Medical Xpress

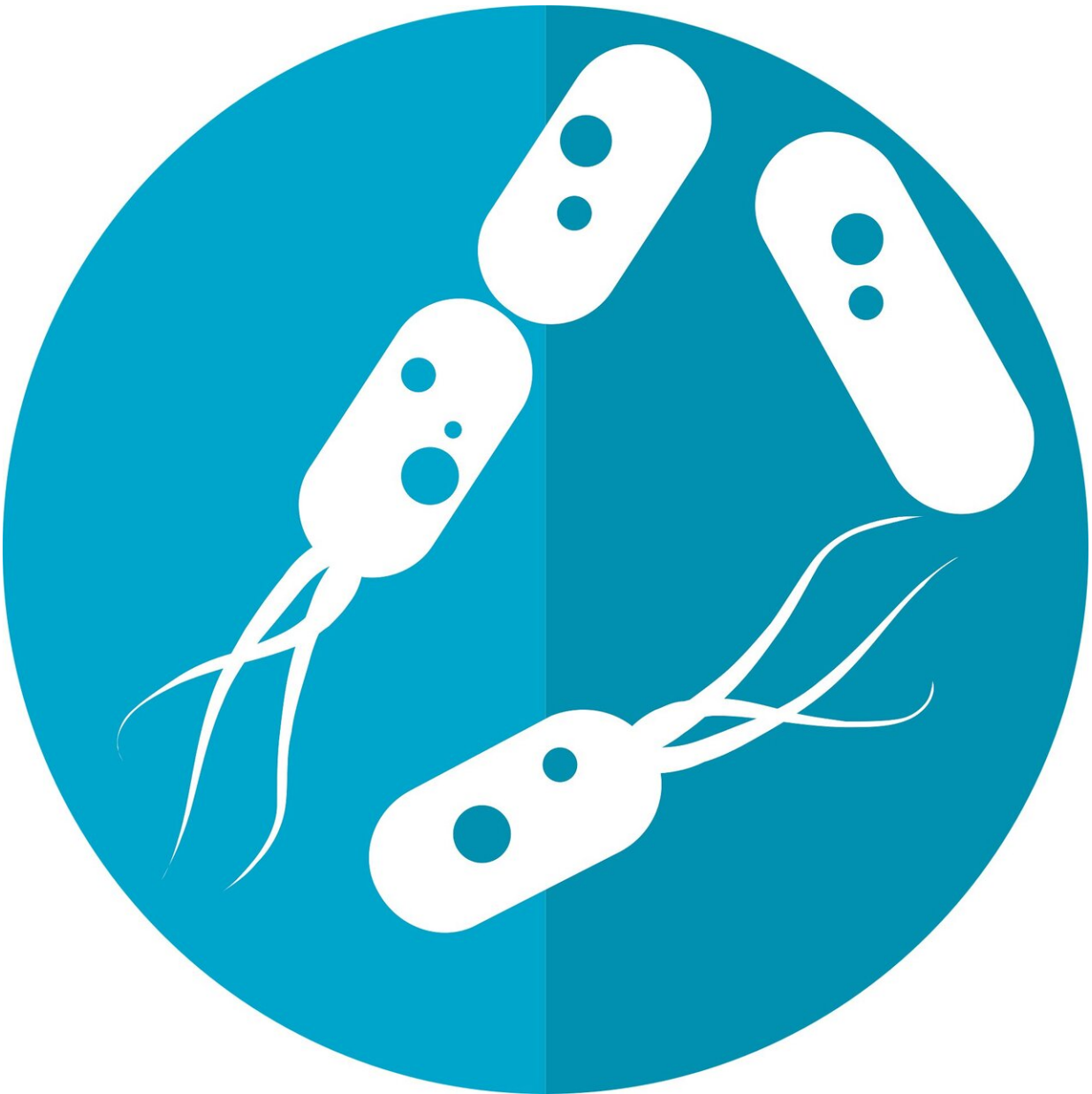# Gut microbiome variations could predict colorectal cancer risk, new study finds

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New research has identified significant variations in the gut microbiome of individuals who developed pre-cancerous colonic lesions, suggesting a potential connection between gut bacteria and the onset of colorectal lesions and cancers. These findings, presented at [UEG Week 2023](#), open promising new avenues for enhancing the detection and prevention of colorectal cancer.

The large-scale prospective study, involving 8,208 participants, linked data from the Dutch Microbiome Project with the Dutch nationwide pathology database to identify all recorded cases of colonic biopsies from the last five decades.

Researchers analyzed the function and composition of the gut microbiomes of individuals who developed pre-cancerous colorectal lesions before fecal sampling between 2000 and 2015 (n=214), as well as those who developed lesions after fecal sampling between 2015 and 2022 (n=305).

These groups were then compared with individuals with normal colonoscopy findings (n=202) and the general population. To gain a deeper insight into the gut microbiome's role, researchers are also examining specific bacterial strains and their functions within the gut by reconstructing their genomes from metagenomic data.

The results revealed that individuals who developed colonic lesions after fecal sampling exhibited increased diversity in their gut microbiome compared with those who did not develop lesions. Moreover, the composition and function of the microbiome differed among individuals with pre-existing or future lesions and varied based on the type of lesion.

Notably, bacterial species from the family of Lachnospiraceae and the genera Roseburia and Eubacterium were linked with the future development of lesions.

Dr. Gacesa, from the University Medical Center Groningen and study lead author, commented, "While we didn't investigate mechanisms in this study, it is known from previous research that some of the bacterial species identified may have properties that could contribute to the development of colorectal lesions."

"A bacterium called Bacteroides fragilis, for example, is known to produce a toxin that can lead to chronic low-grade inflammation in the gut. Prolonged inflammation is believed to be potentially genotoxic and carcinogenic, meaning it may cause genetic damage and promote cancer."

Colorectal cancer is a significant health concern across Europe, ranking as the second most prevalent cancer and second leading cause of cancer-related death. It typically develops from pre-cancerous lesions within the gut, making the removal of these lesions an effective strategy for preventing colorectal cancer. However, existing non-invasive detection methods, such as the fecal immunochemical test, produce a high number of false positives, leading to unnecessary colonoscopies.

Discussing the implications of the study's findings, Dr. Gacesa said, "The connection between the gut microbiome and pre-cancerous lesions has been underexplored, leaving uncertainty about whether gut bacteria can predict the future onset of colorectal cancer. Our findings suggest that the microbiome could act as a valuable tool to improve existing tests, advancing early detection methods for pre-cancerous lesions and colorectal cancer."