

THE HEART AND CARDIOVASCULAR — SYSTEM —

Scientific Foundations

Second Edition

Volume I

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Preface to the First Edition

Cardiovascular medicine today is a rich and powerful tool. Physicians can intervene effectively because of sophisticated and accurate diagnostic methods, specific drugs, reconstructive surgery that requires suspension of cardiovascular function for hours, and knowledge to prevent disease. How did all of this happen?

The first half of this century witnessed an explosion of knowledge in physics, chemistry, and physiology. Such landmark achievements as those of Alexis Carrel in blood vessels, Einthoven with the electrocardiogram, Courand, Richards, and Forssman with the cardiac catheter, all recognized by receiving Nobel prizes, laid the groundwork for this spectacular change in cardiovascular medicine. The mark that they and their physiologist colleagues have made on medical practice surrounds us, because we have translated this science into practical applications in individual lives.

Where will we find the future of cardiovascular medicine? An equivalent explosion of knowledge in biology and biochemistry has followed that in the more physical sciences. We have discovered that cardiovascular science has no definable boundaries, because progress in nerve conduction, carbohydrate metabolism, antibody production, protein structure, and every other area of biological science is of direct importance to progress in cardiovascular medicine. Our opportunities extend even further, embracing engineering, statistics, and psychology. Donald Fredrickson, former Director of the National Institutes of Health, clearly stated the challenge to us when he called upon us to bring this great body of knowledge to medical usefulness in the next half-century.

If there are no boundaries to the sciences important to cardiovascular medicine, how can we cope with our need to know? Here rests the mission of this book. We, the Editors, selected some talented authors to present their views of the problems facing this area of science, the tools we have to study them, and the possible solutions we may achieve. We have made every effort to ignore classical disciplinary boundaries, because we feel they are not relevant to our mission. In this book you will find biochemistry, pathology, molecular biology, physiology, computer science, physics, and anything else that we feel deserves its place in cardiovascular science.

This book will be of value to medical students and graduate students in the biological sciences who want to identify problems in cardiovascular science. We expect trainees in medical specialties and postdoctoral science trainees to draw from the technical discussion the tools they may use in their research. We hope more senior investigators will use it as a source of ideas. For the Editors it has been an exercise in expanding scientific horizons, and we hope it may be as valuable for you.

Inevitably, some areas are treated briefly. We decreased attention to certain areas that we felt were adequately considered by other texts. And we sought to keep the book within bounds of readability by heavy use of reference lists, to guide you to the best sources for more intensive study.

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Preface

After our first flush of excitement and pleasure upon publication of *The Heart and Cardiovascular System*, we gradually recognized that our job was only partly done. So many new ideas and discoveries of importance to cardiovascular science were appearing that we needed to face the task of organizing a revision of the book. While we were initially reluctant, we soon found enthusiasm for the opportunity to build on the first edition by calling attention to this rapid progress.

We have found that basic biological science ignores traditional disciplinary boundaries. Furthermore, fundamental insights are common in areas of science not usually associated with the cardiovascular system. How could we faithfully represent cardiovascular science without giving birth to an encyclopedia? Although we recognize that few will read *The Heart and Cardiovascular System* from cover to cover, our aim was to make this second edition manageable and easy to read. After carefully reviewing the first edition, we decided to revise 52 of the original 72 chapters. We asked those authors to emphasize problems, ideas, and approaches rather than simply adding new facts. The remaining 20 chapters from the first edition were not included in this edition. Of course they remain available in the first edition.

We then identified 30 new topics to add to the 52 revised chapters. One of our goals for these new chapters was to focus more attention on the exciting and very important areas of molecular and cell biology, immunology, thrombosis and thrombolysis, and membrane signalling through receptors and channels. These are no longer esoteric fields with promise; rather they are already influencing day-to-day patient care. Our second goal for these new chapters was to integrate the sciences in the context of specific disease processes, such as heart failure, hypertension, and atherosclerosis.

This is a new, improved book. It is intended to inform and guide the student and beginning investigator, and to stimulate and provoke active investigators regardless of experience in the quest for the best in cardiovascular science and medicine.

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