

CLINICAL BIOCHEMISTRY



LA SOCIÉTÉ CANADIENNE DES CLINICO-CHIMISTES

Official Journal of the Canadian Society of Clinical Chemists

Volume 63

January 2019

Editor-in-Chief

Loralie J. Langman
Mayo Clinic
Rochester, MN, USA

Reviews Editor

Damien Gruson
Université Catholique de Louvain
(Cliniques Universitaires St-Luc),
Brussels, Belgium

Special Issues Editor

Edgard E. Delvin
CHU Sainte-Justine Research Center
Montréal, QC, Canada

Associate Editors

Peter E. Hickman
ANU Medical School
Canberra, Australia

Patricia M. Jones
Children's Medical Center
Dallas, TX, USA

Leslie Lai
Gleneagles Medical Centre
Kuala Lumpur, Malaysia

Nathalie Lepage
Children's Hospital of Eastern
Ontario Ottawa, ON, Canada

Erin McElvania

NorthShore University
HealthSystem
Evanston, IL, USA

Hao Sun

The Chinese University of Hong
Kong, Hong Kong, China

Pierre Wallemacq

Université Catholique de Louvain
(Cliniques Universitaires St-Luc)
Brussels, Belgium

INTERNATIONAL EDITORIAL BOARD

A. Allameh, Tarbiat Modarres University, Tehran, Iran
B. Arneth, University of Technology, Dresden, Germany
H.H. Aydin, Ege University, Izmir, Turkey
H.M.E. Azzazy, The American University in Cairo, Cairo, Egypt
T. Badrick, Bond University, Gold Coast, Australia
V. Bhayana, University of Western Ontario, London, ON, Canada
R.A. Booth, University of Ottawa, Ottawa, ON, Canada
R. Chiu, Chinese University of Hong Kong, Hong Kong
P.O. Collinson, St. George's Hospital Medical School, London, UK
E.P. Diamandis, Mount Sinai Hospital, Toronto, ON, Canada
D.J. Dietzen, Washington University, School of Medicine, St Louis, MO, USA
J.G. Donnelly, Quotient, Eysins, Switzerland
K. Dooley, LifeLabs, British Columbia, Canada
O. Erel, Ataturk Training and Research Hospital, Ankara, Turkey
J. Frohlich, University of British Columbia, Vancouver, BC, Canada
R. Greaves, RMIT University, Bundoora, Australia
M. Guan, Fudan University, Shanghai, China
O. Hammarsten, University of Gothenburg, Gothenburg Sweden
N.S. Harris, University of Florida College of Medicine, Gainesville, Florida, USA
T. Higgins, Dynacare Kasper Medical Laboratories, Edmonton, AB, Canada
S. Hill, McMaster University, Hamilton, ON, Canada
B.R. Hoffman, Mount Sinai Hospital, Toronto, ON, Canada
A.S. Jaffe, Mayo Clinic, Rochester, MN, USA
P. Jarolim, Brigham and Women's Hospital, Boston, Massachusetts, USA
A. Johnston, William Harvey Research Institute, London, UK

J. Kalra, University of Saskatchewan, Saskatoon, SK, Canada
M. Karsdal, Nordic Bioscience, Herlev, Denmark
A.G. Katrukha, HyTest Oy, Turku, Finland
D. Lehotay, University of Saskatchewan, Regina, SK, Canada
A.W. Lyon, University of Saskatchewan, Saskatoon, SK, Canada
J. Massé, Cité de la Santé de Laval, Québec, QC, Canada
Q.H. Meng, The University of Texas, Houston, TX, USA
M.M. Müller, Austrian Society of Quality Assurance
and Standardisation, Vienna, Austria
T. Nilsson, Umeå University, Umeå, Sweden
M. Oellerich, George-August Universität Göttingen, Göttingen, Germany
M. Plebani, University Hospital of Padova, Padova, Italy
J.M. Queraltó, Hospital de la Santa Creu i Sant Pau, Barcelona, Spain
N. Rifai, Harvard University, Boston, MA, USA
R. Salvyre, INSERM, Toulouse, France
H.G. Schneider, AlfredHealth, Victoria, Australia
C. Seger, Medizinische Universität Innsbruck, Innsbruck, Austria
G. Sypniewska, Nicolaus Copernicus University, Bydgoszcz, Poland
G.J. Tsongalis, Dartmouth Hitchcock Medical Center, Lebanon, NH, USA
S. Vasikaran, Royal Perth Hospital, Perth, Australia
N. Watanabe, Sapporo Medical University, Sapporo, Japan
E. Wieland, Universitätsklinikum Stuttgart - Katharinenhospital,
Stuttgart, Germany
E. Young, David Bradley Research Institute, Hamilton, ON, Canada
M. Zaninotto, University Hospital of Padova, Padova, Italy

Publication information: *Clinical Biochemistry* (ISSN 0009-9120) is published monthly by Elsevier (Radarweg 29, 1043 NX Amsterdam, the Netherlands) and distributed by Elsevier, 230 Park Avenue Suite 800, New York, NY 10169, USA. Periodicals Postage Paid at New York, NY and at additional mailing offices. USA POSTMASTER: Send address changes to Elsevier, Journal Returns, 1799 Highway 50 East, Linn, MO 65051, USA.

Orders, claims, and journal enquiries: Please visit our Support Hub page <https://service.elsevier.com> for assistance.

Author inquiries: You can track your submitted article at <http://www.elsevier.com/track-submission>. You can track your accepted article at <http://www.elsevier.com/trackarticle>. You are also welcome to contact Customer Support via <http://service.elsevier.com>.

Language (usage and editing services): Please write your text in good English (American or British usage is accepted, but not a mixture of these). Authors who feel their English language manuscript may require editing to eliminate possible grammatical or spelling errors and to conform to correct scientific English may wish to use the English Language Editing service available from Elsevier's WebShop <http://webshop.elsevier.com/languageediting/> or visit our customer support site <http://service.elsevier.com> for more information.

Advertising information: If you are interested in advertising or other commercial opportunities please e-mail Commercialsales@elsevier.com and your enquiry will be passed to the correct person who will respond to you within 48 hours.

Printed in the United States of America

Ⓜ The paper used in this publication meets the requirements of ANSI/NISO Z39.48-1992 (Permanence of Paper)