

Potentials and limitations of personalized nutrition

The term personalized nutrition gained popularity approximately 15 years ago through publications, conferences, and the release of the first nutritional genomic test in the marketplace. These activities spurred additional research showing associations between nutrition, disease, and genotype generating more testing companies offering new genetic tests for optimizing nutrition. Thus, the personalized nutrition term has become synonymous with the use of genetic testing of selected single nucleotide polymorphisms that translate to nutrition guidance for a personalized diet regimen or supplement use to optimize health. The limitations of translating genetic data to nutrition stems from the number of genes (~ 20,000) and approximately 10 million SNPs per person. Each individual has a different collection of those SNPs. Many of the companies test approximately 5 to 50 genes with one SNP per gene. Additional complexity arises as a result of gene – gene interactions and of course, gene – nutrient or gene environment interactions, none of which have been measured or analyzed in establishing nutritional (or other) genetic tests. While nutritional genetic testing has been shown to be psychologically motivating to create personalized diet change for some individuals, research has shown it is not the only avenue for personalizing nutritional advice. Registered dietitians already personalize nutrition in practice because they account for family history, medical history, current diagnoses, biochemistries, habitual food intake, food preferences, intolerances, success with diet regimens, all of which are influenced by psychological makeup. Regardless of adding genetic data, the clinical nutritionist faces challenges of integrating diverse data on an individual. Hence, this one-on-one personalized approach is more robust than relying on genetic data. Alternative experimental study designs and analyzing data are necessary for analyzing individual as opposed to population average responses if we are to harness the potential of personalized nutrition. Research for personalizing nutrition also needs to be expanded. For example, an underserved research area is gender and hormone specific nutrition therapies for personalized diets that remedy health issues. Finally, technologies need to be built that make diet intake and analysis easier for the individual with the ability to integrate the many health, -omics related, and quantified-self data to create truly personalized nutrition research recommendations.

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Colleen Fogarty Draper, MS RD, is a Registered Dietitian and scientific researcher at Nestle Institute of Health Sciences, currently pursuing her PhD in Nutritional Systems Biology at Leiden University.

Colleen has spent the last decade and a half in nutritional systems biology research and integration into practice and biotechnology directing nutritional genomics clinical research and commercial nutritional genomics product design. She is presently enjoying bringing her depth and breadth of experience in nutritional genomics and practice to nutrition and metabolism research at the Nestle Institute of Health Sciences in Lausanne, Switzerland.

Colleen is currently focused on using novel research designs and approaches to data analysis to characterize the metabolic health of women and adolescent girls; examining the kinetic metabolome and microbiome response to an “ultra-healthy” vegan diet challenge; and creating information systems for dietary capture and analysis. She is passionate about creating research translatable to practice and has a long -standing interest in optimizing nutrition therapies for the brain-gut connection and systems research on ancient healing practices.

As the Nutritional Genomics Advisor for Dietitians in Integrative and Functional Medicine, a practice group of the Academy of Nutrition and Dietetics, Colleen had the opportunity to move nutritional genomics and nutritional system biology forward for the registered dietitian. Colleen is also a founding member of the Nutrition Advisory Board for the Institute of Functional Medicine. In 2012, Colleen received the Dietitians in Integrative and Functional Medicine Service Award.