

The Gastrointestinal System

Po Sing Leung

Editor

The Gastrointestinal System

Gastrointestinal, Nutritional
and Hepatobiliary Physiology



Springer

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*To my wife, Wan Chun Hu, and my daughter,
Choy May Leung and my son, Ho Yan Leung*

Preface

Human gastrointestinal (GI) physiology is a study of our GI system that addresses the regulation and integration of major physiological functions of motility, secretion, digestion, absorption and blood flow, as well as immunity. The coordination of these processes is vital for the maintenance of GI health; thus, any dysregulation will result in GI disease. In fact, GI physiology is a fundamental subject that is indispensable not only for undergraduate but also for graduate students of any biomedical courses, including, but not limited to, medical, pharmacy, nursing, human biology, Chinese medicine, and natural science, as well as other health-related subjects.

From my GI teaching experience over the past decade, it has always been my wish to produce a succinct monograph that can serve as a companion book for biomedical students not only for their initial studies, but also for their career paths. From the students' viewpoint, one of the most common problems they encounter is the lack of any available textbooks that cover both the basic science and provide relevant clinical correlations. Owing to the lack of exposure to patients with real clinical problems, students often cannot see the whole picture of the patient during the diagnostic process. In view of this, students have often shared with me their thoughts on what they want from a textbook; it should cover the basic science comprehensively, but with equal emphasis on relevant clinical problems. In addition, the textbook should be user-friendly and easy-to-understand. This is of particular importance as a well-formatted textbook can facilitate the understanding of the material covered and thereby save the students' time. Furthermore, students would appreciate the provision of relevant multiple-choice questions that would reinforce their understanding of, and ability to apply, the basic concepts, as well as honing their examination skills.

The overall objectives of this *Gastrointestinal System* book are to present basic concepts and principles of normal GI physiology and, most importantly, to convey an understanding of how to apply this knowledge to the understanding of abnormal GI physiology in the clinical context. The ultimate goal is to let the readers have an integrated systems-based approach in order to be able to grasp knowledge on GI disease and its management. The understanding of basic GI concepts and

principles would be guided by scenario-based clinical case-studies, critical for bedside care and also for preparation for professional examinations, and for being able to deal with future developments in clinical care. In this book, the aim is to achieve these various objectives by covering the breadth of GI system. The contents are, therefore, designed to fall systematically into three core sections, namely Gastrointestinal Physiology (Part I), Nutritional Physiology (Part II) and Hepatobiliary Physiology (Part III) with closely relevant scenario-based clinical case presentations at the end of each chapter to help students learn to apply their growing knowledge of basic GI science, in the clinical setting. Last but by no means least, we provide a wide range of multiple-choice questions (Part IV) so that students can evaluate their understanding of the basic science in each area of the GI system and to develop the students' ability to apply their knowledge to solving clinical problems.

Finally, we would like to take this opportunity to express my sincere gratitude to Dr. Thijs van Vlijmen, the Publishing Editor, and to Miss Sara Germans, the Publishing Assistant of Springer, for their support and encouragement. We would also like to express my appreciation to Leo Ka Yu Chan, Medical Student of this University, and Sam Tsz Wai Cheng, PhD student in my Department, for technical assistance.

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Po Sing Leung

Prologue

A major challenge facing medical students and subspecialty trainees is mastery of basic organ system physiology and its application to understanding and treating human disease. This is especially true of the gastrointestinal and liver system where symptoms of disease are frequently vague and non-specific. As I tell my medical students at the beginning of the GI lectures, “Most of us have experienced diarrhea, upset stomach, abdominal pain, and nausea that your patients will present with, and your task as physicians will be to determine whether their severity and duration warrant intervention and, if so, to identify the cause.” In addition, knowledge in this field continues to expand at an ever increasing rate. The ideal textbook for this audience would combine state-of-the-art science with relevant application to disease processes and treatment in a logical and understandable format. This *Gastrointestinal System* book, edited by PS Leung and written by DD Black, EB Chang and MD Sitrin clearly satisfies these requirements. The informative, up-to-date chapters cover all aspects of gastrointestinal and hepatobiliary physiology and span pathophysiology, diagnosis and treatment of disease. Clinical correlations using cases that clearly illustrate the concepts presented are included in each chapter along with a reading list for more in-depth study. Multiple-choice questions at the end of the book help the reader assess his or her understanding of the material and identify areas for additional review. The editor and authors are all outstanding academicians who have contributed significantly to our knowledge of both basic physiology and clinical medicine. This book belongs in every student’s and trainee’s armamentarium for mastering this fascinating area of medicine.

Memphis, TN, USA

Leonard R. Johnson
Thomas A. Gerwin

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