

Biochemical Journal

The Biochemical Society, London © 2003

Volume 374, part 3

15 September 2003

<http://www.BiochemJ.org>

Editorial Board

Chairman

P. J. Parker • London

Vice Chairman, The Americas

G. Salvesen • La Jolla

Reviews Editor

J. D. Scott • Portland, OR

Deputy Chairmen

G. Banting • Bristol

D. N. Brindley • Edmonton

R. A. J. Challiss • Leicester

S. Gutteridge • Newark, DE

B. Henrissat • Marseille

N. M. Hooper • Leeds

J. P. Kehrer • Austin

K. H. Mayo • Minneapolis

M. J. O. Wakelam • Birmingham

M. P. Walsh • Calgary

Publisher

P. J. Starley

Senior Staff Editor

S. M. Hobday

Staff Editors

L. Ball

L. Johnson

J. W. Mockridge

N. B. Prowse

M. R. Thorne

Editorial Assistants

E. A. G. Ellaway

L. M. Petty

Administrative Editor, US Office

S. Schendel

D. R. Alessi (Dundee)

D. Attaix (Ceyrat)

D. Barford (London)

G. J. Barritt (Adelaide)

P. G. Board (Canberra)

M. Bogoy (Stanford, CA)

M. Bollen (Leuven)

N. C. Bruce (York)

B. Brüne (Kaiserslautern)

D. A. Cantrell (Dundee)

D. Carling (London)

S. J. Clark (Sydney)

A. Clerk (London)

G. M. Cohen (Leicester)

G. P. Côté (Kingston, Ont.)

J. R. Couchman (London)

W. Cramer (West Lafayette)

G. J. Davies (York)

D. A. Day (Nedlands)

H. Deckmyn (Kortrijk)

M. A. Driscoll (Piscataway)

J. M. East (Southampton)

B. Engelmann (Munich)

R. M. Epand (Hamilton, Ont.)

B. Foxwell (London)

J.-M. Frère (Liège)

