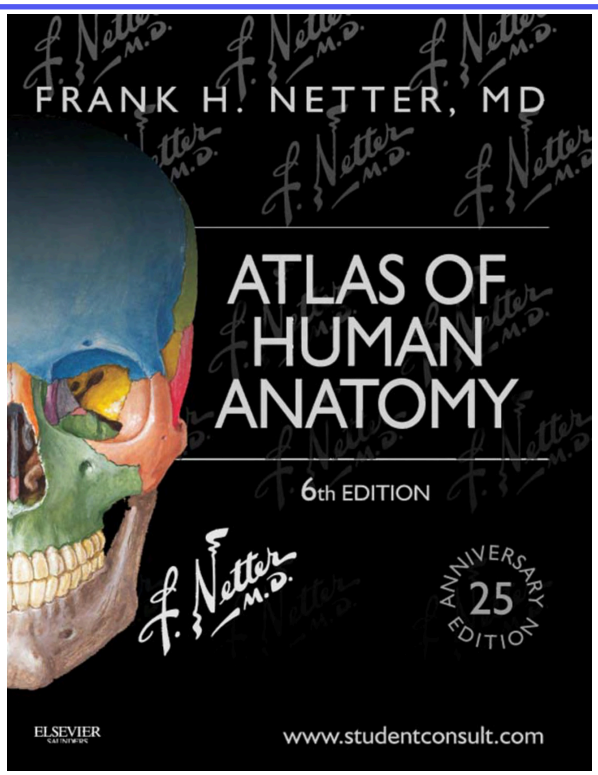


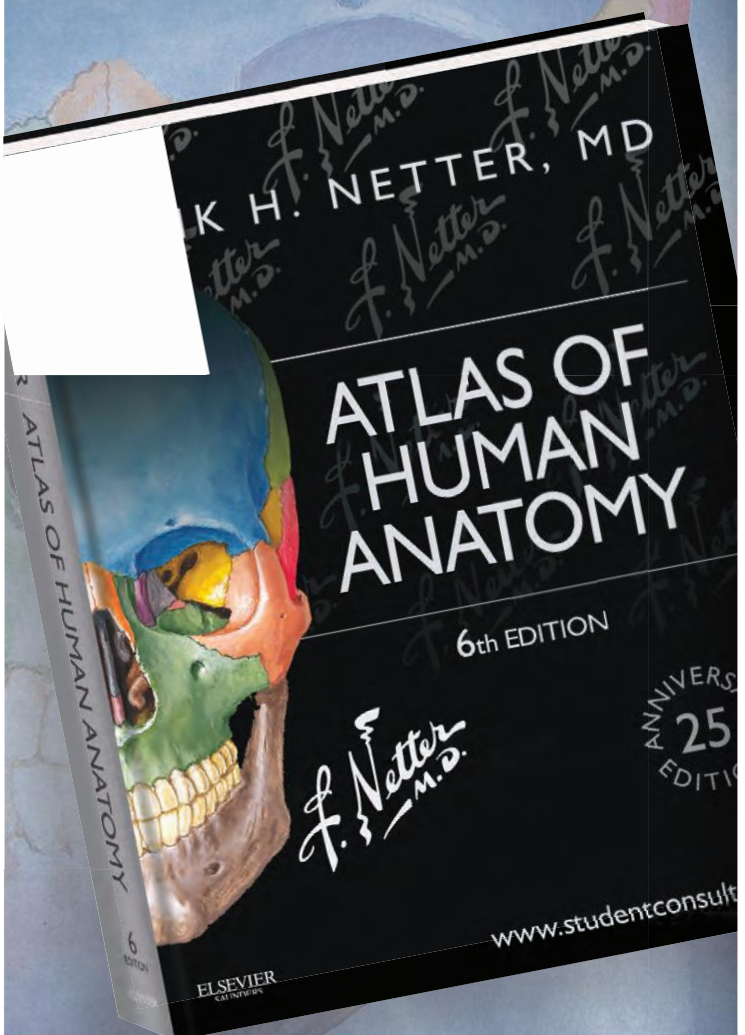

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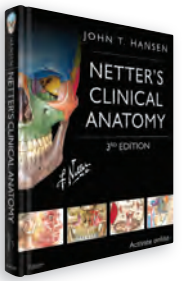





