Title of proposed program: ***Human Microbiome Program (second phase)***

Submitting Source: NIH

What is the major obstacle/challenge/opportunity that the Common Fund should address?
Two goals of the Common Fund's Human Microbiome Program (HMP), initiated in 2007, were to determine an effective approach to study (1) whether the human microbiome plays an essential role(s) in maintaining human health, and (2) whether disruption of the microbiome is associated with specific diseases. HMP tested whether these questions could be addressed by assaying the microbiome at the metagenomic level, by analyzing the correlation between human health or specific diseases and the taxonomic composition of the microbiome. The results demonstrated (a) the feasibility of using metagenomics as an approach to study the composition of the microbiome, and (b) that the composition of an individual's microbiome (i.e., diversity and relative abundance of microbial members) differs so significantly from another individual's with similar health status that taxonomic characterization alone could not be used to study the association of the microbiome with specific health or disease states. On the other hand, *in silico* metabolic pathway reconstructions of the HMP metagenomic data suggested that the microbiomes of the HMP healthy cohort subjects may be similar in the metabolic pathways that affect the host-commensal relationship. If so, there should be a key set of biochemical and metabolic molecular markers that may serve as indicators of microbiome contributions to host health status at the functional level.

What would the goals of the program be?
The goal of the second phase of the HMP2 would be to test whether metabolomics would be more predictive of health or disease status than metagenomics alone.

Why is a trans-NIH strategy needed to achieve these goals?
The microbiome is relevant to many diseases of interest to several NIH ICs.

What initiatives might form the strategic plan for this topic?
The first initiative would establish demonstration projects to test whether metabolomics is more predictive of health or disease status than metagenomics alone. The second initiative would be to support continued data deposition into an open access database.

If a Common Fund program on this topic achieved its objectives, what would be the impact?
The program would establish whether metabolomics is more predictive than metagenomics in establishing health status and provide a community resource for data deposition and access.