M. J. Fry (Reading)

A. Gallone (Oxford)

D. A. F. Gillespie (Glasgow)

S. Goodbourn (London)

S. V. Graham (Glasgow)

P. A. Grimaldi (Nice)

B. Hallberg (Umeå)

P. I. Haris (Leicester)

L. Hedstrom (Waltham, MA)

F. G. Hegardt (Barcelona)

S. High (Manchester)

E. F. Hounsell (London)

J. Hsuan (London)

W. Jessup (Sydney)

B. Kalyanaraman (Milwaukee)

B. L. Knight (London)

I. M. Kovach (Washington D.C.)

P. W. Kuchel (Sydney)

R. Leduc (Sherbrooke)

A. R. Levin (Long Beach, CA)

R. Liddington (La Jolla)

L. Machesky (Birmingham)

R. Marais (London)

P. Maurel (Montpellier)

A. J. Meijer (Amsterdam)

M. Meisterernst (Munich)

H. Mellor (Bristol)

B. P. Morgan (Cardiff)

J. S. Mort (Montreal)

W. Müller-Esterl (Frankfurt)

J. H. Naismith (St. Andrews)

L. M. Obeid (Charleston)

M. Parenti (Monza)

M. A. J. Parry (Harpenden)

M. Paulsson (Cologne)

A. D. Postle (Southampton)

N. J. Pyne (Glasgow)

D. Ricquier (Paris)

G. A. Rutter (Bristol)

N. J. P. Ryba (Bethesda)

S. M. Schwartz (Seattle)

S. C. Sealfon (New York)

R. J. Simpson (Parkville)

B. F. Sloane (Detroit)

M. C. Sugden (London)

P. H. Sugden (London)

C. W. Taylor (Cambridge)

K. F. Tipton (Dublin)

M. A. Titheradge (Brighton)

A. B. Tobin (Leicester)

A. Tokar (Boston)

S. A. Tooze (London)

M. Torti (Pavia)

H. M. Wallace (Aberdeen)

S. G. Ward (Bath)

J. F. Woessner (Miami)

S. J. Yeaman (Newcastle upon Tyne)

J. York (Durham, NC)

S. Yoshikawa (Akoh-Hyogo)



- The *Biochemical Journal* (ISSN 0264-6021 for print/online journal; ISSN 1470-8728 for online only journal) is published and distributed by Portland Press Ltd on behalf of the Biochemical Society (the owner), and appears twice monthly.
- **Editorial and publishing offices:** *Biochemical Journal*, 59 Portland Place, London W1B 1QW, U.K.
- **Biochemical Journal**, c/o Mercury Airfreight International Ltd, 365 Blair Road, Avenel, NJ 07001, U.S.A.
- **Subscriptions department:** Portland Customer Services, 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 0264-6021/2003/\$30.00 + 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. Opinions expressed in articles are not necessarily those of the editors, the publisher or the owner.
- Periodicals postage paid at Rahway, NJ, U.S.A.
- **Postmaster:** send address corrections to *Biochemical Journal*, c/o Mercury Airfreight International Ltd, 365 Blair Road, Avenel, NJ 07001, U.S.A.
- **Cover illustration:** The glutathione S-transferase AdGST4-4 with a structurally sensitive internal region displayed in CPK mode. For further details, see Wongsantichon et al. *Biochem. J.* (2003), **373**, 759–765.

General policy The *Biochemical Journal* publishes papers in English in all fields of biochemistry and cellular and molecular biology, 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. Novel 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 or on the World Wide Web (WWW); 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, including that on the WWW, and of all related papers in press or under editorial consideration in this or other journals.

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.

Accelerated Publications (APs) are short (normally 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 10 working days of receipt, and publication of accepted APs in an issue will follow within 2 months. APs receive full but accelerated reviewing. The criteria of 'novelty and significance' are strictly enforced, and papers may be rejected solely on the grounds of lack of novelty and significance. APs 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 AP merits accelerated treatment. Papers reporting nucleotide sequences only are not acceptable as APs. One colour figure will be published free of charge in APs; subsequent figures will cost £300 each.

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 These instructions do not replace the official *Biochemical Journal* Instructions to Authors (<http://www.BiochemJ.org>). Authors are encouraged to refer to these for overall guidelines on submitting a paper. 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. 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.

The numerical system of references must be used. A reference to 'unpublished work'

must 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.

Submit manuscripts online Authors should submit manuscripts electronically using the Online Submission and Review System available at <http://www.BiochemJ.org/submit/>

Immediate Publications Manuscripts are published online in PDF format as soon as they are accepted, unless on submission the author requests that this not be done. Immediate Publications are listed in and accessible through Medline, and are freely available to anyone with Internet access.

Queries and correspondence Authors in the Americas should address all queries and correspondence about their submission to: Dr Sharon Schendel, BJ USA, The Burnham Institute, 10901 N. Torrey Pines Road, La Jolla, CA 92037, U.S.A. (telephone +1 858 713 6283; fax +1 858 713 6284; e-mail editorial@biochemjusa.org). Authors in the U.K., the rest of Europe, Japan and the rest of the world should contact: The Publisher, *Biochemical Journal*, 59 Portland Place, London W1B 1QW, U.K. (telephone +44 20 7637 5873; fax +44 20 7323 1136; e-mail editorial@portlandpress.com).

Colour figures The first colour figure is published at no charge provided that one author has been a member of the Biochemical Society for at least 2 years and that the use of colour is deemed scientifically necessary by the reviewers. Subsequent colour figures in the same paper cost £300 each.

Multimedia adjuncts The *Biochemical Journal* Online is now able to offer authors the opportunity to enhance their papers with multimedia adjuncts (e.g. time-lapse movies, three-dimensional structures). These will be submitted to peer review alongside the manuscript. To submit a paper with a multimedia adjunct, please attach the file when you submit your manuscript electronically. Preferred formats are QuickTime for time-lapse movies and PDB for structures. There is no extra charge associated with the publication of a multimedia adjunct online.

