Form and function are inseparable in every aspect of life, not just in the life sciences: the laws of aerodynamics dictate the shape of an airplane, just as the shape of a claw hammer is dictated by its use to either pound in nails or pull them out. We chose the name of this textbook, Human Form, Human Function, to emphasize that human body anatomy (form) and physiology (function) are similarly inseparable. For example, it is no accident that when you fold your elbow it brings your hand near your mouth. The length of your upper and lower arm along with the joint in between, function together to make it easy to feed yourself. Also, on the molecular level, form and function are coupled—the function of protein molecules relies on the intricate folds of their structure; a misfolded protein does not function properly.

Approach

Just as form and function are inseparable, so are the workings of the various organs and organ systems of the body, which cooperate in a mutually beneficial way to sustain normal body function. For example, in the broadest sense the lungs support the intestines and the intestines support the lungs. In our discussions, we emphasize these points by returning again and again to the relationship of form to function and the mutual interdependence of body organs and organ systems.

Apart from our emphasis on the interlocking nature of human anatomy and physiology, we also emphasize that injury and disease are nothing more than abnormal form coupled with abnormal function. To this end, the narrative is laced with medical content and features that will deepen your comprehension of the interdependent workings of the body in its healthy state. Let’s look a bit more closely at how form, function, and integrated physiology are presented.

The Body as an Integrated Organism

Although many body functions might seem to be performed by a single body system, just the opposite is true. For example, it would be easy to assume that the lungs are solely responsible for respiration and the intestinal tract for digestion, but in fact, neither the lungs nor the bowels can live without the other. They are bound together by certain integrative functions, such as cell-to-cell communication, the uptake of nutrients and oxygen, and so on. Many textbooks attempt to convey this integration through a single end-of-chapter discussion, diagram, or table. In contrast, we believe that the integrated nature of our functionality is fundamental, and must be conveyed continuously throughout the content discussion. Every aspect of Human Form, Human Function reflects this belief. Let’s look at how we have laid it out for you:

Instead of dividing chapters into anatomy and physiology sections, we weave together form and function. We begin our exploration of the body by introducing you to certain chemical and cellular principles that operate in every cell and every tissue, despite where located, and which support each of the forms and functions you’ll discover as the chapters unfold. As we go, we help you to build on your understanding of these fundamental principles by applying them to the body in health and in disease. To this end we have written two unique chapters in which integration is the focus:

- Chapter 4, Communication: Chemical and Electrical Signaling. We present this subject much earlier and at a more foundational level than in most textbooks. In most other textbooks, signaling is discussed with the endocrine and nervous systems, in which its importance in the life of other systems gets lost in the dizzying complexities of endocrine and neural function. To the contrary, we believe that an early understanding of cell signaling will help you make sense of the physiology of every body system.

- Chapter 18, Life. This closing chapter integrates your new knowledge of form and function from all of the previous chapters and applies it to the discussion on aging, the stages of life, genetics and inherited traits and their importance, good and bad stress, exercise and diet; and other aspects of healthy living.

Several chapters also contain dedicated sections on integration. For example:

- Chapter 6, Bones and Joints, includes a section on the role of nutrients and hormones in bone health.

- Chapter 8, The Nervous System, includes an integrated view of neural form and function.
Chapter 15, Metabolism and Endocrine Control, discusses energy generation, energy balance, body temperature regulation, growth; in short, processes that affect the health and functioning of every body cell.

Your study of these chapters will give you a deeper appreciation of the integrated nature of our body systems.

The Body in Health and Disease

We believe that normal, healthy form and function is best understood and remembered when contrasted with the abnormal forms and functions that are characteristic of certain diseases or conditions.

Each chapter opens with a Case Study, the presentation of the natural history of an episode of disease. Each of these cases, all of them drawn from real patients, was selected to illustrate the most important concepts discussed in the chapter. For example, the case study in Chapter 5, which discusses the skin, tells the story of a young man who sustained severe burns over much of his body. It is a case based on Dr. McConnell’s actual hospital experience, as are many of the other cases.

