Type 2 Diabetes and Ulcerative Colitis: Shared Gut Microbiome Dysbiosis, a Biomarker for Colorectal Cancer

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Ulcerative colitis (UC) and type 2 diabetes (T2D) are associated with high risks of colorectal cancer (CRC), yet bacterial biomarkers for CRC present in both remain unclear. In this study, a cross-study analysis was conducted of T2D and UC gut microbiomes to find shared CRC biomarkers for early CRC detection. Metagenomic and 16S rRNA gene sequencing re-analyzation were performed on colon and rectum samples in 6 datasets with UC, T2D, and CRC patients (n=209). CRC alpha diversity was shown to be the lowest compared to UC and T2D datasets. Through random forest machine learning models with 84.91%, 91.67%, and 83.25% accuracy, decreased levels of Ruminococcaceae UCG-002 spp. and Ruminiclostridium 6 spp. were identified as a bacterial biomarker linking UC and T2D. Increased levels of D. longicatena was identified as a common biomarker between T2D and CRC. Inconclusive levels of D. longicatena levels and Prevotella 9 spp. were identified as common CRC biomarkers between UC and T2D, as well as increased Bacteroides spp. and decreased Faecalibacterium sp. CM04-06. Through identifying bacterial CRC biomarkers present in UC and T2D, this study emphasizes a comprehensive bioinformatics approach for microbe analyzation in CRC diagnosis.

Awards Won:

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