

BRITISH JOURNAL OF PHARMACOLOGY

The *British Journal of Pharmacology* welcomes contributions in all fields of experimental pharmacology including neuroscience, biochemical, cellular and molecular pharmacology. The Board of Editors represents a wide range of expertise and ensures that well-presented work is published as promptly as possible, consistent with maintaining the overall quality of the journal.

Edited for the British Pharmacological Society by

A.T. Birmingham
(Chairman)

R.W. Horton **W.A. Large**
(Secretaries)

Editorial Board

P.I. Aaronson *London*
C.J. Bailey *Birmingham*
L. Belardinelli *Gainesville, USA*
Maria G. Belvisi *London*
G.W. Bennett *Nottingham*
T.P. Blackburn *Harlow*
M.R. Boarder *Leicester*
N.G. Bowery *Birmingham*
W.C. Bowman *Glasgow*
R. Busse *Frankfurt, Germany*
S.P. Butcher *Edinburgh*
K.D. Butler *Horsham*
M. Caulfield *London*
R.A.J. Challiss *Leicester*
R. Chess-Williams *Sheffield*
T. Cocks *Melbourne, Australia*
S.J. Coker *Liverpool*
Helen M. Cox *London*
V. Crunelli *Cardiff*
A. Dickenson *London*
J.R. Docherty *Dublin*
L. Edvinsson *Lund, Sweden*
G. Edwards *Manchester*
R.M. Eglon *Palo Alto, USA*
P.C. Emson *Cambridge*
R.H. Evans *Bristol*
A.W. Ford-Hutchinson *Quebec, Canada*
A.C. Foster *San Diego, USA*
J.R. Fozard *Basle, Switzerland*
B.B. Fredholm *Stockholm, Sweden*
Allison D. Fryer *Baltimore, USA*
J.P. Gallagher *Galveston, USA*

Sheila M. Gardiner *Nottingham*
C.J. Garland *Bristol*
A. Gibson *London*
M.A. Giembycz *London*
W.R. Giles *Calgary, Canada*
R.G. Goldie *Perth, Australia*
R.J. Griffiths *Groton, USA*
R.W. Gristwood *Cambridge*
Judith M. Hall *London*
D.W.P. Hay *Philadelphia, USA*
D.J. Heal *Nottingham*
P.G. Hellewell *London*
K. Hillier *Southampton*
P. Holzer *Graz, Austria*
S.M.O. Hourani *Guildford*
D. Hoyer *Basle, Switzerland*
G.W. John *Castres, France*
E.J. Johns *Birmingham*
R.S.G. Jones *Oxford*
P.A.T. Kelly *Edinburgh*
D.A. Kendall *Nottingham*
C. Kennedy *Glasgow*
I. Kitchen *Guildford*
N.R. Kitteringham *Liverpool*
R.Z. Kozlowski *Oxford*
S. Lazareno *London*
R.A.J. Lefebvre *Ghent, Belgium*
J. Llenas *Barcelona, Spain*
A.T. McKnight *Cambridge*
C.A. Maggi *Florence, Italy*
I.G. Marshall *Glasgow*
Janice M. Marshall *Birmingham*

G. Martin *Beckenham*
A. Mathie *London*
P.K. Moore *London*
H. Nilsson *Aarhus, Denmark*
H. Osswald *Tübingen, Germany*
F.L. Pearce *London*
J.D. Pearson *London*
U. Quast *Tübingen, Germany*
A.G. Ramage *London*
P.J. Roberts *Bristol*
W.C. Sessa *New Haven, USA*
N. Shankley *London*
N.L. Simmonds *Newcastle*
P.G. Skett *Glasgow*
P. Sneddon *Glasgow*
S. Clare Stanford *London*
K. Starke *Freiburg, Germany*
R.J. Summers *Melbourne, Australia*
J. Tamargo *Madrid, Spain*
C. Thiemeermann *London*
M.D. Tricklebank *Basle, Switzerland*
T.J. Verbeuren *Suresnes, France*
R.R. Vollmer *Pittsburgh, USA*
Cherry L. Wainwright *Glasgow*
T.D. Warner *London*
K.J. Watling *Boston, USA*
J. Westwick *Bath*
K.I. Williams *Bath*
V.G. Wilson *Nottingham*
E.H.F. Wong *Milan, Italy*
S. Wonnacott *Bath*
B. Woodward *Bath*

