Translational Bioinformatics

Volume 14

Series editor
Xiangdong Wang, MD, Ph.D.
Zhongshan Hospital Institute of Clinical Science, Fudan University Shanghai Medical College, China
Shanghai Institute of Clinical Bioinformatics, China

Aims and Scope

The Book Series in Translational Bioinformatics is a powerful and integrative resource for understanding and translating discoveries and advances of genomic, transcriptomic, proteomic and bioinformatic technologies into the study of human diseases. The Series represents leading global opinions on the translation of bioinformatics sciences into both the clinical setting and descriptions to medical informatics. It presents the critical evidence to further understand the molecular mechanisms underlying organ or cell dysfunctions in human diseases, the results of genomic, transcriptomic, proteomic and bioinformatic studies from human tissues dedicated to the discovery and validation of diagnostic and prognostic disease biomarkers, essential information on the identification and validation of novel drug targets and the application of tissue genomics, transcriptomics, proteomics and bioinformatics in drug efficacy and toxicity in clinical research.

The Book Series in Translational Bioinformatics focuses on outstanding articles/chapters presenting significant recent works in genomic, transcriptomic, proteomic and bioinformatic profiles related to human organ or cell dysfunctions and clinical findings. The Series includes bioinformatics-driven molecular and cellular disease mechanisms, the understanding of human diseases and the improvement of patient prognoses. Additionally, it provides practical and useful study insights into and protocols of design and methodology.

Series Description

Translational bioinformatics is defined as the development of storage-related, analytic, and interpretive methods to optimize the transformation of increasingly voluminous biomedical data, and genomic data in particular, into proactive, predictive, preventive, and participatory health. Translational bioinformatics includes research on the development of novel techniques for the integration of biological and clinical data and the evolution of clinical informatics methodology to encompass biological observations. The end product of translational bioinformatics is the newly found knowledge from these integrative efforts that can be disseminated to a variety of stakeholders including biomedical scientists, clinicians, and patients. Issues related to database management, administration, or policy will be coordinated through the clinical research informatics domain. Analytic, storage-related, and interpretive methods should be used to improve predictions, early diagnostics, severity monitoring, therapeutic effects, and the prognosis of human diseases.

Recently Published and Forthcoming Volumes

Computational and Statistical Epigenomics
Editor: Andrew E. Teschendorff
Volume 7

Allergy Bioinformatics
Editors: Ailin Tao, Eyal Raz
Volume 8

Transcriptomics and Gene Regulation
Editor: Jiaqian Wu
Volume 9

Pediatric Biomedical Informatics – Computer Applications in Pediatric Research (Edition 2)
Editor: John J. Hutton
Volume 10

More information about this series at http://www.springer.com/series/11057

Xiangdong Wang • Duojiao Wu • Huali Shen
Editors

Lipidomics in Health & Disease

Methods & Application

Springer

Editors
Xiangdong Wang
Zhongshan Hospital Institute of Clinical Science
Fudan University Shanghai Medical College
Shanghai, China

Shanghai Institute of Clinical Bioinformatics
Shanghai, China

Huali Shen
Institutes of Biomedicine
Fudan University
Shanghai, China

Duojiao Wu
Shanghai Institute of Clinical Bioinformatics
Shanghai, China

Zhongshan Hospital Institute of Clinical Science
Fudan University Shanghai Medical School
Shanghai, China

ISSN 2213-2775 ISSN 2213-2783 (electronic)
Translational Bioinformatics
ISBN 978-981-13-0619-8 ISBN 978-981-13-0620-4 (eBook)
https://doi.org/10.1007/978-981-13-0620-4

Library of Congress Control Number: 2018948704

© Springer Nature Singapore Pte Ltd. 2018
This work is subject to copyright. All rights are reserved by the Publisher, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, reuse of illustrations, recitation, broadcasting, reproduction on microfilms or in any other physical way, and transmission or information storage and retrieval, electronic adaptation, computer software, or by similar or dissimilar methodology now known or hereafter developed.
The use of general descriptive names, registered names, trademarks, service marks, etc. in this publication does not imply, even in the absence of a specific statement, that such names are exempt from the relevant protective laws and regulations and therefore free for general use.
The publisher, the authors and the editors are safe to assume that the advice and information in this book are believed to be true and accurate at the date of publication. Neither the publisher nor the authors or the editors give a warranty, express or implied, with respect to the material contained herein or for any errors or omissions that may have been made.

Printed on acid-free paper

This Springer imprint is published by the registered company Springer Nature Singapore Pte Ltd.
The registered company address is: 152 Beach Road, #21-01/04 Gateway East, Singapore 189721, Singapore

Contents

1 Clinical Lipidomics: A Critical Approach for Disease Diagnosis and Therapy 1
Xiangdong Wang

2 The Role of Lipid Metabolism in the Development of Lung Cancer 7
Lixin Wang, Weiling Huang, and Xiu-Min Li

3 Bioinformatics of Embryonic Exposures: Lipid Metabolism and Gender as Biomedical Variables 21
K. K. Linask

4 An Evaluation of Multivariate Data Analysis Models for Lipidomic Parameters from Patients with Metabolic Syndrome Undergoing Remedial Treatment 39
D. Farabos, C. Wolf, R. Chapier, A. Lamaziere, and Peter J. Quinn

5 Lipidomics in Carotid Artery Stenosis: Further Understanding of Pathology and Treatment 55
Wei Zhang, Xiushi Zhou, Daqiao Guo, Weiguo Fu, and Lixin Wang

6 Metabolomics of Immunity and Its Clinical Applications 73
Jing Qiu, Fangming Liu, and Duojiao Wu

7 Urinary Lipidomics 97
Phornpimon Tipthara and Visith Thongboonkerd

8 Breast Cancer and Lipid Metabolism 113
Chunfa Huang, Yuntao Li, Yifan Tu, and Carl E. Freter

9 Association of Circulating Oxidized Lipids with Cardiovascular Outcomes 137
Irena Levitan, Ibra S. Fancher, and Evgeny Berdyshev

10 Lipidomics: Mass Spectrometry Based Untargeted Profiling and False Positives 155
Xiaohui Liu, Lina Xu, Xueying Wang, and Yupei Jiao

11 Phospholipid and Phospholipidomics in Health and Diseases 177
Tanxi Cai and Fuquan Yang

Index 203