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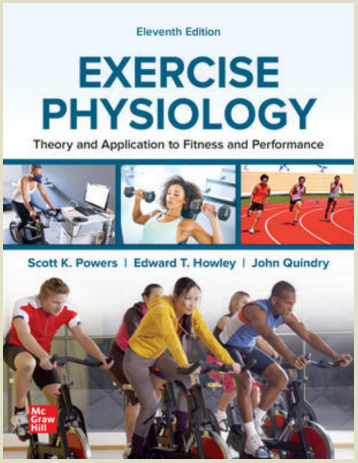

Exercise Physiology: Theory and Application to Fitness and Performance

11th Edition

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Changes to Powers: Exercise Physiology, 11e

Chapter 0

- Completely revised chapter that provides a brief history of exercise physiology research
- New information discussing the research process in exercise physiology
- Original segment on how to read and understand scientific journals articles
- Addition of section on how to effectively search the scientific literature
- Revised segment on exercise physiology professional organizations
- New discussion of careers in exercise physiology and related fields

Chapter 1

- Addition of new section introducing the major types of ergometers used in exercise physiology laboratories
- New figure illustrating the differences in running economy between runners varying in experience and ability

Chapter 2

- Expanded discussion of the gain of a biological control system
- New Research Focus 2.1 introducing the concept of exercise-induced hormesis
- New Figure illustrating relationship between exercise intensity/duration and adaptation

Chapter 3

- New discussion on why skeletal muscles' store carbohydrate in the form of glycogen
- New Research Focus 3. 2 added to discuss the fact that free radicals are formed in the mitochondria
- Addition of new "Ask the Expert" box with Dr. Wayne Willis. This box feature introduces a simple hydraulic model that assists students in better understanding oxidative phosphorylation

Chapter 4

- New information on the role of endurance exercise training plays in lactate removal from the blood (A Closer Look 4.1)
- Addition of new "A Closer Look 4.2" to discuss VO_2 max and it's verification
- New information added to discuss the role that excess post exercise oxygen consumption plays in exercise-induced weight loss
- New figure added to illustrate the Cori cycle

Chapter 5

- Updated information and new figures that detail cortisol changes during the day and following exercise
- Undated information and a revised figure detailing glucagon responses during exercise

Chapter 6

- New information on circulating immune cell percentages at rest and during exercise
- Updated information about key aspects of the immune system

Chapter 7

- Numerous new and improved figures added to the chapter
- Updated research about exercise for multiple sclerosis patients
- Expanded discussion about the "size principle" of motor unit recruitment during exercise
- New research findings about exercise and improved brain health

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Chapter 8

- Updated information on the steps leading to muscle contraction
- New information introducing the four domains of exercise intensity
- New information introducing the four domains of exercise intensity
- Research update on the causes of skeletal muscle fatigue during exercise at both moderate and high intensities
- New research on exercise-induced muscle cramps
- Numerous new and improved figures added to the chapter

Chapter 9

- New information and figures on autonomic control and the cardiovascular system
- New research and a novel figure on the cardiac response to high intensity interval training
- Updated information on the ECG, pharmacologic considerations, and blood pressure control that provide clinical links to many important concepts linked to cardiovascular physiology

Chapter 10

- New discussion about exercise-induced changes in breathing patterns
- Updated information on the control of breathing at rest and during exercise
- New discussion about the role that the Hering-Breuer reflex plays in regulation of tidal volume during exercise
- Addition of new information on the cause of exercise-induced hypoxemia
- Numerous new figures to improve student learning

Chapter 11

- Chapter updated with latest research findings
- Addition of new figure to illustrate a key concept in acid-base balance during exercise

Chapter 12

- Updated information on measurement of body temperature during exercise
- New information on thermoreceptors and control of body temperature
- Latest research findings provided on aging and thermoregulation during exercise
- Addition of new “Closer Look 12.1” on SI units for temperature measurement
- Updated references containing the latest research on exercise and thermoregulation