Corresponding Editors

P.R. Adams *Stony Brook, U.S.A.*
C. Bell *Dublin*
F.E. Bloom *La Jolla, U.S.A.*
A.L.A. Boura *Newcastle, Australia*
N.J. Dun *Toledo, U.S.A.*
R.F. Furchgott *New York, U.S.A.*
T. Godfraind *Brussels, Belgium*
S.Z. Langer *Paris, France*

R.J. Miller *Chicago, U.S.A.*
R.C. Murphy *Denver, U.S.A.*
E. Muscholl *Mainz, Germany*
R.A. North *Geneva, Switzerland*
M. Otsuka *Tokyo, Japan*
M.J. Rand *Melbourne, Australia*
S. Rosell *Södertälje, Sweden*
P. Seeman *Toronto, Canada*

L. Szekeres *Szeged, Hungary*
B. Uvnäs *Stockholm, Sweden*
P.A. Van Zwieten *Amsterdam, Netherlands*
V.M. Varagić *Belgrade, Yugoslavia*
G. Velo *Verona, Italy*
Wang Zhen Gang *Beijing, China*
M.B.H. Youdim *Haifa, Israel*

Submission of manuscripts: Manuscripts (two copies) should be sent to The Editorial Office, British Journal of Pharmacology, St. George's Hospital Medical School, Cranmer Terrace, London SW17 0RE.

Authors should consult the Instructions to Authors and the Nomenclature Guidelines for Authors in Vol. 114, 245–255. These Instructions and Guidelines also appear with the journal Index for Volumes 111–113, 1994. A checklist of the essential requirements is summarised in each issue of the journal, or as the last page of the issue.

Whilst every effort is made by the publishers and editorial committee to see that no inaccurate or misleading data, opinion or statement appears in this Journal, they and the *British Pharmacological Society* wish to make it clear that the data and opinions appearing in the articles and advertisements herein are the responsibility of the contributor or advertiser concerned. Accordingly, the *British Pharmacological Society*, the publishers and the editorial committee and their respective employees, officers and agents accept no liability whatsoever for the consequences of any such inaccurate or misleading data, opinion or statement.

N. Lebel, P. D'Orléans-Juste, A. Fournier & P. Sirois. Role of the neutral endopeptidase 24.11 in the conversion of big endothelins in guinea-pig lung parenchyma **184**

G. Lombardi, P. Leonardi & F. Moroni. Metabotropic glutamate receptors, transmitter output and fatty acids: studies in rat brain slices **189**

K. Ren, M.J. Iadarola & R. Dubner. An isobolographic analysis of the effects of N-methyl-D-aspartate and NK₁ tachykinin receptor antagonists on inflammatory hyperalgesia in the rat **196**

E. R. Lazarowski, W.C. Watt, M. Jackson Stutts, H. Alex Brown, R.C. Boucher & T. Kendall Harden. Enzymatic synthesis of UTP γ S, a potent hydrolysis resistant agonist of P_{2U}-purinoceptors **203**

B.A. Evans, M. Papaioannou, V.R. Bonazzi & R.J. Summers. Expression of β_3 -adrenoceptor mRNA in rat tissues **210**

G. Fricker, A. Fahr, C. Beglinger, T. Kissel, G. Reiter & J. Drewe. Permeation enhancement of octreotide by specific bile salts in rats and human subjects: *in vitro*, *in vivo* correlations **217**

R.P. Burt, C.R. Chapple & I. Marshall. The role of diacylglycerol and activation of protein kinase C in α_{1A} -adrenoceptor-mediated contraction to noradrenaline of rat isolated epididymal vas deferens **224**

Corrigendum

231

The *British Journal of Pharmacology* is published by Stockton Press, a division of Macmillan Press Ltd. It is the official publication of the British Pharmacological Society.

