

Childhood Obesity

Prevalence, Pathophysiology,
and Prevention



Editor

Rexford S. Ahima, MD, PhD



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CHILDHOOD OBESITY

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Edited by

Rexford S. Ahima, MD, PhD



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CHILDHOOD OBESITY

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ABOUT THE EDITOR

REXFORD S. AHIMA, MD, PhD

Rexford S. Ahima, MD, PhD, is a Professor of Medicine at the University of Pennsylvania Perelman School of Medicine, Philadelphia, Pennsylvania. He received a BSc from the University of London, an MD from the University of Ghana, and a PhD from Tulane University in New Orleans, Louisiana. After an internship and residency training in internal medicine at the Albert Einstein College of Medicine in New York, Dr. Ahima did his specialty training in endocrinology, diabetes and metabolism, and postdoctoral research at the Beth Israel Deaconess Medical Center and Harvard Medical School in Boston, Massachusetts. Dr. Ahima's research is focused on the central and peripheral actions of adipose hormones on energy homeostasis and glucose and lipid metabolism. He is an attending endocrinologist at the Hospital of the University of Pennsylvania, Director of the Obesity Unit of the Institute for Diabetes, Obesity and Metabolism, and Director of the Diabetes Research Center Mouse Phenotyping Core. He was elected to the American Society for Clinical Investigation and the Association of American Physicians, and he is a Fellow of the American College of Physicians and The Obesity Society.

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The chapters in this book were previously published in various places and in various formats. By bringing them together here in one place, we offer the reader a comprehensive perspective on recent investigations of childhood obesity. Each chapter is added to and enriched by being placed within the context of the larger investigative landscape.

We wish to thank the authors who made their research available for this book, whether by granting their permission individually or by releasing their research as open source articles. When citing information contained within this book, please do the authors the courtesy of attributing them by name, referring back to their original articles, using the credits provided at the end of each chapter.

LIST OF CONTRIBUTORS

Alen Agaronov

School of Public Health at Hunter College, City University of New York, 2180 Third Avenue, New York, NY 10035, USA

Noori Akhtar-Danesh

School of Nursing and Department of Clinical Epidemiology and Biostatistics, McMaster University, Hamilton, Canada

Leslie R. Atkinson

Ryerson University, Department of Psychology, 350 Victoria Street, Toronto, ON, M5B 2K3, Canada

L. Charles Bailey

Children's Hospital of Philadelphia, Philadelphia, Pennsylvania, United States of America, Perelman School of Medicine, University of Pennsylvania, Philadelphia, Pennsylvania, United States of America

V. M. Beauloye

Pediatric Endocrinology Unit, Cliniques Universitaires Saint-Luc, Université Catholique de Louvain, 1200 Bruxelles, Belgium

Rakesh Bhattacharjee

Division of Sleep and Respiratory Medicine, Department of Pediatrics, The Hospital for Sick Children, University of Toronto, Toronto, ON, M5G 1X8, Canada

Michael H Boyle

McMaster University, Department of Psychiatry and Behavioral Neuroscience, Offord Centre for Child Studies, 1280 Main Street West, Chedoke Site, Patterson Building, Hamilton, ON L8S 3K1, Canada

Luc Bruyndonckx

Laboratory of Cellular and Molecular Cardiology, University Hospital Antwerp, Wilrijkstraat 10, 2650 Edegem, Belgium, Cardiovascular Diseases, Department of Translational Pathophysiological Research, Faculty of Medicine and Health Sciences, University of Antwerp, Universiteitsplein 1, 2610 Antwerp, Belgium, Department of Pediatrics, University Hospital Antwerp, Wilrijkstraat 10, 2650 Edegem, Belgium

Oscar Sans Capdevila

Pediatric Sleep Unit, Division of Neurophysiology, Department of Neurology, Hospital Sant Joan de Déu, 08950 Barcelona, Spain

Viviane M. Conraads

Laboratory of Cellular and Molecular Cardiology, University Hospital Antwerp, Wilrijkstraat 10, 2650 Edegem, Belgium, Cardiovascular Diseases, Department of Translational Pathophysiological Research, Faculty of Medicine and Health Sciences, University of Antwerp, Universiteitsplein 1, 2610 Antwerp, Belgium, Department of Cardiology, University Hospital Antwerp, Wilrijkstraat 10, 2650 Edegem, Belgium

