

diabetes®

EDITOR IN CHIEF

K. Sreekumaran Nair, MD, PhD

ASSOCIATE EDITORS

E. Dale Abel, MD, PhD

Sharon G. Adler, MD

Peter J. Dyck, MD

Thomas W. Gardner, MD, MS

Kathryn M. Haskins, PhD

Gökhan Hotamisligil, MD, PhD

Michael D. Jensen, MD, PhD

Anna Krook, PhD

Braxton Mitchell, PhD

Jeffrey E. Pessin, PhD

James R. Sowers, MD

Lori Sussel, PhD

Adrian Vella, MD, FRCP

Nick Wareham, MBBS, PhD, FRCP, FFPHM

Fredric E. Wondisford, MD

CONSULTING EDITORS

Steven F. Abcouwer, PhD

Reza Abdi, MD

Nada A. Abumrad, PhD

Gail K. Adler, MD, PhD, FAHA

Rocco Barazzoni, MD, PhD

Timothy J. Bartness, PhD

Dwaipayan Bharadwaj, PhD, FNASc

Andrew A. Butler, PhD

Wenhong Cao, MD

Deborah J. Clegg, RD, PhD

Anne Cooke, DPhil, FMedSci

Gregory Cooney, PhD

Daniel J. Drucker, MD

Josephine M. Egan, MD,

MRCPI, FRCPI

Gian Paolo Fadini, MD, PhD

Brian N. Finck, PhD

Simon J. Fisher, MD, PhD

Alessia Fornoni, MD, PhD

Maureen Gannon, PhD

Richard E. Gilbert, MBBS, PhD, FRCPC

Benjamin Glaser, MD

Laurie J. Goodyear, PhD

Struan F.A. Grant, PhD

Eric Hajdуч, PhD

Christian Herder, PhD, MSc

Pedro L. Herrera, PhD

Michael Horowitz, MBBS, PhD, FRACP

Patrick B. Iynedjian, MD

Anton M. Jetten, PhD

Weiping Jia, MD, PhD

James D. Johnson, PhD

Fredrik Karpe, PhD, FRCP

Richard G. Kibbey, MD, PhD

Jae Bum Kim, PhD

Jason K. Kim, PhD

Jeonga Kim, PhD

James L. Kirkland, MD, PhD

Amira Klip, PhD

Ian R. Lanza, PhD

Chih-Hao Lee, PhD

Sheldon E. Litwin, MD

Carey N. Lumeng, MD, PhD

Francis C. Lynn, PhD

Patrick E. MacDonald, PhD

Bettina Mittendorfer, PhD

Viswanathan Mohan, MD, FRCP, PhD, DSc,

FNASc, FASc, FNA, FACP, FACE, FTWAS

Nicolas Musi, MD

Erik Näslund, PhD

Linda R. Peterson, MD

Inga Prokopenko, PhD

Alberto Pugliese, MD

Jerry Radziuk, PhD, MD, CM

Erik A. Richter, MD, DMSci

Michael Roden, MD

Guy A. Rutter, PhD

Alice S. Ryan, PhD

Leslie S. Satin, PhD

Masakazu Shiota, DVM, PhD

Kevin R. Short, PhD

Bart Staels, PhD

John M. Stafford, MD, PhD

Craig S. Stump, MD, PhD, FACE

Scott A. Summers, PhD

Farook Thameem, PhD

Gianna Maria Toffolo, PhD

Michael I. Trenell, PhD

Hubert M. Tse, PhD

Matthias von Herrath, MD

Jianping Ye, MD

Lori M. Zeltser, PhD

AMERICAN DIABETES ASSOCIATION OFFICERS**CHAIR OF THE BOARD**

Robin J. Richardson

PRESIDENT, MEDICINE & SCIENCE

Desmond Schatz, MD

PRESIDENT, HEALTH CARE & EDUCATION

Margaret A. Powers, PhD, RD, CDE

SECRETARY/TREASURER

Lorrie Welker Liang

CHAIR OF THE BOARD-ELECT

David A. DeMarco, PhD

PRESIDENT-ELECT, MEDICINE & SCIENCE

Alvin C. Powers, MD

PRESIDENT-ELECT, HEALTH CARE & EDUCATION

Brenda Montgomery, RN, MSHS, CDE

SECRETARY/TREASURER-ELECT

Umesh Verma

CHIEF EXECUTIVE OFFICER

Kevin L. Hagan

CHIEF SCIENTIFIC & MEDICAL OFFICER

Robert E. Ratner, MD, FACP, FACE



*The mission of the American Diabetes Association
is to prevent and cure diabetes and to improve
the lives of all people affected by diabetes.*