Scope The *British Journal of Pharmacology* is published twice a month. It welcomes contributions in all fields of experimental pharmacology including neuroscience, biochemical, cellular and molecular pharmacology. The Board of Editors represents a wide range of expertise and ensures that well-presented work is published as promptly as possible, consistent with maintaining the overall quality of the journal.

This journal is covered by Current Contents, Excerpta Medica, BIOSIS, CABS, CINAHL and Index Medicus.

Editorial Manuscripts (plus two copies) and all editorial correspondence should be sent to: The Editorial Office, British Journal of Pharmacology, St George's Hospital Medical School, Cranmer Terrace, London SW17 0RE, UK. Tel: +44 (0)181 767 6765; Fax: +44 (0)181 767 5645.

Advertisements Enquiries concerning advertisements should be addressed to: Michael Rowley, Hasler House, High Street, Great Dunmow, Essex CM6 1AP, UK. Tel: +44 (0)1371 874613; Fax: +44 (0)1371 872273.

Publisher All business correspondence, supplement enquiries and reprint requests should be addressed to *British Journal of Pharmacology*, Stockton Press, Houndmills, Basingstoke, Hampshire RG21 6XS, UK. Tel: +44 (0)1256 29242; Fax: +44 (0)1256 810526. Publisher: Marija Vukovojac. Production Controller: Nicci Crawley. Supplement Production Controller: Simone Larché

Subscriptions – EU/Rest of World Subscription price per annum (3 volumes, 24 issues) £655, rest of world £735 (Surface mail) £880 (Airmail), or equivalent in any other currency. Orders must be accompanied by remittance. Cheques should be made payable to *Macmillan Magazines* and sent to: The Subscription Department, Macmillan Press Ltd, Houndmills, Basingstoke, Hampshire RG21 6XS, UK. Where appropriate, subscribers may make payments into UK Post Office Giro Account No. 519 2455. Full details must accompany the payment. Subscribers from EC territories should add sales tax at the local rate.

Subscriptions – USA USA subscribers call toll free 1-800-221-2123 or send check/money order/credit card details to: Stockton Press, 345 Park Avenue South, 10th Floor, New York, NY 10010-1707; Tel: +1 212 689 9200, Fax: +1 212 689 9711. USA annual subscription rates (institutional/corporate): \$1170 (surface) \$1400 (airmail). Individual making personal payment: \$240.

British Journal of Pharmacology (ISSN 0007-1188) is published twice a month by Macmillan Press Ltd, c/o Mercury Airfreight International Ltd, 2323 Randolph Avenue, Avenel, NJ 07001, USA. Subscription price for institutions is \$1170 per annum (surface). 2nd class postage is paid at Rahway NJ. Postmaster: send address corrections to Macmillan Press Ltd, c/o Mercury Airfreight International Ltd, 2323 Randolph Avenue, Avenel NJ 07001.

Reprints of any article in this journal are available from Stockton Press, Houndmills, Basingstoke, Hampshire RG21 6XS, UK. Tel: +44 (0)1256 29242; Fax: +44 (0)1256 810526.

Copyright © 1996 Stockton Press
ISSN 0007-1188

All rights of reproduction are reserved in respect of all papers, articles, illustrations, etc., published in this journal in all countries of the world.

All material published in this journal is protected by copyright, which covers exclusive rights to reproduce and distribute the material. No material published in this journal may be reproduced or stored on microfilm or in electronic, optical or magnetic form without the written authorisation of the Publisher.

Authorisation to photocopy items for internal or personal use of specific clients, is granted by Stockton Press for libraries and other users registered with the Copyright Clearance Center (CCC) Transaction Reporting Service, provided that the base fee of \$12.00 per copy is paid directly to CCC, 21 Congress St., Salem, MA 01970, USA. 0007-1188/96 \$12.00 + \$0.00.

