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Adventures in personal genomics and whole omics profiling

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Personalized medicine is expected to benefit from the combination of genomic information with the global monitoring of molecular components and physiological states. To ascertain whether this can be achieved, we determined the whole genome sequence of an individual at high accuracy and performed an integrated Personal Omics Profiling (iPOP) analysis, combining genomic, transcriptomic, proteomic, metabolomic, and autoantibodyomic information, over a 21-month period that included healthy and two virally infected states. Our iPOP analysis of blood components revealed extensive, dynamic and broad changes in diverse molecular components and biological pathways across healthy and disease conditions. Importantly, genomic information was also used to estimate medical risks, including Type 2 Diabetes, whose onset was observed during the course of our study. Our study demonstrates that longitudinal personal omics profiling can relate genomic information to global functional omics activity for physiological and medical interpretation of healthy and disease states.

Biography

Michael Snyder is the Chairman of Genetics and the Director of the Center for Genomics and Personalized Medicine at Stanford. Dr. Snyder received his Ph.D. training at CalTech and carried out postdoctoral training at Stanford. His laboratory study was the first to perform a large-scale functional genomics project in any organism, and has launched many technologies in genomics and proteomics. These include the development of proteome chips, high resolution tiling arrays for the entire human genome, methods for global mapping of transcription factor binding sites, paired end sequencing for mapping of structural variation in eucaryotes, and RNA-Seq. These technologies have been used for characterizing genomes, proteomes and regulatory networks.