Medical Xpress

# Research team investigates mutated gene's role in breast cancer

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A microscopic gene may play a gigantic role when it comes to cancerous tissue in the human body, according to one Kansas State University research team.

The team is investigating mutation within the ADAM12 gene of the A Disintegrin and Metalloprotease family, or ADAM family, and its role in breast cancer.

"We want to know whether ADAM12 is a good guy or a bad guy in breast cancer," said Anna Zolkiewska, associate professor of biochemistry and research team leader.

If researchers can answer this question about ADAM12, Zolkiewska said it could lead to more effective therapies and treatments due to a better understanding of cancer's components. This, however, hinges on discovering the exact nature of ADAM12, about which little is known. Research has uncovered some interesting information -- and raised more questions, Zolkiewska said.

"Typically human cells have very little ADAM12 protein, but the abundance is suddenly very high in cancer tissue," she said. "When we look even closer, we find a very high level of ADAM12 expression in what we call cancer stem cells. Those cells are the most vicious as they drive the tumor growth."

Although chemotherapy and radiotherapy kill tumors, they are

ineffective on the cancer stem cells, Zolkiewska said. Without being surgically removed from the body, the stem cells will grow another tumor over the course of a few years. This again raises the question as to the role of ADAM12.

"Is it helping that tumor re-grow or is it trying to prevent it?" Zolkiewska asks.

Perhaps the most perplexing question the team hopes to solve is why the ADAM12 gene mutates inside cancer tissue.

"Mutation means that one letter in the DNA within the cell has changed," Zolkiewska said. "This is very striking because there are only a handful of human genes that are changed that way in tumors. ADAM12 is one of those genes and the only one among that family."

Zolkiewska said this raises the questions of whether the gene's mutation in cancer tissue is purely a coincidence or is part of a larger role. Prior research by the team indicates ADAM12 is a "good guy" since mutation to the gene effectively kills ADAM12 protein.

"A tumor wants to grow, and from the point of view of the tumor, you want to invade and kill the patient. So you will first take care of those good guys, or those policemen inside the body who protect the patient," Zolkiewska said. "If ADAM12 is one of those good guys, the growing tumor wants to take it out of the picture."

This discovery of mutation rendering ADAM12 dead was a scientific first by the K-State team.

Provided by Kansas State University