Shikta Das

Department of Epidemiology and Biostatistics, School of Public Health, Imperial College, London, United Kingdom

M. M. Dassy

Pediatric Endocrinology Unit, Cliniques Universitaires Saint-Luc, Université Catholique de Louvain, 1200 Bruxelles, Belgium

Mahshid Dehghan

Population Health Research Institute, McMaster University, Hamilton, Canada

Mark Del Beccaro

Seattle Children's Hospital, Seattle, WA

Lise Dubois

Institute of Population Health, University of Ottawa, Ottawa, Ontario, Canada, Department of Epidemiology & Community Medicine, University of Ottawa, Ottawa, Ontario, Canada

A. C. Dubuisson

Pediatric Endocrinology Unit, Cliniques Universitaires Saint-Luc, Université Catholique de Louvain, 1200 Bruxelles, Belgium

Laura Duncan

McMaster University, Department of Psychiatry and Behavioral Neuroscience, Offord Centre for Child Studies, 1280 Main Street West, Chedoke Site, Patterson Building, Hamilton, ON L8S 3K1, Canada

Paul Elliott

Department of Epidemiology and Biostatistics, School of Public Health, Imperial College, London, United Kingdom, Centre for Environment and Health, School of Public Health, Imperial College, London, United Kingdom

Christopher B. Forrest

Children's Hospital of Philadelphia, Philadelphia, Pennsylvania, United States of America, Perelman School of Medicine, University of Pennsylvania, Philadelphia, Pennsylvania, United States of America

Victor L. Fulgoni

Nutrition Impact, LLC, 9725 D Drive North, Battle Creek, MI, 49104, USA

Stefan Galet

Unité Mixte de Recherche 8199, Centre National de Recherche Scientifique (CNRS) and Pasteur Institute, Lille, France

Katholiki Georgiades

McMaster University, Department of Psychiatry and Behavioral Neuroscience, Offord Centre for Child Studies, 1280 Main Street West, Chedoke Site, Patterson Building, Hamilton, ON L8S 3K1, Canada

Matthew W. Gillman

Obesity Prevention Program, Department of Population Medicine, Harvard Medical School and Harvard Pilgrim Health Care Institute, Boston, Massachusetts, United States of America

Manon Girard

Institute of Population Health, University of Ottawa, Ottawa, Ontario, Canada

Andrea Gonzalez

McMaster University, Department of Psychiatry and Behavioral Neuroscience, Offord Centre for Child Studies, 1280 Main Street West, Chedoke Site, Patterson Building, Hamilton, ON L8S 3K1, Canada

David Gozal

Department of Pediatrics, Comer Children's Hospital, The University of Chicago, Suite K-160, 5721, Maryland Avenue, MC 8000, Chicago, IL 60637, USA

Struan F. A. Grant

Division of Human Genetics, The Children's Hospital of Philadelphia, Philadelphia, PA 19104, USA, Department of Pediatrics, University of Pennsylvania School of Medicine, Philadelphia, PA 19104, USA, Center for Applied Genomics, Abramson Research Center, The Children's Hospital of Philadelphia Research Institute, 34th and Civic Center Boulevard, Philadelphia, PA 19104, USA

Kateryna Grytsenko

School of Public Health at Hunter College, City University of New York, 2180 Third Avenue, New York, NY 10035, USA

Anna-Liisa Hartikainen

Institute of Clinical Medicine/Obstetrics and Gynecology, University of Oulu, Oulu, Finland

Remy A. Hirasing

EMGO Institute for Health and Care Research, VU University Amsterdam, Amsterdam, The Netherlands, Department of Public and Occupational Health, VU University Medical Center, Amsterdam, The Netherlands

