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HIV-induced immunosuppression is associated with loss of microbial colonization resistance in the proximal gut

Liying Yang

New York University School of Medicine, USA

To identify microbial targets for treatment of HIV enteropathy, we contrasted microbiota composition between HIV-1infected patients and HIV-negative controls in the esophagus, stomach and duodenum as well as the mouth using a universal 16S rRNA gene survey and correlated the findings with HIV serostatus and peripheral blood T-cell counts. HIV infection was associated with an enrichment of Proteobacteria and depletion of Firmicutes in the proximal gut. In particular, environmental species *Burkholderia fungorum* and *Bradyrhizobium pachyrhizi* colonized the duodenum of HIV patients who had abnormally low blood CD4+ T-cell counts but were absent in HIV-negative controls or HIV patients whose CD4 counts were normal. The two species co-existed and exhibited a decreasing trend proximally towards the stomach and esophagus and were virtually absent in the mouth. Their abundance was inversely correlated with CD4 counts but not viral load. The colonization of the duodenum by environmental bacteria reflects loss of colonization resistance in HIV infection. Their correlation with CD4 counts suggests that compromised immunity could be responsible for the observed invasion by exogenous microbes. These findings provide unprecedented insight into mechanisms guiding future efforts to develop therapeutic interventions in HIV infection, such as antibiotic treatment aimed at eradicating the species that are associated with increased gastrointestinal opportunistic infections or alternatively, combined with probiotics to introduce the species that are associated with a decreased the diseases risk.

Biography

Living Yang has obtained her Doctor of Medicine degree from Jiamusi University School of Medicine in China and Master of Science in Clinical Research from New York University. Currently, she is an Assistant Professor of Medicine at New York University School of Medicine. She serves as a Principal Investigator and Co-Investigator on a number of NIH-sponsored projects studying the role of microbiome in HIV infection and cancers and has published more than 30 papers in reputed journals.

Liying.yang@nyumc.org

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