Apart from any fair dealing for the purposes of research or private study, or criticism or review, as permitted under the Copyright, Designs and Patent Act 1988, this publication may be reproduced, stored or transmitted, in any form 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.

PREPARATION OF MANUSCRIPTS

Authors are strongly recommended to read the full *Instructions to Authors* and *Nomenclature Guidelines for Authors* (*Br. J. Pharmacol.* 1995, **114**, 245–255) before submitting a manuscript for publication in the *British Journal of Pharmacology*. The manuscript and cover letter should be checked against the following list before mailing.

The original and one copy of the manuscript must be supplied. Manuscripts must be typed in double-line spacing on one side of A4 paper, in type not smaller than 12 characters per inch or 10 point. Both copies to include Tables and a set of labelled Figures. One set of Figures without numbers or letters is also to be included. The text to be arranged in the following subsections:

1. **Title**—To have no more than 150 characters on a separate page, which should also include a Short Title (50 characters maximum) and the name and address of the author for correspondence.
2. **Summary**—To be arranged in numbered paragraphs (Full Papers) or a single paragraph (Special Reports).
—to include aims, principal results and conclusions.
—to include Key words (10 maximum) at end of summary.
3. **Introduction**—To contain concise statements of the problem and the aims of the investigation.
4. **Methods**—To have brief but adequate account of the procedures; *full names of drugs (including those referred to by manufacturer's code)*, sources of drugs and statistical tests to be stated.
5. **Results**—To have no repetition of data in Figures, Tables and text.
6. **Discussion**—Findings and conclusions to be placed in context of other relevant work.
NB Simple repetition of results and unwarranted speculation are not acceptable.
7. **Acknowledgements**—Sources of support. Sources of drugs not widely available commercially.
8. **References**—All references in the text to be included in the Reference List and *vice versa*. References in alphabetical order with complete citations; Journals publishing 'in press' papers identified.

References to manuscripts submitted to other journals but not yet accepted are not allowed.

9. **Tables**—Each on a separate page and prepared in accordance with current requirements of the Journal.
10. **Figures**—Both labelled and non-labelled Figures to be prepared in accordance with current requirements of the Journal (see *Instructions to Authors*, 1994, **114**, 245–251) and provided with Figure Number and Authors' names on back (*in pencil*).
—each legend to be typed on a separate page and carrying keys to symbols.
—keys to symbols and histograms must not appear on the figures themselves, but in the respective legends.
—'box style' figures are not in keeping with the Journal style; line drawings etc must have only left-hand and bottom axes.
11. **Manuscripts**—To be accompanied by a declaration signed by each author that
 - (a) results are original
 - (b) approval of all persons concerned has been given to submit manuscripts for consideration (see also 12b)
 - (c) the same material is neither 'in press' (i.e. is in proof or has definitely been accepted for publication) nor under consideration elsewhere. Furthermore it will not be submitted or published elsewhere before a decision has been reached by the Editorial Board of the *British Journal of Pharmacology* and will not be submitted elsewhere if accepted by the *British Journal of Pharmacology*.
 - (d) Copyright assignment is included.
12. **Cover letter**—To state clearly
 - (a) Corresponding author's full postal address, telephone, telex or Fax number
 - (b) where appropriate, that *either* ethical approval has been given for investigation *or* Company or Institutional permission to publish work has been received.
13. **Reminder**—Packaging to be sufficiently robust to protect Figures and to withstand mailing.

Failure to comply with *Instructions to Authors* may lead to substantial delays in processing, review and publication and may even jeopardize acceptance of the manuscript.

NOMENCLATURE

Authors are reminded that accepted receptor and associated terminology is laid out in *Nomenclature Guidelines for Authors*, as published in the *British Journal of Pharmacology*, *Br. J. Pharmacol.*, 1995, **114**, 253–255.

