

Examining a Developmental Approach to Childhood Obesity: the Fetal and Early Childhood Years

Speaker Biosketches

Linda S. Adair, Ph.D., is a Professor of Nutrition in the School of Public Health at the University of North Carolina. Dr. Adair is a biological anthropologist interested in maternal and child nutrition. Her theoretical orientation comes from human biology and she is interested in how human populations respond to nutritional stresses. She is currently working on a large-scale longitudinal survey of women and children in the Philippines. This work involves exploration of patterns and determinants of growth from infancy through young adulthood; the long-term consequences of fetal and early child-growth patterns; the development of chronic disease risk factors in adolescents and young adults; and determinants of women's nutritional status through the life cycle. She also collaborates with other Department of Nutrition faculty in the study of (1) gene-environment interactions as determinants of health and nutritional status; (2) feeding, parenting styles and growth of African American infants; (3) factors affecting postpartum maternal to child transmission of HIV and of maternal and child nutritional status in Malawi as well as nutrition projects in rural South Africa and China. She teaches international nutrition, advanced methods of nutritional epidemiology and the doctoral seminar. She received her B.S. in biological sciences in 1971 from the State University of New York at Stony Brook and Ph.D. in biological anthropology from the University of Pennsylvania in 1980.

Andrea Baccarelli, MD, MPH, PhD, is the Mark and Catherine Winkler Associate Professor of Environmental Epigenetics in the Department of Environmental Health and Department of Epidemiology at the Harvard School of Public Health. His research focuses on identifying molecular and biological factors reflecting the impact of environmental exposures on cancer risk, with particular interest in epigenetics. Epigenetic marks, including DNA methylation, histone modifications, and non-coding RNAs, modify chromatin structure and gene expression without changing the underlying DNA sequence. Unlike genetic mutations, which represent rare events with permanent consequences on genes, epigenetic changes are reversible and responsive to environmental influences. Using a highly quantitative pyrosequencing-based approach for DNA methylation analysis, he has been examining the effects on DNA methylation of a variety of environmental carcinogens, including particulate air pollution, airborne benzene, metals, pesticides, dioxin-like compounds, and persistent organic pollutants, which are known to be relevant to cancer etiology.

Shari Barkin, M.D., M.S.H.S. is the William K. Warren Foundation Chair and Professor of Pediatrics, Director of Pediatric Obesity Research in the Diabetes Center, and Chief of General Pediatrics at Vanderbilt University Medical Center. She studies family-based community centered clinical interventions to measurably reduce pediatric obesity during critical windows of childhood development. Research focuses on changing early growth trajectories in childhood, applying the ecologic model that considers the child in the context of their family, and the family in the context of their community. Studies utilize a micro- to macro-level systems conceptual model that examines the interaction between behavior, environment and genetics. She is an NIH-funded researcher in the area of injury prevention and obesity prevention and early intervention. She conducted the first intervention trial in the Pediatric Research in Office Settings (PROS) Network testing the effectiveness of office-based youth violence prevention, including more than 200 providers and close to 5,000 families. More recently, she has conducted interventional trials to prevent and treat childhood obesity, with attention to health disparities, working with minority populations. Currently, she is conducting a 7 year randomized controlled trial to prevent childhood obesity, the Growing Right Onto Wellness (GROW) Trial funded by NHLBI and NICHD. She received her M.D. from the University of Cincinnati, completed her pediatric residency at Children's Hospital of Los Angeles, and a Robert Wood Johnson Clinical Scholars fellowship in Health Services Research at UCLA.

Antonio Convit, M.D. is the Deputy Director of the Nathan Kline Institute and a professor of Psychiatry, Medicine, and Radiology at the NYU School of Medicine. Dr. Convit's work focuses on understanding the impact of obesity-mediated metabolic disease on the brain. He also created the Banishing Obesity and Diabetes in Youth (BODY) Project, a public health program to help obese adolescents reduce their risk of type 2 diabetes and early cardiovascular disease. Dr. Convit is a native of Venezuela. He obtained his M.D. from the University of Chicago, Pritzker School of Medicine and trained in psychiatry at the New York University Medical Center.

Jacob E. Friedman, Ph.D., is Professor in the Department of Pediatrics, Biochemistry & Molecular Genetics at the University of Colorado Denver. His primary interest is in Exploring the Fuel-Mediated Programming of Neonatal Growth in Non-Human Primates. He has spent the past 13 years investigating the causes and consequences of Gestational Diabetes Mellitus (GDM) and the impact on the fetus. In addition, Dr. Friedman has a ten year history of research in the basic molecular mechanisms for control of hepatic glucose output. This involved developing novel animal models (transgenic mice, Non-Human Primate) together with invasive clinical investigation of human pregnancy utilizing skeletal muscle and adipose tissue biopsies obtained from obese GDM women with post-partum follow-up.

