

Large population study links blood infection with certain bacteria to increased risk of colorectal cancer

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New research due to be presented at this year's European Congress of Clinical Microbiology and Infectious Diseases (ECCMID) shows a link between blood infections with certain anaerobic bacteria and the risk of developing colorectal cancer. The study is by Dr. Ulrik Stenz Justesen, Odense University Hospital, Denmark, and colleagues.

Anaerobic [bacteria](#) are bacteria that do not require oxygen for energy production, and live in various environments including the human gut, where they usually do not cause infections directly. Previous studies have reported an association between bacteria from the Bovis group streptococci, Clostridium septicum and [colorectal cancer](#) (CRC). Recently associations between different Bacteroides species, Fusobacterium nucleatum and CRC have also been reported. The authors aimed to investigate this further in a large-scale study.

The researchers performed a population-based cohort study including data on blood cultures from 2007 to 2016 covering a population of more than 2 million people in two regions of Denmark (Southern Denmark and Zealand regions).

They combined blood culture data with the national register for colorectal [cancer](#) (Danish Colorectal Cancer Group Database) and identified new cases of CRC after blood [infection](#) with these bacteria. The risk of incident CRC until 2018 was investigated for Bacteroides

spp., *Clostridium* spp. and *Fusobacterium* spp. and compared with *Bovis* group streptococci, *Escherichia coli*, *Staphylococcus aureus* and with blood samples that contained no infection (controls). Each case of infection was matched by age and sex with five controls.

The data included 45,760 bacteraemia episodes, of which 492 (1.1%) were diagnosed with CRC after the bacterial infection; 241 (0.5%) within 1 year. The risk of CRC for selected bacteria is shown in the full abstract (link below). Results for infection with *E. coli* and *S. aureus* are not shown but were similar to negative (control) blood cultures. Most anaerobic species were associated with a considerable increased risk of CRC (up to 42 times) compared with negative blood cultures.

Clostridium septicum infection was associated with a 42 times increased risk of CRC within 1 year (0.5% of controls developing CRC versus 20.8% in *C. septicum*), and a 21-times risk overall (1.1% controls versus 22.6%). *Bacteroides ovatus* was linked to a 13 times increased risk of CRC within 1 year (0.5% of controls versus 6.7% *B. ovatus*), and a 6-times increased risk overall (1.1% controls versus 6.7%).

The authors conclude: "In this large scale cohort study, it was found that, in patients with [blood infections](#) caused by selected anaerobic bacteria, the risk of developing colorectal cancer was increased by up to 42 times compared with patients with blood infections caused by aerobic bacteria such as *E.coli* or *S.aureus* or negative controls. The discovery of blood infections with certain anaerobic bacteria could potentially result in a recommendation of screening for colorectal cancer in selected patients."

To put the findings in context, in Dr. Justesen's own clinical microbiology department, there are usually two cases of blood infection caused by these anaerobic bacteria each week. They are usually caused by a breach in the intestinal wall, which can itself be caused by cancer. Dr. Justesen says: "At this stage we are not sure if the bacteria are

directly causing cases of colorectal cancer, or if the blood infection with these bacteria is itself caused by the cancer. It's an example of the question 'is this the chicken or the egg?'"

He continues: "Our follow up research of this study will focus on the specific bacteria from cancer patients to see if we can identify specific characteristics that could be implicated in cancer development. If this is the case it could be of great importance when it comes to screening and treatment of colorectal cancer."

He adds: "With regards to screening, if we saw these high-risk bacteria in combination with advanced age, then it would definitely be worth screening the patient for colorectal cancer. At the other end, we would not need to screen children, but it is very rare to see either colorectal cancer or [blood](#) infections caused by [anaerobic bacteria](#) in children. We need to do further analysis to come up with specific recommendations on screening."

Provided by European Society of Clinical Microbiology and Infectious Diseases

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