Primary Prevention by Nutrition Intervention in Infancy and Childhood
Primary Prevention by Nutrition Intervention in Infancy and Childhood

Editors
Alan Lucas, London, UK
Hugh A. Sampson, New York, N.Y., USA
Contents

IX    Foreword
XI    Contributors

Introduction

1    Infant Nutrition and Primary Prevention: Current and Future Perspectives
     Lucas, A. (London); Sampson, H.A. (New York)

Reduction in Risk of Cardiovascular Diseases

15   Nutritional Interventions in Infancy and Childhood for Prevention of Atherosclerosis and the Metabolic Syndrome
     Singhal, A. (London)

31   Childhood Obesity: Potential Mechanisms for the Development of an Epidemic
     Maffeis, C. (Verona)

51   Prenatal and Postnatal Development of Obesity: Primary Prevention Trials and Observational Studies
     Kroke, A. (Dortmund)

67   Childhood Diabetes Mellitus with Emphasis on Perinatal Factors
     Laron, Z. (Tel Aviv)

Prevention of Atopy, Allergy and Infectious Diseases

81   The Gut Microbiota and Potential Health Effects of Intervention
     Björkstén, B. (Stockholm)
93  The Relationship of Breastfeeding to the Development of Atopic Disorders
Zeiger, R.S.; Friedman, N.J. (San Diego, Calif.)

109  Prevention of Atopy and Allergic Disease: Type of Infant Formula
Sampson, H.A. (New York, N.Y.)

125  Introduction of Solid Foods
von Berg, A. (Wesel)

Other Potentially Preventable Diseases

135  Osteoporosis: Is Primary Prevention Possible?
Fewtrell, M.S. (London)

153  Nutrition and Cancer Prevention: Targets, Strategies, and the Importance of Early Life Interventions
Hursting, S.D.; Cantwell, M.M.; Sansbury, L.B.; Forman, M.R. (Bethesda, Md.)

LC-PUFAs: Influence on Multiple Health Outcome

203  Long-Chain Polyunsaturated Fatty Acids in Early Life: Effects on Multiple Health Outcomes
A Critical Review of Current Status, Gaps and Knowledge
Fewtrell, M.S. (London)

223  Perinatal PUFA Intake Affects Leptin and Oral Tolerance in Neonatal Rats and Possibly Immunoreactivity in Intrauterine Growth Retardation in Man
Hanson, L.Å.; Korotkova, M.; Hahn-Zoric, M. (Göteborg); Zaman, S.; Malik, A.; Ashraf, R. (Lahore); Amu, S.; Padyukov, L.; Telemo, E.; Strandvik, B. (Göteborg)

235  The Crucial Role of Dietary n-6 Polyunsaturated Fatty Acids in Excessive Adipose Tissue Development: Relationship to Childhood Obesity
Massiera, F. (Nice); Guesnet, P. (Jouy-en-Josas); Ailhaud, G. (Nice)
Contents

Impact of Nutrition on Health Mechanism Aspects

247 -Omics for Prevention: Gene, Protein and Metabolite Profiling to Better Understand Individual Disposition to Disease
Affolter, M.; Bergonzelli, G.E. (Lausanne); Blaser, K. (Davos);
Blum-Sperisen, S.; Corthésy, B.; Fay, L.B.; Garcia-Rodenas, C.;
Lopes, L.V.; Marvin-Guy, L.; Mercenier, A.; Mutch, D.M.; Panchaud, A.;
Raymond, F. (Lausanne); Schmidt-Weber, C. (Davos); Schumann, A.;
Spertini, F.; Williamson, G.; Kussmann, M. (Lausanne)

257 Concluding Remarks

267 Subject Index
Foreword

For the 57th Nestlé Pediatric Nutrition Workshop, which took place in May 2005 at Half Moon Bay, San Francisco, the topic ‘Primary Prevention by Nutrition Intervention in Infancy and Childhood’ was chosen. Early nutrition seems to be involved in the mechanism of control, especially taking into account the role of protein and long-chain polyunsaturated fatty acids (LC-PUFAs). It seems that the new generation of infant formulas already takes those findings into consideration.

