

ISSN 0007-1188 (print)  
ISSN 1476-5381 (online)

[www.brjpharmacol.org](http://www.brjpharmacol.org)

# BJP

British Journal of  
Pharmacology

**WILEY**  
Blackwell



BRITISH  
PHARMACOLOGICAL  
SOCIETY

[www.bps.ac.uk](http://www.bps.ac.uk)

# BJP

BRITISH JOURNAL  
OF PHARMACOLOGY

## Editor-in-Chief

J.C. (Ian) McGrath *Glasgow, UK*

## Senior Editors

Amrita Ahluwalia *London, UK*  
Richard Bond *Houston, USA*  
Michael J. Curtis *London, UK*

Mark Gienbycz *Calgary, Canada*  
Daniel Hoyer *Melbourne, Australia*  
Andrew Lawrence *Melbourne, Australia*

David MacEwan *Liverpool, UK*  
Arthur Weston *Manchester, UK*  
Susan Wonnacott *Bath, UK*

## Reviews Editor

Stephen Alexander *Nottingham, UK*

## Senior Online Editor

Annette Gilchrist *Downers Grove, USA*

## Press Editors

Y.S. Bakhle  
Caroline Wedmore

## Editorial Board

Ruth Andrew *Edinburgh, UK*  
Alexis Bailey *Guildford, UK*  
Chris Bailey *Bath, UK*  
Phillip Beart *Melbourne, Australia*  
Heather Bradshaw *Bloomington, USA*  
Keith Brain *Birmingham, UK*  
John Challiss *Leicester, UK*  
Victoria Chapman *Nottingham, UK*  
Steven Charlton *Horsham, UK*  
Diana Chow *Houston, USA*  
Macdonald Christie *Sydney, Australia*  
Sandy Clanachan *Edmonton, Canada*  
Lucie Clapp *London, UK*  
David Cowan *London, UK*  
John Cryan *Cork, Ireland*  
Nicola Curtin *Newcastle upon Tyne, UK*  
Gerhard Cvim *Graz, Austria*  
Anthony Davenport *Cambridge, UK*  
Peter Doris *Houston, USA*  
Pedro D'Orléans-Juste *Sherbrooke, Canada*  
Claire Edwards *Oxford, UK*  
Michael Emerson *London, UK*  
Peter Ferdinandy *Szeged, Hungary*  
Anthony Ford *San Mateo, USA*  
Chris George *Cardiff, UK*  
Heather Giles *London, UK*  
Derek Gilroy *London, UK*  
Gary Gintant *Illinois, USA*  
Michelle Glass *Auckland, New Zealand*  
Fiona Gribble *Cambridge, UK*  
Anthony Harmar *Edinburgh, UK*  
John Hartley *London, UK*

Robin Hiley *Cambridge, UK*  
Andrea Hohmann *Georgia, USA*  
Miles Houslay *London, UK*  
Jackie Hunter *Weston, UK*  
Ryuji Inoue *Fukuoka, Japan*  
Paul Insel *San Diego, USA*  
Angelo Izzo *Naples, Italy*  
Yong Ji *Nanjing, China*  
Eamonn Kelly *Bristol, UK*  
Melanie Kelly *Halifax, Canada*  
Terry Kenakin *Durham, USA*  
Dave Kendall *Nottingham, UK*  
Charles Kennedy *Glasgow, UK*  
Chris Langmead *Welwyn Garden City, UK*  
Rebecca Lever *London, UK*  
Eliot Lilley *Redhill, UK*  
Jon Lundberg *Stockholm, Sweden*  
Mhairi Macrae *Glasgow, UK*  
Ziad Mallat *Cambridge, UK*  
Karen McCloskey *Belfast, UK*  
Barbara McDermott *Belfast, UK*  
Alister McNeish *Reading, UK*  
Olivier Micheau *Dijon, France*  
Paula Moreira *Coimbra, Portugal*  
Maria Moro *Madrid, Spain*  
Fiona Murray *San Diego, USA*  
Anne Negre-Salvayre *Toulouse, France*  
Janet Nicholson *Biberach an der Riss, Germany*  
Eliot Ohlstein *Pennsylvania, USA*  
Saoirse O'Sullivan *Nottingham, UK*  
Hiroshi Ozaki *Tokyo, Japan*  
Reynold Panettieri Jr *Philadelphia, USA*

Sandy Pang *Toronto, Canada*  
Andreas Papapetropoulos *Patras, Greece*  
Clare Parish *Melbourne, Australia*  
Peter Peachell *Sheffield, UK*  
Ray Penn *Baltimore, USA*  
John Peters *Dundee, UK*  
Roger Phillips *Bradford, UK*  
Michael Pugsley *Jersey City, USA*  
Susan Pyne *Strathclyde, UK*  
Jelena Radulovic *Chicago, USA*  
Harpal Randeva *Warwick, UK*  
Patrick Sexton *Monash, Australia*  
Edith Sim *Oxford, UK*  
Chris Sobey *Monash, Australia*  
Michael Spedding *Suresnes, France*  
Beata Sperlagh *Budapest, Hungary*  
Katarzyna Starowicz *Krakow, Poland*  
Barbara Stefanska *Quebec, Canada*  
Gary Stephens *Reading, UK*  
Kenneth Takeda *Strasbourg, France*  
Paolo Tammaro *Oxford, UK*  
Anna Teti *L'Aquila, Italy*  
David Thwaites *Newcastle upon Tyne, UK*  
Alexandre Trifilieff *Basel, Switzerland*  
Jean-Pierre Valentin *Macclesfield, UK*  
Paul Vanhoutte *Hong Kong, China*  
Christopher Vaughan *Sydney, Australia*  
Harald Wajant *Würzburg, Germany*  
Julia Walker *Durham, USA*  
Xin Wang *Manchester, UK*  
Nina Weber *Amsterdam, the Netherlands*  
Baofeng Yang *Heilongjiang, China*

The *British Journal of Pharmacology* is a broad-based journal giving leading international coverage of all aspects of experimental pharmacology. The Editorial Board 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.

### Disclaimer

The Publisher, British Pharmacological Society and Editors cannot be held responsible for errors or any consequences arising from the use of information contained in this journal; the views and opinions expressed do not necessarily reflect those of the Publisher, British Pharmacological Society and Editors.

Neither does the publication of advertisements constitute any endorsement by the Publisher, British Pharmacological Society and Editors of the products advertised.

### Copyright and Copying

Copyright © 2014 The British Pharmacological Society. All rights reserved. No part of this publication may be reproduced, stored or transmitted in any form or by any means without the prior permission in writing from the copyright holder. Authorization to copy items for internal and personal use is granted by the copyright holder for libraries and other users registered with their local Reproduction Rights Organisation (RRO), e.g. Copyright Clearance Center (CCC), 222 Rosewood Drive, Danvers, MA 01923, USA ([www.copyright.com](http://www.copyright.com)), provided the appropriate fee is paid directly to the RRO. This consent does not extend to other kinds of copying, such as copying for general distribution for advertising or promotional purposes, for creating new collective works, or for resale. Special requests should be addressed to: [permissionsuk@wiley.com](mailto:permissionsuk@wiley.com).