Cancer Research

American Association for Cancer Research, Inc.
Publications Staff
Managing Editor
Margaret Foi
Assistant Managing Editor
Mary Anne Menette
Manager, Editorial Services
Heide M. Puziaty
Staff Editors
Michael J. Beveridge
Kathleen C. Assenmacher
Pamela R. Arnold
Ronald M. Vitale
Staff Assistant
Mary Ellen Perring
Senior Editorial Assistant
Theresa A. Griffith
Editorial Assistants
Valerie L. Samuel
Cecilia Gallo
Marketing Coordinator
Robert B. O'Malley
Administrative Staff
Executive Director
Margaret Foi
Director of Administration
Adam D. Blistein
Controller
Joan D. Ritchie
Manager, Meetings and Exhibits
Jeffrey M. Ruben
Meeting Planner
Carole L. Kanoff
Public Information Coordinator
Jenny Anne Horst-Martz
Assistant to the Executive Director
Ruth E. Fortson
Membership Development Coordinator
Robin E. Felder
Administrative Assistant
Margaret A. Pickels
Systems Specialist
Lydia I. Rodriguez
Secretary
Malika L. Wright
Editorial Assistant
Diana F. Certo
Office Clerk
James J. Waters
Data Entry Clerk
Robert A. Simms II

Editor-in-Chief
Carlo M. Croce

Associate Editors
Stuart A. Aaronson
David S. Alberts
Carmen J. Allegra
Frederick R. Appelbaum
Leonard H. Augenlicht
Silvia Bacchetti
William M. Baird
Allan Balmain
J. Carl Barrett
Renato Baserga
Stephen B. Baylin
William T. Beck
Nathan A. Berger
Joseph R. Bertino
Diane F. Birt
Mina J. Bissell
Clara D. Bloomfield
Ronald H. Blum
Gianni Bonadonna
Rodrigo Bravo
Edward Bresnick
Garrett M. Brodeur
Paul A. Bunn, Jr.
C. Patrick Burns
Fernando Cabanillas
Bruno Calabretta
Eli Canaani
Robert L. Capizzi
Webster K. Caveness
Ann F. Chambers
Bruce D. Cheson
David Colcher
Robert L. Comis
Allan H. Conney
Neal G. Copeland
Pelayo Correa
Suzanne Cory
William M. Crist
Riccardo Dalla-Favera
Mary B. Daly
Nancy E. Davidson

Benito de Crombrugghe
Albert B. Deisseroth
Luigi M. DeLuca
Eugene R. DeSombrer
Vincent T. DeVita, Jr.
T. Michael Dexter
Ralph E. Durand
Alan Eastman
Merril J. Egorin
Gertrude B. Elion
Leonard C. Erickson
Nelson Fausto
Eric R. Fearon
Andrew P. Feinberg
Olivia J. Finn
Robert A. Foyd
Antonio T. Fojo
Jadad Folkman
Kenneth A. Foro
Albert J. Fornace, Jr.
Joseph F. Fraumeni, Jr.
Stephen H. Friend
Zvi Y. Fukas
Minoru Fukuda
Philip Furmaniski
Eugene W. Gerner
Eli Glatstein
David W. Golde
Joe W. Gray
J. W. Grisham
Lorraine J. Gudas
F. Peter Guengricher
Sen-itiroho Hakomori
Stanley R. Hamilton
Curis C. Harris
Stephen S. Hecht
Carl-Henrik Heldin
Ingegerd Hellstrom
Brian E. Henderson
Richard B. Hochberg
Waan Ki Hung

