

Molecular Cancer Therapeutics

The Journal of Cancer Drug Discovery & Preclinical Development

AACR

American Association
for Cancer Research

AN OFFICIAL JOURNAL OF THE AMERICAN ASSOCIATION FOR CANCER RESEARCH

Editor-in-Chief

Beverly A. Teicher

Deputy Editors

Yubin Kang
Akash Patnaik
Puja Sapra
Paul Workman

Senior Editors

Timothy P. Cripe
Susan M. Galbraith
Iqbal S. Grewal
Peter J. Houghton
Candace S. Johnson
Ricky W. Johnstone
Razelle Kurzrock
David G. Kirsch
John S. Lazo
Joel Morris
Brion W. Murray
Dario Neri
Seth M. Pollack
Martine F. Roussel
Marco Ruella
Peter Senter
Louis F. Stancato

Editorial Staff

Managing Editor

Gregory Pavlovcak

Associate Editor

Richard W. Davis IV

Associate Journal Manager

Crystal Cheepudom

Editorial Staff

Nageena Laing
Meredith A. Kahn

Special Content Manager

Chris Vesce

Senior Production Editor

Jennifer L. Harper

Editorial Board

Robert T. Abraham	Sayed S. Daoud	Michael M. Gottesman	Barry R. O'Keefe
Rajesh Agarwal	Marcia I. Dawson	Lorraine J. Gudas	Pier Paolo Pandolfi
Adriana Albini	William A. Denny	Stephen B. Howell	Ira Pastan
Kari Alitalo	Paul Dent	Rakesh K. Jain	Maurizio Pellecchia
Suresh V. Ambudkar	Channing J. Der	Peter A. Jones	Yves Pommier
Paul A. Andrews	Vishva M. Dixit	Craig T. Jordan	C. Patrick Reynolds
Avi Ashkenazi	Ethan Dmitrovsky	Juliane M. Jürgensmeier	Edward A. Sausville
André S. Bachmann	Suzanne A. Eccles	Robert S. Kerbel	Jeffrey Settleman
Raffaele Baffa	Heinz-Herbert Fiebig	Donald W. Kufe	Shivendra V. Singh
Rebecca G. Bagley	William D. Figg, Sr.	Michihiko Kuwano	David B. Solit
Albert S. Baldwin, Jr.	Paul B. Fisher	Daruka Mahadevan	Michael B. Sporn
Laura E. Benjamin	Antonio Fojo	Srid`har Mani	Bin Tean Teh
Darell D. Bigner	Arthur E. Frankel	Lawrence D. Mayer	Carter Van Waes
Michael L. Bittner	Stephen V. Frye	David J. McConkey	Kristiina Vuori
Thomas F. Bumol	Simone Fulda	Frank McCormick	Shaomeng Wang
Robert M. Campbell	Ram N. Ganapathi	Giovanni Melillo	David J. Waxman
David A. Cheresh	Michelle D. Garrett	Ira Mellman	Tai Wai Wong
James G. Christensen	Andreas J. Gescher	Paul S. Mischel	Amy E. Wright
Steve R. Coats	David A. Gewirtz	Brett P. Monia	Jingwu Xie
Barbara A. Conley	Amato J. Giaccia	Robert A. Newman	Leigh S. Zavel
Robert A. Copeland	I. David Goldman		Yuesheng Zhang

Editorial Office: *Molecular Cancer Therapeutics* [ISSN: 1535-7163 (Print); ISSN: 1538-8514 (Online)] is published monthly, one volume per year, by the American Association for Cancer Research, Inc.; 615 Chestnut Street, 17th Floor, Philadelphia, PA 19106-4404. Periodicals postage paid at Philadelphia, PA, and additional mailing offices. POSTMASTER: Send address changes to *Molecular Cancer Therapeutics*, Member Services, AACR, 615 Chestnut St., 17th Floor, Philadelphia, PA 19106-4404 or E-mail: membership@aacr.org. Copyright 2019 by the American Association for Cancer Research, Inc. © The paper used in this publication meets the requirements of ANSI/NISO Z39.48-1992 (Permanence of Paper).

