American Journal of Physiology-Gastrointestinal and Liver Physiology®

Editor: Nigel W. Bunnell

Deputy Editor: Denise M. Nen

Associate Editors: Michael F. McTernar, Eugene B. Chang, Andrew S. Giraud, Stephen J. Pandol, Charalabos Potoulakis, Detlef Schuppan, Natalie J. Tomok, Nathalie Vergnolle

Editorial Board:

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

Publications Committee
Curt D. Sigmund, Chair
Catherine E. Carr, Editor, and Andrew Greene, Editorial Assistant, Paul A. Insel, Lynette K. Rogers, Loren Wold

The American Journal of Physiology-Gastrointestinal and Liver Physiology (ISSN 0913-1857) is published monthly online at www.aipg.org (two volumes a year) by the American Physiological Society, 9650 Rockville Pike, Bethesda, MD 20814-3991 (ISSN 1522-1547). Subscriptions Prices (postpaid): For institutional print and online pricing, please see http://www.the-aps.org/publications/subs. Nonmember institutions (online only) $445.00. 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. Print back issues, when available, through December 2011: Subscriber, $45 each; Nonsubscriber, $90. Periodicals postage paid at Bethesda, MD and at additional mailing offices.

The American Journal of Physiology-Gastrointestinal and Liver 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—Lancaster Division, Lancaster, PA 17601. 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.

Editorial and Business Correspondence: AJP-Gastrointestinal and Liver Physiology, 9650 Rockville Pike, Bethesda, MD 20814-3991.

Disclaimer: The statements and opinions contained in the articles of the American Journal of Physiology-Gastrointestinal and Liver 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.

Eric Pesaneli, Editorial Art Manager
Josh Robbins, Editor’s Assistant
Travis Christensen
Leona Kanaskie
Jennifer Mankazee
Copy Editors