Nitric oxide shown to cause colon cancer

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(PhysOrg.com) -- Researchers long ago established a link between inflammation, cancer and the compound nitric oxide, which may be produced when the immune system responds to bacterial infections, including those of the colon. However, the exact nature of the relationship was unknown -- until now.

Scientists from MIT's Division of Comparative Medicine and Department of Biological Engineering have found that nitric oxide produced by inflammatory cells during bacterial infection can cause colon cells to become cancerous. The finding suggests that blocking the compound may help prevent or treat colon cancer, the third most common form of cancer in the United States.

The researchers, led by James Fox, director of the Division of Comparative Medicine (DCM), report their findings in the Jan. 19 online edition of the *Proceedings of the National Academy of Sciences.*

Many years ago it was discovered that gastrointestinal infection by H. pylori is often linked to cancer in humans; a related bacteria called H. hepaticus has similar effects in mice.

Nitric oxide is produced during the inflammatory response to such bacterial infection, but it has been unclear whether it was damaging cells or protecting them. By studying mice, the MIT team found that nitric oxide produced by different types of cells has different effects.

"Nitric oxide delivered by inflammatory cells, in particular, is important

in causing changes in intestinal epithelial cells, setting the stage for cancer development," said Susan Erdman, principal research scientist in the Division of Comparative Medicine and lead author of the PNAS paper.

In mice infected with H. hepaticus, the researchers found that blocking an enzyme needed to produce nitric oxide reduced colon cancer rates. More work is needed to study the exact effects of nitric oxide and develop potential clinical therapies for colon cancer, Erdman said.

"Therapies will need to be targeted to inhibit the damaging effects of nitric oxide while preserving as many of the protective elements of nitric oxide as possible," she said.

"This study is a wonderful example of the value and final product that results from an interdisciplinary team effort," said Fox.

Provided by MIT