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Pathophysiology

病理生理学

主编 王建枝 金惠铭

Wang Jianzhi Jin Huiming

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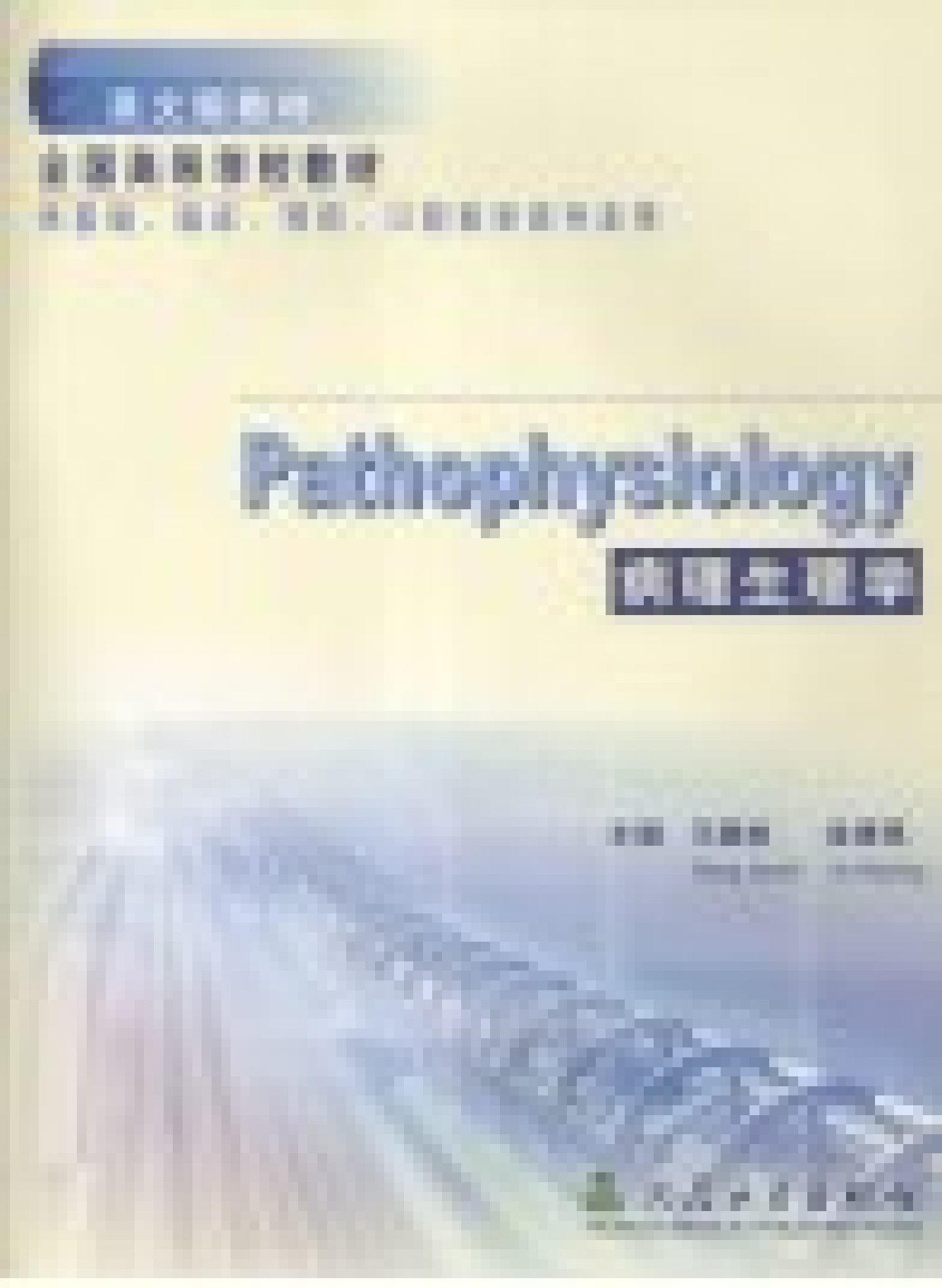

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Foreword

Wang Dixun

Pathophysiology is a science concerning the etiology and pathogenesis of diseases, as well as the mechanisms of functional and metabolic alterations in diseases.

The development of diseases has its objective law, which could be elucidated more correctly by dialectical points of view, such as the viewpoint of that all things invariably divide into two, the viewpoint of the struggle, identity and transformation of contradictions etc.. That is why that pathophysiology is recognized by some scholars as "Philosophy in Medicine".

Along with the development of cellular biology and molecular biology, the researches in the mechanisms of disease have been deepened. This has greatly enriched our knowledge of pathogenesis and the content of pathophysiology course.

Medical students learn the normal functions of organs and normal cellular metabolism in the courses of physiology and biochemistry. In the course of pathophysiology they will learn the alterations of function and metabolism and their mechanism in diseases, and their expression in patients. That means that the pathophysiology is one of the bridge courses between basic medical science and clinical medicine, which enables us to use the knowledge of basic medical science for the diagnosis and treatment of diseases.