Tasuku Honjo
H. Robert Horvitz
Janet A. Houghton
Kay Huehner
Mark A. Israel
Elaine S. Jaffe
Rakesh K. Jain
Peter A. Jones
V. Craig Jordan
Frederick K. Kadin
Michael B. Kastan
Young S. Kim
Kenneth W. Kinzler
Hyndia K. Kleinman
Alfred G. Knudson, Jr.
Richard D. Kolodner
Laurence N. Kornel
Peter H. Kramer
David P. Lane
Edmund C. Lantime
John S. Lazo
Victor A. Levin
Jay A. Levy
Victor Ling
Lance A. Liotta
Martin Lipkin
Marc E. Lippman
Gerald Litwack
Leroy F. Liu
David M. Livingston
Lawrence A. Loeb
Dan L. Longo
Reuben Lotan
David B. Ludlum
Lynn M. Marrissen
W. Gilles McKenna
Beatrice Mintz
James B. Mitchell
Malcolm S. Mitchell

Ruth J. Muschel
Yusuke Nakamura
Susan L. Naylor
Kenneth Nilson
Sussena Nimishira
Jeffrey A. Norton
Kenneth Olden
Allen I. Offil
Richard J. O'Reilly
Robert F. Oszlos
Michael A. Polladinno, Jr.
Takis S. Papas
Carlos P. Parada
Drew M. Pardoll
Ramnon Parsons
Anthony E. Pegg
Pier Giuseppe Pellicci
Angel Pellicer
Bice Perussia
Lester J. Peters
Gordon L. Phillips
Cecil B. Pickett
Jacalyn H. Pierce
Jennifer A. Pietenpol
Yves G. Pommier
Bruce A. J. Ponder
Theresa P. Predow
Vito Quaronza
Frank J. Rauscher III
John C. Reed
Richard A. Rifkind
Leslie L. Robison
Igor B. Roninson
Eric K. Rowinsky
Howard I. Scher
Robert T. Schimke
J. Schlessinger
Manfred Schwab
Jerry W. Shay
David Sidransky

Joseph V. Simone
Francis M. Sirotnak
Anna Marie Skalka
Michael B. Sporn
Martha R. Stampler
Eric J. Stanbridge
Patricia S. Steeg
Glenn Steele, Jr.
Gary S. Stein
Gary D. Stoner
Takashi Sugimura
Saraswati Sukumar
Paul Talalay
Tadatsugu Taniguchi
Steven R. Tannenbaum
Masakida Terada
Kenneth D. Tew
Donald J. Tindall
Thea D. Tisty
Jeffrey M. Trent
Giorgio Trinchieri
Takashi Tsukuda
Axel Ullrich
George F. Vande Woude
Peter W. Vaupe
Giancarlo Vecchio
Peter K. Vogt
Daniel V. Von Hoff
Carol J. Walker
Michael D. Waterfield
Lee W. Wattenberg
Ralph W. Weiselbaum
Bengt Westmark
Raymond L. White
Alice S. Whitemore
Max S. Wicha
Wendell Wierenga
Roger Wiestman
Sheldon Wolff
Harald zur Hausen

Cancer Research is sponsored by the American Association for Cancer Research, Inc. Accelerated mailing of all AACR Journals to AACR members in Japan is supported by a generous grant from the Banyu Pharmaceutical Company, Tsukuba, Japan.

Subscription Information
Cancer Research is published twice a month, one volume per year, by the American Association for Cancer Research (AACR), Inc. Subscriptions include the Proceedings of the American Association for Cancer Research, issued in March of each year. For exceptions to the AACR, all subscriptions are payable in advance to AACR, Subscription Office, P.O. Box 11806, Birmingham, AL 35202 [Telephone: (800) 633-4931 or (205) 995-1567, FAX: (205) 995-1588], to which all business communications, remittances (in United States currency or its equivalent), and subscription orders should be sent. In Japan, send orders and inquiries to (sole agent): USAOCorporation,TatsuBldg.,13-12,Shinbashi1-chome,Minato-ku,Tokyo105,Japan;Tel.(03)502-6471.Individuals who are not AACR members may subscribe to Volume 58 (1998) of Cancer Research at the rate of $495 U.S.$335 foreign. Cancer Research is only available to institutions as a combined subscription with Clinical Cancer Research. The combined 1998 institutional subscription price of $795 U.S.$525 foreign includes $210 U.S.$150 for a subscription to Clinical Cancer Research. (Foreign subscription cost includes cost of surface mail. For faster delivery, expedited mailing rates are available by contacting the AACR Publications Department.) Canadian subscribers should add 7% GST. Changes of address notification should be sent 60 days in advance and include both old and new addresses. Member subscribers should send address changes to: AACR Member Services, Public Ledger Bldg., Suite 826, 150 South Independence Mall West, Philadelphia, PA 19106-3483. Nonmember subscribers should send changes of address to: AACR Subscription Office, P.O. Box 11806, Birmingham, AL 35202. Copies of the journal which are undeliverable because of address changes will be destroyed.
Notice to Members of the American Association for Cancer Research (AACR)