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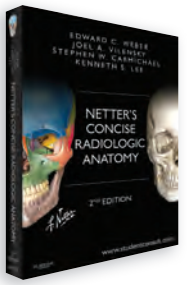
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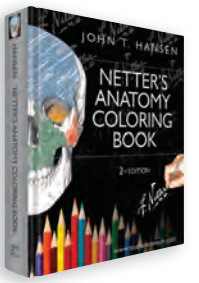
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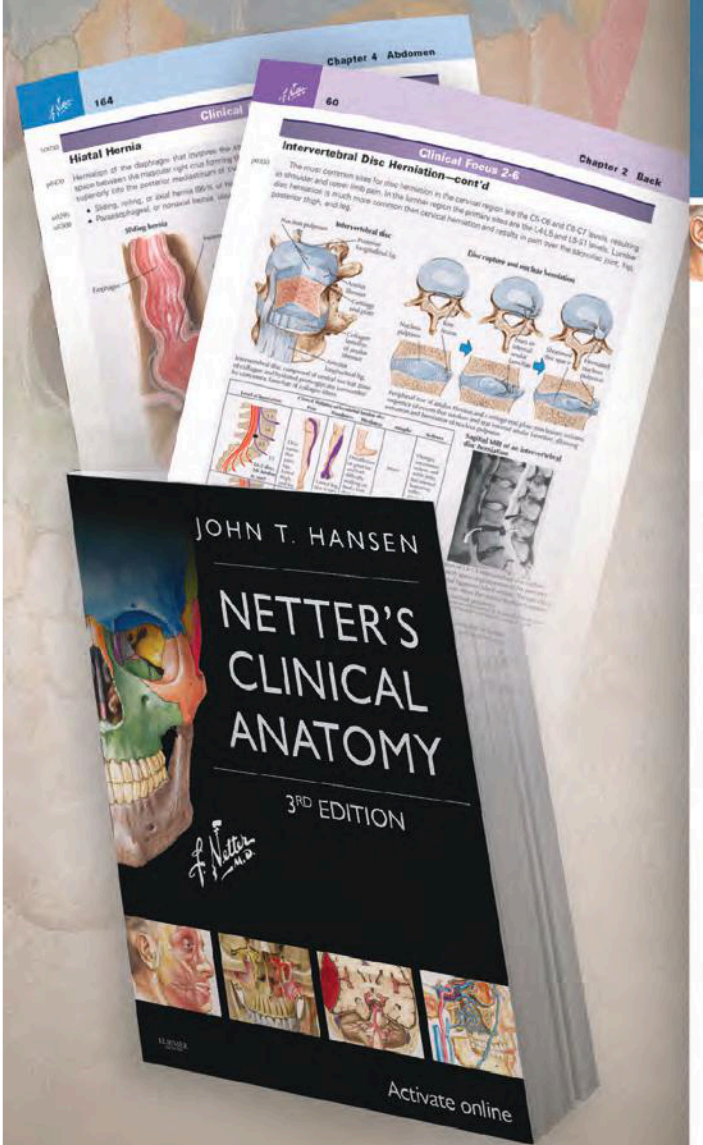


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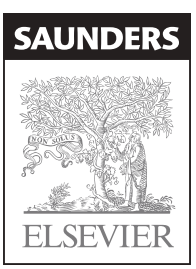
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**Sixth Edition**

Frank H. Netter, MD



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SIXTH EDITION

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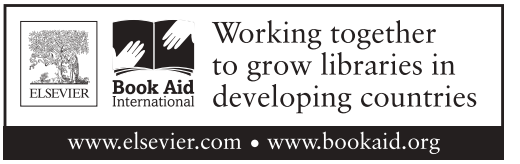
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## Netter's Atlas of Human Anatomy – Celebrating 25 Years

*"Anatomy, of course, does not change, but our understanding of anatomy and its clinical significance does."*

– **Frank H. Netter, MD**

Whether you're using this 6th edition of ***Atlas of Human Anatomy*** in print, as an e-Book, online, or in the Netter's Anatomy Atlas for iPad app—Dr. Netter's paintings of the intricacies of the human form remain as relevant today as at first launch. The publication of the 6th edition marks the silver anniversary of the first release of Frank H. Netter's *Atlas of Human Anatomy*—when its vibrant colors and unique clinical perspective made it a must-have companion in anatomy classes, dissection labs, and clinical professional offices worldwide—solidifying his legacy to so many as one of the world's most influential medical educators.

Anatomy remains a cornerstone of healthcare education. It is often one of the first topics taught in medical or healthcare curricula. Anatomy is also central to so much in clinical practice, from physical examination and radiologic imaging to surgery and physical rehabilitation. However, changes in anatomy education and its clinical application over these past 25 years have been significant. Medical and healthcare curricula increasingly integrate anatomy throughout and dedicated gross-anatomy hours have decreased. Some programs have discontinued full-body dissection. Advances in imaging technology have provided increasingly clearer views of living anatomy, and 3D models of anatomy continue to evolve. Likewise, the *Atlas* has evolved. Thanks to the tremendous guidance of leading clinical anatomists and expert anatomy educators, as well as the contributions of talented medical illustrators, the 6th edition features newly created illustrations and modern radiologic images that provide students with views of current clinical significance and perspectives that elucidate complex anatomic relationships. This edition also includes the illustrations from older editions of the *Atlas*, like Dr. Netter's depictions of common anatomic variations (in electronic editions and print+electronic packages) as bonus plates to help provide more comprehensive coverage that dissection lab hours may not allow. For the first time, the *Atlas* incorporates muscle tables as quick look-up appendices at the end of each section for the convenience of the clinician, student, or educator with little time. StudentConsult.com and NetterReference.com electronic resources include some 3D models extracted from Netter's 3D Interactive Anatomy, dissection video selections from Netter's Online Dissection Modules by UNC at Chapel Hill, and other supporting resources. In addition, all text throughout the Atlas has been meticulously updated to be in line with the most recent version of *Terminologia Anatomica* by the Federal International Program for Anatomical Terminology (FIPAT) of the International Federation of Associations of Anatomists (IFAA).

