (Leicester)

S. P. Robins (Aberdeen)

S. B. Shears (Research Triangle Park)

M. L. Sinnott (Chicago)

A. R. Slabas (Durham)

B. E. Smith (Brighton)

J. B. Smith (Philadelphia)

A. K. Soutar (London)

F. A. Stephenson (London)

L. M. G. van Golde (Utrecht)

M. J. O. Wakelam (Glasgow)

M. Wallis (Brighton)

M. Watford (New Brunswick)

S. J. Weiss (Ann Arbor)

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:** *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 permissions granted by copyright clearing houses such as the Copyright Licensing Agency (U.K.) or the Copyright Clearance Center (U.S.A.). The CCC item-fee code for this publication is 0264-6021/93/\$5.00 + 0.00. Inquiries concerning reproduction outside those terms should be sent to the publishers at the above-mentioned 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 *Biochemical Journal*, c/o Mercury Airfreight International Ltd, 2323 Randolph Avenue, Avenel, NJ 07001, U.S.A.
- **Cover illustration:** computer graphic image of the protein myoglobin, the oxygen-storage molecule found in muscle. The structure of myoglobin was established in 1962 by M. F. Perutz and J. C. Kendrew. (Dr A. Lesk/Science Photo Library).

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. 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.

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.

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.

To allow the reviewers to assess possible overlap with previous work, 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.

The paragraphs below are a summarized version of the journal's complete Instructions to Authors [*Biochem. J.* (1993) **289**, 1–15], 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.

●**BJ Letters** are brief (two printed pages or less) items of scientific correspondence intended to provide an opportunity to discuss or expand particular points made in published work, to comment on or criticize work previously published in the *Biochemical Journal*, 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
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. Submission of the final version of an article on diskette will become mandatory during 1994.

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 1993 volumes 289–296 (three parts each) will appear. The subscription also includes the annual compendium of *Biochemical Journal Reviews* and an author and key-word index.

●**Subscription rates** Institutional subscription rates for 1993 are shown below. Subscribers to the *Biochemical Journal* can subscribe additionally to *Biochemical Society Transactions* on a joint subscription at a reduced rate. Terms are cash with order (£ sterling for subscribers other than in North America, or US\$ equivalent at current rate of exchange), or against pro-

forma 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\$ 1495	£795
Single issues	US\$ 68	£35

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 102–288 of the *Biochemical Journal* are avail-

able 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 0206-796351; fax 0206-799331).

●**Advertising** Advertising is accepted in the *Biochemical Journal*. For information contact the Advertising Department, Portland Press Ltd, 59 Portland Place, London W1N 3AJ (telephone 071-580 5530; fax 071-323 1136).

