CANCER PREVENTION & RESEARCH INSTITUTE OF TEXAS

Award ID:
RP140767

Project Title:
Toll-Like Receptors, Gut Microbiota, and Risk of Colorectal Adenoma

Award Mechanism:
Individual Investigator

Principal Investigator:
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Entity:
Baylor College of Medicine

Lay Summary:

Colorectal cancer (CRC) remains the 3rd leading cancer killer in Texas and the U.S. More than 90% of CRCs arise from pre-cancerous polyps known as colorectal adenoma (CRA). Diet is a modifiable risk factor for CRA and CRC. Understanding the cause of this link may provide a novel opportunity for preventing CRC. Toll-like receptors (TLRs) are present on the lining of cells in the colon. TLRs recognize bacterial and dietary components like fatty acid and transmit signals to our body initiating an inflammatory response. The delicate balance among diet, gut microbiota (i.e., a population of greater than 100 trillion microorganisms living in our gut) and TLRs is critical in maintaining colon health. Through TLR4, a high-fat diet can alter gut microbiota and colon cell activities and induce tumors in animals. However, whether this holds true for humans is unknown. We set out to compare the colonic microbiota as well as expression levels of TLRs genes in CRA with those in normal colon; the blood levels of bacterial immune activation and inflammation in patients with CRA with those of polyp-free individuals. We will collect data on lifestyle, diet, clinical factors, as well as colon biopsy, stool, and blood from patients who get colonoscopy at a single large medical center. We aim to identify whether patients with CRA are more likely to have imbalanced microbiota or abnormal expression of TLR4 gene, and identify diet that contributes to this disrupted status. Through modifying diet, manipulating gut microbiota or the use of medications targeting TLRs, we may be able to restore balanced microbiota and prevent colorectal tumors. The circulating markers may be combined with existing tools in identifying high-risk population in need of enhanced surveillance or intervention. Our study will provide novel and crucially needed data on the combined role that diet, gut microbiota, and the TLR protein family play in CRA risk.