

Contents

Contributors	viii
Preface	xi
Acknowledgments	xiii

1 Exercise Pulmonary Physiology in Health **1**

A. William Sheel ■ P. Alexander Derchak ■ Jerome A. Dempsey

Breathing Patterns During Exercise	3
Reducing Airway Resistance in Exercise	5
Lung Mechanics During Exercise	7
Regulation of Exercise Ventilation	12
Pulmonary Gas Exchange During Exercise	23
Cardio-Pulmonary Interactions	28
Summary	31
References	32

2 Incidence of Asthma and Exercise-Induced Asthma **39**

Randall L. Wilber

Incidence of Asthma and EIA in the General Population	40
Incidence of Asthma and EIA in the Athletic Population	41
Elite Athletes with Asthma and/or EIA	63
Summary	66
References	67

3 Pathophysiology of Exercise-Induced Asthma **69**

Sandra D. Anderson ■ Karen Holzer

Features of Classical Exercise-Induced Asthma	71
Dehydration and Cooling in Exercise-Induced Asthma	74
Conditioning of the Inspired Air—Potent Stimulus to the Airways	75
Possible Mechanisms of Exercise-Induced Asthma	76
The Osmotic, or Dehydration, Theory of EIA/EIB	80
Summary	87
References	88

4 Animal Models, Athletes, and the Development of Exercise-Induced Asthma 101

Arthur N. Freed and Michael S. Davis

- Animal Models and Their Relevance to Exercise-Induced Asthma 104
- The Immediate Response 108
- The Late-Phase Response 123
- Response to Repetitive Exposure 128
- Summary 134
- References 135

5 Role of Allergies in the Provocation of Exercise-Induced Asthma 151

William W. Storms

- Nasal Allergies 152
- Sinus Disease and Exercise-Induced Asthma 155
- Other Allergic Conditions 158
- Prohibited Substances and Drug Control Issues 159
- Summary 160
- References 161

6 Asthma: Before, During, and After Exercise 163

Kenneth C. Beck, Oscar E. Suman, and Paul D. Scanlon

- Measuring Changes in Airway Function 164
- Changes in Airway Function During Exercise 166
- Quantifying Pulmonary Limitations During Exercise 172
- Summary 176
- References 176

7 Diagnosis of Exercise-Induced Asthma in the Athlete 181

Kenneth W. Rundell, Daniel A. Judelson, and Scott D. Williams

- Symptom-Based Diagnosis 182
- Pulmonary Function Testing 184
- Determining an Appropriate Exercise Challenge 189

Surrogate Challenges to Exercise 195

Summary 200

References 201

8 Asthma Treatment and Guidelines 211

Christine A. Sorkness, Rick Kelley, and Robert F. Lemanske Jr.

Pharmacologic Approaches for Prevention
of Exercise-Induced Asthma 214

Nonpharmacological Interventions 225

Unconventional Therapies 226

Summary 228

References 229

9 Asthma Medications As Ergogenic Aids 237

Donald C. McKenzie and I.B. Stewart

Doping Control 239

Ergogenic Aids 240

The Respiratory System As the Limiting Factor
to Performance 241

Specific Pharmacological Agents 242

Antileukotrienes 250

Summary 251

References 252

Index 257

About the Editors 265