Index of Authors

	PAGE		PAGE		PAGE		PAGE
Abdel-Latif, A. A.	401	Dragani, B.	417	Klein, H.	549	Quentmeier, A.	549
Abouakil, N.	609	Eady, R. R.	335, 395	Knight, B. L.	569	Quinn, M. T.	481
Aceto, A.	417	Eldridge, M. E.	395	Komarek, D.	411		
Adachi, T.	523	Emmendorffer, A.	481	Landolfi, R.	475	Rees, D. L. P.	533
Akhtar, R. A.	401	Ernst, J. D.	539	Lapetina, E. G.	349	Regazzi, R.	379
Alexander, D. R.	387	Escribano, M. J.	609	Lavesa, M.	605	Reibnegger, G.	357
Amicarelli, F.	417			Li, G.	379	Richter, C.	587
Angelucci, S.	417	Farrell, F. X.	349	Liang, C.-M.	411	Rijkers, G. T.	373
Atrash, B.	363	Figarella, C.	609	Lim, C. K.	529	Rocca, B.	475
		Fincher, G. B.	453	Lim, L.	439	Roche, E.	379
Bailey, D.	363	Fox, K. R.	605	Lindahl, U.	313	Roesler, J.	481
Bandyopadhyay, U.	575	Friderici, K. H.	343	Liotta, L. A.	411	Roudani, S.	609
Banerjee, R. K.	575	Fridman, R.	411	Lombardo, D.	609	Royo, T.	557
Berman, M. L.	411	Fuchs, D.	357	Lowe, D. J.	335		
Bhattacharyya, D. K.	575	Fuerst, T. R.	411	Luo, J.	529	Sacchetta, P.	417
Biffen, M.	387	Fukatsu, J.	503	Lyons, K. C.	543	Schepers, T. M.	469
Bird, R. E.	411	Fukushima, T.	523			Shiroo, M.	387
Birkett, D. J.	533			Mackenzie, P. I.	533	Sidell, B. D.	427
Bizzi, B.	475	Gangeswaran, R.	335	Maeda, S.	503	Sopher, B. L.	343
Blundell, T. L.	363	Gasser, R.	533	Martini, F.	417	Soutar, A. K.	569
Bourin, M.-C.	313	Griffioen, A. W.	373	Mas, E.	609	Steiner, B.	445
Bucciarelli, T.	417	Guy-Crotte, O.	609	Mayer, B.	357	Stetler-Stevenson, W. G.	411
				McLeish, K. R.	469	Szelke, M.	363
Cárdenas, M. L.	599	Harden, N.	439	McManus, M. E.	533		
Cavanagh, K. T.	343	Haro, D.	557	Meier, B.	481	Takamaru, Y.	503
Chatterjee, R.	575	Hausen, A.	357	Meyer, U. A.	533	Tapscott, E. B.	423
Chevillard, C.	599	Hayashi, S.-i.	581	Miners, J. O.	533	Traviss, C. E.	343
Chiam, M.-A.	439	Hegardt, F. G.	557	Miralles, F.	609		
Comerford, J. G.	561	Hennet, T.	587	Miranda, M.	417	Unthan-Fechner, K.	549
Comper, W. D.	543	Hirano, K.	523	Monny, C.	435	Usami, Y.	523
Cooper, J. B.	363	Hoffman, R.	331	Müller, G.	509		
Cornish-Bowden, A.	599	Hoshino, K.	581			van der Linden, M. P. G.	593
Criss, A. B.	445	Howell, S. L.	497	Nagasawa, S.	503	Veerapandian, B.	363
Crockett, E. L.	427	Hoyhtya, M.	411	Nannizzi, L.	445	Veronese, M. E.	533
		Hrmova, M.	453				
Daneschmand, H.	549	Igarashi, K.	581	Oelkuct, M.	411		
Davies, M. J.	435			Olsen, R. K.	605	Wachter, H.	357
Dawson, A. P.	561	Jesaitis, A. J.	481	Parise, L. V.	445	Wakelam, M. J. O.	487
Dearey, E. A.	509	John, D. C. A.	463	Patel, D. D.	569	Weiss, G.	357
de Cristofaro, R.	475	Jones, D. M.	363	Persaud, S. J.	497	Werner, E. R.	357
de Haan, L.	593	Jones, M. Z.	343	Peterhans, E.	587	Werner-Felmayer, G.	357
Di Ilio, C.	417	Jones, P. M.	497	Pettitt, T. R.	487	Wollheim, C. B.	379
Dilworth, M. J.	395			Phillips, D. R.	445		
Doecke, C. J.	533	Kakinuma, Y.	581	Probst, I.	549	Yamamoto, K.	349
Dohm, G. L.	423	Kameji, T.	581	Pünter, J.	509	Yar, S. F.	439
Dolan, P. L.	423	Keck, W.	593	Puppo, A.	435		
Dorton, P. J.	423					Zhou, C.-J.	401
Douglas, K. T.	463						

