

Physiology in Health and Disease

Published on behalf of The American Physiological Society by Springer

Physiology in Health and Disease

This book series is published on behalf of the American Physiological Society (APS) by Springer. Access to APS books published with Springer is free to APS members.

APS publishes three book series in partnership with Springer: *Physiology in Health and Disease* (formerly *Clinical Physiology*), *Methods in Physiology*, and *Perspectives in Physiology* (formerly *People and Ideas*), as well as general titles.

More information about this series at <http://www.springer.com/series/11780>

Michelle L. Gumz
Editor

Circadian Clocks: Role in Health and Disease

 Springer



Editor
Michelle L. Gumz
University of Florida
Gainesville
Florida
USA

Physiology in Health and Disease
ISBN 978-1-4939-3448-5 ISBN 978-1-4939-3450-8 (eBook)
DOI 10.1007/978-1-4939-3450-8

Library of Congress Control Number: 2016930025

Springer New York Heidelberg Dordrecht London
© The American Physiological Society 2016

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

Springer Science+Business Media LLC New York is part of Springer Science+Business Media
(www.springer.com)

Contents

1	Introduction to Circadian Rhythms and Mechanisms of Circadian Oscillations	1
	David R. Weaver	
2	The Circadian Timing System and Endocrine Physiology	57
	Michael T. Sellix	
3	Circadian Regulation of Sleep	103
	Kazuo Mishima	
4	The Human SCN in Health and Neuropsychiatric Disorders: Postmortem Observations	117
	Ai-Min Bao and Dick F. Swaab	
5	Mammalian Circadian Clocks and Metabolism: Navigating Nutritional Challenges in a Rhythmic World	153
	Jeremy J. Stubblefield and Carla B. Green	
6	Circadian Regulation of Renal Function	175
	Kristen Solocinski, Gianluigi Mazzoccoli, and Michelle L. Gumz	
7	Circadian Rhythms and the Circadian Clock in the Cardiovascular System	199
	R. Daniel Rudic	
8	The Cardiac Clock	225
	Faisal J. Alibhai, Elena V. Tsimakouridze, Cristine J. Reitz, W. Glen Pyle, and Tami A. Martino	
9	Regulation of Immunity by the Circadian Clock	251
	Alba de Juan, David Druzd, Louise Ince, and Christoph Scheiermann	
10	Rhythms in the Digestive System	267
	David B. Rhoads, Lynne L. Levitsky, and Ali Tavakkoli	

11 Chronotherapy of Blood Pressure Medications to Improve Management of Hypertension and Reduce Vascular Risk 295
Ramón C. Hermida, Diana E. Ayala, Michael H. Smolensky, and Francesco Portaluppi

12 The Circadian Clock as a Drug Target 335
Sadichha Situala, Ariadna Amador, and Thomas P. Burris

Index 367