ISSN: 2040-1744

DEVELOPMENTAL ORIGINS OF HEALTH AND DISEASE





CAMBRIDGE UNIVERSITY PRESS

Journal of Developmental Origins of Health and Disease

Published in association with the International Society for Developmental Origins of Health and Disease

EDITOR

Dr Michael G Ross Harbor-UCLA (University of California, Los Angeles) Medical Center, USA

Email: dohadeditor@cambridge.org

EDITORIAL ASSISTANT

Ms Antonia M Enriquez Dept of Obstetrics and Gynecology Harbor-UCLA (University of California, Los Angeles) Medical Center 1000 W. Carson Street, Torrance, California 90502, USA Email: dohadassistant@cambridge.org

EDITORIAL ADVISORY BOARD

Dr David Barker

University of Southampton, UK

Dr Patrick Bateson

Dr John Challis

University of Toronto, Canada

Dr Cyrus Cooper

University of Southampton, UK

Dr Peter Gluckman

University of Auckland, New Zealand

Dr Mark Hanson

University of Southampton, UK

Dr Alan Jackson

University of Southampton, UK

Dr Lucilla Poston

King's College London, UK

ASSOCIATE EDITORS

Dr Linda Adair

University of North Carolina at Chapel Hill, USA

Dr Heather Dean

University of Manitoba, Canada

Dr Mina Desai

Harbor-UCLA (University of California, Los Angeles) Medical Center, USA

Dr Caroline Fall

University of Southampton, United Kingdom

Dr Bernardo Lessa Horta

Universidade Federal de Pelotas, Brazil

Dr Deborah Sloboda

The University of Auckland, New Zealand

Dr Michael Symonds

Queen's Medical Centre, University Hospital Nottingham, United Kingdom

EDITORIAL BOARD

Dr Cindy Anderson, College of Nursing, University of North Dakota, USA **Dr Nick Ashton**, Faculty of Life Sciences, University of Manchester, UK

Dr Mary Barker, MRC Epidemiology Resource Centre, University of Southampton, UK Dr Carlos Blanco, Children Research Centre, Our Lady's Children's Hospital,

Dr Frank Bloomfield, Liggins Institute, University of Auckland, New Zealand

Dr Stephen Buka, Brown University, Providence, USA

Dr Graham Burdge, Institute of Developmental Sciences,

University of Southampton, UK

Dr Noel Cameron, Human Sciences, Loughborough University, UK

Dr Pau-Cheung Chen, College of Public Health, National Taiwan University,

Dr Jane Cleal, Institute of Developmental Sciences, University of Southampton, UK Dr Elaine Dennison, MRC Epidemiology Resource Centre, University of Southampton, UK

Dr Tony Duan, Shanghai 1st Maternity and Infant Hospital of Tongji University, China

Dr Caleb Finch, University of Southern California, Los Angeles, USA

Dr Elwyn Firth, Institute of Veterinary, Animal & Biomedical Sciences, Massey University, New Zealand

Dr Tom Fleming, School of Biological Sciences, University of Southampton, UK

Dr Matt Gillman, Harvard Pilgrim Health Care, Harvard Medical School, Boston, USA

Dr Dino Giussani, Physiology, Development and Neuroscience,

University of Cambridge, UK

Dr Gilman Grave, Eunice Kennedy Shriver National Institute of Child Health and Human Development, Maryland, USA

Dr Jerry Heindel, National Institute of Environmental Health Sciences,

Dr Hazel Inskip, MRC Epidemiology Research Centre,

University of Southampton, UK

Dr Hiroaki Itoh, Hamamatsu University School of Medicine, Shizuoka, Japan

Dr Thomas Jansson, University of Cincinnati Medical Center, USA

Dr Rebecca Jones, Maternal and Fetal Health Research Group, University of Manchester, UK

Dr Henry Kahn, Centers for Disease Control and Prevention (CDC), National Center for Chronic Disease Prevention & Health Promotion, Atlanta, USA

Dr Eero Kaiantie. Department of Chronic Disease Prevention. National Institute for Health and Welfare, Finland

Dr Stan Karsten, Geffen School of Medicine at UCLA, LABioMed at Harbor-UCLA Medical Center, USA