Editorial Advisory Panel

- B. A. C. Ackrell (San Francisco)
R. L. P. Adams (Glasgow)
L. Agius (Newcastle)
G. Ailhaud (Nice)
T. Akino (Sapporo)
D. Allan (London)
A. K. Allen (London)
J. C. Anderson (Manchester)
J. Andrews (Manchester)
C. Anthony (Southampton)
G. J. Arlaud (Grenoble)
S. J. H. Ashcroft (Oxford)
B. M. Austen (London)
K. S. Authi (London)
- A. A.-B. Badawy (Cardiff)
M. Baggiolini (Bern)
A. Baici (Zürich)
A. J. Bailey (Langford)
A. J. Baines (Canterbury)
F. J. Ballard (Adelaide)
G. J. Barritt (Flinders)
T. W. Barrowcliffe (London)
K. Bartlett (Newcastle)
G. Baverel (Lyon)
D. Bell (Nottingham)
D. S. Bendall (Cambridge)
A. Benedetti (Siena)
J. P. Bennett (London)
M. J. Berridge (Cambridge)
H. U. Beuscher (Erlangen)
R. J. Beynon (Liverpool)
J. G. Bieth (Illkirch)
M. M. Billah (Bloomfield)
I. Björk (Uppsala)
G. E. Blair (Leeds)
R. Blomhoff (Oslo)
K. W. Bock (Tübingen)
M. Bollen (Leuven)
G. P. Bolwell (London)
U.-A. Bommer (London)
J. Bond (Blacksburg)
A. R. Boobis (London)
F. W. Booth (Houston)
F. Bosch (Barcelona)
R. Bouillon (Leuven)
J. M. W. Bouma (Groningen)
M. J. Brammer (London)
M. D. Brand (Cambridge)
J. Bremer (Oslo)
I. Bremner (Aberdeen)
K. M. Brindle (Oxford)
D. N. Brindley (Edmonton)
A. H. Bristow (London)
C. W. J. Brooks (Glasgow)
M. E. Brosnan (St John's)
A. J. P. Brown (Aberdeen)
B. L. Brown (Sheffield)
K. D. Brown (Cambridge)
N. C. Bruce (Cambridge)
K. R. Bruckdorfer (London)
A. Burchell (Dundee)
R. Busse (Frankfurt)
F. L. Bygrave (Canberra)
- R. B. Cain (Newcastle)
R. D. Campbell (Oxford)
M. J. Carden (Canterbury)
A. Caswell (Leeds)
B. Casu (Milano)
- R. A. J. Challiss (Leicester)
H. Chap (Toulouse)
K. E. Chapman (Edinburgh)
F. Checler (Valbonne)
K. H. Cheeseman (Uxbridge)
D. L. Christie (Auckland)
M. Claret (Orsay)
R. A. Clegg (Ayr)
P. H. Cobbold (Liverpool)
P. Cohen (Dundee)
J. Colyer (Leeds)
G. A. Cook (Memphis)
B. A. Cooke (London)
A. P. Corfield (Bristol)
M. P. Coughlan (Galway)
M. W. H. Coughtrie (Dundee)
P. Courtoy (Bruxelles)
P. Crine (Québec)
M. Crompton (London)
C. M. Cuchillo (Barcelona)
J. M. Cuezva (Madrid)
N. P. Curthoys (Fort Collins)
W. Cushley (Glasgow)
- J. L. Daniel (Philadelphia)
R. M. Daniel (Hamilton)
J. Davey (Birmingham)
K. J. A. Davies (Los Angeles)
M. F. Dean (London)
F. C. de Beer (Lexington)
H. de Groot (Dusseldorf)
A. Dell (London)
F. de Matteis (Carshalton)
J. J. H. M. de Pont (Nijmegen)
F. M. Dickinson (Hull)
C. Dingwall (Cambridge)
H. B. F. Dixon (Cambridge)
B. Dobberstein (Heidelberg)
C. M. Dobson (Oxford)
K. Docherty (Birmingham)
K. T. Douglas (Manchester)
C. P. Downes (Dundee)
M. J. Dufton (Glasgow)
- J. M. East (Southampton)
J. S. Easterby (Liverpool)
A. W. Eddy (Manchester)
S. W. Edwards (Liverpool)
J. M. Edwardson (Cambridge)
C. Elcombe (Macclesfield)
K. R. F. Elliott (Manchester)
M. B. Enser (Langford)
H. Esterbauer (Graz)
- J. B. Fagan (Fairfield)
J. M. Fagan (New Brunswick)
J. N. Fain (Memphis)
R. B. Fears (Epsom)
T. Feizi (London)
P. Ferré (Meudon-Bellevue)
P. R. Flatt (Coleraine)
L. Flohe (Braunschweig)
T. G. Flynn (Kingston)
K. R. Fox (Southampton)
D. R. Fraser (Sydney)