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 2003 volumes 369–376 (three parts each) will appear. The subscription also includes an author and key-word index.

Subscription rates Institutional subscription rates for 2003 are shown below. Subscribers to the *Biochemical Journal* can subscribe additionally to *Biochemical Society Transactions* and *Biotechnology and Applied Biochemistry* on a joint subscription at a reduced rate. Terms are cash with order (US\$ in N. America, £ sterling for rest of the world, or US\$ equivalent at current rate of exchange; subscribers in the EU may pay in £ sterling or Euros), or against pro forma invoice. Orders should be sent to the address below, or through your usual agent.

	N. America	Rest of world	Euro price
One year (8 vols)			
Print and online	US\$2299	£1307	€2223
Online only	US\$2115	£1202	€2044
Print only	US\$2226	£1271	€2156
Single issues (print only)	US\$110	£64	€105

Overseas rates include airfreight delivery. Priority delivery is available at an additional cost of £56/€95.

VAT is due on some supplies to subscribers within the UK, and to non-registered subscribers elsewhere in the EU. If in the EU please state your VAT number otherwise VAT may be charged at the appropriate national rate.

Electronic back archive This is freely available to all users with Internet access.

Microfiche and back issues Volumes 102–336 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 Customer Services
P.O. Box 32, Commerce Way
Colchester CO2 8HP, Essex, U.K.
(telephone 01206 796351; fax 01206-799331; e-mail sales@portland-services.com).

Advertising Enquiries about advertising in this journal should be addressed to Mark White or Philip Northcott, PRN Media Sales Ltd., Suite 209, 2nd Floor, Wellington House, Butt Road, Colchester CO3 3DA, U.K.; tel: 01206 767797; fax: 01206 767532; e-mail: sales@prnmediasales.co.uk; ISDN: 01376 562673.

Review**RecQ helicases: suppressors of tumorigenesis and premature aging**

Published as BJ Immediate Publication 12 June 2003,
DOI 10.1042/BJ20030491

C.Z. Bachrati and I.D. Hickson

577–606

Accelerated PublicationIdentification of the mitochondrial pyruvate carrier in *Saccharomyces cerevisiae*

Published as BJ Immediate Publication 30 July 2003,
DOI 10.1042/BJ20030995

J.C.W. Hildyard and A.P. Halestrap

607–611

**Online Commentary**

Trials, tribulations and finally, a transporter: the identification of the mitochondrial pyruvate transporter

Published on the Internet 8 September 2003,
DOI 10.1042/BJ20031105

(see accompanying paper pp. 607–611)

M.C. Sugden and M.J. Holness

e1–e2

Research PapersSpectrin α II and β II isoforms interact with high affinity at the tetramerization site

Published as BJ Immediate Publication 23 June 2003,
DOI 10.1042/BJ20030507

P.A. Bignone and A.J. Baines

613–624

Synergistic effects of epoxy- and amine-silanes on microarray DNA immobilization and hybridization

Published as BJ Immediate Publication 16 June 2003,
DOI 10.1042/BJ20030486

S.-K. Chiu, M. Hsu, W.-C. Ku, C.-Y. Tu, Y.-T. Tseng, W.-K. Lau, R.-Y. Yan, J.-T. Ma and C.-M. Tzeng

625–632

Characterization of the interactions between Asp¹⁴¹ and Phe²³⁶ in the Mn²⁺-L-malate binding of pigeon liver malic enzyme

Published as BJ Immediate Publication 19 June 2003,
DOI 10.1042/BJ20030268

Y.-I. Chen, Y.-H. Chen, W.-Y. Chou and G.-G. Chang

633–637

Biochemical and three-dimensional-structural study of the specific inhibition of protein kinase CK2 by [5-oxo-5,6-dihydroindolo-(1,2-a)quinazolin-7-yl]acetic acid (IQA)