Jacob Hjelmberg

Department of Biostatistics, University of Southern Denmark, Odense, Denmark

Vicky Y. Hoymans

Laboratory of Cellular and Molecular Cardiology, University Hospital Antwerp, Wilrijkstraat 10, 2650 Edegem, Belgium, Cardiovascular Diseases, Department of Translational Pathophysiological Research, Faculty of Medicine and Health Sciences, University of Antwerp, Universiteitsplein 1, 2610 Antwerp, Belgium

Marjo-Riitta Järvelin

Institute of Health Sciences and Biocenter, University of Oulu, Oulu, Finland, Department of Epidemiology and Biostatistics, School of Public Health, Imperial College, London, United Kingdom, Centre for Environment and Health, School of Public Health, Imperial College, London, United Kingdom, Department of Life Course and Services, National Institute for Health and Welfare, Oulu, Finland

N. B. Jodogne

Pediatric Endocrinology Unit, Cliniques Universitaires Saint-Luc, Université Catholique de Louvain, 1200 Bruxelles, Belgium

Marika Kaakinen

Institute of Health Sciences and Biocenter, University of Oulu, Oulu, Finland

Michael G. Kahn

Children's Hospital of Colorado, Aurora, Colorado, United States of America

Pekka Kannus

The UKK Institute for Health Promotion Research, Bone Research Group, Tampere, P.O. Box 30, 33501 Tampere, Finland, Medical School, University of Tampere, 33014 University of Tampere, Finland, Division of Orthopaedics and Traumatology, Department of Trauma, Musculoskeletal Surgery and Rehabilitation, Tampere University Hospital, P.O. Box 2000, 33521 Tampere, Finland

Kelly Kelleher

Nationwide Children's Hospital, Columbus, Ohio, United States of America

Abdelnaby Khalyfa

Department of Pediatrics, Comer Children's Hospital, The University of Chicago, Suite K-160, 5721, Maryland Avenue, MC 8000, Chicago, IL 60637, USA

Anokhi Ali Khan

Department of Epidemiology and Biostatistics, School of Public Health, Imperial College, London, United Kingdom

Michael G. Kahn

Children's Hospital of Colorado, Aurora, Colorado, United States of America

Leila Kheirandish-Gozal

Department of Pediatrics, Comer Children's Hospital, The University of Chicago, Suite K-160, 5721, Maryland Avenue, MC 8000, Chicago, IL 60637, USA

Jinkwan Kim

Department of Pediatrics, Comer Children's Hospital, The University of Chicago, Suite K-160, 5721, Maryland Avenue, MC 8000, Chicago, IL 60637, USA

Ken Kleinman

Obesity Prevention Program, Department of Population Medicine, Harvard Medical School and Harvard Pilgrim Health Care Institute, Boston, Massachusetts, United States of America

Kirsten Ohm Kyvik

Institute of Regional Health Services Research, University of Southern Denmark, Odense, Denmark, Odense Patient Data Explorative Network, Odense University Hospital, Odense, Denmark

Jaana Laitinen

Finnish Institute of Occupational Health, Helsinki, Finland

May May Leung

School of Public Health at Hunter College, City University of New York, 2180 Third Avenue, New York, NY 10035, USA

Paul Lichtenstein

Department of Medical Epidemiology and Biostatistics, Karolinska Institute, Stockholm, Sweden

Stéphane Lobbens

Unité Mixte de Recherche 8199, Centre National de Recherche Scientifique (CNRS) and Pasteur Institute, Lille, France

Harriet L MacMillan

McMaster University, Department of Psychiatry and Behavioral Neuroscience, Offord Centre for Child Studies, 1280 Main Street West, Chedoke Site, Patterson Building, Hamilton, ON L8S 3K1, Canada

Claudio Maffeis

Regional Centre for Juvenile Diabetes, Obesity and Clinical Nutrition, University of Verona, Verona, Italy

Nicholas G. Martin

Queensland Institute of Medical Research, Brisbane, Australia

Joseph L. Mathew

Division of Respiratory Medicine, The Hospital For Sick Children, 555 University Avenue, Toronto, ON, M5G 1X8, Canada

Anwar T. Merchant

Department of Clinical Epidemiology and Biostatistics, and Population Health Research Institute, McMaster University, Hamilton, Canada