SPECIAL REPORTS

The purpose of *Special Reports* is to provide rapid publication for **new** and **important** results which the Editorial Board considers are likely to be of special pharmacological significance. *Special Reports* will have publication priority over all other material and so authors are asked to consider carefully the status of their work before submission.

In order to speed publication there is normally no revision allowed beyond very minor typographical or grammatical corrections. If significant revision is required, the Board may either invite rapid re-submission or, more probably, propose that it be re-written as a Full Paper and be re-submitted for consideration. In order to reduce delays, proofs of *Special Reports* will be sent to authors but **essential corrections must reach the Production Office within 48 hours of receipt**. Authors should ensure that their submitted material conforms exactly to the following requirements.

Special Reports should normally occupy no more than two printed pages of the Journal; two illustrations (Figures or Tables, with legends) are permitted. As a guideline, with type face of 12 pitch and double-line spacing, a page of A4 paper could contain about 400 words. The absolute maximum length of the *Special Report* is 1700 words. For each Figure or Table, please deduct 200 words. The manuscript should comprise a Title page with key words (maximum of 10), a Summary consisting of a single short paragraph, followed by Introduction, Methods, Results, Discussion and References (maximum of 10). In all other respects, the requirements are the same as for Full Papers (see current 'Instructions to Authors').

