
Preface

The Endoplasmic Reticulum (ER) is an organelle with extraordinary signaling and homeostatic functions. It is the organelle responsible for protein folding, maturation, quality control, and trafficking of proteins destined for the plasma membrane or for secretion into the extracellular environment. Failure, overloading or malfunctioning of any of the signaling or quality control mechanisms occurring in the ER may provoke a stress condition known as ‘ER stress’. Accumulating evidence indicates that ER stress may dramatically perturb interactions between the cell and its environment, and contributes to the development of human diseases, ranging from metabolic diseases and cancer to neurodegenerative diseases, or impacts therapeutic outcome.

This book focuses on different aspects of ER stress. It starts with an introduction into the ER biology and the molecular bases of ER stress, the signaling pathways engaged and cellular responses to ER stress, including the adaptive Unfolded Protein Response (UPR), autophagy, as well as cell death. The reader will find much emphasis on transitions between different cellular responses and communication between different organelles (including ER-Golgi, ER-mitochondria and ER-nucleus communication).

The book focuses on physiological responses of ER stress in pancreatic β cells and on major pathologies or pathological conditions which have been linked with ER stress. The first topic consists of chapters delineating the emerging role of ER stress in metabolic disease, such as obesity, Type 2 diabetes and cardiovascular disease. Next, the role of ER stress in inflammatory-based diseases and neurodegeneration is covered. Furthermore, the double-edged function of ER stress pathways in carcinogenesis is discussed. The last chapter describes how ER stress pathways can be targeted for therapeutic benefit.

Altogether, these 19 chapters will provide the reader with the latest insights in the role of ER stress in pathophysiology. These chapters are presented by scientists at the forefront of scientific discovery. Their reviews will highlight the most exciting and innovative aspects of their particular areas of expertise in ER stress.

Keywords: ER stress, Signal Transduction, Apoptosis, Autophagy, Carcinogenesis, Inflammation, Infection, Metabolic disease, Neurodegeneration, Therapy

Related subjects: Biomedical Sciences, Cancer Research, Oncology, Metabolic disease, Inflammation