

# Preface

**H**uman anatomy is a fascinating field that has many layers of complexity. The subject is difficult to teach, and students can often be overwhelmed by its massive amount of material. In many respects, studying anatomy is similar to studying a foreign language because students must understand the vocabulary before they can apply the material. As many instructors know, textbook selection can either help or hinder student understanding. Throughout our teaching careers, we have examined and reviewed many textbooks. Some texts provide relatively accurate terminology and description but are too difficult for the average undergraduate to read. Other texts are easier to read but not as thorough or accurate in their discussions. We felt that a new textbook was in order—one that was accurate and in-depth in its anatomic descriptions and yet easy to understand and full of pedagogical elements to help the student. This is the vision of this first edition of *Human Anatomy*.

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## Audience

This textbook is designed for a one-semester human anatomy course, typically taken in the second or third year of college, for students in pre-allied health professions, nursing, exercise science, kinesiology, and/or other pre-professional health programs. It assumes the reader has no prior knowledge of biology or chemistry, and so the early chapters serve as a primer for the history of anatomy, biological terminology, and cell biology. This text provides all the background the introductory student needs to learn the basics of human anatomy.

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## What Makes This Book Special?

Although several human anatomy books are already on the market, a variety of features make this text different from the rest.

### Designed and Written “From the Ground Up” as a Human Anatomy Text

Most, if not all, current undergraduate human anatomy textbooks are primarily “cut-down” versions of existing anatomy and physiology textbooks. Our text, *Human Anatomy*, was written exclusively for and with attention to the human anatomy course. Our text is not a “pared down” version of an A&P text; we have designed it from the ground up to satisfy the needs of anatomy students and instructors.

### Authors’ Experience in Gross Anatomy and Histology

Using our combined experience in teaching undergraduate and graduate anatomy courses, we have worked to create a textbook that combines our extensive knowledge of the material with our understanding of how to best teach human anatomy.

Valerie Dean O’Loughlin has spent the past decade teaching human gross anatomy to medical students and performing cadaver dissections at Indiana University. She has developed an expert eye for both gross human anatomy and the variability typically seen, and drew heavily upon this experience to ensure that both the narrative and the gross anatomy artwork in this book conform to standards typically seen in medical atlases and medical textbooks. Incorporating her experience in teaching undergraduates, Valerie has made sure that the art and text are accurate but presented at a level that will not overwhelm the undergraduate reader.

Michael McKinley has 10 years of experience teaching histology to medical students at the University of California at San Francisco, and also was the director of the Brain Donation Program at the Sun Health Research Institute. More recently, Mike has spent the past 15 years teaching anatomy and physiology, general biology, and genetics to undergraduates at Glendale Community College. Mike carefully focused his eye for detail and accuracy on the text and artwork for the histological and nervous system chapters.

### Superior Illustrations and a Quality Art Program

Anatomy is a visual subject, and one of the best ways a student can learn it is by studying beautiful, accurate drawings. We have been dismayed in the past to see texts in which sound anatomic discussions were accompanied by weak or inaccurate illustrations. One of our prime goals in producing this book was that the illustrations be just as accurate as the text. To meet this objective, we worked with an experienced team of certified medical illustrators to produce a collection of anatomic images unsurpassed by other anatomy texts. These images are both beautiful and as accurate as possible. We painstakingly scrutinized each rendering, relying on experience in human gross anatomy, cadaver dissection, histology, and A&P—as well as trusted anatomic bibles such as Gray, Grant, Clemente, Netter, and a host of photographic atlases—to make sure the art matches life. Every illustration also went through an intensive peer review in which dozens of fellow instructors gave us pointed feedback on how to clarify concepts and make the drawings even more accurate—welcome assistance for our sometimes-weary eyes! Finally, we have carefully labeled the illustrations to coincide with coverage in the narrative to ensure that the pictures and words work together to tell a cohesive story. We challenge you to compare the artwork in this text with that in other human anatomy texts, and see which you and your students prefer.