Matthew Gillman, M.D., S.M. is Professor of Medicine at Harvard Medical School and the Harvard Pilgrim Health Care Institute, Professor of Nutrition at the Harvard School of Public Health, and Director of the Obesity Prevention Program in the Harvard Pilgrim Health Care Institute's Department of Population Medicine. His research interests include early life prevention of chronic disease, including obesity, diabetes, cardiovascular disease, and asthma; individual and policy-level interventions to prevent obesity and its consequences; and childhood cardiovascular risk factors. He directs Project Viva, an NIH-funded cohort study of pregnant women and their offspring, focusing on effects of gestational diet and other factors on outcomes of pregnancy and childhood. Dr. Gillman also leads or participates in several other federally-funded studies of diet, activity, obesity, and cardiovascular risk in children and adults. He has served in leadership roles in the U.S. National Children's Study, the International Society for Developmental Origins of Health and Disease, the American Heart Association, and the American Academy of Pediatrics. He was a member of the Institute of Medicine Committee on Weight Gain during Pregnancy: Re-examining the Guidelines. He is an active teacher of medical students and mentor to research trainees. Formerly a primary care internist and pediatrician, Dr. Gillman's current clinical work is in preventive cardiology among children.

Kevin L. Grove, Ph.D., is a Senior Scientist in the Division of Diabetes, Obesity, & Metabolism, and Division of Reproductive & Developmental Sciences. He is also the Director of the NHP Obese Resource. Dr. Grove has been at ONPRC since 1996, starting as a Staff Scientist. In the past 15+ years, he has developed an internationally recognized and well-funded research program focused on the developmental programming of metabolic systems and how poor maternal metabolic health and diet can cause abnormalities in the developing offspring that predispose them to numerous metabolic diseases later in life; and interventions and therapies that can prevent or reverse the effects of diet-induced obesity/diabetes. Both of these programs extensively use nonhuman primate (NHP) models. Dr. Grove has developed these models at ONPRC and has made them available to the broader research community, resulting in several multi-Principal Investigator and R01 grants supporting independent programs at OHSU and throughout the United States. Because of the success of the program and the emerging expertise at ONPRC and OHSU, Dr. Grove recently agreed to help develop a new division of Diabetes, Obesity, & Metabolism that is focused on metabolic diseases, and will function as the Interim Division Chief. Dr. Grove received his BSc in the Department of Animal Science at Washington State

University in 1990, and his PhD in Neuroscience from the College of Veterinary Medicine at the same university in 1994. He did his postdoctoral work at the Institute of Clinical Research of Montreal.

Judith G. Hall, MD, MSc, is Clinical Geneticist and Pediatrician. She is currently Professor Emerita of Pediatrics and Medical Genetics at the University of British Columbia. Her research interests are human congenital anomalies, including neural tube defects, the genetics of short stature, mechanisms of disease such as mosaicism and imprinting, the natural history of genetic disorders, the genetics of connective tissue disorders such as arthrogyrosis and dwarfism and monozygotic twins. She has contributed in many leadership roles, including Presidency of the American Society of Human Genetics and the American Pediatrics Society. Dr. Hall has served on numerous national and international committees and boards and has received many honors for her scientific contributions and lifetime achievements. Among her publications are summary reviews and articles that are considered classics, having introduced aspects of the new genetics. Dr. Hall advocated for folic acid supplementation, pediatric physician resources, the development of specific disease health guidelines, and research on rare genetic disorders and natural history. Dr. Hall trained at Wellesley College, the University of Washington School of Medicine, and Johns Hopkins Hospital.

