



NIDDK P30 Center for Molecular Studies in Digestive and Liver Diseases Research Seminar



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"Community-scale Metabolic Modeling of the Gut Microbiome Enables the Rational Design of Personalized Prebiotic, Probiotic, and Dietary Interventions"

Thursday, September 15, 2022
12:00 – 1:00 PM EST
901 Biomedical Research Building

The human gut is an anaerobic bioreactor, wherein hundreds of microbial species transform diverse dietary and host-derived substrates into myriad bioactive small molecules that are absorbed into the bloodstream and circulate throughout the body. We have developed a community-scale metabolic modeling platform for the human gut microbiome, called MICOM, which maps ecological composition to metabolic functional outputs, given personalized constraints on microbiome and dietary composition. MICOM enables *in silico* intervention studies, where thousands of dietary, prebiotic, and probiotic interventions can be simulated for a given individual. Through a set of *in vitro* and *in vivo* validation studies, we show how MICOM accurately predicts the engraftment of non-indigenous bacterial taxa (e.g., pathogens or probiotics). We also show how MICOM quantitatively predicts inter-individual variation in short-chain-fatty acid production profiles and subsequent immune phenotypes (e.g., lower inflammation in individuals with higher butyrate production). Overall, we demonstrate how MICOM can be used to quantitatively predict personalized responses to prebiotic, probiotic, and dietary interventions.

The meeting will start promptly at 12:00 pm. Please be on time.
Everyone inside and outside of the division is welcome to attend.