

Preface

The new edition of this popular text continues to present homeostasis as a dynamic concept that provides the basis for understanding health and well-being. It also recognizes how failure to respond to homeostatic disturbances results in homeostatic imbalances responsible for the signs and symptoms of ill health, and how health carers seek to reverse those imbalances by acting as external agents of homeostatic control.

Why *homeostasis*? The concept of homeostasis typically is one of a constant performance or environment, but in physiology such an interpretation is not strictly correct because there must be scope for adaptation to allow people to achieve developmental milestones, or to change performance level according to need – for example, when we perform exercise, when a woman becomes pregnant, when we respond to infection, or when we are recovering from an operation. Homeostasis in the physiological sense therefore represents a dynamism that is central to human functioning. Nevertheless, the concept remains about control; few processes in the body occur by chance, and those that do promote corrective or adaptive responses.

This book is especially concerned with identifying the adaptive responses illustrated in health, the maladaptive processes that are illustrated during ill health, and how the healthcare professional utilises this knowledge in restoring a person's health status or improving the quality of life until death. The intention is to utilize homeostasis as a framework to aid learning and so help the healthcare student to appreciate the physiological rationale of practice.

The education of the healthcare professional places emphasis on producing students and staff knowledgeable about the 'holistic' (physiological, psychological, sociological and spiritual) requirements of health. The integration of physiological functioning into this model has provided difficulty in healthcare education, and the need to describe and explain body functioning in the context of an interactive framework prompted the writing of previous editions of this book, as well as many subsequent articles on the theme of homeostasis.

This third edition builds on the successful format, providing nature–nurture interactions as a basis of this interactive framework. The book gives an integrated explanation of body functioning, with descriptions of related anatomy in health, illness and health care. This exciting new edition has been updated and extended to provide the following new material:

- Overview of microbiology and principles of infection management.
- Extended information on pharmacological principles and actions of the major classes of drugs.
- Extended application of physiological functions in relation to specific pathologies, and examples of health care.
- Updates on how the Human Genome Project is beginning to impact on health care.

- More case studies to illustrate the health carer's role as an external agent of homeostatic control.
- New, improved colour design.
- Photographs of common clinical conditions.
- An accompanying website www.hodderplus.co.uk/physiologyandanatomy

The book is divided into six major sections:

- *Section I: An introduction to the human body.* This introductory section considers the construction of the human body and what is meant by cell function. The basic principles of homeostasis are explored in depth. Although each chapter can be read individually, the reader is strongly encouraged to read Chapter 1 first since the principles discussed, and in particular the inclusion of a simple but unique aid to learning – the homeostatic graph – are the foundations for what follows in the other chapters.
- *Section II: The need for regulation.* This second section identifies the fundamentals of human body functioning, including the composition of the body, its chemical reactions (metabolism) and the physiological rationale underlying a healthy diet.
- *Section III: Sensing change and coordinating responses.* This third section explains how the internal (and external) environment is identified by individual or sense organ receptors, and how adaptive responses are enabled and coordinated by the nervous and endocrine systems.
- *Section IV: Effectors of homeostasis.* This section considers further systems of the human body that are themselves capable of bringing about change, and so provide the means of correcting homeostatic disturbances of excess and deficits.
- *Section V: Influences on homeostasis.* The penultimate section considers some of the vital interactive components that promote variation in the human body. It discusses the influence of genes and environmental factors in human development and ageing, and the nature–nurture interactions associated with the perception of pain and distress, and in the control of bodily rhythms over the 24-hour period.
- *Section VI: Healthcare practice: A homeostatic approach.* This final section provides numerous examples of case studies that illustrate homeostatic principles in relation to healthcare problems and how healthcare practitioner may be considered to be an external agent of homeostatic control.

Each chapter provides frequent cross-referencing to other chapters in a manner that can only provide the reader with a greater understanding of the integrated functioning of the human body in health and illness.

Although the book assumes some knowledge of physiology, it identifies and explains the main aspects of function that in turn relate to homeostasis, homeostatic disturbance and home-

ostatic imbalances. Application Boxes are used throughout to reinforce how healthcare practitioners act as external agents of homeostatic control to minimise, or reverse, functional disturbance in their patients. Activities and reflective questions are included within the text and illustrations of each chapter to test the reader's understanding.

The authors between them have over 50 years' experience of teaching physiology to healthcare practitioners, and they understand what an overwhelming subject the student is faced with when studying physiology and anatomy. Their objective is not for the reader to memorise the contents of each chapter (that would be truly remarkable!), but merely to grasp a general understanding of homeostasis in action, since the book

can always be referred to for further reference when needed.

Finally, we hope you enjoy reading the book, and that it will contribute to a better understanding of your role as a healthcare practitioner and of your patients, to the ultimate benefit of both.

John Clancy
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PS. We would value comments on the value of this book so that the next edition will evolve!