Heart Failure (HF), an endemic problem of great magnitude in the world, is essentially the final and common pathway of cardiovascular diseases that result in cardiac systolic and/or diastolic dysfunction. Common underlying disorders in HF include cardiomyopathy, primary or acquired from previous myocardial infarctions, chronic myocardial ischemia, hypertension, diabetes, valvular defects, dysrhythmias, and congenital heart defects. The hallmark of HF is that of relentless clinical progression often manifested as repeated hospitalizations with a significant economic impact to society. Despite considerable clinical and research advances, the morbidity and mortality of HF remain high. Consequently, there is an urgent need to develop new paradigms and to identify novel therapeutic targets for HF.

While invasive and noninvasive procedures such as cardiac catheterization and echocardiography have been for several decades the most important diagnostic tools in children and adults with cardiovascular diseases, presently clinical cardiology is experiencing a period of profound transformation with advances that are changing dramatically our understanding of HF pathophysiology. Upon the completion of the Human Genome Project, new discoveries in molecular and cellular biology have begun to offer significant insights into the basic mechanisms underlying HF, and they are providing clinicians and researchers alike with a large armamentarium of new and largely effective noninvasive diagnostic techniques. With so many new and spectacular developments at hand we believe that this is an appropriate time for a new book on HF that will translate new information from the bench to the bedside. Our goal has been to provide the reader with detailed information of new findings and forthcoming methodologies as well as a critical clinical evaluation of the complex HF syndrome together with available and future therapies. Initially, the clinical phenotypes of HF and known facts concerning its prevalence, relationship to other diseases and incidence in special population defined by age, gender, and ethnicity will be discussed. After that, we will offer the reader clinical terminology employed throughout the book, a primer on gene profiling and bioenergetics of the normal heart and a discussion on molecular, genetic, biochemical, and cellular techniques critical to better understanding HF pathogenesis and pathophysiology. Thenceforth, animal models of HF (one of the most important research tool currently available) will be discussed, including the models of rat coronary artery ligation model, pacing-induced HF, and transgenic animals with either deleted or overexpressed genes. Later, the molecular, genetic, and metabolic variables so far identified in HF, and specific metabolic, signaling pathways, and gene expression patterns that may participate in the causation of HF will be presented. This will be followed by discussions on cardiac remodeling, oxidative stress, and alterations in other organs and systems that are often associated with human HF. Two chapters are specifically dedicated to the pathogenesis and clinical presentation of HF in children together with a comprehensive subsection covering heart transplantation in this age group. This will be followed by another section with two chapters designed to cover basic mechanisms and clinical presentation of HF in the elderly.

Finally in the last four chapters, we will deal with current and forthcoming diagnostic techniques and therapies, including the application of “omics” in HF, pharmaceutical and
pharmacogenomic-based individualized medicine, gene and cell-based therapies, and the search for new frontiers.

We have tried to provide the readers of this book with a clear view of current approaches to HF clinical diagnosis and treatment, as well as insightful critiques of original and creative scientific thoughts on postgenomic HF research; however, we are aware of the limitations that a single volume may have to cover in its entirety a subject so complex and extensive as HF.

Nowadays, books dealing with subjects of the complexity and magnitude of HF are often written with the participation of numerous contributors sacrificing at times reading homogeneity. To overcome this potential shortcoming, we purposely decided to limit the number of contributors to only a few hoping that this approach will lend the book a higher sense of homogeneity and clarity.

We hope that new discoveries, innovations, increasing knowledge, and learning will flourish in the future, and hopefully soon there will be no more HF, but until then the work must continue.

From the beginning of time,
we are looking for the light,
it is here... it is there.......
the truth is worth searching.

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