Dr Chris Kelsall, Institute of Developmental Sciences,

University of Southampton, UK

Dr Omid Khorram, Geffen School of Medicine at UCLA, LABioMed at Harbor-UCLA Medical Center, USA

Dr Berthold Koletzko, Dr. von Hauner Children's Hospital. University of Munich, Germany

Dr Ilona Koupil, Centre for Health Equity Studies, Karolinska Institute, Stockholm University, Sweden

Dr Anita Kozyrskyj, University of Alberta, Edmonton, Canada

Dr Robert Lane, University of Utah, Salt Lake City, USA

Dr David Leon, London School of Hygiene and Tropical Medicine, UK

Dr Karen Lillycrop, School of Biological Sciences, University of Southampton, UK

Dr Francisco Mardones, Pontificia Universidad Catolica de Chile, Santiago, Chile

Dr Barrie Margetts, Public Health Nutrition, University of Southampton, UK

Dr Mary C. Mceniry, Sociology-CDE/CDHA, University of Wisconsin, USA

Dr Sophie Moore, MRC Laboratories, Banjul, Gambia

Dr Janna Morrison, Sansom Institute, University of South Australia, Adelaide, Australia

Dr Leslie Myatt, University of Texas Health Center at San Antonio, USA

Dr Peter Nathanielsz. University of Texas Health Science Center at San Antonio. USA

Dr John Newnham, University of Western Australia, Perth, Australia

Dr Robert Norman, Robinson Institute, University of Adelaide, Australia

Dr Shane Norris, University of Witwatersrand, Johannesburg, South Africa

Dr Jean-Pierre Ozil, Institut National de Recherche Agronomique, Domaine de Vilvert, Paris, France

Dr Vasantha Padmanabhan, University of Michigan, Ann Arbor, USA

Dr Yuan-Xiang Pan, University of Illinois at Urbana, USA

Dr Cristina Rabadan-Diehl, Division of Cardiovascular Science, National Heart, Lung and Blood Institute, Bethesda, USA

Dr Rebecca Reynolds, University of Edinburgh, UK

Dr Alina Rodriguez, Uppsala University, USA

Dr John Rogers, Developmental Biology Branch, United States Environmental Protection Agency, North Carolina, USA

Dr Carolyn Salafia, Institute for Basic Research in Developmental Disabilities, New York State Department of Health, Larchmont, USA

Dr Atul Singhal, MRC Childhood Nutrition Centre, Institute of Child Health, London, UK

Dr Aryeh Stein, Hubert Department of Global Health, Emory University, Atlanta, USA

Dr Ezra Susser, Department of Epidemiology, Columbia University, New York, USA

Dr James Swanson, University of California, Irvine, USA

Dr Haifa Tawfeek, Iraqi Cultural Office, Haada Political District, Yemen

Dr Edwin Trevathan, Centers for Disease Control and Prevention, National Center on Birth Defects & Developmental Disabilities, Atlanta, USA

Dr Mark Vickers, Liggins Institute, University of Auckland, New Zealand

Dr Melissa Westwood, Maternal and Fetal Health Research Group, University of Manchester, UK

About the International Society for Developmental Origins of Health and Disease

The Society (Registered Charity Number 1116722) was set up to promote research into the fetal and early-life origins of disease and involves scientists from many backgrounds. Full details can be found at: www.dohadsoc.org

Aims of the Society

- O To promote the co-ordination of a research strategy in different countries, for the scientific exploration of early human development in relation to chronic disease in later life
- O To promote the development and application of public health strategies to prevent chronic disease
- O To advocate for the need for funds from governmental and non-governmental sources for research in the developmental origins of health and disease
- O To champion training opportunities for scientists and clinicians
- O To foster regular meetings to discuss research findings and potential intervention
- O To promote the interchange of ideas, staff and expertise between laboratories across the world
- O To make representations to government, NGOs and other relevant agencies concerning the health implications of DOHaD

The Society is governed by an executive committee ("Council") comprising President, Secretary and Treasurer, seven trustees, and an advisory committee of up to 24 members representing regions of the world and scientific specialties. Members of Council are chosen by a vote by all members of the Society and serve for a term of three years.

