

Nutritional Genomics in Health and Disease

Session Description

It has long been recognized that humans have displayed individual responsiveness to the foods they consume. Phenotypic variation to foods can be as subtle as sensitivity to bitterness, as reflected by the response to compounds like phenylthiocarbamide, or as gross as obesity as reflected by differences in energy utilization. Collectively, the scientific study of the way foods or their components interact with genes to influence phenotype is referred to as 'nutrigenomics' or 'nutritional genomics'. The science of nutrigenomics is beginning to provide clarity to the genetic pathways and associated molecular targets which account for the ability of food components to result in a physiologically relevant response. We believe that unraveling the effects of bioactive food components on genes and their encoded proteins as well as identifying genetic influences on dietary factors will be essential for identifying those who will and will not benefit from intervention strategies. In this symposium nutrigenomics presentations/discussions will encompass an understanding about how the response to bioactive food components depend on an individual's genetic background or nutrigenetics, nutrient induced changes in DNA methylation and chromatin alterations or nutritional epigenetics, nutrient induced changes in gene expression or nutritional transcriptomics, as well as the interaction between microbial factors and specific dietary components that may impact health and disease. Future directions as well as examples of nutritional genomics approaches will be presented in the context of understanding the pathogenesis of disease and/or maintenance of health.

Purpose

In this symposium we will aim to describe important emerging research approaches, including nutrigenetics, nutritional epigenetics, nutritional transcriptomics, and microbiomics for the study of nutrition in health and disease. It is our aim to show that these research approaches will assist in understanding the underlying mechanisms for diet-health relationships, and help explain a potential paradigm shift for the future, such that dietary advice (and possibly tailored food products) for promoting optimal health could be provided on an individual basis, in relation to genes, biological responses, and lifestyle factors.

Session Co-chairs/moderators:

Prof. Michael Müller, Ph.D.

Chair Nutrition, Metabolism and Genomics Division of Human Nutrition Wageningen University & Director Netherlands Nutrigenomics Consortium TI Food and Nutrition Bomenweg 2, 6703 HD Wageningen, The Netherlands

Sharon A. Ross, Ph.D., M.P.H.

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Session Topics and Speakers:

Introduction: Dr. Michael Müller (5 minutes)

Topic 1: *Nutrigenetics – The role of gene polymorphisms in eating behaviors.*

Speaker: Dr. Ahmed El-Sohehy, Associate Professor, Department of Nutritional Sciences, University of Toronto, Toronto, Ontario, Canada. (TBI)

Topic 2: *Nutrigenetics approaches in obesity and diabetes*

Speaker: Dr. Xu Lin, Associate Director, Professor, Institute for Nutritional Sciences, Shanghai Institutes for Biological Sciences, Chinese Academy of Sciences, Shanghai, P.R. China. (TBI)

Topic 3: *Nutrition and epigenetics*

Speaker: Dr. Sharon Ross, Program Director, Nutritional Science Research Group, Division of Cancer Prevention, National Cancer Institute National Institutes of Health, U.S. Department of Health and Human Services, Bethesda, MD, USA.

Topic 4: *The use of transcriptomics to elucidate the genome wide impact of unsaturated fatty acids*

Speaker: Dr. Michael Müller, Chair Nutrition, Metabolism and Genomics Division of Human Nutrition Wageningen University & Director Netherlands Nutrigenomics Consortium TI Food and Nutrition, Wageningen, The Netherlands.

Topic 5: *Molecular fingerprinting of the interaction of carbohydrates and gut microbiota*

Speaker: Dr. Lars Dragstedt, Department of Human Nutrition, University of Copenhagen, Copenhagen, Denmark.

Topic 6: TBI

Speaker: TBC

Short Sessions