Biomarker predicts chemo response for osteosarcoma

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(Medical Xpress) -- Scientists have found that a protein expressed by some cancers is a good predictor of how the cancer will respond to standard chemotherapy for osteosarcoma, the most common bone cancer in children. Knowing whether a patient's tumor has this protein biomarker could help doctors determine if a patient should undergo standard treatment or if a more aggressive or alternative therapy may be more effective.
The study findings were published in *Human Pathology*.

"This is the first time that a biomarker has been identified that predicts treatment success for osteosarcoma," said Dariusz Borys, assistant professor in the UC Davis Department of Pathology and Laboratory Medicine and lead author of the study. "It is a first step in individualizing therapy to maximize success based on a protein that the cancer expresses."

Osteosarcoma is usually diagnosed during the teenage years. It also may affect people over 60.

Osteosarcoma is typically treated with "neoadjuvant therapy," which involves several cycles of chemotherapy using a combination of drugs to shrink the tumor before it is surgically removed. How effective the chemotherapy is in inducing cancer cell death (necrosis) is the best predictor of a patient's survival following surgery. But a tumor's response to chemotherapy varies widely among patients and, until now, a way to predict whether the chemotherapy will work well has not been

identified.

The investigators focused on a protein expressed by cancer cells known as P16, which inhibits cell growth. For unknown reasons, some cancers stop expressing P16. The researchers found that patients who had cancers that still expressed P16 were more likely to respond well to chemotherapy.

"It is useful to know ahead of time if patients are likely to respond to standard therapy," said Borys. "Those who have tumors that do not express P16 would be especially good candidates for more aggressive or experimental treatments to see if they might respond better."

The study enrolled 40 patients, aged 9 to 75 years old (median age, 15 years), with osteosarcoma at UC Davis and UC San Francisco. Pathologic specimens of the tumors before treatment were collected for study from each patient and were analyzed for P16 expression. After chemotherapy, during surgery to remove the tumor, specimens were again collected and analyzed for the extent of tumor cell death. A little more than half of the patients responded well to chemotherapy, and these patients were found to be significantly more likely to have had tumors that expressed the P16 protein.

Data on how the patients fared clinically were not available for this study, but it has been well established from other studies that the amount of tumor killed preoperatively is strongly associated with survival.

Borys said more patients will be studied to strengthen the findings, and on a molecular level, more study is needed to clarify why some cancer cells stop expressing P16.

The study was a collaboration among three institutions on the West Coast (UC Davis, UC San Francisco and University of Washington) and

involved pathologists and surgeons. According to Borys, pathologists traditionally have been used to help establish a diagnosis, but are now moving toward an equally important role in helping clinicians determine treatment strategies.

"Pathologists will one day be able to provide answers to better help clinicians cure their patients," said Borys. "Our work to improve the treatment of osteosarcoma is an important step in that direction."

  More information: The article is titled, "P16 expression predicts necrotic response among patients with osteosarcoma receiving neoadjuvant chemotherapy." www.ncbi.nlm.nih.gov/pubmed/22578565

Provided by UC Davis

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