Advantages of membership

- Opportunity to join an international scientific network which promotes an interdisciplinary and integrative approach to research
- Subscription to Journal of Developmental Origins of Health and Disease (J DOHAD)
- Two-monthly newsletter highlighting hot topics and current research initiatives across the field
- Preferential registration rates at the two-yearly DOHaD World Congress
- Eligibility to apply for financial support for workshops and advertising space for workshops on the website
- Details of relevant workshops, meetings and conferences on the website
- A password-protected section of the website, giving members' key publications and contact details

JOURNALS



MANUSCRIPT SUBMISSION NOW ONLINE!

Submission to *Journal of Developmental Origins of Health and Disease* is exclusively via the web-based peer review system, ScholarOne Manuscripts.

Benefits include:

- Rapid review process
- Online submission and tracking
- Worldwide 24/7 availability
- Access to all information in one place
- Prompt communication via e-mail

We invite all authors to submit online any NEW MANUSCRIPTS that are to be considered for publication in *Journal of Developmental Origins of Health and Disease*.

Bookmark the ScholarOne Manuscripts page now for future reference!

http://mc.manuscriptcentral.com/dohad

The Power of Programming International Conference on Developmental Origins of Health and Disease

Munich, Germany, May 6-8, 2010

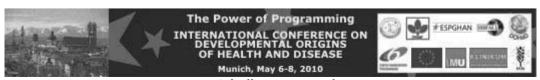
Organised by the Early Nutrition Programming Project, the Early Nutrition Academy, and the DOHaD Society, with support by the European Commission.

Conference Chair: Prof. Berthold Koletzko, MD, Dr. von Hauner Children's Hospital, LMU Munich, Germany

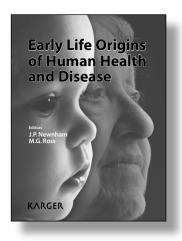
New findings and future opportunities in the area of developmental programming by early nutrition as well as other aspects of the developmental origins of adult disease will be presented and discussed at this international conference. In a multi-disciplinary approach, results from basic science, epidemiological cohort studies, and clinical intervention trials are presented.

Further information, abstract submission and registration:

www.metabolic-programming.org/munich2010



www.metabolic-programming.org



Early Life Origins of Human Health and Disease

Editors John P. Newnham Michael G. Ross

There is compelling evidence that many of the risks leading to the most frequent chronic diseases in adulthood originate in the earliest stages of life. Adverse environmental conditions in utero and during infancy can lead to negative health effects during the subsequent lifetime of the exposed individual.

This book offers precious insights into the latest concepts and results from epidemiologic, clinical and basic studies in this burgeoning area of health care. The developmental origins of various diseases such as diabetes, obesity and cancer are examined, as well as the early programming of reproductive health and different organs. Attention is given to the impact of environmental factors such as nutrition and pollution, and the mediating genetic and epigenetic pathways are reviewed. A crucial point under discussion is the concept of environmental insults adversely affecting not only the exposed persons, but also their descendants. In addition, the economic consequences of a suboptimal start to life and the importance of preventive measures are stressed.

This publication is of great value to anyone interested in health care, notably to specialists in obstetrics, pediatrics, internal medicine, obesity, diabetes and heart disease.

Contents

Preface: Newnham, J.P.; Ross, M.G.

Developmental Plasticity and the Developmental Origins of Health and Disease: Gluckman, P.D.; Hanson, M.A.

Epigenetics and the Influence of Maternal Diet: Lillycrop, K.A.; Hanson, M.A.; Burdge, G.C.

The Economics of Developmental Origins of Health and Disease: Modelling the Benefit of a Healthy Start to Life: Franko, K.L.; O'Connor, K.C.; Morton, S.M.B.

Nutritional Interventions in Mothers to Improve the Health of the Offspring - Are We Ready?: Fall, C.H.D.; Harding, J.E.; Yajnik, C.S.

Developmental Origins of Health and Disease: The Importance of Environmental Exposures: Newbold, R.; Heindel, J.J.

Developmental Origins of Health and Disease across Generations – Theory, Observation, Experiment: Gillman, M.W.; Davey Smith, G.; Hanson, M.A.; Spencer, H.G.

Early Embryo Environment and Developmental Potential: Fleming, T.P.; Sinclair, K.D.; Kind, K.L.

Early Environmental Influences on Lung Development: Implications for Lung Function and Respiratory Health throughout Life: Harding, R.; Snibson, K.; O'Reilly, M.; Maritz, G.