diabetes®

Mission Statement for *Diabetes*

Diabetes publishes original research about the physiology and pathophysiology of diabetes mellitus. Submitted manuscripts can report any aspect of laboratory, animal, or human research. Emphasis is on investigative reports focusing on areas such as the pathogenesis of diabetes and its complications, normal and pathological pancreatic islet function and intermediary metabolism, pharmacological mechanisms of drug and hormone action, and biochemical and molecular aspects of normal and abnormal biological processes. Studies in the areas of diabetes education or the application of accepted therapeutic and diagnostic approaches to patients with diabetes are not published. More information about the journal can be found online at diabetes.diabetesjournals.org.

Copyright © 2016 by the American Diabetes Association, Inc. All rights reserved. Printed in the USA. Requests for permission to reuse content should be sent to Copyright Clearance Center at www.copyright.com or 222 Rosewood Dr., Danvers, MA 01923; phone: (978) 750-8400; fax: (978) 646-8600. Requests for permission to translate should be sent to Permissions Editor, American Diabetes Association, at permissions@diabetes.org.

The American Diabetes Association reserves the right to reject any advertisement for any reason, which need not be disclosed to the party submitting the advertisement.

Commercial reprint orders should be directed to Sheridan Content Services, (800) 635-7181, ext. 8065.

Single issues of *Diabetes* can be ordered by calling toll-free (800) 232-3472, 8:30 A.M. to 5:00 P.M. EST, Monday through Friday. Outside the United States, call (703) 549-1500. Rates: \$75 in the United States, \$95 in Canada and Mexico, and \$125 for all other countries.

Diabetes is available online at diabetes.diabetesjournals.org. Please call the numbers listed above, e-mail membership@diabetes.org, or visit the online journal for more information about submitting manuscripts, publication charges, ordering reprints, subscribing to the journal, becoming an ADA member, advertising, permission to reuse content, and the journal's publication policies.

PRINT ISSN 0012-1797

ONLINE ISSN 1939-327X

PRINTED IN THE USA

Periodicals postage paid at Alexandria, VA, and additional mailing offices.

AMERICAN DIABETES ASSOCIATION PERSONNEL AND CONTACTS

VICE PRESIDENT, PUBLISHER
Michael Eisenstein

**ASSOCIATE PUBLISHER,
SCHOLARLY JOURNALS**
Christian S. Kohler

EDITORIAL OFFICE DIRECTOR
Lyn Reynolds

PEER REVIEW MANAGER
Jane Castner

EDITORIAL ASSISTANT
Joan Garrett

DIRECTOR, SCHOLARLY JOURNALS
Heather Norton Blackburn

CONTENT PRODUCTION MANAGER
Kelly Newton

EDITORIAL CONTENT MANAGER
Oedipa Rice

TECHNICAL EDITOR
Theresa Cooper

**ASSOCIATE DIRECTOR, BILLING
& COLLECTIONS**
Laurie Ann Hall

**DIRECTOR, MEMBERSHIP/
SUBSCRIPTION SERVICES**
Donald Crowl

SENIOR ADVERTISING MANAGER
Julie DeVoss Graff
jdevoss@diabetes.org
(703) 299-5511

ADVERTISING SALES

PHARMACEUTICAL/DEVICE DIGITAL ADVERTISING
e-Healthcare Solutions
John Burke
Chief Revenue Officer
sales@ehsmaail.com
(609) 882-8887, ext. 149

PHARMACEUTICAL/DEVICE PRINT ADVERTISING
The Jackson-Gaeta Group, Inc.
B. Joseph Jackson
joejackson@jacksongaeta.com
Paul Nalbandian
paulnalbandian@jacksongaeta.com
Tina Auletta
tinaauletta@jacksongaeta.com
(973) 403-7677