Officers for 1997–1998

President: Donald S. Coffey, Johns Hopkins University School of Medicine, Baltimore, MD 21287-2101
President-Elect: Webster K. Cavenee, Ludwig Institute for Cancer Research, La Jolla, CA 92037-0660
Treasurer: Bayard D. Clarkson, Memorial Sloan-Kettering Cancer Center, New York, NY 10021
Executive Director: Margaret Foti, AACR, Public Ledger Bldg., Suite 826, 150 South Independence Mall West, Philadelphia, PA 19106-3483

Annual Dues

The annual dues of active members of the AACR are $175, $90 of which may be applied to a subscription to Cancer Research. Corresponding members of the Association will be charged an appropriate fee to offset postage costs. Payment of dues and changes of address of members of the Association should be sent promptly to: Member Services, AACR, Public Ledger Bldg., Suite 826, 150 South Independence Mall West, Philadelphia, PA 19106-3483. Telephone: (215) 440-9300; FAX: (215) 440-9313.

Back Issues and Single Copy Sales of the Journal

Copies of back stock of the journal Cancer Research may be ordered from AACR Subscription Office, P.O. Box 11806, Birmingham, AL 35202 [Telephone: (800) 633-4931 or (205) 995-0157; FAX: (205) 995-1588]. As long as supplies permit, single copies of Cancer Research will be sold at $30 per copy for regular and Supplement issues, plus $4 shipping for orders outside the U.S. The annual Proceedings of the American Association for Cancer Research is available at $45 per copy, plus $6 shipping for orders outside the U.S.

Advertisements in Cancer Research

Advertisement insertion orders and copy must be received approximately 5 weeks prior to the date of the issue in which the advertisement is to be published. The journal is mailed approximately 5 days preceding the date of issue. Inquiries about advertising should be directed to: M. J. Mrivica Associates, Inc., 2 West Taunton Avenue, Berlin, NJ 08009 [Telephone: (609) 768-9360; FAX: (609) 753-0064].

Historical Cover Themes

Readers are invited to submit themes (events, persons, institutions) for consideration for the illustrated covers of Cancer Research. Correspondence regarding suggested cover themes, or other matters regarding covers, should be addressed to the Cover Editor, AACR Publications Department.

Submission of Manuscripts

Manuscripts should be sent to the attention of: Dr. Carlo M. Croce, Editor-in-Chief, AACR Publications Department, Public Ledger Bldg., Suite 826, 150 South Independence Mall West, Philadelphia, PA 19106-3483. Telephone: (215) 440-9300. If accepted, they will be listed under one of ten categories in the Table of Contents. Please specify in a covering letter which category applies to your submission: biochemistry and biophysics, carcinogenesis, clinical investigations, endocrinology, epidemiology and prevention, experimental therapeutics, immunology, molecular biology and genetics, tumor biology, and virology. (Final categorization in the Table of Contents is at the discretion of the Editor-in-Chief.) For other submission requirements, consult the "Instructions for Authors" printed in the January 1 issue of the journal and available through the AACR Website at http://www.aacr.org/caninst.htm. Reprints of the "Instructions" are available also upon request.

