

JOURNAL OF VIROLOGY

VOLUME 71 • APRIL 1997 • NUMBER 4

Thomas E. Shenk, *Editor in Chief* (1999)
Princeton University
Princeton, N.J.

Roger N. Beachy, *Editor* (2000)
The Scripps Research Institute
La Jolla, Calif.

John M. Coffin, *Editor* (2001)
Tufts University Medical School
Boston, Mass.

Ronald C. Desrosiers, *Editor* (1998)
Harvard Medical School
Boston, Mass.

Daniel C. DiMaio, *Editor* (2001)
Yale University School of Medicine
New Haven, Conn.

Lynn W. Enquist, *Editor* (1999)
Princeton University
Princeton, N.J.

Mary K. Estes, *Editor* (1998)
Baylor College of Medicine
Houston, Tex.

Diane E. Griffin, *Editor* (1999)
The Johns Hopkins University School of
Hygiene and Public Health
Baltimore, Md.

Gary J. Nabel, *Editor* (2000)
University of Michigan
Ann Arbor, Mich.

Carol Prives, *Editor* (2001)
Columbia University
New York, N.Y.

Vincent R. Racaniello, *Editor* (1997)
Columbia University
New York, N.Y.

Joseph Sodroski, *Editor* (1998)
Dana-Farber Cancer Institute
Boston, Mass.

Inder M. Verma, *Editor* (1998)
The Salk Institute
San Diego, Calif.

EDITORIAL BOARD

Rafi Ahmed ('97)
Chris Aiken ('99)
Jeffrey Almond ('98)
David Anders ('99)
Raul Andino ('99)
Carl C. Baker ('97)
Kenneth Berns ('98)
Martin Billeter ('97)
Joseph B. Bolen ('97)
Thomas J. Braciale ('97)
John Brady ('97)
Philip Branton ('99)
William Britt ('97)
Patrick Brown ('97)
Frederic D. Bushman ('97)
Robert Callahan ('97)
Michael Carter ('99)
Irvin S. Y. Chen ('99)
Bruce W. Chesebro ('97)
Janice Clements ('97)
Donald M. Coen ('98)
Gary H. Cohen ('97)
Peter L. Collins ('97)
Richard C. Condit ('98)
Matthew Cotten ('98)
Bryan R. Cullen ('99)
Samuel Dales ('97)
Satya Dandekar ('99)
Neal DeLuca ('97)
C. Michael Deom ('98)
Peter Doherty ('98)
Esteban Domingo ('97)
Theo Dreher ('99)
Roselyn J. Eisenberg ('97)
John H. Elder ('99)
Michael Emerman ('98)
Emilio Emini ('97)
Dan Engel ('99)
Francis Ennis ('99)
Hung Fan ('97)
Ellen Fanning ('98)
Lawrence Feldman ('99)
J. Bert Flanagan ('98)
Berhard Fleckenstein ('99)

Jane Flint ('99)
Thomas Folks ('99)
Paul D. Friesen ('97)
Dana H. Gabuzda ('99)
Denise A. Galloway ('98)
Don Ganem ('97)
Richard Gaynor ('97)
Eli Gilboa ('98)
Steven Goff ('97)
Heinrich Gottlinger ('99)
Jaap Goudsmit ('97)
Kim Green ('98)
Harry B. Greenberg ('98)
Charles Grose ('97)
Anne-Lise Haenni ('99)
Beatrice H. Hahn ('97)
Timothy C. Hall ('98)
M.-L. Hammarskjöld ('98)
J. Marie Hardwick ('99)
S. Diane Hayward ('98)
Patrick Hearing ('97)
Ari H. Helenius ('99)
Cynthia Hemenway ('98)
David D. Ho ('99)
James M. Hogle ('97)
Brenda Hogue ('99)
Thomas Hohn ('99)
Kathryn V. Holmes ('97)
Fred Homa ('97)
Edward A. Hoover ('97)
Thomas Hope ('97)
Peter M. Howley ('99)
Eric Hunter ('99)
Tony Hunter ('98)
Michael J. Imperiale ('98)
Jun-ichiro Inoue ('97)
Kuan-Teh Jeang ('97)
David C. Johnson ('99)
Paul Jolicoeur ('99)
Kathy Jones ('99)
Yoshihiro Kawaoka ('98)
Thomas J. Kelly ('97)
Elliott Kieff ('99)
Karla Kirkegaard ('99)

David M. Knipe ('97)
Dan Kolakofsky ('99)
Bette Korber ('98)
Richard Koup ('98)
Mark Krystal ('99)
Richard Kuhn ('98)
Michael Lai ('97)
Laimonis Laimins ('97)
Paul Lambert ('98)
Sondra Lazarowitz ('98)
Jonathan Leis ('97)
Stanley M. Lemon ('98)
Jack Lenz ('99)
Norman L. Letvin ('98)
David M. Livingston ('97)
L. Sue Loesch-Fries ('98)
Paul J. Maddon ('99)
Michael Malim ('97)
James L. Manley ('98)
Patricia Marion ('98)
Malcolm A. Martin ('98)
William S. Mason ('97)
Paul Masters ('98)
Michael B. Mathews ('97)
Alison McBride ('99)
Alan McLachlan ('99)
A. Dusty Miller ('97)
Lois K. Miller ('97)
Leonard Mündich ('97)
Edward S. Mocarski ('99)
Peter Model ('98)
John P. Moore ('99)
Elizabeth Moran ('99)
Casey Morrow ('97)
Bernard Moss ('98)
Richard W. Moyer ('98)
James Mullins ('99)
Karl Mungler ('97)
Brian R. Murphy ('97)
Nicholas A. Muzyczka ('99)
Opendra Narayan ('97)
Neal Nathanson ('99)
Jay A. Nelson ('97)