- J. Wójcicki, T. Sulikowski, M. Wójcicki, M. Drożdżik, B. Gawrońska-Szklarz, B. Barcew-Wiszniewska, J. Skowron & L. Rózewicka. Pharmacokinetics of phenazone (antipyrine) in rabbits with experimental common bile duct obstruction 1
- Y-T. Xuan & P.S.A. Glass. Propofol regulation of calcium entry pathways in cultured A10 and rat aortic smooth muscle cells 5
- S.L. Lydford, K.C.W. McKechnie & I.G. Dougall. Pharmacological studies on prostanoid receptors in the rabbit isolated saphenous vein: a comparison with the rabbit isolated ear artery 13
- C.J. Watkins & N.R. Newberry. Multiple 5-HT receptors in the guinea-pig superior cervical ganglion 21
- D.R. Allan, S.B. Penner & D.D. Smyth. Antagonism by idazoxan at low dose but not high dose, of the natriuretic action of moxonidine 29
- P.M. Dunn, D.C.H. Benton, J. Campos Rosa, C.R. Ganellin & D.H. Jenkinson. Discrimination between subtypes of apamin-sensitive Ca^{2+} -activated K^{+} channels by gallamine and a novel *bis*-quaternary quolinium cyclophane, UCL 1530 35
- L-C. Yu, P. Hansson, G. Brodda-Jansen, E. Theodorsson & T. Lundeberg. Intrathecal CGRP₈₋₃₇-induced bilateral increase in hindpaw withdrawal latency in rats with unilateral inflammation 43
- C.L. Beauregard & P.G. Smith. Parasympathetic excitation of sympathetic innervation after cholinesterase inhibition 51
- L.J. Steward, J. Ge, R.L. Stowe, D.C. Brown, R.K. Bruton, P.R.A. Stokes & N.M. Barnes. Ability of 5-HT₄ receptor ligands to modulate rat striatal dopamine release *in vitro* and *in vivo* 55
- A.D. Michel & P.P.A. Humphrey. High affinity P_{2X}-purinoceptor binding sites for [³⁵S]-adenosine 5'-O-[3-thiotriphosphate] in rat vas deferens membranes 63
- I. Juránek & F. Lembeck. Evidence for the participation of glutamate in reflexes involving afferent, substance P-containing nerve fibres in the rat 71
- M.P. Hallsworth, M.A. Gienbycz, P.J. Barnes & T.H. Lee. Cyclic AMP-elevating agents prolong or inhibit eosinophil survival depending on prior exposure to GM-CSF 79
- P.J. Bennett & M.A. Simmonds. The influence of membrane cholesterol on the GABA_A receptor 87
- A.J. Kaumann. (-)-CGP 12177-induced increase of human atrial contraction through a putative third β -adrenoceptor 93
- V. Limmroth, W.S. Lee & M.A. Moskowitz. GABA_A-receptor-mediated effects of progesterone, its ring-A-reduced metabolites and synthetic neuroactive steroids on neurogenic oedema in the rat meninges 99
- B.F. del Pozo, F. Pérez-Vizcaino, E. Villamor, F. Zaragoza & J. Tamargo. Stereoselective effects of the enantiomers, quinidine and quinine, on depolarization- and agonist-mediated responses in rat isolated aorta 105
- S. Al-Damluji & I. J. Kopin. Functional properties of the uptake of amines in immortalised peptidergic neurones (transport-P) 111
- M. Holland, P.D. Langton, N.B. Standen & J.P. Boyle. Effects of the BK_{Ca} channel activator, NS1619, on rat cerebral artery smooth muscle 119
- M. Bianchi & A.E. Panerai. The dose-related effects of paracetamol on hyperalgesia and nociception in the rat 130
- D. Chesnoy-Marchais & J.Y. Barthe. Voltage-dependent block of NMDA responses by 5-HT agonists in ventral spinal cord neurones 133
- S. Flanders, K.J. Hardy & M.J. Lew. Effect of cold storage in University of Wisconsin solution on the responses of porcine hepatic arteries to 5-hydroxytryptamine and bradykinin *in vitro* 142
- A. Papapetropoulos, C.Y. Go, F. Murad & J.D. Catraves. Mechanisms of tolerance to sodium nitroprusside in rat cultured aortic smooth muscle cells 147
- J. Gonçalves & G. Queiroz. Purinoceptor modulation of noradrenaline release in rat tail artery: tonic modulation mediated by inhibitory P_{2Y}- and facilitatory A_{2A}-purinoceptors 156
- F. Noble & B.M. Cox. Differential desensitization of μ - and δ - opioid receptors in selected neural pathways following chronic morphine treatment 161
- J. Nicholls, V.R. Brownhill & S.M.O. Hourani. Characterization of P₁-purinoceptors on rat isolated duodenum longitudinal muscle and muscularis mucosae 170
- A.J. Kirkup, G. Edwards & A.H. Weston. Investigation of the effects of 5-nitro-2-(3-phenylpropylamino)- benzoic acid (NPPB) on membrane currents in rat portal vein 175
- N. Lebel, P. D'Orléans-Juste, A. Fournier & P. Sirois. Role of the neutral endopeptidase 24.11 in the conversion of big endothelins in guinea-pig lung parenchyma 184
- G. Lombardi, P. Leonardi & F. Moroni. Metabotropic glutamate receptors, transmitter output and fatty acids: studies in rat brain slices 189
- K. Ren, M.J. Iadarola & R. Dubner. An isobolographic analysis of the effects of N-methyl-D-aspartate and NK₁ tachykinin receptor antagonists on inflammatory hyperalgesia in the rat 196
- E. R. Lazarowski, W.C. Watt, M. Jackson Stutts, H. Alex Brown, R.C. Boucher & T. Kendall Harden. Enzymatic synthesis of UTP_γS, a potent hydrolysis resistant agonist of P_{2U}-purinoceptors 203
- B.A. Evans, M. Papaioannou, V.R. Bonazzi & R.J. Summers. Expression of β_3 -adrenoceptor mRNA in rat tissues 210
- G. Fricker, A. Fahr, C. Beglinger, T. Kissel, G. Reiter & J. Drewe. Permeation enhancement of octreotide by specific bile salts in rats and human subjects: *in vitro*, *in vivo* correlations 217
- R.P. Burt, C.R. Chapple & I. Marshall. The role of diacylglycerol and activation of protein kinase C in α_{1A} -adrenoceptor-mediated contraction to noradrenaline of rat isolated epididymal vas deferens 224
- Corrigendum 231