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Sixteenth Edition

Vander's **HUMAN
PHYSIOLOGY**

The Mechanisms of Body Function

A woman in red athletic wear is performing a battle rope exercise against a brick wall. She is holding a thick, braided rope with both hands, and the rope is swinging in a large arc behind her. The background is a brick wall.

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Eric P. Widmaier | Hershel Raff | Kevin T. Strang

SIXTEENTH EDITION

VANDER'S

HUMAN PHYSIOLOGY

The Mechanisms of Body Function

ERIC P. WIDMAIER

BOSTON UNIVERSITY

HERSHEL RAFF

MEDICAL COLLEGE OF WISCONSIN
AURORA ST. LUKE'S MEDICAL CENTER/
ADVOCATE AURORA RESEARCH INSTITUTE

KEVIN T. STRANG

UNIVERSITY OF WISCONSIN–MADISON



VANDER'S HUMAN PHYSIOLOGY

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MEET THE AUTHORS



Courtesy of Maria Widmaier

ERIC P. WIDMAIER received his Ph.D. in 1984 in Endocrinology from the *University of California at San Francisco*. His postdoctoral training was in molecular endocrinology, neuroscience, and physiology at the *Worcester Foundation for Experimental Biology* in Shrewsbury, Massachusetts, and *The Salk Institute* in La Jolla, California. His research was focused on the control of body mass and metabolism in mammals, the mechanisms of hormone action, and molecular mechanisms of intestinal and hypothalamic adaptation to high-fat diets. He is currently Emeritus Professor of Biology at *Boston University*, where he has taught Human Physiology for many years, and he has been recognized with the Gitner Award for Distinguished Teaching by the College of Arts and Sciences as well as the Metcalf Prize for Excellence in Teaching by Boston University. He is the author of many scientific and lay publications, including books about physiology for the general reader. He has two grown children, Rick and Carrie; he and his wife Maria divide their time between New Hampshire and Florida.



Courtesy of Tonya Limberg

HERSHEL RAFF received his Ph.D. in Environmental Physiology from the *Johns Hopkins University* in 1981 and did postdoctoral training in Endocrinology at the *University of California at San Francisco*. He is now a Professor of Medicine (Endocrinology and Molecular Medicine), Surgery, and Physiology in the School of Medicine at the *Medical College of Wisconsin*. He is Director of the Endocrine Research Laboratory at *Aurora St. Luke's Medical Center/Advocate Aurora Research Institute*. He teaches physiology and pathophysiology to medical, pharmacy, and graduate students as well as clinical fellows. At the Medical College of Wisconsin, he is the Endocrinology/Reproduction Course Director for second-year medical students. He was an inaugural inductee into the Society of Teaching Scholars, elected as a faculty member to Alpha Omega Alpha (AOA Honor Medical Society), received the Beckman Basic Science Teaching Award from the senior MD class five times, and has been one of the MCW's Outstanding Medical Student Teachers in multiple years. He is also an Adjunct Professor of Biomedical Sciences at *Marquette University*. Dr. Raff's basic research focuses on the adaptation to stress. His clinical interest focuses on pituitary and adrenal diseases, with a special focus on laboratory tests for the diagnosis of Cushing's syndrome. He resides outside Milwaukee with his wife Judy and son Jonathan.



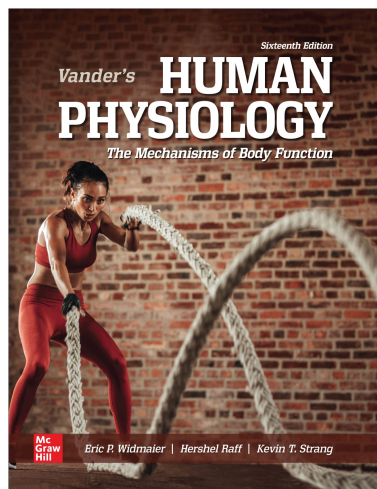
Kevin Strang

KEVIN T. STRANG received both his Master's Degree in Zoology (1988) and his Ph.D. in Physiology (1994) from the *University of Wisconsin–Madison*, where he is now an emeritus Distinguished Faculty Associate in the Departments of Neuroscience and Kinesiology. His thesis research focused on cellular mechanisms of contractility modulation in cardiac muscle. For over 30 years he taught a large undergraduate systems physiology course as well as the first-year medical physiology course in the *UW–Madison School of Medicine and Public Health*. He was elected to UW–Madison's Teaching Academy and as a Fellow of the Wisconsin Initiative for Science Literacy. He has been a frequent guest speaker at colleges and high schools on the physiology of alcohol consumption. Twice awarded the UW Medical Alumni Association's Distinguished Teaching Award for Basic Sciences, he also received the University of Wisconsin System's Underkofler/Alliant Energy Excellence in Teaching Award. In 2012 he was featured in *The Princeton Review* publication *The Best 300 Professors*. Interested in teaching technology, Dr. Strang has produced numerous physiology animations, some of which were adopted for use with *Vander's Human Physiology*. He has two adult children, Jake and Amy, and lives in Madison with his wife Sheryl.

TO OUR FAMILIES: MARIA, CAROLINE, AND RICHARD; JUDY AND JONATHAN; SHERYL, JAKE, AND AMY

FROM THE AUTHORS

Lifeline to success in physiology



Cover Image: Jacob Lund/Shutterstock

We are pleased to offer an integrated package of textual and digital material to deliver basic and clinical content, real-life applications, and educational technologies to students of physiology. With the sixteenth edition of *Vander's Human Physiology*, all these pieces come together to facilitate learning and enthusiasm for understanding the mechanisms of body function.

The cover of this edition reflects several areas of focus of the book, including homeostasis, exercise, and human health. These and other areas of interest are elaborated upon, beginning with [Chapter 1](#), where the key “General Principles of Physiology,” an underlying theme in the book, is first introduced. Unifying themes, such as homeostasis, are explored throughout the book at all levels of system, organ, tissue, and cellular function. As in previous editions, these themes are always

related to pathophysiology through the use of compelling clinical case studies in all chapters, and a final chapter with several cases that integrate material across the entire book.

We are certain that you will find the sixteenth edition of this textbook to be the most up-to-date and comprehensive book available for students of physiology. Thank you and happy reading!

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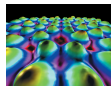
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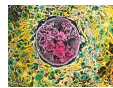
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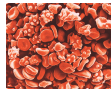
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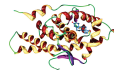
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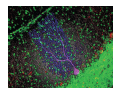
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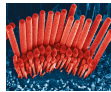
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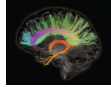
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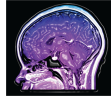
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