The unique visual perspective of Frank H. Netter is unsurpassed. Dr. Netter brought the hand of a master medical illustrator, the brain of a physician, and the soul of an artist to his depictions of the human body. This 25th anniversary edition celebrates the lasting impact of his work that continues to teach and inspire.

**We want to hear from you**—about the history and future of anatomy education and medicine and the Netter legacy and invite you to share your thoughts, inspirations, memories, tributes, and feedback with us through email: NetterAppFeedback@elsevier.com and on Facebook: www.facebook.com/NetterImages







**Frank H. Netter, MD**
Photograph by James L. Clayton

**To my dear wife, Vera**

## Preface to the First Edition

I have often said that my career as a medical artist for almost 50 years has been a sort of "command performance" in the sense that it has grown in response to the desires and requests of the medical profession. Over these many years, I have produced almost 4,000 illustrations, mostly for *The CIBA* (now *Netter*) *Collection of Medical Illustrations* but also for *Clinical Symposia.* These pictures have been concerned with the varied subdivisions of medical knowledge such as gross anatomy, histology, embryology, physiology, pathology, diagnostic modalities, surgical and therapeutic techniques, and clinical manifestations of a multitude of diseases. As the years went by, however, there were more and more requests from physicians and students for me to produce an atlas purely of gross anatomy. Thus, this atlas has come about, not through any inspiration on my part but rather, like most of my previous works, as a fulfillment of the desires of the medical profession.

It involved going back over all the illustrations I had made over so many years, selecting those pertinent to gross anatomy, classifying them and organizing them by system and region, adapting them to page size and space, and arranging them in logical sequence. Anatomy of course does not change, but our understanding of anatomy and its clinical significance does change, as do anatomical terminology and nomenclature. This therefore required much updating of many of the older pictures and even revision of a number of them in order to make them more pertinent to today's ever-expanding scope of medical and surgical practice. In addition, I found that there were gaps in the portrayal of medical knowledge as pictorialized in the illustrations I had previously done, and this necessitated my making a number of new pictures that are included in this volume.

In creating an atlas such as this, it is important to achieve a happy medium between complexity and simplification. If the pictures are too complex, they may be difficult and confusing to read; if oversimplified, they may not be adequately definitive or may even be misleading. I have therefore striven for a middle course of realism without the clutter of confusing minutiae. I hope that the students and members of the medical and allied professions will find the illustrations readily understandable, yet instructive and useful.

At one point, the publisher and I thought it might be nice to include a foreword by a truly outstanding and renowned anatomist, but there are so many in that category that we could not make a choice. We did think of men like Vesalius, Leonardo da Vinci, William Hunter, and Henry Gray, who of course are unfortunately unavailable, but I do wonder what their comments might have been about this atlas.

**Frank H. Netter, MD**
(1906–1991)

## Frank H. Netter, MD

Frank H. Netter was born in New York City in 1906. He studied art at the Art Students League and the National Academy of Design before entering medical school at New York University, where he received his Doctor of Medicine degree in 1931. During his student years, Dr. Netter's notebook sketches attracted the attention of the medical faculty and other physicians, allowing him to augment his income by illustrating articles and textbooks. He continued illustrating as a sideline after establishing a surgical practice in 1933, but he ultimately opted to give up his practice in favor of a full-time commitment to art. After service in the United States Army during World War II, Dr. Netter began his long collaboration with the CIBA Pharmaceutical Company (now Novartis Pharmaceuticals). This 45-year partnership resulted in the production of the extraordinary collection of medical art so familiar to physicians and other medical professionals worldwide.

Icon Learning Systems acquired the Netter Collection in July 2000 and continued to update Dr. Netter's original paintings and to add newly commissioned paintings by artists trained in the style of Dr. Netter. In 2005, Elsevier Inc. purchased the Netter Collection and all publications publications featuring the art of Dr. Netter available through Elsevier Inc.

Dr. Netter's works are among the finest examples of the use of illustration in the teaching of medical concepts. The 13-book *Netter Collection of Medical Illustrations,* which includes the greater part of the more than 20,000 paintings created by Dr. Netter, became and remains one of the most famous medical works ever published. *The Netter Atlas of Human Anatomy,* first published in 1989, presents the anatomic paintings from the Netter Collection. Now translated into 16 languages, it is the anatomy atlas of choice among medical and health professions students the world over.

The Netter illustrations are appreciated not only for their aesthetic qualities, but, more importantly, for their intellectual content. As Dr. Netter wrote in 1949 "clarification of a subject is the aim and goal of illustration. No matter how beautifully painted, how delicately and subtly rendered a subject may be, it is of little value as a *medical illustration* if it does not serve to make clear some medical point." Dr. Netter's planning, conception, point of view, and approach are what inform his paintings and what make them so intellectually valuable.

Frank H. Netter, MD, physician and artist, died in