

## **PRESS RELEASE**

### **Evidence emerges that colon cancer may be a bacteria-related disease**

(Stockholm, 24 October 2011) Researchers in France have shown for the first time that colon cancer may be associated with distinctive changes in intestinal bacteria. A study presented at the United European Gastroenterology Week (UEGW) in Stockholm, Sweden, and selected as one of the top five congress abstracts found that not only was the composition of bacteria in the stools of patients with colon cancer significantly different to healthy individuals, but that when these bacteria were transferred into the colons of healthy mice, pre-cancerous lesions developed.<sup>1</sup> Professor Iradj Sobhani from the Henri Mondor Hospital and University Paris-Est Créteil in France told journalists at the UEGW meeting that the results of this study can potentially open the possibility of mass screening for colon cancer. “Our studies provide clear evidence that carcinogenic factors are present in the stools of colon cancer patients and point to abnormal intestinal bacteria as the key suspect,” he said.

#### **Bacteria and the colon**

The human colon contains billions of bacteria – called microbiota – that form a well-organised, largely beneficial society. One of the main functions of microbiota is the modulation of immunity and protection against pathogens and diseases. There is, however, growing evidence that changes in bacterial populations or the products of bacterial metabolism may contribute to disease, with some initial studies suggesting an association between microbial imbalances (dysbiosis) and the risk of colon cancer.

“Until relatively recently, the only way to identify and analyse bacteria was to use specimen cultures, which are far from ideal, as around 60% of bacterial species won’t grow in culture dishes or milieu,” explained Prof. Sobhani. “Whole genome sequencing has now made it possible to characterise the biodiversity of microbiota, which has helped us to study bacteria in the intestines of normal and diseased individuals.”

#### **Dysbiosis and colon cancer**

Prof. Sobhani and co-workers have undertaken groundbreaking research on the association between intestinal bacteria and colon cancer. In their first study,<sup>2</sup> stool samples from a large number of individuals undergoing colonoscopy were analysed for bacterial DNA. Around one-third of the individuals were found to have colorectal cancer, while the rest were normal.

A comparison between the bacteria found in the stools of colorectal cancer patients and the normal individuals identified significant differences, with a marked elevation in the *Bacteroides/Prevotella* populations that appeared to be associated with an increase in infiltrating immune cells (IL17 cells) in the tumour samples.

“This study produced convincing evidence that the composition of bacteria in the stools of patients with cancer is markedly different to normal individuals,” said Prof. Sobhani. “This offers the intriguing possibility of using microbiota as a sensitive marker of colon cancer in the future.”

In a second study described by him, fresh stool samples were collected from individuals with colon cancer and healthy individuals and transferred to the colons of healthy germ-free mice by gavages, and the animals were followed up to 6 weeks.<sup>1</sup> The composition of bacteria in mice’s stools was of human type and remained stable over time. However, cell proliferation – an early cancer marker – and aberrant crypt foci (ACF) – an equivalent in mice to adenomatous polyps in humans – increased in the colons of mice given the cancerous stools. “This is the first evidence that the bacteria from the intestines of colon cancer patients are carcinogenic in germ-free mice,” said Prof. Sobhani. “We now need to try and identify which groups of bacteria are involved in the development of colon cancer so we can go on to improve mass screening programmes in healthy individuals and to assess response to chemotherapy and, ultimately, prognosis in those patients suffering from colon cancer.”

#### References

1. Sobhani I, et al. Colon cancer patients’ microbiome induces intestinal precancerous change in germ-free mice. Abstract presented at the UEGW 2011, Stockholm, Sweden. Gut 2011; 60 (Suppl 3) A1.
2. Sobhani I, Tap J, Roudot-Thoraval F, et al. Microbial dysbiosis in colorectal cancer (CRC) patients. PLoS One. 2011 Jan 27; 6(1): e16393.

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