

Advances in Experimental Medicine and Biology

Volume 846

Series Editors

Irwin R. Cohen

The Weizmann Institute of Science, Rehovot, Israel

N.S. Abel Lajtha

Kline Institute for Psychiatric Research, Orangeburg, New York, USA

Rodolfo Paoletti

University of Milan, Milan, Italy

John D. Lambris

University Of Pennsylvania, Philadelphia, Pennsylvania, USA

Advances in Experimental Medicine and Biology presents multidisciplinary and dynamic findings in the broad fields of experimental medicine and biology. The wide variety in topics it presents offers readers multiple perspectives on a variety of disciplines including neuroscience, microbiology, immunology, biochemistry, biomedical engineering and cancer research. *Advances in Experimental Medicine and Biology* has been publishing exceptional works in the field for over 30 years and is indexed in Medline, Scopus, EMBASE, BIOSIS, Biological Abstracts, CSA, Biological Sciences and Living Resources (ASFA-1), and Biological Sciences. The series also provides scientists with up to date information on emerging topics and techniques.

2013 Impact Factor: 2.012

More information about this series at <http://www.springer.com/series/5584>

Maria Diakonova, PhD
Editor

Recent Advances in Prolactin Research

 Springer

Editor

Maria Diakonova, PhD
Department of Biological Sciences
University of Toledo
Toledo
Ohio
USA

ISSN 0065-2598

ISSN 2214-8019 (electronic)

Advances in Experimental Medicine and Biology

ISBN 978-3-319-12113-0

ISBN 978-3-319-12114-7 (eBook)

DOI 10.1007/978-3-319-12114-7

Library of Congress Control Number: 2014956558

Springer Cham Heidelberg New York Dordrecht London

© Springer International Publishing Switzerland 2015

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

Preface

This book is devoted to some aspects of the prolactin action. Although prolactin (PRL) was discovered more than 80 years ago, our understanding of the roles of PRL in the human physiology is still very incomplete. Thus, PRL is not only a pituitary hormone with an important role in the reproduction but also acts as a cytokine, eliciting a wide variety of actions. Data gathered during the last decade have evidently demonstrated that locally produced PRL acts as the autocrine/paracrine factor and plays a role in breast cancer. Following the reestablishing a contributory role for PRL during breast oncogenesis, the scientific and clinical communities have held great hope that manipulation of the PRL axis may lead to the successful treatment of breast cancer. This hope is not yet dashed, however the role of the PRL axis is now being shown to be more complex than was first envisaged. The first aim of this book is to overview major advances in the field.

Secondly, this book presents information on the role of PRL in non-mammary tissues in physiological and patho-physiological conditions. About 100–300 functions or targets have been identified for PRL in various species. This is true for the prostate, the skin, the decidua, the brain, some immune cells, adipocytes, and several others. The book discusses the role of PRL in adipocytes, immune response, angiogenesis, as well as in prolactinomas and prostate tumorigenesis.

This book also aims to summarize current knowledge about PRL and its receptor, plasticity of the PRL axis, PRL signaling pathways, and PRL crosstalk with other oncogenic factors.

Overall, the goal of this book is to identify and review new experimental findings that have provided further insight into the role of PRL in human physiology and patho-physiology. Thus, this book will bridge between new research results, as published in journal articles, and a contextual literature review.

M. Diakonova

Contents

1 Prolactin (PRL) in Adipose Tissue: Regulation and Functions	1
Nira Ben-Jonathan and Eric Hugo	
2 Signaling Pathways Regulating Pituitary Lactotrope Homeostasis and Tumorigenesis	37
Allyson K. Booth and Arthur Gutierrez-Hartmann	
3 The Many Faces of Prolactin in Breast Cancer	61
Wen Y Chen	
4 Regulation of Blood Vessels by Prolactin and Vasoinhibins	83
Carmen Clapp, Stéphanie Thebault, Yazmín Macotella, Bibiana Moreno-Carranza, Jakob Triebel and Gonzalo Martínez de la Escalera	
5 Tyrosyl Phosphorylated Serine-Threonine Kinase PAK1 is a Novel Regulator of Prolactin-Dependent Breast Cancer Cell Motility and Invasion	97
Alan Hammer and Maria Diakonova	
6 Plasticity of the Prolactin (PRL) Axis: Mechanisms Underlying Regulation of Output in Female Mice	139
P. R. Le Tissier, D. J. Hodson, A. O. Martin, N. Romanò and P. Mollard	
7 Role of Src Family Kinases in Prolactin Signaling	163
Jorge Martín-Pérez, José Manuel García-Martínez, María Pilar Sánchez-Bailón, Víctor Mayoral-Varo and Annarica Calcabrini	
8 Prolactin-Induced Protein in Breast Cancer	189
Ali Naderi	

9 Modeling Prolactin Actions in Breast Cancer	
In Vivo: Insights from the NRL-PRL Mouse	201
Kathleen A. O’Leary, Michael P. Shea and Linda A. Schuler	
10 Prolactin-Induced Prostate Tumorigenesis	221
Lucila Sackmann-Sala and Vincent Goffin	
11 Prolactin in Inflammatory Response	243
Ana Laura Pereira Suarez, Gonzalo López-Rincón, Priscila A. Martínez Neri and Ciro Estrada-Chávez	
12 A Positive Feedback Loop Between Prolactin and STAT5	
Promotes Angiogenesis	265
Xinhai Yang and Andreas Friedl	
Erratum	E1
Index	281