

diabetes®

EDITOR IN CHIEF

Martin G. Myers Jr., MD, PhD

SENIOR ASSOCIATE EDITORS

David A. D'Alessio, MD

Maureen A. Gannon, PhD

Randy J. Seeley, PhD

ASSOCIATE EDITORS

Frank C. Brosius, MD

Kevan C. Herold, MD

Massimo Pietropaolo, MD

Charles F. Burant, MD, PhD

Jeffrey F. Horowitz, PhD

Rodica Pop-Busui, MD, PhD

Alessandro Doria, MD, PhD

Jiandie D. Lin, PhD

Leslie Satin, PhD

James Granneman, PhD

Carey Nien-Kai Lumeng, MD, PhD

Doris A. Stoffers, MD, PhD

Maria B. Grant, MD, FARVO

Ormond A. MacDougald, PhD

Morris F. White, PhD

EDITORIAL BOARD

Steven F. Abcouwer, PhD

Eric Hajduch, PhD

Matthew J. Potthoff, PhD

Gail K. Adler, MD, PhD, FAHA

Alyssa Hasty, PhD

Alberto Pugliese, MD

Laura C. Alonso, MD

Mark A. Herman, MD

Matthew Rodeheffer, PhD

David A. Antonetti, PhD

Pedro L. Herrera, PhD

Liangyou Rui, PhD

Alan D. Attie, PhD

Ken Inoki, MD, PhD

Guy A. Rutter, PhD

Julio E. Ayala, PhD

James D. Johnson, PhD

Alice S. Ryan, PhD

Manuela Bartoli, PhD

Young-Bum Kim, PhD

Darleen Sandoval, PhD

Bryan C. Bergman, PhD

Chih-Hao Lee, MD

Gaetano Santulli, MD, PhD

Pengpeng Bi, PhD

Moshe Levi, MD, MS

Philipp E. Scherer, PhD

Shawn C. Burgess, PhD

Xiaoying Li, MD, PhD

Gary J. Schwartz, PhD

Julia V. Busik, PhD

Francis C. Lynn, PhD

Show-Ling Shyng, PhD

Lu Cai, MD, PhD

Patrick E. MacDonald, PhD

Scott Soleimanpour, MD

Nigel A. Calcutt, PhD

Kieren J. Mather, MD, FRCPC

Andreas Stahl, PhD

Jonathon Campbell, PhD

Franck Mauvais-Jarvis, MD, PhD

Jacqueline M. Stephens,

William P. Cawthorn, PhD

Rory J. McCrimmon, MD, MBChB

BS, PhD

Sheila Collins, PhD

Aaron W. Michels, MD

Craig S. Stump, MD, PhD,

Robert V. Considine, PhD

Bettina Mittendorfer, PhD

FACE

Marc Y. Donath, MD

Viswanathan Mohan, MD, FRCP, PhD, DSc,
FNASc, FASc, FNA, FACP, FACE, FTWAS

Gianna Maria Toffolo, PhD

Lena Eliasson, PhD

Daniel J. Moore, MD, PhD

Peter Tontonoz, MD, PhD

Sven Enerback, MD, PhD

Rama Natarajan, PhD

Vincenzo Trischitta, MD

Carmela Evans-Molina, MD, PhD

David P. Olson, MD, PhD

Hubert M. Tse, PhD

Patrick Fueger, PhD

Edwards A. Park, PhD

Fumihiko Urano, MD, PhD

Paula Goforth, PhD

Diego Perez-Tilve, PhD

Adrian Vella, MD

Bret H. Goodpaster, PhD

Linda R. Peterson, MD

Matthew Watt, PhD

Laurie J. Goodyear, PhD

Vincent Poitout, DVM, PhD

Li Wen, MD, PhD

Struan F.A. Grant, PhD

Yang Kevin Xiang, PhD

AMERICAN DIABETES ASSOCIATION OFFICERS

CHAIR OF THE BOARD

Karen Talmadge, PhD

PRESIDENT-ELECT, MEDICINE & SCIENCE

Louis Philipson, MD

PRESIDENT, MEDICINE & SCIENCE

Jane Reusch, MD

PRESIDENT-ELECT, HEALTH CARE & EDUCATION

Gretchen Youssef, MS, RD, CDE

PRESIDENT, HEALTH CARE & EDUCATION

Felicia Hill-Briggs, PhD, ABPP

SECRETARY/TREASURER-ELECT

Brian Bertha, JD, MBA

SECRETARY/TREASURER

Michael Ching, CPA

INTERIM CHIEF EXECUTIVE OFFICER

Martha Parry Clark

CHAIR OF THE BOARD-ELECT

David J. Herrick, MBA

CHIEF SCIENTIFIC, MEDICAL & MISSION OFFICER

William T. Cefalu, MD



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 © 2017 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, email 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 Arlington, VA, and additional mailing offices.

AMERICAN DIABETES ASSOCIATION PERSONNEL AND CONTACTS

SENIOR VICE PRESIDENT, PUBLISHER
Michael Eisenstein

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

EDITORIAL OFFICE DIRECTOR
Lyn Reynolds

PEER REVIEW MANAGER
Jane Castner

ASSOCIATE MANAGER, PEER REVIEW
Joan Garrett

DIRECTOR, SCHOLARLY JOURNALS
Heather Norton Blackburn

CONTENT PRODUCTION MANAGER
Kelly Newton

EDITORIAL CONTENT MANAGER
Oedipa Rice

TECHNICAL EDITOR
Theresa Cooper
Donna J. Reynolds

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

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

ADVERTISING REPRESENTATIVES

AMERICAN DIABETES ASSOCIATION
Paul Nalbandian
Associate Publisher, Advertising &
Sponsorships
pnalbandian@diabetes.org
(703) 549-1500, ext. 4806

Tina Auletta
Senior Account Executive
tauletta@diabetes.org
(703) 549-1500, ext. 4809

PHARMACEUTICAL/DEVICE DIGITAL ADVERTISING
The Walchli Tauber Group
Maura Paoletti
National Sales Manager
maura.paoletti@wt-group.com
(443) 512-8899, ext. 110