Filip Mess

Division of Sport Science, University of Konstanz, Konstanz, Germany

David Meyre

Unité Mixte de Recherche 8199, Centre National de Recherche Scientifique (CNRS) and Pasteur Institute, Lille, France, Department of Clinical Epidemiology and Biostatistics, McMaster University, Hamilton, Canada

David E. Milov

Nemours Children's Hospital, Orlando, Florida, United States of America

Anita Morandi

Unité Mixte de Recherche 8199, Centre National de Recherche Scientifique (CNRS) and Pasteur Institute, Lille, France, Regional Centre for Juvenile Diabetes, Obesity and Clinical Nutrition, University of Verona, Verona, Italy

Indra Narang

Division of Respiratory Medicine, The Hospital For Sick Children, 555 University Avenue, Toronto, ON, M5G 1X8, Canada

Matti Pasanen

The UKK Institute for Health Promotion Research, Bone Research Group, Tampere, P.O. Box 30, 33501 Tampere, Finland

Daniel Pérusse

Faculté des Arts et des Sciences, Université de Montréal, Montreal, Quebec, Canada

Anneli Pouta

Department of Children, Young People and Families, National Institute for Health and Welfare, Helsinki, Finland, Institute of Clinical Medicine/Obstetrics and Gynecology, University of Oulu, Oulu, Finland

Erin E. Quann

Dairy Research Institute/National Dairy Council, Rosemont, IL, 60018, USA

Hein Raat

Department of Public Health, Erasmus MC University Medical Center Rotterdam, Rotterdam, The Netherlands

José Ramet

Department of Pediatrics, University Hospital Antwerp, Wilrijkstraat 10, 2650 Edegem, Belgium

Finn Rasmussen

Department of Public Health Sciences, Karolinska Institute, Stockholm, Sweden

Annette Rauner

Division of Sport Science, University of Konstanz, Konstanz, Germany

Carry M. Renders

Department of Health Sciences, Faculty of Earth and Life Sciences, VU University Amsterdam, Amsterdam, The Netherlands, EMGO Institute for Health and Care Research, VU University Amsterdam, Amsterdam, The Netherlands

Thomas Richards

Children's Hospital of Philadelphia, Philadelphia, Pennsylvania, United States of America

Sheryl L. Rifas-Shiman

Obesity Prevention Program, Department of Population Medicine, Harvard Medical School and Harvard Pilgrim Health Care Institute, Boston, Massachusetts, United States of America

Aimo Ruokonen

Department of Clinical Sciences and Clinical Chemistry, University of Oulu, Oulu, Finland

Harri Sievänen

The UKK Institute for Health Promotion Research, Bone Research Group, Tampere, P.O. Box 30, 33501 Tampere, Finland

Axel Skytthe

Odense Patient Data Explorative Network, Odense University Hospital, Odense, Denmark

Fabiola Tatone-Tokuda

Institute of Population Health, University of Ottawa, Ottawa, Ontario, Canada

Riva Tauman

Dana Children's Hospital, Tel-Aviv University School of Medicine, Tel-Aviv 64239, Israel

Kirsti Uusi-Rasi

The UKK Institute for Health Promotion Research, Bone Research Group, Tampere, P.O. Box 30, 33501 Tampere, Finland, Research Department, University Hospital, Tampere, P.O. Box 2000, 33521 Tampere, Finland

Amaryllis H. Van Craenenbroeck

Laboratory of Cellular and Molecular Cardiology, University Hospital Antwerp, Wilrijkstraat 10, 2650 Edegem, Belgium, Cardiovascular Diseases, Department of Translational Pathophysiological Research, Faculty of Medicine and Health Sciences, University of Antwerp, Universiteitsplein 1, 2610 Antwerp, Belgium, Department of Nephrology, University Hospital Antwerp, Wilrijkstraat 10, 2650 Edegem, Belgium

Amy van Grieken

Department of Public Health, Erasmus MC University Medical Center Rotterdam, Rotterdam, The Netherlands

Vincent Vatin

Unité Mixte de Recherche 8199, Centre National de Recherche Scientifique (CNRS) and Pasteur Institute, Lille, France

