Recent Advances in Growth Research:
Nutritional, Molecular and Endocrine Perspectives
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Preface

Among all biological phenomena, the growth of organisms is perhaps the most complex process. In mammals, this must encompass intrauterine growth as well as the distinct growth trajectories of infancy, childhood and adolescence. Each of these phases has evolved in a manner suited to the distinct metabolic, survival and reproductive demands of the particular species. And, as captured in the title of the 71st Nestlé Nutrition Institute Workshop, each of these phases is characterized by very specific nutritional, molecular and endocrine perspectives, which, under ideal conditions, allow the organism to achieve its genetically programmed growth patterns. The Workshop thus represents an effort to address these complexities, individually and collectively, with the goal of discussing these aspects historically (i.e. within an evolutionary framework), physiologically (i.e. from a molecular and biochemical perspective) and socially (i.e. how do we meet the requirements for normal growth within an overpopulated and resource-deprived world).

Session 1 (Drivers of Growth) is directed at an understanding of the genetic, epigenetic, molecular and nutritional determinants of intrauterine and postnatal growth. Among the questions addressed are the influence of nutrition on growth in utero and during infancy, lessons learned from genome-wide association studies of normal growth and candidate gene approaches to abnormal growth, and the impact of both imprinted and nonimprinted epigenetics on fetal and postnatal growth.

Session 2 (Secular Trends in Growth): While evolution over the thousands or millions of years of any species has resulted in significant changes in body size, it is clear that there have been secular changes in growth over much shorter time periods, as brief indeed as a century. One of the most remarkable phenomena in human growth has been the increase in height and the advancement of puberty in Third World countries, presumably reflecting improved nutrition and health. It is thus important to look at changes in body size in utero, during infancy and childhood, and during adolescence, to best understand the individual and collective impact of improved health upon human growth. While one may look at improved growth as a sign of organismal health, there are also potentially
unfavorable consequences of enhanced nutrition and growth, including early onset of puberty, development of obesity, and increases in metabolic and cardiovascular disease. The challenge thus involves maximizing the potential for normal growth without increasing the risk of associated disorders.

Session 3 (What Is Healthy Growth?): In light of the influence of nutritional, molecular and endocrine influences upon growth, and given the clear-cut secular changes in both linear growth and body mass, the question arises as to what factors define healthy growth. Standard growth curves derived from calculating means and standard deviations of various auxologic parameters are fine from a statistical perspective, but do not in and of themselves determine optimal growth. This point is especially important in developing countries, which have seen rapid changes in body size, often accompanied by altered patterns of metabolic and cardiovascular disease. Although this association is clear, the precise nature of causality remains uncertain. Critical issues include how to define optimal intrauterine and postnatal growth and what are the roles of pharmacological intervention and public policy.

These are several of the critical issues addressed in the 71st Nestlé Nutrition Institute Workshop held in Vienna, Austria, on October 23–26, 2011. It is the hope of the editors that the papers included in this volume will shed some needed light on these important matters.

Matthew W. Gillman
Peter D. Gluckman
Ron G. Rosenfeld
Foreword

The 71st Nestlé Nutrition Institute Workshop Pediatric Program ‘Recent Advances in Growth Research: Nutritional, Molecular and Endocrine Perspectives’ took place in October 2011 in Vienna (Austria).

Growth and development during the fetal and postnatal periods as well as during the first 2 years of life are important for short- and long-term health. There are many growth drivers during this phase of life, among them nutrition, genetic and epigenetic factors, and hormonal regulation.

Thus, the scope of the workshop was to focus on the latest scientific findings in growth research.

The Nestlé Nutrition Institute Workshop brought to discussion the questions which have been circulating in the scientific community during the last decade: how feeding in early life influences long-term growth and development, and the risks which are related to inadequate nutrition such as obesity and malnutrition. In addition, the workshop program covered the potential health economic impact of stunting.

The 3 days of intense scientific discussions have crystallized again the importance of understanding the value of breastfeeding and, in case of non-availability of breast milk, how appropriate nutrition can prevent nutritional disorders and long-term metabolic consequences.

We wish to warmly thank the three chairpersons of this workshop – world-renowned experts in the area of child growth and development – Prof. Matthew Gillman, Prof. Sir Peter Gluckman and Prof. Ron Rosenfeld for establishing an excellent scientific workshop program.

We are also indebted to the renowned speakers and discussants who have furthered the debate and understanding of this important topic through their presentations and participation. We thank the many experts who came from across the globe to review and discuss the importance of child growth and development.
Finally, we wish to thank and congratulate Dr. Mike Poßner and his team from Nestlé Nutrition Institute – Europe for their excellent logistical support that allowed us all to enjoy the scientific program and the vital spirit of Vienna.