We would like to thank the two chairmen, Prof. Hugh Sampson and Prof. Alan Lucas who are recognized experts in this field, for putting the program together and inviting the opinion leaders in the field of maternal and infant nutrition as speakers.

Our first chairperson, Prof. Hugh Sampson, already chaired the 34th Nestlé Nutrition Workshop entitled ‘Intestinal Immunology and Food Allergy’ in Versailles, France, in June 1993, a topic related to allergy and intestinal immunity. Since then a lot of new data concerning this area have been discovered and the results of the GINI study in Germany have confirmed the hypothesis that mildly hydrolyzed whey-based formulas are effective in the prevention of atopy. Having Professors von Berg, Björkstén, Zeiger and Sampson around the table was a source of lively exchanges, discussions and ideas resulting in strong and valuable conclusions.

Prof. Alan Lucas, our second chairperson, has substantially contributed to our understanding of early nutrition and long-term outcome. With his co-workers A. Singhal and M. Fewtrell, he is raising new hypotheses in the development of obesity, diabetes, cardiovascular diseases later in life, the so-called ‘syndrome X’.

We would also like to thank Mrs. Linda Hsieh and her team from Nestlé USA, who provided all logistical support, enabling the participants to enjoy the American hospitality.

Prof. Ferdinand Haschke, MD, PhD
Vice President and Chairman

Dr. Philippe Steenhout, MD
Medical Advisor

Nestlé Nutrition Institute
57th Nestlé Nutrition Workshop
Pediatric Program
Half Moon Bay, San Francisco, May 24–28, 2005
Contributors

Chairpersons & Speakers

Prof. Bengt Björkstén
National Institute of Environmental Medicine
IMM Division of Physiology
Karolinska Institutet
SE–17177 Stockholm
Sweden
Tel. +46 8 52 48 69 56
Fax +46 8 30 06 19
E-Mail bengt.bjorksten@admin.ki.se

Dr. Mary Fewtrell
MRC Childhood Nutrition Research Centre
Institute of Child Health
30 Guilford Street
London WC1N 1EH
UK
Tel. +44 207 905 2389/2251
Fax +44 207 831 9903
E-Mail m.fewtrell@ich.ucl.ac.uk

Prof. Lars Å. Hanson
Göteborg University
Department Clinical Immunology
Guldhedsgatan 10
SE–413 46 Göteborg
Sweden
Tel. +46 31 342 4916/+46 31 342 4996
Fax +46 31 342 4621
E-Mail lars.hanson@immuno.gu.se

Prof. Stephen D. Hursting
Division of Nutritional Sciences
University of Texas at Austin
1 University Station, A2700
Austin, TX 78712
USA
Tel. +1 512 475 7931
E-Mail shursting@mail.utexas.edu

Dr. Anja Kroke
Research Institute of Child Nutrition
Rheinische Friedrich-Wilhelms-Universität Bonn
Heinestück 11
DE–44225 Dortmund
Germany
Tel. +49 231 79 22 10 17
Fax +49 231 71 15 81
E-Mail kroke@fke-do.de

Dr. Martin Kussmann
Nestec Ltd.
c/o Nestlé Research Center
PO Box 44
CH–1000 Lausanne 26
Switzerland
Tel. +41 21 785 9572
Fax +41 21 785 9486
E-Mail Martin.Kussmann@rdls.nestle.com
Prof. Zvi Laron
Endocrinology & Diabetes Research Unit
Schneider Children's Medical Center of Israel
14 Kaplan Street
49202 Petach Tikva, Israel
Tel. +972 3 925 3610
Fax +972 3 535 1295
E-Mail laronz@clalit.org.il

