

The Journal of Pharmacology and Experimental Therapeutics

A Publication of the American Society for Pharmacology and Experimental Therapeutics

Founded by John J. Abel - 1908

Rick G. Schnellmann, Editor

Craig C. Beeson, Assistant Editor

ASSOCIATE EDITORS

Darrell R. Abernethy
Ian Adcock
Jerry J. Buccafusco
Philip S. Burton
David B. Bylund
Paul Ernsberger

Mitchell P. Fink
Alan R. Gintzler
Ronald N. Hines
Myron K. Jacobson
Michael F. Jarvis

Norbert E. Kaminski
Raouf A. Khalil
Daniel R. Knapp
Lawrence H. Lash
Roberto Levi

Louis M. Luttrell
David S. Miller
Richard A. Morrisett
A. Leslie Morrow
Michael J. O'Neill

Bryan L. Roth
Robert A. Roth
Kenneth D. Tew
Stephanie W. Watts
Alice M. Young

EDITORIAL ADVISORY BOARD

Geoffrey W. Abbott
Thomas J. Abbruscato
Peter Abel
Edson X. Albuquerque
Thomas M. Argentieri
Bork Balkan
Leslie R. Ballou
William A. Banks
Jack Bergman
Daniel C. Bertrand
Italo Biaggioni
C. Paul Bianchi
Floyd E. Bloom
Jean-Marie Boeynaems
Franco Borsini
Marco Brotto
Nancy Brown
John Charpie
Lucio G. Costa
Brian M. Cox
Bryan F. Cox
Bruce N. Cronstein
Brian Cummings
M. Imad Damaj
William C. deGroat
Russell Delude

Patrick Dougherty
Frederick J. Ehler
John L. Evenden
Steven J. Feinmark
Giora Z. Feuerstein
Stephen F. Flaim
Anthony W. Fox
Charles P. France
Alan Frazer
Gert Fricker
Ryan Fryer
Bernard W. Futscher
James J. Galligan
Vadivel Ganapathy
Patricia E. Ganey
Richard A. Gillis
Gary Gintant
John R. Glowa
Murali Gopalakrishnan
Steven M. Grassl
Garrett J. Gross
Perry V. Halushka
Arthur A. Hancock
Gyorgy Hasko
J. Paul Hieble
K. Roger Hornbrook
Susanna Hourani

Leonard L. Howell
Dale G. Hoyt
John Imig
Harry Ischiropoulos
Edwin K. Jackson
Kenneth M. Johnson
William J. Jusko
Peter W. Kalivas
Laurence S. Kaminsky
Jonathan L. Katz
Mark R. Kelley
Lewis B. Kinter
Thomas Kocarek
George F. Koob
Suk-Hee Lee
Benedict R. Lucchesi
Joseph J. Lynch
Rosalinde Masereeuw
Philip R. Mayeux
Donald E. McMillan
Mark J. Millan
Gary W. Miller
Hitoshi Morikawa
Hasan Mukhtar
L. Charles Murrin
Michael Nader
Stanley Nattel

S. Stevens Negus III
Kim A. Neve
Yasuyuki Nomura
James S. Norris
Grazyna Nowak
James M. O'Donnell
Patricio O'Donnell
Michael F. O'Neill
Mark Osinski
K. Sandy Pang
Achilles J. Pappano
B. Kevin Park
Sandra Pfister
Michael T. Piascik
Russell O. Pieper
Joseph W. Polli
John B. Pritchard
Russell A. Prough
Raymond M. Quock
J. Larry Renfro
Michael C. Sanguinetti
Jonathan G. Scammell
Michal Laniado
Schwartzman
Ronald Seifert
Federico Sesti
David R. Sibley

Theodore A. Slotkin
Mark Smith
Philip C. Smith
Quentin R. Smith
Nikolai M. Soldatov
Edward E. Soltis
Patricia K. Sonsalla
Michael D. Southall
Roger D. Spealman
Francis G. Spinale
John L. Sutko
Douglas Sweet
Istvan Szelenyi
Milt Teitler
Paul F. Terranova
Alvin V. Terry
Myron L. Toews
George J. Trachte
Hiroshi Ueda
Michael R. Vasko
Sandra P. Welch
Daniel Wierda
Michael Williams
Raymond J. Winquist
Jeffrey M. Witkin
Bryan K. Yamamoto

