

Protein protects cancer cells from oxidative stress

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High levels of a protein called thioredoxin-like 2 helps protect cancer cells from the oxidative stress that they generate as they grow and invade tissues throughout the body, said a consortium of researchers led by those at Baylor College of Medicine in a report in the *Journal of Clinical Investigation* .

When Dr. Ning-Hui Cheng, an instructor at the USDA/ARS Children's Nutrition Research Center at Baylor College of Medicine and Texas Children's Hospital, and his colleague Dr. Xiaojiang Cui (then at BCM and now at the John Wayne Cancer Institute in Santa Monica, Calif.) looked for the protein in human [breast cancer cells](#), they found it exists there at high levels.

When they removed the protein from the cancer cells, the levels of [oxidative stress](#) (called reactive oxygen species or ROS) increased and an important signaling activity called NF-kB were reduced. As a result, the cells ceased growing and invading.

"They did not thrive. Cancer cells can use this as a weapon to keep oxidative stress at a level that is toxic to normal cells but can be tolerated by cancer cells," he said. This ability to withstand oxidative stress is one reason cancer cells can resist anti-cancer drugs, he said.

"Our data show that this protein is highly expressed in cancer cells lines and in patients," he said.

This makes thioredoxin-like 2 (also called glutaredoxin 3) a promising target of future drug development, said Cheng.

"We could use an inhibitor to reduce the levels of the protective protein. When the reactive oxygen species levels go up, it kills the cancer," he said. He thinks this protein plays an important role in the spread of cancer or metastasis.

The protein is essential for normal growth in developmental stages, he said. Mice bred to lack this protein die before birth.

"Cells that lack this protein cannot survive," he said. "The difference is that cancer cells produce too much and they survive as well.

He and his colleagues have found high levels of protein in other cancers as well. In future studies, they hope to find out whether the protein causes cancer or just maintains it.

More information: www.jci.org/

Provided by Baylor College of Medicine

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