I. Fridovich (Durham)
S. K. Fried (New Brunswick)
- D. G. Gadian (London)
C. Gahmberg (Helsinki)
- J. T. Gallagher (Manchester)
J. M. Gallo (London)
D. L. Garbers (Dallas)
A. Garner (Uxbridge)
D. R. Garrod (Southampton)
J. A. Gatehouse (Durham)
M. A. Greeves (Bristol)
J. M. Ghuysen (Liège)
J. R. Girard (Meudon)
D. B. Glass (Atlanta)
P. Goldfarb (Guildford)
G. W. Gould (Glasgow)
A. B. Graham (Glasgow)
R. J. A. Grand (Birmingham)
B. Grandchamp (Paris)
M. E. Grant (Manchester)
A. Graslund (Umea)
J. C. Gray (Cambridge)
I. C. Green (Brighton)
N. A. Gregson (London)
S. Grinstein (Toronto)
J. J. Guinovart (Barcelona)
W. Gullick (London)
J. M. C. Gutteridge (London)
S. Gutteridge (Wilmington)
- A. P. Halestrap (Bristol)
A. Hall (London)
B. D. Hames (Leeds)
P. J. Hanson (Aston)
S. E. Harding (Nottingham)
S. J. S. Hardy (York)
M. M. Harnett (Glasgow)
R. A. P. Harrison (Cambridge)
S. Hasnain (Daresbury)
F. Hay (London)
J. D. Hayes (Edinburgh)
J. F. Head (Boston)
D. R. Headon (Galway)
D. F. Heath (Manchester)
D. Heinegård (Lund)
P. C. Heinrich (Aachen)
J. C. Henquin (Bruxelles)
A. C. Herington (Melbourne)
D. G. Herries (Leeds)
R. C. Hider (London)
S. High (Heidelberg)
C. F. Higgins (Oxford)
S. G. Hillier (Edinburgh)
M. B. Hodgins (Glasgow)
D. Hoekstra (Groningen)
J. G. Hoggett (York)
A. A. Holder (London)
G. D. Holman (Bath)
N. M. Hooper (Leeds)
U. Hopfer (Cleveland)
J. Houghton (Leeds)
S. L. Howell (London)
R. C. Hughes (London)
J. C. Hutton (Cambridge)
- Y. Ikehara (Fukuoka)
R. A. Iles (London)
T. Ishikawa (Houston)
- S. M. Jarvis (Canterbury)
B. Jeanrenaud (Genève)
G. I. Jenkins (Glasgow)
W. Jessup (Sydney)
J. Johansson (Stockholm)
- R. A. John (Cardiff)
P. Johnson (La Jolla)
O. T. G. Jones (Bristol)
P. M. Jordan (London)
- H. Kacser (Edinburgh)
M. Kaderbhai (Aberystwyth)
H. Kanoh (Sapporo)
D. J. Keeling (Molndal)
J. P. Kehrer (Austin)
F. J. Kelly (Southampton)
B. Ketterer (London)
C. J. Kirk (Birmingham)
T. M. Kitson (Palmerston North)
K. I. Kivirikko (Oulu)
L. Kjellen (Uppsala)
C. Kleanthous (Norwich)
B. L. Knight (London)
R. G. Knowles (Beckenham)
J. Knudsen (Odense)
H. Kresse (Münster)
P. W. Kuchel (Sydney)
- M. Lagarde (Lyon)
A. Lai (London)
D. A. Lane (London)
C. Lazarus (Bristol)
P. J. Lea (Lancaster)
F. Lederer (Paris)
A. G. Lee (Southampton)
Y. Le Marchand-Brustel (Nice)
J. E. Lillehaug (Bergen)
J. G. Lindsay (Glasgow)
J. M. Lord (Coventry)
M. G. Low (New York)
D. J. Lowe (Brighton)
G. Lowe (Oxford)
G. G. Lunt (Bath)
- A. J. MacGillivray (Brighton)
I. H. Madshus (Oslo)
A. I. Magee (London)
G. P. Mannaerts (Leuven)
H. G. Mannherz (Marburg)
T. J. Mantle (Dublin)
S. Maroux (Marseille)
B. R. Martin (Cambridge)
S. R. Martin (London)
T. Masaki (Kyoto)
R. M. Mason (London)
R. W. Mason (Blacksburg)
G. W. Mayr (Bochum)
F. McCormick (Emeryville)
A. McEwan (Norwich)
A. G. McLennan (Liverpool)
D. W. Meek (Dundee)
P. J. Meier-Abt (Zürich)
A. J. Meijer (Amsterdam)
J. W. T. Melvin (Aberdeen)
J. E. Merritt (Welwyn)
G. Milligan (Glasgow)
A. J. G. Moir (Sheffield)
W. Montague (Al Ain)
W. H. Moolenaar (Amsterdam)
G. R. Moore (Norwich)
B. P. Morgan (Cardiff)