Published as BJ Immediate Publication 20 June 2003,
DOI 10.1042/BJ20030674

S. Sarno, E. De Moliner, M. Ruzzene, M.A. Pagano, R. Battistutta, J. Bain, D. Fabbro, J. Schoepfer, M. Elliott, P. Furet, F. Meggio, G. Zanotti and L.A. Pinna

639–646

A novel protein phosphatase 2A (PP2A) is involved in the transformation of human protozoan parasite *Trypanosoma cruzi*

Published as BJ Immediate Publication 9 May 2003,
DOI 10.1042/BJ20030215

J. González, A. Cornejo, M.R.M. Santos, E.M. Cordero, B. Gutiérrez, P. Porcile, R.A. Mortara, H. Sagua, J.F. da Silveira and J.E. Araya

647–656

The metabolism of nitrosothiols in the mycobacteria: identification and characterization of S-nitrosomycothioli reductase

Published as BJ Immediate Publication 17 June 2003,
DOI 10.1042/BJ20030642

R.N. Vogt, D.J. Steenkamp, R. Zheng and J.S. Blanchard

657–666

The transcriptional repressor protein PRH interacts with the proteasome

Published as BJ Immediate Publication 26 June 2003,
DOI 10.1042/BJ20030769

K.L. Bess, T.E. Swingle, A.J. Rivett, K. Gaston and P.-S. Jayaraman

667–675

<p>γIII-Crystallin is the primary target of glycation in the bovine lens incubated under physiological conditions <i>Published as BJ Immediate Publication 13 June 2003,</i> <i>DOI 10.1042/BJ20030542</i></p>	H. Yan, A.C. Willis and J.J. Harding	677–685
<p>Malleable conformation of the elastic PEVK segment of titin: non-co-operative interconversion of polyproline II helix, β-turn and unordered structures <i>Published as BJ Immediate Publication 20 June 2003,</i> <i>DOI 10.1042/BJ20030702</i></p>	K. Ma and K. Wang	687–695
<p>The <i>Dictyostelium</i> class I myosin, MyoD, contains a novel light chain that lacks high-affinity calcium-binding sites <i>Published as BJ Immediate Publication 26 June 2003,</i> <i>DOI 10.1042/BJ20030656</i></p>	M.A. De La Roche, S.-F. Lee and G.P. Côté	697–705
<p>A study of host defence peptide β-defensin 3 in primates <i>Published as BJ Immediate Publication 10 June 2003,</i> <i>DOI 10.1042/BJ20030528</i></p>	M. Boniotto, N. Antcheva, I. Zelezetsky, A. Tossi, V. Palumbo, M.V. Verga Falzacappa, S. Sgubin, L. Braidà, A. Amoroso and S. Crovella	707–714
<p>Sphingosine-1-phosphate receptor subtype-specific positive and negative regulation of Rac and haematogenous metastasis of melanoma cells <i>Published as BJ Immediate Publication 12 June 2003,</i> <i>DOI 10.1042/BJ20030381</i></p>	H. Yamaguchi, J. Kitayama, N. Takuwa, K. Arikawa, I. Inoki, K. Takehara, H. Nagawa and Y. Takuwa	715–722
<p>Modulation of DNA topoisomerase IIα promoter activity by members of the Sp (specificity protein) and NF-Y (nuclear factor Y) families of transcription factors <i>Published as BJ Immediate Publication 27 May 2003,</i> <i>DOI 10.1042/BJ20030032</i></p>	N. Magan, A.P. Szremska, R.J. Isaacs and K.M. Stowell	723–729
<p>Clarification of the role of key active site residues of glutathione transferase Zeta/maleylacetate isomerase by a new spectrophotometric technique <i>Published as BJ Immediate Publication 10 July 2003,</i> <i>DOI 10.1042/BJ20030625</i></p>	P.G. Board, M.C. Taylor, M. Coggan, M.W. Parker, H.B. Lantum and M.W. Anders	731–737
<p>TIMP-2 (tissue inhibitor of metalloproteinase-2) regulates MMP-2 (matrix metalloproteinase-2) activity in the extracellular environment after pro-MMP-2 activation by MT1 (membrane type 1)-MMP <i>Published as BJ Immediate Publication 20 May 2003,</i> <i>DOI 10.1042/BJ20030557</i></p>	M.M. Bernardo and R. Fridman	739–745
<p>Different modes of internalization of apoptotic alkyl-lysophospholipid and cell-rescuing lysophosphatidylcholine <i>Published as BJ Immediate Publication 1 July 2003,</i> <i>DOI 10.1042/BJ20030179</i></p>	A.H. van der Luit, M. Budde, M. Verheij and W.J. van Blitterswijk	747–753
<p>The directionality of chitin biosynthesis: a revisit <i>Published as BJ Immediate Publication 20 June 2003,</i> <i>DOI 10.1042/BJ20030145</i></p>	T. Imai, T. Watanabe, T. Yui and J. Sugiyama	755–760
<p>Oxidation of thioanisole and <i>p</i>-methoxythioanisole by lignin peroxidase: kinetic evidence of a direct reaction between compound II and a radical cation <i>Published as BJ Immediate Publication 12 June 2003,</i> <i>DOI 10.1042/BJ20030487</i></p>	T.B. Brück, M.F. Gerini, E. Baciocchi and P.J. Harvey	761–766
<p>Overexpression of UDP-glucose dehydrogenase in <i>Escherichia coli</i> results in decreased biosynthesis of K5 polysaccharide <i>Published as BJ Immediate Publication 30 May 2003,</i> <i>DOI 10.1042/BJ20030365</i></p>	E. Roman, I. Roberts, K. Lidholt and M. Kusche-Gullberg	767–772
<p>5,10-Methenyltetrahydrofolate cyclohydrolase, rat liver and chemically catalysed formation of 5-formyltetrahydrofolate <i>Published as BJ Immediate Publication 9 June 2003,</i> <i>DOI 10.1042/BJ20021970</i></p>	J.E. Baggott and R.E. MacKenzie	773–778