Chapter 13

- New chapter focusing on the Physiology of training: effects of aerobic and anaerobic training
- Addition of latest information on the impact of genetics on “VO_2 max”
- Addition of new Research Focus 13.1 “Hot Topic in Exercise Physiology: MicroRNA’s and the adaptive response to exercise training”

Chapter 14

- New chapter focusing on resistance training-induced physiological changes
- Latest information on neural adaptations to resistance training
- New information on the important role that ribosomes play muscle hypertrophy
- Updated information on the role that satellite cells play in skeletal muscle hypertrophy
- Detailed discussion of the concept of “muscle memory”
- Latest information on resistance training-induced changes in muscle specific force production
- New information on resistance training-induced changes in tendons and bone

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Chapter 15

- New chapter on Physical activity and Health (replaces old chapter 14)
- Introductory materials provide the most up to date information on physical activity and the prevention of all cause morbidity and mortality
- Latest information and figures about the role of physical activity and exercise in the prevention of diabetes and cancer
- State-of-the-art discussion on the role that physical activity plays in preventing and treating the metabolic syndrome

Chapter 16

- Updated information on the new ACSM physical activity guidelines and improved health are described in a new section
- Updated information about activities of daily living, physical activity, and exercise link to a new appendix of estimated MET equivalents
- A new figure helps understand heart rate-based exercise prescription based on the heart rate reserve and heart rate maximal approaches
- Updated information describes the relationship between VO_2max and health

Chapter 17

- New state-of-the-art material added including a new “ask the expert” side bar with Dr. Kathryn Schmitz highlight the role of exercise in treating those with a cancer diagnosis
- Updated text and a new figure outline approaches to an exercise prescription in asthmatic individuals
- New information provides background information on osteoporosis and exercise prescription approaches to alter bone mineral density
- A new figure and information describes COPD and the importance of exercise in treating this chronic condition

Chapter 18

- Completely revised chapter beginning with an introduction to the science of nutrition providing an overview of both macro- and micronutrients
- Up-to-date discussion on nutritional requirements and guidelines
- Specific details of the nutritional guidelines for intake of macronutrients and micronutrients including the dietary guidelines for Americans
- An overview of techniques to evaluate body composition
- Discussion of the strengths and weaknesses of popular techniques used to determine body composition
- Detailed discussion of the impact of diet and exercise on body composition
- Overview of popular diet plans
- Latest research on the theory and effectiveness of diet plans that emphasize specific macronutrients
- Step-by-step approach provided on how to achieve a healthy percent body fat

Chapter 19

- Updated information and a new figure highlight the physiologic responses that underpin exercise performance for events lasting between 10 seconds and 180 seconds.
- New information and a new figure in A Closer Look at muscular fatigue examine the role of free radicals on muscular fatigue and exercise performance.

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Chapter 20

- New information and a new figure help students gain a conceptual understanding of the training response, the effects of overtraining, and detraining
- A new research focus and multiple figures describe the key laboratory tests used to quantify endurance exercise potential
- Updated information and a new figure in A Closer Look at high intensity interval training provide students with recent findings on this highly popular training method

Chapter 21

- A new Research Focus and figure highlight how exercise performance and exercise adaptations may be impacted by different phases of the menstrual cycle
- Updated information highlights training approaches for those with eating disorders and Diabetes Mellitus

Chapter 22

- New text and a new figure help explain how dietary antioxidant supplementation may blunt exercise adaptation responses to an exercise training regimen.
- New information highlights the role of periodized nutrition as a strategy for improved exercise training and performance.

Chapter 23

- New information and a new figure highlight the physiologic acclimatization responses to high altitude
- New information describes the role that free radicals play in the adaptive responses to both altitude and the potentially detrimental effects of exercise in a smoky environment

Chapter 24

- A new Closer Look highlights the science behind the athlete biological passport that is used to determine which competitors are adhering to anti-doping regulations, and which are not.
- New information highlight various aspects of blood doping approaches in modern athletics

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