Researchers describe role of STING protein in development of colorectal cancer

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A new study published today by researchers at Sylvester Comprehensive Cancer Center at the University of Miami Miller School of Medicine (Sylvester) reports on a key finding about the immune system's response to tumor development following studies on colorectal cancer. This is the first detailed examination of how the stimulator of interferon genes (STING) signaling pathway, discovered by Glen N. Barber, Ph.D., Leader of the Viral Oncology Program at Sylvester, may play an important role in alerting the immune system to cellular transformation.

In 2008, Barber, who is also Professor and Chairman of Cell Biology at the University of Miami Miller School of Medicine, and colleagues published in Nature the discovery of STING as a new cellular molecule that recognizes virus and bacteria infection to initiate host defense and immune responses. In the new study, published in *Cell Reports*, they describe STING's role in the potential suppression of colorectal cancer.

"Since 2008 we've known that STING is crucial for antiviral and antibacterial responses," said Barber. "But until now, little had been known about its function in human tumors. In this study we show, for the first time, that STING signaling is repressed in colorectal carcinoma and other cancers, an event which may enable transformed cells to evade the immune system."

Colorectal cancer currently affects around 1.2 million people in the United States and 150.000 new cases are diagnosed every year, making it the third most common cancer in both men and women. Since most colon cancers develop from benign polyps, they can be treated successfully when detected early. However, if the tumor has already spread, survival rates are generally low.

Using disease models of colorectal cancer, the team of Sylvester scientists showed that loss of STING signaling negatively affected the body's ability to recognize DNA-damaged cells. In particular, certain cytokines - small proteins important for cell signaling - that facilitate tissue repair and anti-tumor priming of the immune system were not sufficiently produced to initiate a significant immune response to eradicate the colorectal cancer.

"We were able to show that impaired STING responses may enable damaged cells to elude the immune system," added Barber. "And if the body doesn't recognize and attack cancer cells, they will multiply and, ultimately, spread to other parts of the body."

Barber and his colleagues suggest evaluating STING signaling as a prognostic marker for the treatment of colorectal as well as other cancers. For example, Barber's study showed that cancer cells with defective STING signaling were particularly prone to attack by oncolytic viruses presently being used as cancer therapies. Alternate studies with colleagues have also shown that activators of STING signaling are potent stimulators of anti-tumor immune responses. Collectively, the control of STING signaling may have important implications for cancer development as well as cancer treatment.

Provided by University of Miami Miller School of Medicine