Marie-France Hivert, MD, MMSc, is an Assistant Professor in the Department of Population Medicine at Harvard Pilgrim Health Care Institute at Harvard Medical School. Dr. Hivert is a clinical investigator with primary focus on the etiology and primordial prevention of obesity and related co-morbidities, particularly type 2 diabetes and gestational diabetes. Her interests also include fetal metabolic programming mechanisms and the integration of genetics, epigenetics, and environmental factors contributing to obesity and related disorders. Dr. Hivert is currently involved in many international consortia investigating the genetics determinants of glycemic regulation during and outside of pregnancy. Dr. Hivert completed her clinical training as an Endocrinologist in 2007 at the Université de Sherbrooke (QC, Canada). Dr. Hivert was awarded a Scholar Research Award from the Fonds de Recherche du Québec – Santé, a Clinical Scientist Award from the Canadian Diabetes Association, and the New Investigator Award from the Canadian Institutes of Health Research (CIHR). From CIHR, she also received the Maud Menten New Principal Investigator Award from the Institutes of Genetics in 2011. Dr. Hivert has initiated her research in primary prevention by conducting a trial of lifestyle intervention to prevent weight gain in young adults and her work led to upgrading the medical school curriculum at Université de Sherbrooke to allow better training in lifestyle counseling of future physician. Related to this expertise, Dr. Hivert is involved in the Physical Activity Committee at the American Heart Association. Dr. Hivert completed her postdoctoral fellowship at the Massachusetts General Hospital and a Master in Medical Sciences in the Scholars in Clinical Sciences Program at Harvard Medical School.

Meredith A. J. Hullar, PhD is a Staff Scientist at the Fred Hutchinson Cancer Research Center. Her research interests include the role of the microbiome and diet in human health. Her research focuses on how the gut microbiome metabolizes dietary constituents and alters exposures that may influence health outcomes related to cancer. She uses a combination of dietary interventions and cross-sectional human population designs to study changes in the microbial community composition and functional genes associated with health outcomes. More specifically, she is interested in the role of the gut microbiome in obesity, the metabolism of phytochemicals by microbiota, and intermediary mechanisms of inflammation modulated by the gut microbiome. Dr. Hullar received her Ph.D. from Harvard University in 2000.

Stephen Krawetz, Ph.D. is Charlotte B. Failing Professor of Fetal Therapy and Diagnosis, Associate Director C.S. Mott Center for Human Growth and Development, and Director, Center of Excellence: Paternal Impact of Toxicological Exposure at Wayne State University School of Medicine, Department of Obstetrics and Gynecology and Center for Molecular Medicine and Genetics. Dr. Krawetz is well-

recognized in the fields of Reproductive Genetics and Bioinformatics. Using human spermatogenesis as a model system, his primary research focus is directed towards understanding the long range genetic mechanisms that dictate cell fate. His laboratory continues to implement and develop state-of-the-art technologies to determine how RNAs feedback to the genome to modulate the system. The spermatozoal RNAs delivered at fertilization may provide an essential component to early paternal genome reprogramming acting as genetic and epigenetic effectors. Dr. Krawetz received his PhD in Biochemistry from the University of Toronto in 1983 and trained with Gordon Dixon at The University of Calgary as an AHFMR postdoctoral fellow.

Karen A. Lillycrop, Ph.D. is Professor of Epigenetics in the Centre for Biological Sciences at the University of Southampton, UK. Dr. Lillycrop 's research focuses on the effect of early life environment on the epigenome and long consequences for disease susceptibility. She showed for the first time in collaboration with Dr. Graham Burdge (Faculty of Medicine) that maternal nutritional constraint induces long term epigenetic changes in the regulation of key metabolic genes leading to persistent changes in phenotype. She is a founder member of the Epigen consortium, an international consortium investigating the role of epigenetic processes in the developmental origins of disease.

Bruce McEwen, PhD, is Alfred E. Mirsky Professor, Rockefeller University and Head of the Harold and Margaret Milliken Hatch Laboratory of Neuroendocrinology at the Rockefeller University, and a member of the National Scientific Council on the Developing Child. He leads research on the effects of sex, stress, and hormones on the brain. In 1968, his laboratory discovered adrenal steroid receptors in the hippocampus—a truly seminal discovery. His current research focuses on how stress affects particular areas of the brain, including the amygdala, prefrontal cortex, and hippocampus. He is also investigating how brain regions differ between men and women. Dr. McEwen's research has significantly deepened our understanding of how the brain changes over the course of development, from childhood to old age, and it continues to shine new light upon the causes and progression of psychiatric illnesses, particularly post-traumatic stress disorder and depression. He received his B.A. in Chemistry from Oberlin College and Ph.D. in cell biology from Rockefeller University.