Prof. Ferdinand Haschke, MD, PhD
Head of Nestlé Nutrition Institute
Vevey, Switzerland

Natalia Wagemans, MD, PhD
Global Medical Advisor
Nestlé Nutrition Institute
Vevey, Switzerland
Contributors

Chairpersons & Speakers

**Dr. Harold Alderman**
World Bank
MS: G8-803
1818 H St.
Washington, DC 20433
USA
E-Mail h.alderman@cgiar.org

**Prof. Barry Bogin**
School of Sport, Exercise & Health Sciences
Loughborough University
Loughborough LE11 3TU
UK
E-Mail b.a.bogin@lboro.ac.uk

**Prof. Alexandre Archanjo Ferraro**
Departamento de Pediatria da Faculdade de Medicina da Universidade de São Paulo
Av Dr Eneas Carvalho Aguiar, 647
05403-900 São Paulo – SP
Brazil
E-Mail ferraro@usp.br

**Prof. Terrence Forrester**
The University of The West Indies
Tropical Metabolism Research Unit
Faculty of Medical Sciences
Mona, Kingston 7
Jamaica
E-Mail Terrence.Forrester@uwimona.edu.jm

**Prof. Matthew Gillman**
Harvard Medical School
Department of Population Medicine
133 Brookline Avenue, 6th Floor
Boston, MA 02215
USA
E-Mail matthew_gillman@harvardpilgrim.org

**Prof. Sir Peter Gluckman**
Liggins Institute
University of Auckland
Private Bag 92109
Auckland 1142
New Zealand
E-Mail pd.gluckman@auckland.ac.nz

**Prof. Keith Godfrey**
MRC Lifecourse Epidemiology Unit
Tremona Road
Southampton General Hospital
Southampton SO16 6YD
UK
E-Mail kmg@mrc.soton.ac.uk

**Prof. Vivian Hwa**
Department of Pediatrics, CDRCP
Oregon Health & Science University
3181 SW Sam Jackson Park Road
Portland, OR 97239
USA
E-Mail hwav@ohsu.edu
Contributors

Prof. Berthold Viktor Koletzko
Div. Metabolic and Nutritional Medicine
Dr. von Hauner Children's Hospital
University of Munich Medical Centre
Lindwurmstrasse 4
80337 Munich
Germany
E-Mail berthold.koletzko@med.uni-muenchen.de

Prof. Maria Makrides
Women's and Children's Health Research Institute
72 King William Road
North Adelaide, SA 5006
Australia
E-Mail maria.makrides@health.sa.gov.au

Dr. Irène Netchine
Hôpital Armand Trousseau, explorations fonctionnelles endocriniennes
26, avenue du Dr. Arnold Netter
75012 Paris
France
E-Mail irene.netchine@trs.aphp.fr

Dr. Emily Oken
Department of Population Medicine
Harvard Medical School and
Harvard Pilgrim Health Care Institute
133 Brookline Avenue
Boston, MA 02215
USA
E-Mail emily_oken@hphc.org

Prof. Ron G. Rosenfeld
Stat5 Consulting
258 Valley Street
Los Altos, CA 94022
USA
E-Mail ron@stat5consulting.com

Prof. Lawrence T. Weaver
University of Glasgow
Department of Child Health
Royal Hospital for Sick Children
Yorkhill
Glasgow G3 8SJ
UK
E-Mail lawrence.weaver@glasgow.ac.uk

Dr. Mike Weedon
Genetics of Complex Traits
Peninsula College of Medicine and Dentistry
University of Exeter
St Lukes Campus
Magdalen Road
Exeter EX1 2LU
UK
E-Mail michael.weedon@pms.ac.uk

Prof. Paul H. Wise
Stanford University
CHP/PCOR
117 Encina Commons
Stanford, CA 94304-6019
USA
E-Mail pwise@stanford.edu

Discussants

Dr. Linda Strube Adair
UNC Gillings School of Global Public Health
Department Nutrition
123 West Franklin St.
Campus Box 8120
Chapel Hill 27713
USA
E-Mail linda_adair@unc.edu

Prof. Adrian Clark
Centre for Endocrinology
Barts and The London School of Medicine
Charterhouse Square
London, EC1M 6BQ
UK
E-Mail a.j.clark@qmul.ac.uk

Prof. Peter Ellison
Department of Human Evolutionary Biology
Harvard University
Cambridge, MA 02138
USA
E-Mail pellison@fas.harvard.edu
Contributors XVII

Prof. Catherine Law
Centre for Paediatric Epidemiology and Biostatistics
UCL Institute of Child Health
30 Guilford St.
London WC1N 1EH
UK
E-Mail c.law@ich.ucl.ac.uk

Prof. Christos Mantzoros
Div. of Endocrinology, Diabetes and Metabolism
Joslin and Beth Israel Deaconess Medical Center
330 Brookline Avenue FD-876
Boston, MA 02215
USA
E-Mail cmantzor@bidmc.harvard.edu

Prof. Aryeh D. Stein
Rollins School of Public Health
1518 Clifton Road NE
Atlanta, GA 30345
USA
E-Mail aryeh.stein@emory.edu

Participants

Robert Birnbacher/Austria
David Endress/Austria
Nadja Haiden/Austria
Ursula Kiechl-Kohlendorfer/Austria
Arnold Pollak/Austria
Klaus Schmitt/Austria
Wolfgang Sperl/Austria
Sabine Wagner/Austria
Karl Zwiauer/Austria
Phedra Dikaiou/Cyprus
Charalambos Hadjigeorgiou/Cyprus
Meropi Toumba/Cyprus
Katarina Mitrova/Czech Republic
Kim Fleischer Michae Lena/ Denmark
Jean-Louis Bresson/France
Olivier Goulet/France
Regis Hankard/France
Yong Kim Lacoste/France
Delphine Mitanchez/France
Frank Rueu mele/France
Andreas Artlich/Germany
Marius Bartsch/Germany
Hansjosef Böhles/Germany
Heide Brandau/Germany
Thilo Diehl/Germany
Pracha Nuntnarumit/Thailand
Galyna Beketova/Ukraine
Oleksandr Katilov/Ukraine
Ali Al Shamrani/United Arab Emirates
Hanan Anwar/United Arab Emirates
Mohammad Howidi/United Arab Emirates