Prof. Alan Lucas
MRC Childhood Nutrition Research Centre
Institute of Child Health
30 Guilford Street
London WC1N 1EH, UK
Tel. +44 20 905 2389
Fax +44 20 404 7109
E-Mail a.lucas@ich.ucl.ac.uk

Dr. Claudio Maffeis
Department of Mother and Child Biology – Genetics
Section of Pediatrics
University of Verona
Piazza L.A. Scuro, 10
IT–37134 Verona, Italy
Fax +39 45 820 0993
E-Mail claudio.maffeis@univr.it

Dr. Florence Massiera
Laboratoire ‘Développement du Tissu Adipeux’
Centre de Biochimie – CNRS UMR 6543
Parc Valrose – Faculté des Sciences
FR–06108 Nice Cedex 2, France
Tel. +33 4 92 07 64 39
Fax +33 4 92 07 64 04
E-Mail massiera@unice.fr

Prof. Hugh A. Sampson
Department of Pediatrics
Jaffe Food Allergy Institute
Mount Sinai School of Medicine
Box 1198
New York, NY 10029-6574
USA
Tel. +1 212 241 5548
Fax: +1 212 426 1902
E-Mail hugh.sampson@mssm.edu

Dr. Atul Singhal
MRC Childhood Nutrition Research Centre
Institute of Child Health
30, Guilford Street
London WC1N 1EH
UK
Tel +44 20 7905 2389
Fax +44 20 7831 9903
E-Mail a.singhal@ich.ucl.ac.uk

Dr. Andrea von Berg
Forschungsinstitut an der Klinik für Kinder- und Jugendmedizin
des Marien-Hospital Wesel
Pastor-Janssen-Strasse 8–38
DE–46483 Wesel
Germany
Tel. +49 281 104 1179
Fax +49 281 319 1659
E-Mail vonberg@marien-hospital-wesel.de

Dr. Robert S. Zeiger
Kaiser Permanente Medical Center
Department of Allergy-Immunology
7060 Clairemont Mesa Boulevard
San Diego, CA 92111
USA
Tel. +1 858 573 5408
Fax +1 858 573 5251
E-Mail robert.s.zeiger@kp.org

Prof. Dennis M. Bier
USDA/ARS Children’s Nutrition Center
1100 Bates Street
Houston, TX 77030
USA
Tel. +1 713 798 7022
Fax +1 713 798 7022
E-Mail dbier@bcm.tmc.edu
Contributors

Moderators

Prof. Steven Abrams
USDA/ARS Children’s
Nutrition Research Center
1100 Bates Street
Houston, TX 77030, USA
Tel. +1 713 798 7124
Fax +1 713 798 7119
E-Mail sabrams@bcm.edu

Prof. Craig Jensen
Baylor College of Medicine
Texas Children’s Hospital MC1010.00
6621 Fannin Street
Houston, TX 77030, USA
Tel. +1 832 822 3611
Fax +1 835 825 3633
E-Mail cljensen@texaschildrenshospital.org

Prof. William Klish
Baylor College of Medicine
Texas Children’s Hospital MC1010.00
6621 Fannin Street
Houston, TX 77030, USA
Tel. +1 832 822 3616
Fax +1 835 825 3633
E-Mail wklish@bcm.tmc.edu

Prof. Alan Lake
10807 Falls Rd
Lutherville, Maryland 21093
USA
Tel. +1 410 321 9393
Fax +1 410 825 4945
E-Mail alakeslake@aol.com

Prof. José Saavedra
Nestlé USA, Nutrition Division
800 N. Brand Blvd.
Glendale, CA 91203
USA
Tel. +1 818 549 6774
Fax +1 818 549 5704
E-Mail jose.saavedra@us.nestle.com

