

Preface

THE HEART ULTIMATELY PERFORMS the relatively simple function of beating an average of two billion times in a lifetime to ensure the flow of oxygenated blood throughout the body, yet its development is complex and the subject of significant ongoing study. With new and exciting advances in our understanding of heart development and their implications for heart disease, this seemed like an appropriate moment in the field to reflect on these advances and synthesize them into comprehensive reviews.

Coalescing the latest research into a series of chapters that offer something new is a significant challenge and it is testimony to our authors that they have ensured this volume is highly topical and offers a fresh perspective. Combining sage contributions with early- to mid-career insights, we have structured the volume into four broad categories: early heart development, featuring insights into cardiac progenitor specification, the onset of cardiac function, early cardiac morphogenesis, basic anatomy informed by state-of-the art imaging, and control of organ morphology and size with underpinning genetic and epigenetic mechanistic insights; specific cardiovascular cell types and a focus on non-muscle lineages, including coronary blood and lymphatic development, the cardiac conduction system, cardiac fibroblasts, neural crest, the epicardium and its derivatives, and the endocardium, including the valves; model organisms, highlighting the various animal models that drive research in this area, drawing comparisons with humans, and including reptiles to provide an “evo–devo” perspective; and, finally, congenital heart disease (CHD), the genetic basis of birth defects, specific models of CHD, and environmental causes that likely explain the poor genotype-to-phenotype correlation that manifests in this form of heart disease.

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