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New cancer treatment targets both tumor cells and blood vessels

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MU researchers develop nontoxic treatment that has broad anti-cancer potential

It takes more than one punch to fight tumors. Often, tumors have more than one way of surviving, and attacking the tumor alone is not enough. Now, in a new study, University of Missouri researchers have developed a new non-toxic treatment that effectively reduces breast cancer cells, by combining a small molecular drug that targets tumor cells with an antibody that causes selective shutdown of tumor blood vessels.

In 50 percent of breast cancer cases, a mutated protein, known as p53, is present. Previous research has indicated that when p53 is functionally abnormal, tumor cells are prolific and develop quickly. PRIMA-1, a small molecular drug, targets and returns normal function to the mutated p53, but PRIMA-1 alone is not enough to stop tumor growth. Proliferating blood vessels supply oxygen and other nutrients that the tumor needs to grow. However, a specific antibody, 2aG4, has the ability to destroy these blood vessels and prevent future growth. According to the MU research team, no one has previously tried to attack tumor cells by targeting mutated p53 and the tumor-associated blood vessels with this combination of PRIMA-1 and 2aG4.

"Tumors are entities that want to live," said Salman Hyder, professor of biomedical sciences in the College of Veterinary Medicine and the Dalton Cardiovascular Research Center. "They adapt under conditions that would cause anything else to die. In order to effectively treat tumors, treatments must attack the breast tumor cells and the blood

vessels that supply nutrients to the tumor. Treatment strategies in our study that targeted both areas resulted in improved and more potent responses."

In the pre-clinical trials, mice bearing tumors of human origin were given the drug combination to combat tumor growth. After four weeks of treatment, the mice that were given the combination showed a dramatic decrease in the development of tumors and had better results than the mice that were given only one of the compounds. In addition, the treatment combination proved to be non-toxic as the mice maintained their body weight and displayed few side effects.

"Mutated p53 in tumor cells plays a key role in promoting tumor cell survival and tumor cell resistance to chemotherapeutic drugs. The mutated protein is found in 50 percent of breast cancer cases," Hyder said. "The results of this study are very promising and show the possibility of broad anti-cancer potential."

Source: University of Missouri-Columbia