Bifidobacterium Genus in Colorectal Carcinoma Tissue in relation to Tumor Characteristics and Patient Survival

Evidence suggests that members of the Bifidobacterium genus may not only inhibit colorectal carcinogenesis, but also enhance the antitumor immune response and efficacy of immunotherapy. We hypothesized that the amount of bifidobacteria in colorectal carcinoma tissues may be associated with distinctive clinical features, higher immune response to colorectal cancer, and favorable clinical outcome.

Using 1,313 rectal and colon carcinoma cases in the Nurses' Health Study and Health Professionals Follow-up Study, we measured the amount of Bifidobacterium DNA in carcinoma tissue by a quantitative polymerase chain reaction assay. Multivariable logistic and Cox proportional hazards models were used to adjust for potential confounders, including microsatellite instability status, CpG island methylator phenotype, and intepersand nucleotide element-1 methylation, KRAS, BRAF, and PIK3CA mutations.

Intratumor bifidobacteria were detected in 393 (30%) cases. The amount of bifidobacteria was associated with the extent of signet ring cell density (P = 0.002, with adjusted a of 0.002). Compared with signet ring cell-absent cases, multivariable odds ratios for the amount of bifidobacteria were 1.45 (95% confidence interval 0.98-2.14) for cases with 1-50% signet ring cell components and 2.21 (95% confidence interval 1.05-4.63) for cases with ≥51% signet ring cell components (P = 0.011). The amount of bifidobacteria was not significantly associated with any densities, histological lymphocytic reaction patterns, or colorectal cancer survival.

The amount of detectable Bifidobacterium DNA in colorectal cancer tissue is associated with the extent of signet ring cells.