Development of the Fetal Hypothalamic-Pituitary-Adrenal-Placental Axis: Implications for Postnatal Health: Challis, J.; Connor, K.; Matthews, S.; Lye, S.J.; Caniggia, I.; Petraglia, F.; Imperatore, A.; Sloboda, D.M.; Li, S.; Braun, T.; Li, W.; Newnham, J.P.

Developmental Origins of Musculoskeletal Disease: Cooper, C.; Aihie Sayer, A.; Mishra, G.; Kuh, D.

Developmental Origins of Reproductive Health: Sloboda, D.M.; Hart, R.; Hickey, M.

Developmental Origins of Immune Tolerance: Pathways and Influences: Prescott, S.L. Developmental Programming of the Kidney:

Nijland, M.J.; Nathanielsz, P.W. Perinatal Appetite Programming: Desai, M.; Keen-Rhinehart, E.; Ross, M.G.

Fetal Programming of Type 2 Diabetes: Piekarz, A.; Ozanne, S.E.

Developmental Origins of Diabetes: Interventional Strategies: Simmons, R.A.

Prenatal Risk Factors for Breast Cancer and Clues to the Underlying Biological Mechanisms from Animal and Human Studies: Troisi, R.; dos Santos Silva, I.; Newbold, R.

The Offspring of Women with Severe Mental Disorder: Morgan, V.A.; McGrath, J.; Hultman, C.M.; Zubrick, S.; Bower, C.; Croft, M.; Valuri, G.; Jablensky, A.V.

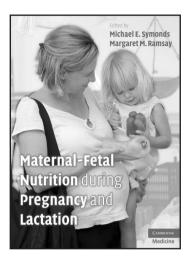
Approaches to Evaluate Gene-Environment Interactions Underlying the Developmental Origins of Health and Disease: Pennell, C.E.: Palmer, L.J.: Knight, B.S.; Relton, C.; Lye, S.J.

Author Index Subject Index

www.karger.com/pediatrics

Early Life Origins of Human Health and Fax: +41 61 306 12 34 Please send: __ _copy/ies Disease S. Karger AG, P.O. Box, CH-4009 Basel (Switzerland) Postage and handling free with prepayment Editors: Newnham, J.P. (Perth); Ross, M.G. E-Mail orders@karger.ch, www.karger.com (Los Angeles, Calif.) X + 224 p., 29 fig., 6 tab., hard cover, 2009 Special offer for DOHaD members: CHF 88.— / EUR 63.— / USD 88.00 Please charge to my credit card Name/Address: ☐ American Express □ Diners □ Eurocard EUR price for Germany, USD price for USA only ☐ MasterCard ISBN 978-3-8055-9139-3 e-ISBN 978-3-8055-9140-9 Card No.: Exp. date: CVV/CVC (3 digits in the signature field on the back of Visa and MasterCard) ☐ Please bill me Orders may be placed with any bookshop, subscription agency, Signature: directly with the publisher or through a Karger distributor.

CAMBRIDGE



Maternal-Fetal Nutrition During Pregnancy and Lactation

Michael E. Symonds, University of Nottingham, UK Margaret Ramsay, University of Nottingham, UK

Improving clinicians' understanding of effects nutrition can have on maternal health and fetal and neonatal development can have considerable impact on achieving a healthy pregnancy and reducing childhood morbidity. This book defines the nutritional requirements with regard to each stage of fetal development and growth, placing scientific developments into a clinical context. Clinicians and scientists discuss how the fetus grows and what macro- and micronutrients it requires, what happens when there is nutrient deficiency and when placental development is abnormal and aspects of infant feeding, both with breast milk and formula milk.

Specific problems encountered in pregnancy that pose a nutritional challenge are also considered, including pregnancy in teenagers, multiple pregnancies and pregnancy in those who are vegetarians or vegans. Essential reading for all doctors, health-care workers and scientists who either care for women, their newborn and growing infants, or who are involved in research in these areas.

Published January 2010 by Cambridge University Press ISBN: 9780521887090 Hardback, £45.00 176 pages, 16 b/w illustrations, 31 tables

Order now by calling Customer Services on +44 (0)1223 326050 or by emailing directcustserve@cambridge.org