AACR Officers

Elaine R. Mardis, President
 Antoni Ribas,
 President-Elect
 Elizabeth M. Jaffee, Past
 President
 William N. Hait, Treasurer
 Margaret Foti, Chief Executive
 Officer

**Publications
Committee**

Victor E. Velculescu,
 Chairperson
 Dafna Bar-Sagi
 Mary Helen Barcellos-Hoff
 Michael E. Berens
 John D. Carpten
 Maura L. Gillison
 Rakesh K. Jain
 Pasi A. Jänne
 Gerrit A. Meijer
 Gordon B. Mills
 Steffi Oesterreich
 William Pao
 Gloria M. Peterson
 David R. Piwnica-Worms
 Charles W.M. Roberts
 Alice T. Shaw
 Lillian L. Siu
 Saraswati V. Sukumar
 Toshikazu Ushijima

Publishing Staff

Publisher
 Christine Battle

**Director, Journal
 Operations and Systems**
 Daniel S. Evanko

**Director, Journal Sales
 and Marketing**
 Nicola L. Hill

**Director, Digital
 Publishing**
 Mark Jacobson

**Associate Director,
 Production**
 Charlene Squibb

**Assistant Director,
 Production**
 David Livewell

**Assistant Director,
 Journal Marketing**
 Joanna Arnold

**Assistant Director,
 Institutional Sales &
 Outreach**
 Karola Rac

**Marketing and Creative
 Services**

Senior Director
 Paul Driscoll

Design Staff
 Susan Moore

Scope

Molecular Cancer Therapeutics strives to be the top choice for publishing the best science in the discovery and preclinical development of novel therapeutic agents for oncology, preclinical studies of approved therapeutics, mechanisms of drug action, mechanisms of drug resistance, biomarkers of drug response, novel models and technologies, and occasional drug toxicity mechanisms. While the Journal's main focus is on small molecule and protein drugs, other molecular entities may be considered.

Molecular Cancer Therapeutics is abstracted and/or indexed in Current Contents/Clinical Medicine, MEDLINE, Science Citation Index, Scopus, and Web of Science.

Submission of Manuscripts

Online manuscript submission is welcomed at <http://mct.msubmit.net>. Before submitting a manuscript, please read the Instructions for Authors, which is available from the Journal's home page at <http://mct.aacrjournals.org>.

Publication Charges

Beginning with manuscripts submitted January 1, 2016 or after, articles will be published with the understanding that the author(s) will pay both a publication fee plus a color figure handling fee. Please see the Instructions for Authors, which are available from the Journal's home page at <http://mct.aacrjournals.org>.

Subscription Information

Nonmember Individuals
 Subscriptions include print version with online access. Contacts listed below are for nonmember individual subscriptions.

USA and Rest of World (excluding Japan)
 American Association for Cancer Research, 615 Chestnut Street, Philadelphia, PA 19106; 1-855-744-4667; pubsales@aacr.org

Japan
e-support@maruzen.co.jp;
journal@kinokuniya.co.jp; usaco@usaco.co.jp

International print subscriptions include cost of surface mail. Expedited mailing is available. Contact the American Association for Cancer Research for rates.

Site Licenses

For information about institutional site licenses, contact pubsales@aacr.org.

AACR Members

AACR members may opt to receive either a print subscription with online access to content or an online-only subscription. Contact membership@aacr.org or visit the membership page at www.aacr.org for more information.

Single Issue Sales

Subject to their availability, single or back issues may be purchased for \$60 (U.S.) or \$65 (outside the U.S.) each. The cost must be prepaid. Contact pubsales@aacr.org.

Claims

One-time claims for missing issues made within 120 days of the issue's publication will be honored, subject to availability. No credit or refund will be given if an issue is out of print at the time of claim.

AACR Members
membership@aacr.org

Nonmembers and Institutions
pubsales@aacr.org

Advertising Information

For information about advertising in AACR journals, contact Pharmaceutical Media Inc., 30 East 33rd St., 4th Floor, New York, NY 10016; 212-904-0360; Dsimone@pminy.com

Copyright and Permissions

Content printed in or disseminated by *Molecular Cancer Therapeutics* is protected by copyright. Authors who wish to publish material in *Molecular Cancer Therapeutics* must formally transfer copyright to the AACR. All authors must sign copyright transfer forms before the AACR can proceed with publication.

To read the complete AACR Copyright and Permissions Policy, visit <http://aacrjournals.org/content/authors/copyright-permissions-and-access>.