MOLECULAR

The Journal of Cancer Drug Discovery & Preclinical Development





Editor-in-Chief Beverly A. Teicher

Deputy Editors

Yubin Kang Akash Patnaik Puja Sapra Paul Workman

Reviews Editor

Razelle Kurzrock

Senior Editors

Timothy P. Cripe Susan M. Galbraith Iqbal S. Grewal Peter J. Houghton Candace S. Johnson Ricky W. Johnstone 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

Special Content Manager

Chris Vesci

Senior Production Editor

Jennifer L. Harper

Editorial Board

Robert T. Abraham Rajesh Agarwal Adriana Albini Kari Alitalo Suresh V. Ambudkar Paul A. Andrews Avi Ashkenazi James E. Audia André S. Bachmann Raffaele Baffa Rebecca G. Bagley Albert S. Baldwin, Jr.

David Bearss Darell D. Bigner Michael L. Bittner Thomas F. Bumol Robert M. Campbell David A. Cheresh

James G. Christensen Steve R. Coats Barbara A. Conley Robert A. Copeland Sayed S. Daoud

Marcia I. Dawson William A. Denny Paul Dent Channing J. Der Vishva M. Dixit

Ethan Dmitrovsky Suzanne A. Eccles Heinz-Herbert Fiebig William D. Figg, Sr. Paul B. Fisher Antonio Fojo Arthur E. Frankel

Lori Friedman Stephen V. Frye Simone Fulda Ram N. Ganapathi Michelle D. Garrett

(continued on next page)

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 2021 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).

MOLECULAR CANCER THERAPEUTICS

Editorial Board (Continued)

Kathy Gately
Andreas J. Gescher
David A. Gewirtz
Amato J. Giaccia
William H. Gmeiner
I. David Goldman
Michael M. Gottesman
Paul Grothaus
Lorraine J. Gudas
Yusuf A. Hannun
Stephen B. Howell
Donna Huryn
Rakesh K. Jain

Stephen B. Howell
Donna Huryn
Rakesh K. Jain
Peter A. Jones
Craig T. Jordan
Juliane M. Jürgensmeier
Robert S. Kerbel
Andrew S. Kraft
Donald W. Kufe
Michihiko Kuwano

Zihai Li Mary M. Mader Daruka Mahadevan Sanjay V. Malhotra Sridhar Mani Lawrence D. Mayer David J. McConkey Frank McCormick Giovanni Melillo Ira Mellman Paul S. Mischel Brett P. Monia Nouri Neamati Robert A. Newman Barry R. O'Keefe Pier Paolo Pandolfi Ira Pastan Steven R. Patierno

Maurizio Pellecchia

Gail D. Lewis Phillips

Andrew Phillips Yves Pommier C. Patrick Reynolds Edward A. Sausville Jeffrey Settleman Shivendra V. Singh David B. Solit Michael B. Sporn Pavel Strop Bin Tean Teh Carter Van Waes Kristiina Vuori Shaomeng Wang David J. Waxman Tai Wai Wong Amy E. Wright Jingwu Xie Leigh S. Zawel Yuesheng Zhang

Trusted and TimelyPublication of Scientific Discoveries

AACR'S ESTEEMED JOURNAL COLLECTION

Cancer Cancer Cancer Epidemiology, **Prevention Immunology Biomarkers** Research Research The forefront of prevention science & Prevention Impact Factor: 3.473 Impact Factor: 4.344 Impact Factor: 8.728 Cancer Clinical Molecular Molecular Research Cancer Cancer Research Research **Therapeutics** The journal of clinical and translational rese Defining the molecular basis of malignancy and progression Impact Factor: 10.107 Impact Factor: 4.630

Subscribe Today!
PubSales@AACR.org
Learn more at AACRJournals.org



Print ISSN: 1535-7163 | Online ISSN: 1538-8514

MOLECULAR CANCER THERAPEUTICS

Publishing Information



AACR Officers

Antoni Ribas, President David A. Tuveson. President-Elect Elaine R. Mardis, Past President William N. Hait, Treasurer Margaret Foti, Chief Executive

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

Director, Editorial Robert Kruger

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

Publication Charges

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 Publication Fees and Reprints page which is available at https://aacrjournals.org/content/ authors/publication-fees-and-reprints.

Subscription Information

Nonmember Individuals

Subscriptions include online access only. 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 https://aacr.org for more information.

Single Issue Sales/Claims

Due to the impact of COVID-19, the AACR has discontinued single issue orders and fulfillment of claims through December 31, 2021.

Advertising Information

For information about advertising in AACR journals, contact The Walchli Tauber Group, Inc., 2225 Old Emmorton Road, Suite 201, Bel Air, MD 21205; (443) 512-8899; maura.paoletti@wt-group.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 https://aacrjournals.org/ content/authors/copyright-permissions-and-access.