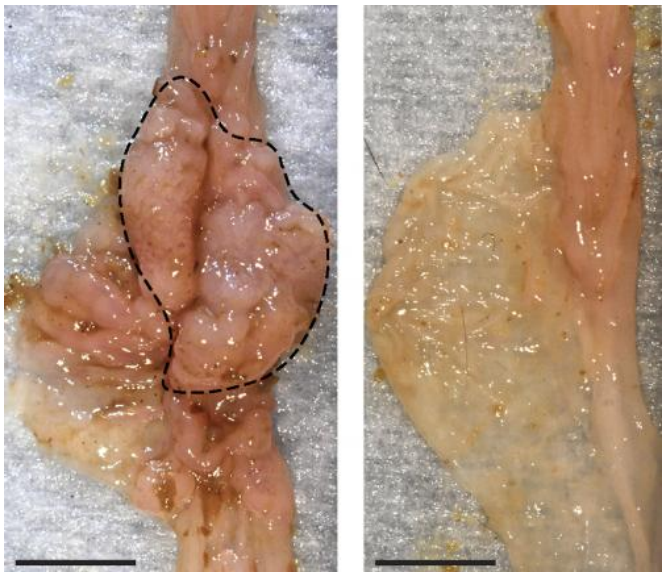
Gut microbes spur development of bowel cancer

3 March 2014



The development of intestinal tumors (polyps) in mice (left) was prevented by modifying the composition of gut microbes (right). Credit: Bongers et al., 2014

It is not only genetics that predispose to bowel cancer; microbes living in the gut help drive the development of intestinal tumors, according to new research in mice published in the March issue of *The Journal of Experimental Medicine*.

Bowel cancer, also called colorectal cancer, results from a series of genetic changes (mutations) that cause healthy cells to become progressively cancerous, first forming early tumors called polyps that can eventually become malignant. Although mutations can occur anywhere in the human intestine, certain types of colorectal cancer tend to develop in particular locations, suggesting that additional, nongenetic factors contribute to tumor growth and dictate where polyps appear.

Dr. Sergio Lira and his team at the Icahn School of Medicine at Mount Sinai, New York, asked if gut microbes have a hand in tumor development. The researchers had noticed previously that mice carrying polyp-causing mutations develop polyps only in a limited section of the intestine, despite the mutations being present in all cells along the intestine. In the new study, they treated the mice with antibiotics to disrupt the populations of microbes living in their gut. This treatment prevented the formation of polyps, showing that bacteria are essential for early tumor development in this model. The authors propose that bacteria cross from the gut into the tissue of the intestinal wall, triggering inflammation that promotes tumor growth.

While further research is needed to confirm the identity of the cancer-promoting bacteria, the findings suggest it may be possible to reduce the risk of colorectal cancer in genetically susceptible individuals by removing certain types of gut bacteria.

The work may also help explain some of the nongenetic factors that have been implicated in colorectal cancer. "In addition to genetic changes, various lifestyle-related factors, such as obesity and diet, have been linked to colorectal cancer. Some of these lifestyle factors appear to affect the types of bacteria present in the gut," explains Dr Lira. "Ultimately, understanding the interplay between genetic mutations, gut microbes, and inflammation may lead to novel diagnostics and therapies for intestinal cancer."

More information: Bongers, G., et al. 2014. *J. Exp. Med.* DOI: 10.1084/jem.20131587

Provided by Rockefeller University