

## **Heat Shock Proteins and Whole Body Physiology**

# HEAT SHOCK PROTEINS

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Volume 5

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# Heat Shock Proteins and Whole Body Physiology

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ISSN 1877-1246 e-ISSN 1877-1254  
ISBN 978-90-481-3380-2 e-ISBN 978-90-481-3381-9  
DOI 10.1007/978-90-481-3381-9  
Springer Dordrecht Heidelberg London New York

Library of Congress Control Number: 2009941471

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Printed on acid-free paper

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*This book is dedicated to our children Dean,  
Diana, Dorte and Daffy (to B.K.P.) and Edwina,  
Vanessa and Alexzander Jr. (to A.A.A.)*

## PREFACE

The heat shock proteins (HSP) are a family of highly conserved proteins with critical roles in maintaining cellular homeostasis and in protecting the cell from chronically and acutely stressful conditions. HSP are molecular chaperones that participate in a variety of physiological processes and are widespread in organisms, tissues, and cells. It follows that chaperone failure will have an impact, possibly serious, on one or more cellular function, which may lead to disease. Activation of HSP results in stress tolerance and cytoprotection against otherwise lethal exposures to stress-induced molecular damage and the induction of HSP, therefore, may have broad therapeutic benefits in the treatment of various types of tissue trauma and disease. This book provides a comprehensive review on contemporary knowledge on the role of heat shock proteins in whole body physiology. Using an integrative approach to understanding heat shock protein physiology, the contributors provide a synopsis of novel mechanisms by which HSP are involved in the regulation of normal physiological and pathophysiological conditions.

*Heat Shock Proteins and Whole Body Physiology* reviews current progress on heat shock proteins in relation to diseases (Part I), psychological stress (Part II), exercise physiology and physiology of aging (Part III). Part I provides cutting edge knowledge regarding the regulatory role of HSP in the progression of a wide spectrum of diseases, ranging from diabetes, kidney diseases and cardiovascular diseases to infertility. Part II reviews our recent knowledge with regard to psychological stress, including learning, posttraumatic stress disorders, Alzheimer, social isolation and provides us with brand new information on the proteomics profile of chronically stressed individuals. Part III provides comprehensive reviews on the role of HSP in muscle. Increasing evidence suggests that intracellular expression of HSP has numerous protective effects for health and that increased muscular expression of HSP may represent one among several links between physical exercise and health. In contrast, HSP released during stress provoke pro-inflammatory responses and immune impairment. Finally, the “shock” of aging is presented. One of the key homeostatic responses involved in maintaining vitality and longevity is the induction of HSP. These chaperones play an important role in the deterrence of protein damage during aging.

Key basic and clinical research laboratories from major universities and hospitals around the world contribute chapters that review present research activity

and importantly project the field into the future. The book is a must read for researchers, postdoctoral fellows and graduate students in the fields of Endocrinology, Cardiology, Rheumatology, Physiology, Molecular Medicine, Aging, Pharmacology and Pathology.

Alexzander A. A. Asea and Bente K. Pedersen

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