

JOURNAL OF APPLIED PHYSIOLOGY®

Editor: Sue Bodine

Deputy Editor: Jason H. T. Bates

Associate Editors:

Lacy M. Alexander
Marcas M. Bamman
Esther Barreiro
Marni Boppert

Christopher DeSouza
Esther E. Dupont-Versteegden
Ralph Fregosi
Simon Gandevia

Benjamin F. Miller
Judith Neubauer
Gordon Kim Prisk

Simon Schenk
John Thyfault

Consulting Editors:

Hannah V. Carey
Jerome A. Dempsey
Susan J. Gunst
Mark Hargreaves
Hans Hoppeler

Michael J. Joyner
Bente Kiens
Fabiola Leon-Velarde
Michiaki Mishima
Wayne Mitzner

Jens Bo Nielsen
Michael B. Reid
Michael N. Sawka
Gary C. Sieck
Muriel Thoby-Brisson

Consulting Associate Editor:

Shawn Bender

Editorial Board:

Philip N. Ainslie
Andrea Aliverti
Bill T. Ameredes
Damien M. Bailey
E. Fiona Bailey
Thomas J. Barstow
Melissa L. Bates
Bradley J. Behrens
Christopher Bell
Donald C. Bolser
Katarina T. Borer
Douglas K. Bowles
Patrice Brassard
George Brooks
Robert H. Brown
Vito Brusasco
Mark Burnley
James P. Butler
Jane E. Butler
Timothy John Carroll
Gregory D. Cartee
Samuel N. Cheuvront
Philip S. Clifford
Timothy E. Corcoran
Edward F. Coyle
Dominic P. D'Agostino
Chantal Darquenne
Jay B. Dean
Wim Derave
Esther E. Dupont-Versteegden
David G. Edwards
Marlowe W. Eldridge
Craig A. Emter

Paul J. Fadel
Dario Farina
William B. Farquhar
Hubert V. Forster
Patrick T. Fueger
Pietro R. Galassetti
Estelle B. Gauda
Joaquim Gea
Keith P. George
Joaquin U. Gonzales
John R. Halliwill
Karyn L. Hamilton
Zoltan Hantos
Craig A. Harms
John A. Hawley
Robert D. Herbert
Martin E. Heroux
Graham P. Holloway
Lacy M. Alexander
Susan Roberta Hopkins
Connie C. W. Hsia
Sandra K. Hunter
Shiroh Isono
Gary A. Iwamoto
Ollie Jay
Andrew M. Jones
Amy S. Jordan
Marc P. Kaufman
Robert W. Kenefick
John P. Konhilas
John M. Kowalchuk
William J. Kraemer
Maike Krenz

Joseph C. LaManna
Lu-Yuan Lee
James C. Leiter
Lisa R. Leon
Benjamin D. Levine
Dag Linnarsson
Stephen H. Loring
Richard M. Lovering
Carsten Lundby
Maureen J. MacDonald
Sheldon Magder
Jason H. Mateika
Kerry S. McDonald
Chris J. McNeil
Daphne Merkus
Christopher Todd Minson
Bettina Mittendorfer
Scott J. Mountain
Daniel K. Mulkey
Judy M. Muller-Delp
Timothy I. Musch
Robert Naeije
Nicole L. Nichols
Lars Nybo
Donald S. O'Leary
I. Mark Olffert
Jaume Padilla
Scott K. Powers
Blake B. Rasmussen
Peter B. Raven
Charles L. Rice
Russell S. Richardson
Robert C. Roach

H. Thomas Robertson
Matthew M. Robinson
Harry B. Rossiter
James W. E. Rush
Barry W. Scheuermann
Evelyn Schlenker
William G. Schrage
Niels H. Secher
John G. Semmler
Jane Shearer
Andrew William Sheel
Larissa M. Shimoda
Minoru Shinohara
Espen E. Spangenburg
Joseph W. Staunes
Brian L. Stauffer
Michael K. Stickland
Kingman P. Strohl
Bela Suki
Erik Richard Swenson
Hirofumi Tanaka
J. Andrew Taylor
Robert S. Tepper
Dick H. J. Thijssen
Bruce R. Thompson
Gabrielle Todd
Akira Tsuda
Alain Van Muylem
Victoria J. Vieira-Potter
Ioannis Vogiatzis
Brett J. Wong
Christopher R. Woodman
D. Walter Wray

Publications Committee

Curt D. Sigmund, *Chair*
Catherine E. Carr
Andrew Greene
David Ellison
Paul A. Insel
Lynette K. Rogers
Loren Wold

Ex officio

Rita Scheman
*Director of Publications
and Executive Editor*
Dennis Brown, *President*
Jeff M. Sands, *President-Elect*
Jane F. Reckelhoff,
Past President
Martin Frank, *Executive
Director*

Audra E. Cox

Editorial Manager
Virginia Million
Sr. Journal Supervisor
Travis Christensen
Leona Kanaskie
Jennifer Marquez
Copy Editors

Gilbert Ebner

Peer Review Manager
Eric Pesanelli
Editorial Art Manager

The *Journal of Applied Physiology* (ISSN-8750-7587) is published online twice monthly and bound once in print monthly (two volumes per year) by the American Physiological Society, 9650 Rockville Pike, Bethesda, MD 20814-3991 and online at www.jap.org (ISSN 1522-1601). *Subscription Prices (postpaid)*. For institutional print and online pricing, please see <http://www.the-aps.org/publications/subs/>. Individual Pricing: Print and Online: \$1,195 US; \$1,300 International. Print Only: \$1,160 US; \$1,270 International. Online Only: \$990. APS members: Online is free. Subscriptions from outside the United States are payable in US currency or full equivalent. Subscriptions are accepted on a calendar-year basis only. *Single Copies: Back Issues:* When available, subscriber, \$120; nonsubscriber, \$240 each postpaid. Periodicals postage paid at Bethesda, MD and at additional mailing offices. POSTMASTER: Send address changes to the Journal

of Applied Physiology, 9650 Rockville Pike, Bethesda, MD 20814-3991.

The *Journal of Applied Physiology*® is a registered trademark of the American Physiological Society.

Copyright © 2017 by the American Physiological Society. Printed in the United States of America by Cadmus Communications—Hurlock Division, Hurlock, MD 21643-3713. The code at the bottom of the first page of an article indicates the copyright owner's consent that copies of that article may be made beyond that permitted by sections 107 and 108 of the US Copyright Law—unless the copies are for general distribution, for advertising, for creating new works, or for resale—provided the per-copy fee is paid through the Copyright Clearance Center, Inc., 222 Rosewood Dr., Danvers, MA 01923.

Change of Address: The Journal must be advised of a change of address at least 6 weeks prior to date of issue, with both the subscriber's old and new address given. Undelivered copies resulting from address change will not be replaced.

Editorial and Business Correspondence: Journal of Applied Physiology, 9650 Rockville Pike, Bethesda, MD 20814-3991.

Disclaimer: The statements and opinions contained in the articles of *Journal of Applied Physiology* are solely those of the individual authors and contributors and not of the American Physiological Society. The appearance of advertisements in the journal is not a warranty, endorsement, or approval of the products or their safety. The American Physiological Society disclaims responsibility for any injury to persons or property resulting from any ideas or products referred to in any article or advertisement.