Manuscript Processing Fee

Journal policy requires that a manuscript processing fee of $75 be assessed for each paper to defray the expenses incurred in the editorial review process. Each manuscript submitted for publication should be accompanied by a check (drawn on a U.S. bank) for $75 in U.S. currency, payable to AACR, Inc., or credit card information (VISA, Mastercard, or American Express) should be supplied. Note: If an author re-submits a manuscript that our Editors previously found unacceptable for publication, it is journal policy to consider it a new submission, assign it a new manuscript number, and charge the author another $75 handling fee to cover the cost of review.

Page Charges

Accepted manuscripts will be published with the understanding that the author(s) will pay a charge of $80 per printed page. Under exceptional circumstances, when no grant or other source of support exists, the author(s) may apply to Dr. Carlo M. Croce, Editor-in-Chief, at the time of submission, for a waiver of the page charges. All such applications must be countersigned by an appropriate institutional official stating that no funds are available for the payment of page charges.

Copyright and Copyright Clearance Center

The Copyright Revision Act (PL 94-553), which became effective January 1, 1978, states that the copyright of a work is vested in the author from the moment of creation. Therefore, all authors who wish to publish in Cancer Research must formally transfer copyright to the proprietor of the journal, AACR, Inc. It is understood by this transfer that the authors relinquish all exclusive rights of copyright ownership, including the rights of reproduction, derivation, distribution, sale, and display.

Authors who prepare their articles as part of their official duties as employees of the U.S. Federal Government are not required to transfer copyright to the American Association for Cancer Research, Inc., since these articles are considered to be in the public domain. However, it is necessary for these authors to sign the appropriate section of the transfer form. In the case of articles supported by federal grants or contracts, copyright transfer to AACR, Inc., is required. The federal government may retain a nonexclusive license to publish or republish such material.

Copies of articles for which AACR, Inc., owns the copyright may be made for personal or internal use, provided that the copier pay the per-copy fee of $4 through the Copyright Clearance Center, Inc. This Center is a nonprofit organization through which individuals and institutions may reimburse a copyright owner for photocopying journal articles beyond what is defined as "fair use" in Sections 107 and 108 of the Copyright Revision Act of 1978. Those who wish to photocopy Cancer Research articles may report the number of copies they have made, together with the fee code 0008-5472/98 $04.00, to: Copyright Clearance Center, Inc., 22 Rosewood Drive, Danvers, MA 01923; (508) 750-8400. Remittances may be sent to the Center at the time of reporting or the Center will bill the user on a monthly basis. Deposit accounts and prepayment plans may also be arranged.

Between June 1978 and August 1983, a fee code appeared on the first page of all articles for which Cancer Research owned the copyright. For those issues, it is understood that any articles which did not carry this code are on acid-free paper.

Cancer Research is abstracted or indexed in Biological Abstracts, Chemical Abstracts, Index Medicus, MEDLINE, Current Contents, and Reference Update. This journal is printed on acid-free paper.

No responsibility is accepted by the Editors, by AACR, Inc., or by Cadmus Journal Services for the opinions expressed by contributors or for the content of the advertisements.

Cancer Research (ISSN 0008-5472) is published twice a month by the American Association for Cancer Research, Inc., Public Ledger Bldg., Suite 826, 150 South Independence Mall West, Philadelphia, PA 19106–3483 for $90 annually for members and $495 for individual nonmembers. Cancer Research is only available to institutions as a combined subscription with Clinical Cancer Research. The combined 1998 institutional subscription price of $795 includes a subscription to Clinical Cancer Research. Periodicals postage paid at Philadelphia, PA and additional mailing offices. POSTMASTER: Send address changes to AACR Subscription Office, P.O. Box 11806, Birmingham, AL 35202. Copyright 1998 by the American Association for Cancer Research, Inc. Printed in the U.S.A.