

The Effects of an Agrarian Diet Intervention on Inflammation and Gut Microbiome Composition in HIV-Infected Individuals in Colorado

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Individuals living with HIV often suffer from cardiovascular disease, metabolic disease, and chronic inflammation, all of which are associated with gut microbiome dysbiosis. The gut microbiome composition of HIV-infected (HIV+) and uninfected (HIV-) men who have sex with men (MSM) in the United States is predominantly *Prevotella* rich and *Bacteroides* poor (PrevR/BactP). Interestingly, this gut microbiome composition is similar to that of healthy individuals in developing nations who consume an Agrarian diet (AD) high in fiber and low in fat, sodium and sugar, implying that HIV+ and HIV- MSM may consume inadequate nutrients for their gut bacteria. Therefore, we hypothesize that an AD modification for PrevR/BactP HIV+ and HIV- MSM individuals will have beneficial health effects as demonstrated by a greater reduction in inflammatory disease markers. To test this, we performed a four-week clinical study on 90 individuals to compare the effects of an AD versus a typical Western Diet (WD) on HIV+ and HIV- individuals in Colorado. The first two weeks of meals were prepared by our nutrition core, while the last two weeks were study-participant prepared. Dietary questionnaires showed high compliance to target diet modifications. At baseline, systemic inflammation, as measured by IL6, was significantly elevated in HIV+ individuals, and HIV- MSM at high risk for HIV, compared to HIV- low risk individuals ($p = 0.029$). After two weeks, HIV+ individuals on an AD had a reduction in baseline IL6 levels that was not observed in HIV- individuals and those on a WD ($p = 0.047$). IL6 levels were negatively correlated with *Bacteroides*, suggesting a protective effect ($p = 0.003$), while there was no relationship to *Prevotella*. There was a significant increase in *Bacteroides* after four weeks of diet intervention. Our results suggest that an AD can protect from HIV-associated systemic inflammation and associated health outcomes.