Invited attendees

Prof. Elza Daniel de Mello/Brazil
Prof. Angela Mattos/Brazil
Dr. Thomas J. Bowen/Canada
Prof. Zave Chad/Canada
Prof. Ernest Seidman/Canada
Dr. Eduardo Atalah/Chile
Dr. Xiaochuan Wang/China
Dr. Dorian Tjesic-Drinkovic/Croatia
Dr. Duska Tjesic-Drinkovic/Croatia
Dr. Jose Luis Abreu/Dominican Republic
Prof. Manuel Garcia Sugranes/Dominican Republic
Dr. Rafael Aulesti/Ecuador
Prof. Enrique Bolona/Ecuador
Mrs. Aila Paganus/Finland
Prof. Otto Schofer/Germany
Dr. Alexander Andreou/Greece
Prof. Eleftheria Roma/Greece
Dr. Emmanouil Manousakis/Greece
Dr. Eva Micskey/Hungary
Badriul Hegar Syarief/Indonesia
Arinda Yuxianto/Indonesia
Prof. Adib Moukarzel/Lebanon
Dr. Olga Zimanaite/Lithuania
Dr. Angel Carlos/Mexico
Dr. Eustorgio Garcia/Mexico
Dr. Raul Garza/Mexico
Dr. Sofia Leyva/Mexico
Dr. Ricardo Reyes Retana/Mexico
Dr. Enrique Rodriguez/Mexico
Prof. Per Finne/Norway
Dr. Alfredo Mora/Panama
Gerado Rivera/Panama
Dr. Rommel Bernardo/Philippines
Dr. Augustus Manalo/Philippines
Prof. Virginia Tanueco/Philippines
Dr. Luis Pereira-da-Silva/Portugal
Contributors

Dr. Saleh Al-Alaiyan/Saudia Arabia
Dr. Michael Greeff/South Africa
Dr. Manuel Martin Esteban/Spain
Dr. Ine Martinah Mingoen/Suriname
Prof. Mehari Gebre-Medhin/Sweden
Prof. Christian Braegger/Switzerland
Dr. Sompon Chotinaruemol/Thailand
Prof. Zulaika Ali/Trinidad & Tobago
Prof. David Picou/Trinidad & Tobago
Dr. Rajindra Parag/Trinidad & Tobago
Dr. Lynette Welch/Trinidad & Tobago

Dr. Assia Turki-Hammami/Tunisie
Prof. Aziz Sheikh/UK
Dr. Lillian Beard/USA
Dr. Stuart Cohen/USA
Mrs. JoAnn Hattner/USA
Dr. Robert N. Hamburger/USA
Dr. John Kerner/USA
Dr. Ricardo Sorensen/USA
Dr. Ekhard Ziegler/USA
Dr. Bich Chi Pham/Vietnam

Nestlé participants

Prof. Carlos Nogueira de Almeida/
Brazil
Mrs. Shaunda Durance-Tod/Canada
Andrea Papamandjaris/Canada
Mrs. Lis Vinther/Denmark
Mr. Elias Papadopoulos/Greece
Veronidia Ventura/Philippines
Prof. Antonio Guerra/Portugal
Mrs. Mabel Labuschagne/South Africa
Dr. Anette Jarvi/Sweden
Dr. Irene Corthesy/Switzerland
Dr. Bianca-Maria Exl-Preysch/
Switzerland
Dr. Marie-Claire Fichot/Switzerland
Prof. Ferdinand Haschke/Switzerland

Mr. Charly Huber-Haag/Switzerland
Dr. Martin Kussman/Switzerland
Mr. Philippe Steenhout/Switzerland
Prof. Marco Turini/Switzerland
Dr. Peter Van Dael/Switzerland
Mrs. Nicola Bradley/UK
Ms. Cynthia Brown/USA
Ms. Cynthia Busby/USA
Ms. Nina Carroll/USA
Ms. Julie Dunmire/USA
Ms. Kelly Green/USA
Ms. Linda Hsieh/USA
Ms. Kathleen Novak/USA
Ms. Lisa Reavlin/USA
Mr. Ernie Strapazon/USA