

# MOLECULAR PHARMACOLOGY

A Publication of the American Society for Pharmacology and Experimental Therapeutics

Founded by Avram Goldstein—1965

**John J. G. Tesmer, Editor**

Martin C. Michel, Deputy Editor

## ASSOCIATE EDITORS

Raymond Evers, Kasper Hansen, John R. Hepler, Sridhar Mani,  
Andrew Morris, Manojkumar Puthenveedu, Alan Smrcka, and Jin Zhang

Adriano Marchese, *Minireview Editor*

David Gewirtz, *Emerging Concepts Editor*

Martin C. Michel, Harvey J. Motulsky, *Statistics Editors*

## EDITORIAL AND ADVISORY BOARD

Katerina Akassoglou	George Dubyak	Kenneth A. Jacobson	Aashish Manglik	Arun Shukla
Jelena Baranovic	Frederick J. Ehler	Eric F. Johnson	James O. McNamara	J. Benita Sjogren
Giuseppe Battaglia	Michael Freissmuth	Mathew V. Jones	Laurence J. Miller	Lauren Slosky
Jeffrey L. Benovic	Liwu Fu	Marcelo Kazanietz	Graeme Milligan	Gregory Tall
Nigel J. M. Birdsall	Aurelio Galli	John Kehrl	Ole Valente Mortensen	Nikoleta Tsvetanova
Laura Bohn	Adolfo Garcia-Sáinz	Terry Kenakin	Benjamin Myers	Andrew Tobin
Wendy Bollag	Ulrik Gether	Brian K. Kobilka	Senthil Natesan	John Traynor
Joan Heller Brown	Alisa Glukhova	Evi Kostenis	Richard R. Neubig	JoAnn Trejo
Moritz Bunemann	Frank J. Gonzalez	Andrew Kruse	Kim A. Neve	Joanne Wang
Thomas Burris	Michael M. Gottesman	Rakesh Kukreja	Eric Ortlund	David J. Waxman
Jennifer Cash	Patrick Griffin	Nevin Lambert	Rennolds S. Ostrom	Jurgen Wess
William A. Catterall	Grace Guo	Philip Lazarus	Jean-Philippe Pin	Wen Xie
Irene Coin	J. Silvio Gutkind	L. M. Fredrik	Sudarshan Rajagopal	Smitra Yadav
Niels Decher	Randy A. Hall	Leeb-Lundberg	Cheryl Rockwell	Richard D. Ye
Mark Dell'Acqua	Ryan Hibbs	Henry Lester	Michael A. Rogawski	Lixia Yue
Jerod Denton	Donald Hilgemann	Lian Li	Bryan L. Roth	Venetia Zachariou
Lakshmi Devi	Miwako Kato Homma	Angeline M. Lyon	Gunnar Schulte	Michael Zhu
Henrik Dohlman	Nato Hoshi	Ken Mackie	Shivendra V. Singh	

## PUBLICATIONS COMMITTEE

Kenneth D. Tew, *Chair*; Laura Bohn, Lynette Daws, Xinxin Ding, Beverley Greenwood-Van Meerveld, Michael F. Jarvis, Adriano Marchese, Gary O. Rankin, John J. G. Tesmer, Susan Wood, Ai-Ming Yu; and Mohamed Ghonim, *ex officio Young Scientist Representative*

**ASPET EXECUTIVE OFFICER:** Dave Jackson

*Publications Director:* Maria Pasho *Senior Journals Operations Manager:* Jacqueline Perry *Peer Review Coordinator:* Suzanne Cholwek

**Molecular Pharmacology** (ISSN 1521-0111) is published monthly online only (two volumes per year beginning in January and July) by the American Society for Pharmacology and Experimental Therapeutics, 1801 Rockville Pike, Suite 210, Rockville, MD 20852-1633. E-mail: [subscriptions@aspet.org](mailto:subscriptions@aspet.org). ASPET web site: [aspet.org](http://aspet.org). Journalweb site: [molpharm.aspetjournals.org](http://molpharm.aspetjournals.org). Subscription rates at [aspetjournals.org/site/subscriptions/index.xhtml](http://aspetjournals.org/site/subscriptions/index.xhtml). GST Tax Number for Canadian subscribers: BN: 13489 2330 RT.

**Indexed or abstracted by:** *Biochemistry & Biophysics Citation Index*<sup>®</sup>, *Biological Abstracts*, *Current Awareness in Biological Sciences*, *Current Contents*<sup>®</sup>/*Life Sciences*, *EMBASE/Excerpta Medica*, *Index Medicus*, *Medical Documentation Service*<sup>®</sup>, *Reference Update*<sup>®</sup>, *Research Alerts*<sup>®</sup>, *Science Citation Index*<sup>®</sup>, and *SciSearch*<sup>®</sup>.

**Journal and ASPET office:** 1801 Rockville Pike, Suite 210, Rockville, MD 20852-1633. Telephone: 301-634-7060. Fax: 301-634-7061. E-mail: [info@aspet.org](mailto:info@aspet.org). ASPET web site: [aspet.org](http://aspet.org). Journal web site: [molpharm.aspetjournals.org](http://molpharm.aspetjournals.org).

**Editorial matters** should be addressed to Dr. John J. G. Tesmer Editor, *Molecular Pharmacology*, at [molpharm@aspet.org](mailto:molpharm@aspet.org).

**Instructions to Authors:** See [molpharm.aspetjournals.org](http://molpharm.aspetjournals.org) for the Instructions to Authors and information on ASPET Authorship Responsibility, Financial Disclosure, and Chemical Structure policies.

**Subscriptions:** Contact the ASPET Subscriptions Dept., 1801 Rockville Pike, Suite 210, Rockville, MD 20852-1633. Telephone: 301-634-7782. Fax: 301-634-7061. E-mail: [subscriptions@aspet.org](mailto:subscriptions@aspet.org). See [aspetjournals.org/site/subscriptions/index.xhtml](http://aspetjournals.org/site/subscriptions/index.xhtml) for rates.

**Change of IP addresses:** ASPET will help institutional subscription administrators update IP address ranges as requested. Subscription administrators can make these changes at the journal site using their account user name and password.

**Reprints of individual articles** are available from the journal web site using the pay-per-view option for nonsubscribers.

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

**Copyright information:** *Molecular Pharmacology* is copyrighted by the American Society for Pharmacology and Experimental Therapeutics. All permissions requests are processed through the Copyright Clearance Center (CCC), Inc. at <https://www.copyright.com/get-permissions>. Photocopying or printing articles beyond that permitted by Sections 107 and 108 of the U.S. Copyright Law is allowed, provided that the \$35.00-per-copy fee is paid through the CCC. 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.

**Disclaimer:** The statements and opinions contained in the articles of *Molecular Pharmacology* 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 or their safety. The American Society for Pharmacology and Experimental Therapeutics disclaims responsibility for any injury to persons or property resulting from any ideas or products referred to in any article or advertisement.

**Copyright** © 2023 by the American Society for Pharmacology and Experimental Therapeutics. All rights reserved.