

## The potential role of gut microbiota in pancreatic disease: A systematic review

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### Abstract

**Background:** Several studies have suggested a link between microbiota imbalance and some gastrointestinal, inflammatory and neoplastic diseases. However, the role in pancreatic diseases remains unclear. To evaluate the available evidence for pancreatic diseases, we undertook a systematic review. **Methods:** OVID Medline (1946 to 2017), EMBASE (1980 to 2017) and the Cochrane Central Register of Controlled Trials (CENTRAL Issue 3, 2017) were searched for studies on microbiota in pancreatic disease. We also searched the reference lists of retrieved papers and conference proceedings. We excluded animal studies, reviews, and case reports. **Results:** A total of 2,833 articles were retrieved. After screening and applying the exclusion criteria, 10 studies were included. Three studies showed lower levels of Bifidobacterium or Lactobacillus and higher levels of Enterobacteriaceae in chronic pancreatitis. Two of these studies were uncontrolled, and the third (controlled) study which compared patients with endocrine and exocrine insufficiency, reported that Bacteroidetes levels were lower in those patients without diabetes, while Bifidobacteria levels were higher in those without exocrine insufficiency. Only one study investigated acute pancreatitis, showing higher levels of Enterococcus and lower levels of Bifidobacterium versus healthy participants. There was an overall association between pancreatic cancer and lower levels of Neisseria elongate, Streptococcus mitis and higher levels of Porphyromonas gingivalis and Granulicatella adiacens. **Conclusions:** Current evidence suggests a possible link between microbiota imbalance and pancreatic cancer. Regarding acute and chronic pancreatitis, data are scarce, dysbiosis appears to be present in both conditions. However, further investigation is required to confirm these findings and to explore therapeutic possibilities. Changes in diet, lifestyle, and exposure to environmental risk factors account for the increased incidence of pancreatic disorders, including acute and chronic pancreatitis, and pancreatic cancer. The role of the microbiota in the development of pancreatic disorders is increasingly acknowledged. The translocation of gut bacteria and endotoxins following gut barrier failure is a key event contributing to the severity of acute pancreatitis, while small intestine bacterial overgrowth is common in patients with chronic pancreatitis and further worsens their symptoms and malnutrition. Specific molecular mimicry link the microbiota and Helicobacter pylori with autoimmune pancreatitis. Changes in the oral microbiota typical of periodontitis seem to be associated with an increased risk of developing pancreatic

cancer. The composition of the gut microbiota is also unbalanced in the presence of risk factors for pancreatic cancer, such as obesity, smoking and diabetes. Helicobacter pylori infection, atrophic body gastritis and related decreased gastric acid secretion also seem associated with the risk of pancreatic cancer, although this area needs further research. The link between dysbiosis, immune response and proinflammatory status is most likely the key for these associations. The present review article will discuss current available evidence on the role of gut microbiota in pancreatic disorders, highlighting potential areas for future research.

This work is partly presented at

International Conference on Gastrointestinal Cancer and Therapeutics 4th World Congress on Digestive & Metabolic Diseases 26th Annual Congress on Cancer Science and Targeted Therapies on October 29-30, 2018, held in San Francisco, USA.