As the chapter narrative progresses, we return to the chapter case in a feature called Case Notes. The critical thinking questions in this feature prompt you to apply to the case the material you have just learned.

Finally, near the end of each chapter is the Case Discussion in which we revisit the case study and apply the chapter concepts to the case in some detail. These case discussions are accompanied by an illustration to help you visualize the interrelationships among various aspects of the case, such as the breakdown in normal functions and the effect of medical treatment.

Clinical Snapshot boxes are included in most chapters. These allow for a fuller discussion of abnormalities of form and function than can be included within the narrative. For example, a Clinical Snapshot in Chapter 5 discusses skin cancer.

Apart from these particular features, medical discussion of abnormal form and function are regularly woven into the narrative.

Organization and Structure

Just as body systems work together as a unified whole, so the 18 chapters in Human Form, Human Function flow smoothly from one to another with no artificial division into units. This choice reflects and underscores our theme of integration. We believe that units, although useful in highlighting similarities, can also distract from an understanding of the inherent anatomical and physiological interrelationships among body systems. Our integrative approach carries through every chapter of the text.

Chapter 1 introduces you to the basic features of living organisms and the language of anatomy and physiology.

Chapters 2–4 present the chemical and cellular structures and functions that will inform your subsequent learning about the integrated body.

Chapters 5–9 discuss the form and function of skin, bones, muscles and tendons, nerves, and our sensory apparatus.

Chapters 10–11 explore circulation of blood.

Chapter 12 is devoted to the immune system and its role in defending the body against microbes and other threats; also discussed is the lymphatic system, an important feature of the immune system, but part of which plays a role in digestion.

Chapter 13 is devoted to respiration: the inhalation and absorption of oxygen by the lungs and its use by cells; and the generation of carbon dioxide by cells and its exhalation by the lungs.

Chapters 14–16 explore what happens to the foods and fluids we ingest, as well as how the body removes toxins, generates energy and builds essential substances, and regulates temperature, growth, and other processes.

Chapter 17 discusses human reproduction, including a brief look at pregnancy and breastfeeding.

Chapter 18 is intended to weave together your understanding of the structures and functions of the human body into a seamless whole as you consider how the body grows and ages, and how good health is maintained.

Style

We deliberately use a narrative technique that is commonly described as “casual” or “conversational.” Our classroom and professional experience teaches us that
Podcasts provide an audio summary on certain topics that may be more challenging for students.

Interactive Online Activities—approximately 1,800 additional questions and activities for student practice/quizning.

Online Dissection Atlas—fetal pig, human, and cat dissection images are presented in an online library so students get a “real” view of anatomy.

Animations of various processes are included to help students understand the body’s inner workings.

Additional Clinical Snapshot, History of Science, and Basic Form, Basic Function boxes provide learning opportunity and interest for the student.

Instructors

Approved adopting instructors will be given access to all of the student resources and these additional resources:

- Online Instructor’s Manual
- PowerPoint Slides with Lecture Notes and images
- Online Activities—approximately 1,800 additional questions and activities for student practice/quizning
- Image Bank includes all images in the text plus table images and with labels on/off feature
- Answers to textbook chapter questions and mini quizzes (Pop Quiz, Case Notes, Figure legend questions) are included online
- Test Bank with more than 500 questions in different formats (multiple choice, true-false, fill-in-the-blank, and matching)
- WebCT and Blackboard-ready Cartridge, which allow you to integrate the ancillary materials into learning management systems

In addition, purchasers of the text can access the searchable Full Text On-line by going to the Human Form, Human Function: Essentials of Anatomy & Physiology Web site at http://thePoint.lww.com/McConnellandHull. See the inside front cover of this text for more details, including the passcode you will need to gain access to the Web site.

So here it is. We hope you like it. Judge for yourself.

Thomas H. McConnell

Kerry L. Hull