BOARD OF PUBLICATIONS TRUSTEES

Brian M. Cox, *Chair*; P. Jeffrey Conn, Ross Feldman, Lorraine J. Gudas, Eric F. Johnson, John S. Lazo, Edward T. Morgan, Richard R. Neubig, Rick G. Schnellmann, Darryle D. Schoepp, and Mary Vore

ASPET EXECUTIVE OFFICER: Christine K. Carrico

Journals Director: Richard Dodenhoff

Managing Editor: Jill Filler

Senior Editorial Coordinator: David D. Williams

Journal and ASPET Office: 9650 Rockville Pike, Bethesda, MD 20814-3995; telephone: 301-634-7060; fax: 301-634-7061; email: info@aspet.org; web site: www.aspet.org.

Correspondence regarding editorial matters should be addressed to Dr. Rick G. Schnellmann, Editor, *The Journal of Pharmacology and Experimental Therapeutics*, at the above address.

Official version: The online version of *The Journal of Pharmacology and Experimental Therapeutics* contains all of the information and material contained in the print version plus additional material that may not appear in print such as videos and large data sets. The online version may be more current than the print version. Where noted, the online version has been corrected in departure from the print version. The online version of *The Journal of Pharmacology and Experimental Therapeutics* officially published by the American Society for Pharmacology and Experimental Therapeutics is the definitive version and, to the extent any difference exists, will prevail over the print version.

Instructions to Authors: See <http://jpet.aspetjournals.org> for the Instructions to Authors and the ASPET Authorship Responsibility, Financial Disclosure, and Copyright Transfer form.

Correspondence concerning subscriptions: Nonmember individual and institutional subscriptions: ASPET Subscriptions Dept., Rm. L-2310, 9650 Rockville Pike, Bethesda, MD 20814-3998; telephone: 301-634-7029; fax: 301-634-7099; email: staff@dues.faseb.org. ASPET Members: contact the ASPET office. For European site licenses and consortia, contact: David Charles, Institutional Sales & Licensing, 92 avenue du General de Gaulle, 78600 Maisons-Laffitte, France; telephone: +33-1-39-12-29-29; fax: +33-1-39-12-47-45; email: dlcharles@wanadoo.fr.

Change of address: ASPET must be notified 60 days in advance. Journals undeliverable because of incorrect address will be destroyed. Duplicate copies may be obtained, if available, from ASPET at the single copy price. Send address changes to the ASPET office.

Issue Replacement Policy: Domestic Subscribers—Claims for nondelivery of issues must be made within three (3) months of issue mail date.

Foreign Subscribers—Claims for nondelivery of issues must be made

within six (6) months of issue mail date. **Missing Issues (domestic and foreign)**—ASPET will not honor refunds or replacement requests made outside of the claim time period. Up to two (2) issues will be replaced free of charge per subscription year.

Reprints of individual articles are available from the authors and from Infotrieve at www.infotrieve.com; otherwise call 800-422-4633, fax 310-208-5971, or email orders@infotrieve.com. Please send as much citation information as possible such as journal title, volume issue, page number, year, authors, article title, etc.

Reprints in large quantities for commercial or academic use may be purchased from the publisher. For information and prices, call 301-634-7063.

Copyright Information: *The Journal of Pharmacology and Experimental Therapeutics* is copyrighted by The American Society for Pharmacology and Experimental Therapeutics. Photocopying of articles beyond that permitted by Sections 107 and 108 of the U.S. Copyright Law is allowed, provided that the \$20.00-per-copy fee is paid through the Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923. Classroom photocopying is permitted at no fee, provided that students are not charged more than the cost of duplication. This consent does not extend to other kinds of copying. Reproduction of any portion of an article for subsequent republication requires permission of ASPET. Write to the ASPET office at the above address. Requests should include a statement of intended use as well as explicit specifications of the materials to be reproduced.

Disclaimer: The statements and opinions contained in the articles of *The Journal of Pharmacology and Experimental Therapeutics* are solely those of the individual authors and contributors and not of The American Society for Pharmacology and Experimental Therapeutics. The appearance of advertisements in the journal is not a warranty, endorsement, or approval of the products of safety. The American Society for Pharmacology and Experimental Therapeutics disclaims responsibility for any injury to persons or property resulting from any ideas of products referred to in the articles or advertisement.