UT SOUTHWESTERN MEDICAL CENTER NEWS

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UT Southwestern scientists identify possible therapy target for aggressive cancer

DALLAS – Dec.1, 2009 – UT Southwestern Medical Center researchers have found that a naturally occurring protein -- transforming growth factor beta1 (TGF-ß1) -- which normally suppresses the growth of cancer cells, causes a rebound effect after a prolonged exposure. Cancer cells go into overdrive and become even more aggressive and likely to spread, the researchers report.

The mechanism for this reversal is unknown, but UT Southwestern researchers and their colleagues in Indiana suspect that cancerous cells activate a defense mechanism in response to the lethal protein. This mechanism turns on a cascade of cancer-promoting genes.

But clinicians may be able to exploit this rebound for better treatments, said Dr. David Boothman, co-senior author of the study, available online today and appearing in the January issue of *The Journal of Clinical Investigation*.

"These genetic changes would start prior to metastases, so if we detect them early, we might be able to tailor treatment in anticipation of a more aggressive cancer," said Dr. Boothman, a professor of radiation oncology and pharmacology and associate director of translational research in the Harold C. Simmons Comprehensive Cancer Center at UT Southwestern.

The study was conducted on cells from mice and in samples from women with metastatic breast cancer.

TGF-ß1 controls many cellular functions, including cell growth, cell proliferation and natural cell death. It also can act to suppress tumors and prevent cancers from spreading.

The researchers, including co-senior collaborator Dr. Lindsey Mayo from the Indiana University School of Medicine, examined a cascade of biochemical reactions in cells exposed to TGF-ß1. They suspected that prolonged exposure would turn on a particular cancer-causing gene, which in turn, activates other cancer-supporting reactions.

In tissue from women with metastatic breast cancer, 60 percent of the patients showed both TGF-ß1 action and high levels of the cancer-causing gene.

The team also looked at nutlin3, a protein that blocks the action of the cancer-causing gene. They found that nutlin3 blocks the cancer-boosting effects of long-term TGF-ß1 exposure, preventing metastasis and killing cancer cells. Further research will be needed to determine whether nutlin3 might

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be worth developing further as an anti-cancer drug, Dr. Boothman said.

In other studies, UT Southwestern researchers found similar effects in cells from colon and non-small cell lung cancers.

Other UT Southwestern researchers involved in the study included Dr. Shinako Araki, postdoctoral fellow in the Simmons Comprehensive Cancer Center; Dr. Xian-Jin Xie, associate professor of clinical sciences and in the Simmons Comprehensive Cancer Center.

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