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Certain sugars in the body play key role in colitis, colon cancer development

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An Oklahoma Medical Research Foundation scientist has discovered that certain sugars produced by the body play an important role in the development of colitis and, ultimately, colon cancer. The new finding could potentially lead to therapies for ulcerative colitis, Crohn's disease and colon cancer.

At OMRF, Lijun Xia, M.D., Ph.D., has spent two decades studying O-glycans, a form of sugar that the body produces and that comprises nearly 80 percent of a thick mucous layer inside the colon and the gastrointestinal tract.

For the current research project, Xia and his lab genetically modified mice so that their bodies wouldn't produce these sugars. The scientists found that the mucous layer vanished and the mice developed colitis, an inflammatory condition in the large intestine.

In addition to colitis, these mice also developed a form of colon cancer (known as colitis-associated cancer) as they aged.

"Colorectal cancers pose a significant healthcare problem and are the third most common cancers for both men and women in the U.S.," said Xia. "But in order to solve this problem, we first have to know the cause. In this case, we think we have found a key to this."

According to Xia, this discovery is important for two reasons.

"First, these findings tell us that this mucus made up of O-glycan sugars is essential for preventing the development of colitis and colon cancer," said Xia, who holds the Merrick Foundation Chair in Biomedical Research at OMRF.

"When we deleted the sugar, colitis developed. That makes it essential in prevention."

Second, said Xia, he and his team now have created an effective model to help researchers understand colorectal disease and to develop and test therapies.

"For studying colitis and colon cancer, the experimental models have been artificial until now," he said. "By deleting these type of sugar structures, the mice are now forming spontaneous colitis and colitis-associated colon cancer, which is exactly how the disease would occur in humans."

Xia's lab is now working on the development of therapies to repair the injured mucous layer and repair the sugars to treat colitis and prevent tumor development.

"Once you have a tumor, it can often be too late," said Xia. "Our discovery indicates that if we prevent or control colitis, we'll likely prevent that tumor from ever forming. That's significant."

Xia's disease-relevant findings again illustrate the importance of 'basic' research, said OMRF Vice President of Research Paul Kincade, Ph.D. "Researchers had to first understand how the protective mucous layer is put together before they could learn how that results in disease. Xia and his team are acknowledged experts in this field and uniquely positioned to make these discoveries."

Source:

Oklahoma Medical Research Foundation
