

2023 Annual Research Day – Oral session
April 19th, 2023, 2:00 p.m. – 4:30 p.m., PHAB 2A

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Oral/gut microbiome and inflammatory markers in African American colon cancer patients

Background: Colorectal cancer is the third leading cause of cancer deaths in the US, with African American (AA) patients having the highest incidence and mortality rate. Additionally, AAs have the highest prevalence of periodontitis which is a gum disease triggered by oral pathogens associated with bacteremia and systemic inflammation. Periodontitis increases the risk of colorectal cancer and mortality. Periodontal pathogens, *Fusobacterium nucleatum* (Fn) and *Porphyromona gingivalis*, have been linked to carcinogenesis through modulating the tumor immune microenvironment and activating cytokines. Therefore, we will define the microbial and inflammatory link between periodontal pathogens and colon cancer in AA patients.

Methods: To investigate the role of inflammation and microbiome as it relates to colon cancer disparities, our study approach includes DNA and RNA sequencing of tumor vs. non-tumor tissues, serological levels of cytokines by using multiplex ELISA and antibody responses to the oral/gut microbiota by novel protein microarray technology.

Results: The gut microbiota in AA colon cancer patients was heterogeneous and mostly composed of Proteobacteria, Firmicutes, Actinobacteria, and Bacteroidetes. *Faecalibacterium prausnitzii*, a probiotic bacterium, was depleted in cancer samples, while *Aggregatibacter segnis*, an oral bacterium, was enriched in colon tumor tissues. Fn relative abundance was significantly increased in tumor tissues and right-sided colon location. Left-sided colon cancer and advanced cancer stage patients had increased systemic levels of cytokines IL-1 β , IL-8, IL-17, RANK, MMP-13 and CRP. 39 bacterial proteins showed anti-IgG seroprevalence of more than 15% in the samples.

Conclusions: Oral pathogens were enriched in right-sided location and advanced-stage tumors.

Collectively, AA patients with colon cancer displayed microbial signatures and systemic secretion of cytokines that may serve as potential markers for location and cancer stage.