What Has a Genomic Approach Told Us About Vitamin D and Cancer?

James C. Fleet, Ph.D.
Professor, Department of Foods and Nutrition
Purdue University

"Omic" technologies like genomics, transcriptomics, proteomics, and metabolomics hold a promise that one can move from a classic, reductionist scientific research model (i.e., looking at biology from the perspective of a single gene, protein, or compound) into a systems-based research model where many biological events in a system are visualized simultaneously. In cancer biology, genomics has been used as a tool to classify tumors with the hope of improving our understanding of cancer, enhancing diagnostics, and focusing treatment modalities. Since the active hormonal form of vitamin D, 1,25 dihydroxyvitamin D (1,25 D) works through the vitamin D receptor (VDR), a ligand-activated transcription factor, use of transcriptomics is a natural approach to fully understand the molecular actions of 1,25 D responsible for cancer prevention and treatment. Surprisingly, the application of transcriptomics to study 1,25 D action has been limited; several good studies exist but many 1,25 D transcriptomics studies suffer from the use of small arrays, the lack of treatment replication, and inadequate statistics. In addition, few 1,25 D studies are submitted to the public microarray databases, which limits secondary analyses that are common in transcriptomics research. Still, transcriptomic approaches have revealed interesting new directions for research in vitamin D and cancer. This presentation will summarize this work and suggest directions for future advances.