

Research and Perspectives in Endocrine Interactions

Paolo Sassone-Corsi
Yves Christen *Editors*

A Time for Metabolism and Hormones

FONDATION
IPSEN
POUR LA RECHERCHE
THERAPEUTIQUE

OPEN



Springer

Research and Perspectives in Endocrine Interactions

More information about this series at <http://www.springer.com/series/5241>

Paolo Sassone-Corsi • Yves Christen
Editors

A Time for Metabolism and Hormones

 Springer

OPEN

Editors

Paolo Sassone-Corsi
Department of Biological Chemistry
University of California
Irvine, California
USA

Yves Christen
Fondation IPSEN
Boulogne-Billancourt Cedex, France

ISSN 1861-2253 ISSN 1863-0685 (electronic)
Research and Perspectives in Endocrine Interactions
ISBN 978-3-319-27068-5 ISBN 978-3-319-27069-2 (eBook)
DOI 10.1007/978-3-319-27069-2

Library of Congress Control Number: 2015957954

Springer Cham Heidelberg New York Dordrecht London

© The Editor(s) (if applicable) and the Author(s) 2016. The book is published with open access at SpringerLink.com.

Open Access This book is distributed under the terms of the Creative Commons Attribution-Noncommercial 2.5 License (<http://creativecommons.org/licenses/by-nc/2.5/>) which permits any noncommercial use, distribution, and reproduction in any medium, provided the original author(s) and source are credited.

The images or other third party material in this chapter are included in the work's Creative Commons license, unless indicated otherwise in the credit line; if such material is not included in the work's Creative Commons license and the respective action is not permitted by statutory regulation, users will need to obtain permission from the license holder to duplicate, adapt or reproduce the material.

This work is subject to copyright. All commercial 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 International Publishing AG Switzerland is part of Springer Science+Business Media (www.springer.com)

Preface

Each morning we wake up from a night of sleep, and each day we eat our regularly timed meals, go through our normal routines, and fall asleep again for another night. This rhythm, so-called circadian—after the Latin words *circa diem* (“about a day”)—underlies a wide variety of human physiological functions, including sleep–wake cycles, body temperature, hormone secretion, exercise activity, and feeding behavior. Circadian rhythms are remarkably conserved throughout evolution, and it is becoming commonly appreciated that circadian rhythms represent an exquisite example of systems biology.

At the heart of all cyclic biological functions is the circadian clock, a highly conserved molecular system that enables organisms to adapt to common daily changes, such as the day–night cycle and food availability. The mammalian anatomical structure in the brain that governs circadian rhythms consists of a small area of the anterior hypothalamus, called the suprachiasmatic nucleus (SCN). For decades, this “central pacemaker” was thought to be the unique circadian clock of the organism. This dogma was challenged when peripheral tissues were also found to contain functional circadian oscillators that are self-sustained at the single cell level. This notion, together with the discovery that a remarkable fraction of the genome is transcriptionally controlled by the clock, illustrated that circadian control must play a key role in governing the metabolism and physiology of all organisms. This concept was recently validated by studies of the metabolome revealing that a large fraction of metabolites oscillate in a given tissue.

Recent years have seen spectacular advances in the field of circadian biology. These have attracted the interest of researchers in many fields, including endocrinology, neurosciences, cancer, and behavior. By integrating a circadian view within the fields of endocrinology and metabolism, researchers will be able to reveal many, yet-unsuspected aspects of how organisms cope with changes in the environment and subsequent control of homeostasis.

The concept behind the Fondation IPSEN *Colloque Medecine et Recherche* on “A Time for Metabolism and Hormones,” held in Paris on December 5, 2014, was to capture the excitement of this field as it is opening new avenues in our

understanding of metabolism and endocrinology. A panel of the most distinguished investigators in the field gathered together to discuss the present state and the future of the field. These proceedings constitute a compendium of the most updated views by these investigators. We trust that it will be of use to those colleagues who will be picking up the challenge to unravel how the circadian clock can be targeted for the future development of specific pharmacological strategies toward a number of pathologies.

Irvine, CA, USA
Boulogne-Billancourt Cedex, France

Paolo Sassone-Corsi
Yves Christen

Acknowledgements

The editors wish to express their gratitude to Mrs. Mary Lynn Gage for her editorial assistance and Mrs. Astrid de Gérard for the organization of the meeting.