### Human Cadaver Photographs to Complement the Illustrations

Sometimes even the most beautiful art cannot prepare us for what anatomic structures look like in a real human being or for the normal variations that occur among individuals. Whenever possible, we have paired illustrations with human cadaver photographs to provide two valuable perspectives of key views: an artist’s rendering that utilizes color and texture to make features stand out, and a photograph that demonstrates the appearance of real specimens. Furthermore, we have applied labels to complementary illustrations and photos so that they mirror each other whenever possible to make it easier for students to correlate structures between images. Christine Eckel of Salt Lake Community College tirelessly worked on the dissections and photographs of the cadavers. Her work is beautiful, and many of her dissections are presented in a way that is unparalleled in other texts. We suggest you turn to chapter 11 (Axial Muscles) and examine these photos. You will be impressed—and your students will appreciate their value as they are learning the laboratory material.

### Writing Style: Blending Accuracy with Readability

Both authors have distinct writing styles that, when combined in this text, provide the optimum balance between concise anatomic accuracy and user-friendly readability. We felt that a text that was too condensed in its descriptions would be more frustrating than

helpful for students to use. Likewise, if a text is too verbose in its descriptions, students feel they have read many pages that have said little. We have tried to strike a happy medium between these two extremes, so a student will feel that the text is easy to read and understand, while the instructor recognizes that the information is accurate, concise, and expertly written. We have been meticulous in our descriptions and level of accuracy. Through each draft that we wrote and refined, we checked multiple literature sources to ensure that our discussions were accurate and correct to the best of current knowledge. Many gracious human anatomy instructors lent us their eyes as well, as they evaluated our manuscripts and page proofs, providing critical guidance and feedback that kept us on our toes each step of the way.

In addition to making the text readable and accurate, we wanted to make it engaging and effective. To this end, we have incorporated many active learning techniques into the narrative. As we tell our students, you don't lose weight merely by watching an exercise program; you have to *do* the exercises in order to get results. Therefore, throughout our text, we have provided opportunities for the student to be an active learner, not just a passive reader. For example, students are encouraged to palpate structures on their bodies, perform basic experiments to test anatomic principles, and observe certain features on themselves. As the students perform these anatomy "exercises," their understanding will increase.

## **Themes and Distinctive Topic Approaches**

Through our teaching experience, we have developed a few approaches that really seem to help students grasp certain topics or spark their interest. Thus, we have tried to incorporate these successful ideas from our own courses into our book.

### ***Embryology***

In many cases, a student can gain a complete understanding of adult anatomy only by first learning about the embryologic events that formed this anatomy. For this reason, we have placed an entire chapter on embryology (chapter 3) early in our text, as opposed to having a development chapter at the end of the book. In addition, "systems embryology" sections in each systems chapter (e.g., integumentary system, digestive system, etc.) provide a brief but thorough overview of the developmental processes for that particular system at a level that will not overwhelm the introductory student.

### ***Forensic Anthropology***

Many of our students are fascinated by crime scene shows and love to learn how knowledge of anatomy can play a part in forensic analysis. With a Ph.D. in biological anthropology, Valerie shares this interest, and utilized her experience to craft the forensic applications in the skeletal system chapters. Chapters 6–8 feature discussions on such topics as epiphyseal plate fusion as a reliable indicator of age at death, sex differences in the skull, sex differences in the pelvis, and how morphologic changes in the pubic symphysis of the os coxae can be used to estimate age at death. These forensic applications are a great way to reinforce learning, and students will enjoy the "real-life" applications.

### ***Surface Anatomy***

Many of the students who take anatomy will become health-care professionals who use surface anatomy throughout their careers and need to know the importance of these landmarks. To best serve our student audience, we have given surface anatomy the coverage it deserves. Our chapter 13, Surface Anatomy, contains beautiful

photographs and clear, concise text as well as numerous Clinical Views that illustrate the importance of the landmarks and how they are used daily in health care. Placing this chapter directly after the musculoskeletal chapters allows students to establish knowledge of the body's underlying framework before trying to understand surface landmarks.

### ***Nervous System***

In order to understand the workings of the nervous system, it is best to learn how the brain controls all aspects of the nervous system. Thus, in this text we examine the brain first, followed by a chapter illustrating its similarities, differences, and relationships with the spinal cord.

It seemed appropriate to use central nervous system terminology to describe the brain first, then the spinal cord. Additionally, because the nuclei of the cranial nerves are housed within the brain, we felt it made more sense to present the cranial nerves with the brain.