In our country, the department of pathophysiology was set up in medical colleges about half a century ago, since then the course of pathophysiology has been given in medical education. By learning from Russia, America and Europe in combination with the situation in our own country, a course of pathophysiology with Chinese style has been established. In our teaching program, the pathophysiology of common pathological processes, especially their pathogenesis is emphasized and systematically discussed. However, the textbooks of pathophysiology from foreign countries involve a large space reviewing normal physiology and biochemistry, and the pathophysiology of individual diseases. An English textbook of pathophysiology suitable for our course taught in English or in two languages is urgently needed. I am sure that this book edited by Prof. Wang Jiangzi , Prof. Jin Huiming and Professors from several medical colleges may meet the demand and be advantageous to our medical education.

Preface

Wang Jianzhi & Jin Huiming

Why do we write this book? To adapt ourselves to an increasing international communication, we are required to teach Pathophysiology in English. During the long discussion in choosing a textbook, we first considered to use an original English one. However, we have noticed that the emphasis in pathophysiology teaching is quite different between Chinese and Westerners. In general, the pathophysiology in Western countries focuses more on different diseases and emphasizes clinical signs and symptoms, which is to our understanding similar to clinical Internal Medicine. The readers are usually disappointed with the superficial analysis of the mechanisms laid on the signs and symptoms. On the contrary, we do not pinpoint any particular disease or clinical symptoms, but emphasize the general pathological processes and the underlying mechanisms of the representative disorders or processes. The major advantage of our teaching system in pathophysiology is the depth in explaining the pathogenesis of the disease, which compensates excellently to Internal Medicine. Additionally, we also thought about "Contemporary Pathophysiology", the only English text book of pathophysiology edited according to our system, by prof. Kong XS. However, the book was published in 1993 and several new chapters are not included. Therefore, we decided to write this book, and this motion was supported by the pathophysiologists all over the country.

The book is composed of 16 chapters, organized by four parts. The first part is brief introductions of what pathophysiology is and what disease is. The second part is about fundamental concepts and pathological processes, including fluid and electrolyte imbalances, acid and base disturbances, stress, fever, edema, ischemia and reperfusion, shock, multi-organic dysfunction, and hypoxia. Knowledge of these basic pathological processes is essential to understanding the mechanisms of the most common diseases. The third part of the book is called organic pathophysiology, which is a presentation of the pathophysiology of important organs, i. e. , heart, lung, liver, kidney and brain; the emphasis in this part is still on the basic processes and mechanisms of the organic insufficiency or failure. The fourth part of the book is referred as cellular and molecular pathophysiology, including signal transduction and diseases, and cell apoptosis in diseases. Each chapter is divided into sections emphasizing the general concepts, etiology and pathogenesis, the alterations of metabolism and function, as well as the principles for the prevention and therapies.

The intended readers of the book will be medical students, including undergraduates and post-graduates, in their basic pathophysiology courses. We hope these students will find that the book makes a useful contribution to their understanding of how pathological agents cause various disease states. We also expect that physicians-in-training and physicians will find the book helpful in comprehending how and why various disease states appear. The clinical doctors will find the book useful as a refresher and update their understanding the mechanisms of diseases. Nurses and other practitioners will find that the concise format and broad/new scope of the book facilitate their understanding of basic disease entities.

We are most grateful to all the contributors for their hard and efficient work to make this book available in a limited time period. We greatly appreciate Prof. Roy C. Ziegelstein at the John Hopkins University School of Medicine, USA, Dr. Tomo Saric at the Center of

Physiology and Pathophysiology, University of Cologne, Germany, prof. Chengxin Gong at NYS Institute for Basic Research, USA, and Prof. Wang Dixun at the Tongji Medical College for their critical review of the book. We would also like to thank all of our young colleagues in Pathophysiology Department, Tongji Medical College for the rudimentary form of the book and their full support. We thank Dr. Wang Xiaochuan and Zhang Guoping for the tedious secretory work.

Because of the limitation of our English writing skill, inaccuracies must have occurred. Readers are encouraged to contact us for pointing out such errors or offering comments or suggestions. Such feedback will be helpful for us to make a better version of this book in future.

Introduction

Wang Jianzhi

What is pathophysiology?

Pathophysiology is a subject to explore the rule of origin and evolution of disease processes and the underlying mechanisms. It is also referred as physiopathology, physiology of diseases, or physiology of disordered function. Different from "Pathology" that emphasizes the structural changes, pathophysiology focuses on the functional and metabolic alterations and the mechanisms underlying the development of diseases. Traditionally, techniques used in pathophysiology research were limited in systemic or organic levels, which are so called "functional experiments". With the development of cellular and molecular biology, numerous advanced methods have been employed in pathophysiology study, such as cell culture, radio-or fluorescence-labeling or probing, polymerase chine reaction (PCR), electrophoresis, Southern blot, Northern blot, Western blot, flow cytometry, and so on.

Why is Pathophysiology important?

The study of pathophysiology is an essential introduction to clinical medicine and serves as a bridge between the basic medical science and clinical medicine. It enables the students, clinicians and other practitioners to understand why and how diseases develop and various clinical manifestations appear, what are the underlying mechanisms, and in so doing devise rational therapeutics.

How the chapters of the book are constructed?

This book was written with the principles described above in mind. It was generally constructed by the orientation of basic concepts of particular diseased process, the etiology, pathogenesis, the functional and metabolic alterations that strengthen the underlying mechanisms, and the pathophysiological basis for prevention and therapeutics, in which the pathogenesis is the kernel in our pathophysiology teaching.

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