EDITORIAL ADVISORY PANEL (continued)

- D. M. L. Morgan (Harrow)
M. Mori (Kumamoto)
S. E. Moss (London)
M. E. Murphy (Dusseldorf)
- H. Nagase (Kansas City)
T. Nagatsu (Yokohama)
S. Nakanishi (Kyoto)
A. C. Newby (Cardiff)
I. A. Nieduszynski (Lancaster)
M. Nishijima (Tokyo)
H. Nohl (Vienna)
R. I. Norman (Leicester)
D. H. Northcote (Cambridge)
T. Ny (La Jolla)
- A. H. Olavesen (Cardiff)
F. R. Oppendoes (Bruxelles)
- M. J. Page (Beckenham)
R. M. Palmer (Aberdeen)
F. Paltauf (Graz)
R. Panniers (Rochester)
M. S. Patel (Cleveland)
J. D. Pearson (Harrow)
T. M. Penning (Philadelphia)
M. B. Pepys (London)
L. Persson (Lund)
I. R. Phillips (London)
J. H. Phillips (Edinburgh)
R. J. Plevin (Strathclyde)
R. K. Poole (London)
F. Possmayer (London, Ont.)
D. Prockop (Philadelphia)
J. W. Putney Jr. (Research Triangle Park)
N. J. Pyne (Glasgow)
- D. M. Raben (Baltimore)
C. I. Ragan (Harlow)
- D. B. Ramsden (Birmingham)
P. J. Randle (Oxford)
D. E. Rannels (Hershey)
C. P. F. Redfern (Newcastle upon Tyne)
M. J. Rennie (Dundee)
P. S. Rennie (Vancouver)
S. G. Rhee (Bethesda)
C. Rice-Evans (London)
P. R. Rich (Bodmin)
C. Richter (Zürich)
P. J. Richardson (Cambridge)
M. H. Rider (Bruxelles)
R. Rognstad (La Jolla)
K. Rose (Genève)
H. Rosen (Rahway)
- K. S. Sakariassen (Oslo)
G. J. Sale (Southampton)
A. M. Salter (Sutton Bonington)
T. Sarre (Freiburg)
I. Schulz (Homburg/Saar)
J. M. Scott (Dublin)
M. C. Scrutton (London)
M. F. Scully (London)
W. Sebald (Würzburg)
N. Seiler (Strasbourg)
E. Shaw (Basel)
S. Shenolikar (Houston)
W. R. Sherman (St Louis)
H. S. A. Sherratt (Newcastle upon Tyne)
S. P. Shirazi-Beechey (Aberystwyth)
E. Sim (Oxford)
T. P. Singer (San Francisco)
C. J. Skidmore (Reading)
A. G. Smith (Cambridge)
H.-D. Söling (Göttingen)
S. Spadari (Pavia)
- M. J. E. Sternberg (London)
A. K. Stobart (Bristol)
S. R. Stone (Cambridge)
R. C. Strange (Stoke-on-Trent)
G. J. Strous (Utrecht)
D. I. Stuart (Oxford)
M. C. Sugden (London)
P. H. Sugden (London)
T. K. Sundaram (Manchester)
R. Sundler (Lund)
B. Svensson (Copenhagen)
D. M. Swallow (London)
- A. S. Tatham (Long Ashton)
J. M. Tavaré (Bristol)
C. W. Taylor (Cambridge)
R. N. F. Thorneley (Brighton)
M. A. Titheradge (Brighton)
I. P. Trayer (Birmingham)
P. Trayhurn (Aberdeen)
A. J. Trewavas (Edinburgh)
J. T. Triffit (Oxford)
S. Tuček (Praha)
B. M. Turner (Birmingham)
J. A. Tyler (Cambridge)
- K. Ugurbil (Minneapolis)
- D. E. Vance (Edmonton)
J. Vance (Edmonton)
G. van den Berghe (Bruxelles)
G. van de Werve (Montréal)
P. van Haastert (Groningen)
S. van Heyningen (Edinburgh)
E. van Schaftingen (Brussels)
G. Vassart (Bruxelles)
P. F. T. Vaughan (Leeds)
J. H. Veerkamp (Nijmegen)
C. Vermeer (Maastricht)
- R. G. Vernon (Ayr)
D. A. Vessey (San Francisco)
J. F. G. Vliegenthart (Utrecht)
R. Virden (Newcastle)
K. von Figura (Göttingen)
- S. G. Waley (Oxford)
J. H. Walker (Leeds)
R. Wallin (Winston-Salem)
A. Watts (Oxford)
D. J. Waxman (Boston)
A. Wendel (Konstanz)
K. Whaley (Glasgow)
M. Wheatley (Birmingham)
K. P. Wheeler (Brighton)
A. D. Whetton (Manchester)
S. G. Wilkinson (Hull)
D. H. Williamson (Oxford)
M. T. Wilson (Colchester)
B. G. Winchester (London)
H. Winkler (Innsbruck)
C. C. Winterbourn (Christchurch)
A. Wiseman (Guildford)
L. A. Witters (Hanover)
C. R. Wolf (Edinburgh)
E. J. Wood (Leeds)
J. Woodgett (London)
J. M. Wrigglesworth (London)
G. Wu (College Station)
F. Wuytack (Leuven)
C. H. Wynn (Manchester)
- S. J. Yeaman (Newcastle upon Tyne)
D. A. York (Baton Rouge)
J. D. Young (Edmonton)
S. P. Young (Birmingham)
- S. H. Zigmund (Philadelphia)
H. Zimmerman (Frankfurt)