Suppression by polycyclic compounds of the conversion of human amylin into insoluble amyloid <i>Published as BJ Immediate Publication 18 June 2003, DOI 10.1042/BJ20030422</i>	J.F. Aitken, K.M. Loomes, B. Konarkowska and G.J.S. Cooper	779–784
Comparative thermal denaturation of <i>Thermus aquaticus</i> and <i>Escherichia coli</i> type 1 DNA polymerases <i>Published as BJ Immediate Publication 4 June 2003, DOI 10.1042/BJ20030323</i>	I. Karantzeni, C. Ruiz, C.-C. Liu and V.J. LiCata	785–792
Dimeric cystic fibrosis transmembrane conductance regulator exists in the plasma membrane <i>Published as BJ Immediate Publication 24 June 2003, DOI 10.1042/BJ20030683</i>	M. Ramjeesingh, J.F. Kidd, L.J. Huan, Y. Wang and C.E. Bear	793–797
Ribonuclease III-mediated processing of specific <i>Neisseria meningitidis</i> mRNAs <i>Published as BJ Immediate Publication 26 June 2003, DOI 10.1042/BJ20030533</i>	E. De Gregorio, C. Abrescia, M.S. Carlomagno and P.P. Di Nocera	799–805
Corrections		
Induction of glycosylation in human C-reactive protein under different pathological conditions	T. Das, A.K. Sen, T. Kempf, S.R. Pramanik, C. Mandal and C. Mandal (volume 373, pages 345–355, 2003)	807
Characterization of the carbohydrate moieties of the functional unit RvH ₁ -a of <i>Rapana venosa</i> haemocyanin using HPLC/electrospray ionization MS and glycosidase digestion	P. Dolashka-Angelova, A. Beck, A. Dolashki, M. Beltramini, S. Stevanovic, B. Salvato and W. Voelter (volume 374, pages 185–192, 2003)	807