Joseph R. Nevins ('97)
Max L. Nibert ('99)
Don Nuss ('97)
Roland Owens ('99)
Peter Palese ('97)
Enzo Paoletti ('97)
Tristram G. Parslow ('99)
John Patton ('97)
C. David Pauza ('99)
George N. Pavlakis ('97)
Matija Peterlin ('99)
David J. Pintel ('98)
Abraham Pinter ('97)
James M. Pipas ('99)
Roger J. Pomerantz ('99)
Nancy Raab-Traub ('99)
Arnold B. Rabson ('99)
R. Frank Ramig ('97)
Lee Ratner ('97)
Alan R. Rein ('99)
David Rekosh ('98)
Charles Rice ('97)
Douglas Richman ('97)
Alan Rickinson ('99)
Charles Rogler ('98)
George Rohrman ('98)
Bernard Roizman ('97)
John K. Rose ('97)
Craig Rosen ('99)
Barry T. Rouse ('99)
Linda Saif ('98)
Richard Jude Samulski ('98)
R. M. Sandri-Goldin ('97)
Peter Sarnow ('99)
Dorothea L. Sawicki ('97)
Priscilla A. Schaffer ('99)
Heinz Schaller ('98)
John Schiller ('98)
Robert J. Schneider ('97)
Christoph Seeger ('99)
Bartholomew M. Sefton ('97)
Bert L. Semler ('98)
David A. Shafritz ('97)

George Shaw ('97)
Stewart Shuman ('98)
Saul J. Silverstein ('97)
Daniel T. Simmons ('98)
Anna Marie Skalka ('99)
Enzo Soneberg ('99)
Nancy Speck ('97)
Arne Stenlund ('98)
Mario Stevenson ('99)
Mark F. Stinski ('98)
Jonathan P. Stoye ('99)
Stephen E. Straus ('99)
James H. Strauss ('99)
Bill Sugden ('99)
Jesse Summers ('98)
Ronald Swanstrom ('99)
Peter J. Tattersall ('98)
John M. Taylor ('99)
Mary J. Tevethia ('99)
Satvir S. Tevethia ('97)
David A. Thorley-Lawson ('97)
Paula Traktman ('98)
Didier Trono ('99)
Philip N. Tschlis ('98)
Kenneth L. Tyler ('97)
Luis V. Villarreal ('97)
Peter K. Vogt ('99)
Bruce Walker ('97)
Robert G. Webster ('99)
Sandra Weller ('99)
Raymond M. Welsh ('97)
Gail Wertz ('97)
J. Lindsay Whitton ('98)
Reed B. Wickner ('97)
Kent Wilcox ('97)
John W. Wills ('98)
James Wilson ('98)
William S. M. Wold ('99)
Steven M. Wolinsky ('97)
Flossie Wong-Staal ('99)
Moshe Yaniv ('98)
Jonathan Yewdell ('99)
Michael Yoshida ('97)

Barbara H. Iglewski, *Chairman, Publications Board*
Judith Nedrow, *Production Editor*

Linda M. Illig, *Director, Journals*
Barbara S. Slinker, *Assistant Production Editor*

The *Journal of Virology*, a publication of the American Society for Microbiology (ASM), 1325 Massachusetts Ave., N.W., Washington, DC 20005-4171, is devoted to the dissemination of fundamental knowledge concerning viruses of bacteria, plants, and animals. Investigators are invited to submit reports of original research in all areas of basic virology, including biochemistry, biophysics, genetics, immunology, morphology, physiology, and pathogenesis and immunity. Instructions to authors are published in the January issue each year; reprints are available from the editors and the Journals Department. The *Journal* is issued monthly, one volume per year. The nonmember print subscription prices (per year) are: \$462, U.S. (Canadians add 7% GST); \$544, Europe; \$545, Latin America; and \$546, rest of world. Member print subscription prices (per year) are: \$89, U.S. (Canadians add 7% GST); \$135, Europe; \$136, Latin America; \$137, rest of world. Single copies are: \$45, nonmember; \$13, member (Canadians add 7% GST). For prices of CD-ROM versions, contact the Subscriptions Unit, ASM. Correspondence relating to subscriptions, defective copies, missing issues, and availability of back issues should be directed to the Subscriptions Unit, ASM; correspondence relating to reprint orders should be directed to the Reprint Order Unit, ASM; and correspondence relating to disposition of submitted manuscripts, proofs, and general editorial matters should be directed to the Journals Department, American Society for Microbiology, 1325 Massachusetts Ave., N.W., Washington, DC 20005-4171. Phone: (202) 737-3600.

Claims for missing issues from residents of the United States, Canada, and Mexico must be submitted within 3 months after publication of the issues; residents of all other countries must submit claims within 6 months of publication of the issues. Claims for issues missing because of failure to report an address change or for issues "missing from files" will not be allowed.

Periodicals postage paid at Washington, DC 20005, and at additional mailing offices.

POSTMASTER: Send address changes to *Journal of Virology*, ASM, 1325 Massachusetts Ave., N.W., Washington, DC 20005-4171.

Made in the U.S.A. Printed on acid-free paper.

ISSN 0022-538X

CODEN: JOVIAM

Copyright © 1997, American Society for Microbiology.

All Rights Reserved.

The code at the top of the first page of an article in this journal indicates the copyright owner's consent that copies of the article may be made for personal use or for personal use of specific clients. This consent is given on the condition, however, that the copier pay the stated per-copy fee through the Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923, for copying beyond that permitted by Sections 107 and 108 of the U.S. Copyright Law. This consent does not extend to other kinds of copying, such as copying for general distribution, for advertising or promotional purposes, for creating new collective works, or for resale.