Dirk K. Vissers

Faculty of Medicine and Health Sciences, University of Antwerp, Campus Drie Eiken, Universiteitsplein 1, 2610 Antwerp, Belgium

Christiaan J. Vrints

Laboratory of Cellular and Molecular Cardiology, University Hospital Antwerp, Wilrijkstraat 10, 2650 Edegem, Belgium, Cardiovascular Diseases, Department of Translational Pathophysiological Research, Faculty of Medicine and Health Sciences, University of Antwerp, Universiteitsplein 1, 2610 Antwerp, Belgium, Department of Cardiology, University Hospital Antwerp, Wilrijkstraat 10, 2650 Edegem, Belgium

Anne I. Wijtzes

Department of Public Health, Erasmus MC University Medical Center Rotterdam, Rotterdam, The Netherlands

Alexander Woll

Department of Sport and Sport Science, Karlsruhe Institute of Technology, Karlsruhe, Germany

Margaret J. Wright

Queensland Institute of Medical Research, Brisbane, Australia

Ming-Chin Yeh

School of Public Health at Hunter College, City University of New York, 2180 Third Avenue, New York, NY 10035, USA

Feliciano Yu

St. Louis Children's Hospital, St. Louis, Missouri, United States of America

F. R. Zech

Department of Internal Medicine, Cliniques Universitaires Saint-Luc, Université Catholique de Louvain, 1200 Bruxelles, Belgium

Jianhua Zhao

Division of Human Genetics, The Children's Hospital of Philadelphia, Philadelphia, PA 19104, USA

LIST OF ABBREVIATIONS

AA	African American
AAP	American Academy of Pediatrics
ADMA	asymmetric dimethylarginine
AGE	advanced glycation end-products
AHA	advanced hip analysis
AHI	apnea/hypopnea index
ALSPAC	Avon Longitudinal Study of Parents and Children
ANOVA	analyses of variance
AUROC	area under the receiver operating curve
BF	body fat
BIA	bioelectrical impedance analysis
BM	behavioral modification
BMC	bone mineral content
BMD	bone mineral density
BMI	body mass index
BP	blood pressure
CAC	circulating Angiogenic cells
CATSS	Child and Adolescent Twin Study in Sweden
CCHS	Canadian Community Health Survey
CDC	U.S. Center for Disease Control and Prevention
CETP	cholesteryl ester transfer protein
CEVQ-SF	Childhood Experiences of Violence Questionnaire Short-Form
CFU-EC	Endothelial Cell Colony Forming Unit
CHQ-PF28	Child Health Questionnaire Parent Form 28
CV	cardiovascular
CVD	cardiovascular diseases
DTR	Danish Twin Registry
DXA	dual energy X-ray absorptiometry
DZ	dizygotic twins

ECFC	endothelial colony forming cells
EDC	expanded diagnostic cluster
EDS	excessive daytime sleepiness
EHR	electronic health record
EMP	endothelial microparticles
eNOS	endothelial nitric oxide synthase
EPC	endothelial progenitor cells
FFA	free fatty acid
FFM	fat-free mass
fl oz	fluid ounce
FMD	flow-mediated dilation
FMS	fundamental movement skills
GNPDA2	glucosamine-6-phosphate deaminase 2
GP	general practitioner
GWAS	genome-wide association studies
HDL	high-density lipoprotein
HOMA	homeostasis model assessment
HRV	heart rate variability
ICAM-1	Intercellular Adhesion Molecule-1
ICC	intraclass correlation coefficient
INSIG2	Insulin-induced gene 2
ISAAC	International Study of Asthma and Allergies in Childhood
ISHAGE	International Society of Hematotherapy and Graft Engineering
kcal	kilocalorie
KCTD15	potassium channel tetramerisation domain containing 15
kg	kilogram
LDL	low-density lipoprotein
LVMI	left ventricular mass index
m	meter
MCP	monocyte chemotactic protein
MCP-1	Macrophage Chemo attractant Protein-1
MCS	mental component score
MEND	Mind, Exercise, Nutrition, Do it program
MetS	metabolic syndrome
MICE	multiple imputation by chain equations
MIF	macrophage inhibitory factor