Karen Nelson, Ph.D., is president of the J. Craig Venter Institute (JCVI), where she has worked for the past 16 years. Prior to being appointed president, she held a number of other positions at the institute, including director of JCVI's Rockville Campus, and director of human microbiology and metagenomics in the Department of Human Genomic Medicine at JCVI. Dr. Nelson has extensive experience in microbial ecology, microbial genomics, microbial physiology and metagenomics. Since joining the JCVI legacy institutes, Dr. Nelson has led several genomic and metagenomic efforts and the first human metagenomics study on fecal material derived from three individuals that was published in 2006. Additional ongoing studies in her group include metagenomic approaches to study the ecology of the gastrointestinal tract of humans and animals, studies on the relationship between the microbiome and various human and animal disease conditions, reference genome sequencing and analysis primarily for the human body, and other omics studies. Dr. Nelson received her undergraduate degree from the University of the West Indies, and her Ph.D. from Cornell University.

Caroline Relton, PhD, PGCE is Professor of Genetics and Epigenetic Epidemiology at Newcastle University. Her primary research interest is the application of epidemiological approaches to improve our understanding of the role that epigenetic patterns may play in health and development. Ongoing work in Dr. Relton's laboratory includes projects focusing on the role of epigenetic variation in obesity, type 2 diabetes and related co-morbidities; the role of epigenetic variation in women's health through the menopause; determinants of DNA methylation variation in infants and children; the identification of epigenetic biomarkers of cognitive function; the role of DNA methylation in the pathogenesis of lung cancer; variation in epigenetic signatures during fetal development. Underpinning these projects is the

methodological development of epidemiological tools to strengthen casual inference in the context of epigenetic studies.

Sarah S. Richardson, MA, PhD is the John L. Loeb Associate Professor of the Social Sciences at Harvard University. She is jointly appointed in the Department of the History of Science and the Committee on Degrees in Studies of Women, Gender, and Sexuality. A historian and philosopher of science, her research focuses on race and gender in the biosciences and on the social dimensions of scientific knowledge. Richardson's research presses for scholarly reflection on the many developments underway in the present postgenomic moment. Her essay, "Maternal Bodies in the Postgenomic Order," discussed the implications of a prominent postgenomic research stream that situates the maternal body as a central site of epigenetic programming and transmission and as a significant locus of medical and public health intervention.

Aryeh D. Stein MPH, PhD is Professor in the Hubert Department of Global Health of the Rollins School of Public Health, Emory University, with a joint appointment in the Department of Epidemiology. He is a member of the faculty of the Nutrition and Health Sciences program of the Division of Biological and Biomedical Sciences in the Laney Graduate School of Arts and Sciences. In his research, Dr. Stein utilizes critical periods of susceptibility to nutritional deficits and surfeits (such as war-induced famine or migration) to study the role of nutrition over the life course (prenatal, childhood, adulthood) on the development of adult chronic disease. He has secondary interests in the methodologies of dietary assessment and program evaluation. He is currently working with CARE and ICDDR,B in the design and implementation of a novel approach to program evaluation in Bangladesh, with the COHORTS investigative team on the analysis of data from birth cohort studies in Brazil, Guatemala, India, Philippines and South Africa, with investigators from South Africa on the extension of the Birth to Twenty study to the next generation and with the Young Lives investigators to study the consequences through adolescence of variation in growth in childhood.

Mark Hedley Vickers, MSc, PhD, is an Associate Professor and Senior Research Fellow in the Liggins Institute at the University of Auckland. Dr. Vickers' research focus is on the effect of alterations in early life nutrition on the later health and wellbeing of offspring with a particular focus on the development of obesity and the metabolic syndrome. Dr. Vickers has established a number of preclinical models utilizing the paradigm of altered early-life nutrition to examine the mechanistic basis of programming during critical periods of developmental plasticity. He also investigates the potential for reversibility of developmental programming via both nutritional and pharmacologic interventions and was one of the first to show that developmental programming was potentially reversible with interventions in the early life period via the adipokine leptin. Dr. Vickers original work on developmental programming was named the most cited paper of the decade in the American Journal of Physiology: Endocrinology and Metabolism for 2001-11. He has published over 90 peer-reviewed papers and 6 book chapters in the field of early life origins of adult disease and is on the Editorial Board of a number of journals in this area.

Robert Waterland, PhD is Associate Professor of Pediatrics and Molecular & Human Genetics, Baylor College of Medicine. His research aims to understand how nutrition during prenatal and early postnatal development affects individual susceptibility to various adult-onset chronic diseases. Dr. Waterland's group focuses on nutritional influences on developmental epigenetics as a likely mediating mechanism. The Waterland group is increasingly interested in whether maternal obesity and nutrition before and during pregnancy affect developmental epigenetics in the hypothalamus and, consequently, body weight regulation in her offspring.

