

# Compound stimulates tumor-fighting protein in cancer therapy

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A compound that stimulates the production of a tumor-fighting protein may improve the usefulness of the protein in cancer therapy, according to a team of researchers.

TRAIL is a natural anti-tumor protein that suppresses [tumor development](#) during [immune surveillance](#)—the immune system's process of patrolling the body for [cancer cells](#). This process is lost during [cancer progression](#), which leads to uncontrolled growth and spread of tumors.

The ability of TRAIL to initiate cell death selectively in cancer cells has led to ongoing clinical trials with artificially created TRAIL or antibody proteins that mimic its action. Use of the TRAIL protein as a drug has shown that it is safe, but there have been some issues, including stability of the protein, cost of the drug, and the ability of the drug to distribute throughout the body and get into tumors, especially in the brain.

"The TRAIL pathway is a powerful way to suppress tumors but current approaches have limitations that we have been trying to overcome to unleash an effective and selective [cancer therapy](#)," said Dr. Wafik El-Deiry, professor of medicine and chief of the hematology/oncology division, Penn State College of Medicine. "The TRAIL biochemical cell death pathway naturally lends itself as a [drug target](#) to restore anti-tumor immunity."

Researchers have identified a compound called TRAIL-inducing Compound 10 (TIC10) as a potential solution. TIC10 stimulates the

[tumor suppression](#) capabilities of TRAIL in both normal and tumor tissues, including in the brain, and induces tumor cell death in mice. They report their findings in the journal *Science Translational Medicine*.

TIC10 is a small molecule. This organic compound binds to a protein and alters what the protein does.

Stimulation of TRAIL protein is sustained in both tumor and normal cells, with the normal cells contributing to the TIC10-induced cancer cell death through a [bystander effect](#). It is effective in cancer cell samples and cell lines resistant to conventional therapies.

"I was surprised and impressed that we were able to do this," El-Deiry said. "Using a small molecule to significantly boost and overcome limitations of the TRAIL pathway appears to be a promising way to address difficult to treat cancers using a safe mechanism already used in those with a normal effective immune system. This candidate new drug, a first-in-its-class, shows activity against a broad range of tumor types in mice and appears safe at this stage."

New treatments are needed for advanced cancer, as more than half a million people in the United States will die of cancer in 2013.

"We have enough preclinical information to support the rationale for testing this new drug in the clinic," El-Deiry said.

TIC10 seems to be nontoxic to normal cells or mice even at doses 10 times higher than an observed therapeutic dose. However, more research needs to be completed to satisfy FDA requirements prior to initiation of clinical testing.

Provided by Pennsylvania State University

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