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## Preface

We are living in the era of molecular medicine and the influence of basic research on the clinical practice has never been more pronounced. Over the past 15 years, cardiovascular medicine has fully embraced the tools of modern molecular biology creating in effect a bridge between the traditional physiological and clinical discipline of cardiology and genetics, genomics and biotechnology. Moreover, there has been a widespread appreciation of the power of new advances in genetically engineered animal models and novel strategies for rapidly identifying mutations in candidate human genes for diverse cardiovascular diseases, both of which led to an exponential increase in our understanding of the molecular mechanisms that drive disease progression. Gene therapy is then one of the most fascinating consequences of the penetration of molecular biology and genetic engineering into cardiovascular medicine. It is, therefore, understandable that the interest of both experimental and clinical cardiologists in the role of genes in the heart is steadily increasing.

This book is based on the two Mendel symposia “Genes and the Heart”, organized in 2003 and 2008 in the Czech Republic as joint meetings of the Japanese and European Sections of the International Academy of Cardiovascular Sciences. The first one took place in Brno, well known for its industry, fairs, technological park, universities and rich cultural life. But this symposium was held in Brno for another reason: it is the birthplace of genetics. Here in the sixties of the nineteenth century an Augustinian friar and later abbot and, at the same time, a mathematician, physicist and biologist, Johann Gregor Mendel, discovered the principal laws of heredity. The abbey, the site of Mendel’s activities, has been recently restored and is ready to summon a limited number of scientists for their meetings. Thus, the participants of the first Mendel symposium had a unique opportunity, besides visiting an exhibition concerning Mendel’s discovery, to discuss the results of contemporary genetics in the genuine atmosphere of its true father founder.

The scientific and social success of this meeting exceeded the expectations of the organizers; we were repeatedly asked to continue and try to establish a new tradition. This request was strongly supported by our Japanese colleagues, both scientifically and financially. We have decided to invite the participants of the second Mendel symposium to another pleasant place of our country, the beautiful baroque castle Liblice near Prague. It was built between 1699

and 1702 as an aristocratic residence; now it is the property of the Academy of Sciences of the Czech Republic. The recent restoration has transformed the castle into a contemporary conference centre equipped with the latest technology. The castle is surrounded by beautiful French gardens with a ceremonial courtyard and offers exceptional stimulating environment for scientific events.

This book includes chapters which highlight the role of molecular biology and genetics in different areas of cardiovascular research; they are based on the selected contributions from the two Mendel symposia. The book is divided into six sections. The first, introductory, includes the short curriculum of Johann Gregor Mendel and the contemporary view on the possibilities and limitations of the gene therapy. The second section deals with the role of genes in cardiac development; the remaining four sections are devoted to the genetic approach of different cardiovascular disorders: mitochondrial diseases, ischemic heart disease, hypertension and arrhythmias, and cardiac hypertrophy and failure. It should stimulate the curiosity of cardiovascular scientists in gaining insight into the role of genes in the heart function in health and disease.

Twenty-four chapters in this book, written by established investigators, represent a wealth of material to emphasize the role of genetic factors in the genesis of different cardiovascular abnormalities. In addition, changes in gene expression, as a consequence of various pathological stimuli, have been identified to alter the protein content of different subcellular organelles in both cardiac and vascular myocytes and thus result in the development of cardiovascular dysfunction. It appears that a wide variety of gene expressions are excellent targets for gene therapy as well as pharmacological interventions to improve cardiovascular function in the disease state.

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