### ***Autonomic Nervous System***

The autonomic nervous system is perhaps one of the most challenging topics in human anatomy. Why, then, do so many texts make a difficult topic even *more* difficult by presenting the sympathetic division first? We have seen in our own teaching experience that presenting the parasympathetic division (the relatively "easier" system) first increases the overall understanding of the autonomic nervous system. Thus, in chapter 18 (Autonomic Nervous System), we discuss the parasympathetic division first, and follow up with a discussion of the more complex sympathetic division.

### ***Arteries and Veins***

We have been confused as to why other texts discuss all of the arteries in the body first, and then follow with a separate discussion of all of the veins. Presenting this material in such a fragmented fashion does not give students "the big picture." We feel that it makes much more sense to discuss blood flow in its entirety. For this reason, our text discusses arteries and veins in unison by region. For example, we present the veins and arteries of the upper limb together. This approach emphasizes to students that arteries often have corresponding veins and that both are responsible for the blood flow in a general region. We challenge you to compare our chapter 23 (Vessels and Circulation) with chapters from other texts. We predict that you and your students will appreciate our more unified presentation.

### ***Reproductive System Homologues***

Embryology has shown us that the female and male reproductive systems, and thus the homologues within those systems, originate from the same basic structures. An emphasis on homologues helps students grasp the similarities and differences between the female and male reproductive systems. Because the female reproductive system is the "basic" embryologic system (meaning that if no male hormonal influences occur in utero, the female pattern remains), we present the female reproductive system first, followed by the male reproductive system.

### **Accurate Terminology and Pronunciation Aids**

The terms used in this text follow the standards set by the FCAT (Federative Committee on Anatomical Terminology) and published in *Terminologia Anatomica (TA)*. This reference is the international standard by which anatomic vocabulary should be based. In a few cases, TA terminology was not used because an alternative term

was less confusing and more understandable for the student. In the case of an ambiguous term, *Stedman's Medical Dictionary* also was consulted. We have eliminated the use of eponyms as primary terms whenever possible. However, eponyms are given in italics so the student and instructor can correlate an eponym with its proper anatomic term.

A large contributor to success in the human anatomy course is mastering the terminology. Students cannot properly learn the anatomy if they cannot “talk the talk”—that is, pronounce the words and know what the words mean. Pronunciation guides and word origins are included throughout the book to teach students how to say the terms and give them helpful, memorable hints for decoding meaning. These vocabulary aids were derived from *Stedman's Medical Dictionary*.

## Pedagogy

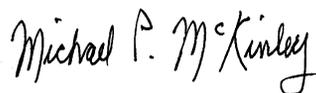
Learning human anatomy is often seen as an endeavor of rote memorization. In *Human Anatomy*, we have employed many pedagogical techniques that aim to take students beyond memorization and engage them in a more thought-provoking discovery of facts that will lead to a well-rounded understanding. Individuals learn in a variety of ways—some learn best by reading text, others by

using visuals, and still others by studying information organized in tables. We have been careful to cover concepts using all three of these mediums. These multifaceted concept presentations are then organized within a framework of pedagogical tools that help students build their knowledge base and encourage them to actively apply the information they read. Question sets within each chapter and review activities at the end of each chapter provide a balanced combination of simple retention-based questions and more complex critical-thinking activities. Study Tip! boxes offer practical advice for understanding and remembering the material. Clinical View essays promote a deeper understanding of the material discussed in the text by demonstrating how basic concepts play out in disease processes. All of these pedagogical elements work together, sparking students to practice, remember, apply, and understand. The “Guided Tour” beginning on the next page offers more specifics about the learning features in *Human Anatomy*.

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## Your Feedback Is Welcome!

We are dedicated to producing the best materials available to help students learn human anatomy and engender a love of this topic. Your suggestions for improving this textbook are always welcome!



Michael P. McKinley  
Department of Biology  
Glendale Community College  
6000 W. Olive Avenue  
Glendale, AZ 85302  
michael.mckinley@gcmil.maricopa.edu



Valerie Dean O'Loughlin  
Jordan Hall 010A  
Medical Sciences  
Indiana University  
Bloomington, IN 47405  
vdean@indiana.edu