Researchers uncover new potential biomarker and therapeutic target for aggressive breast cancer

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(PhysOrg.com) -- In an analysis of more than 1,300 human breast tissue samples, a team of Stony Brook University School of Medicine researchers discovered a possible role of the squamous cell carcinoma antigen (SCCA) in the progression of breast cancer.

Wei-Xing Zong, Ph.D., Associate Professor, Department of Molecular Genetics & Microbiology, and colleagues found that SCCA expression correlated to both grade and stage of cancer. The finding, reported in the current issue of PLoS One, may be a crucial step to developing SCCA as a biomarker and therapeutic target for aggressive and advanced stage breast cancers.

SCCA is an inhibitor of cellular proteases that digests other proteins. Elevated expression of SCCA has been used in medicine as a biomarker for aggressive squamous cell carcinoma in cancers of the cervix, lung, and head and neck. More recently its expression has also been detected in cancers that are not originated from squamous cells such as liver cancer. The report in PLoS One, titled “Elevated expression of squamous cell carcinoma antigen is associated with human breast carcinoma,” investigates a new association with elevated expressions of SCCA and cancer.

“While there has been significant progress in treating breast cancer, aggressive disease remains difficult to treat and cure,” says Dr. Zong.

“Our findings open the door for SCCA to be explored as a useful marker for predicting outcomes of those suffering from aggressive breast cancers and for SCCA to become a potential therapeutic target to treat cancers unresponsive to current therapies.”

Using molecular and pathology analyses, Dr. Zong and colleagues found SCCA expression in breast cancer tissue samples increased when patients had high grade and advanced cancer. They also found that SCCA predicted poor outcomes, as SCCA-positive patients showed shorter overall survival time and shorter time to disease recurrence.

The study included analyses of SCCA expression on 1,360 breast tumor tissue samples and 124 samples of normal breast tissue as controls. Tumors were classified as grades 1, 2, and 3 to define aggressive disease. SCCA expression was observed in only 0.3 percent of grade 1 tumors, but increased to 2.5 percent and 9.4 percent in grades 2 and 3 tumors, respectively.

Regarding SCCA expression in various stages of breast cancer in non-metastatic disease, the progression was similar. SCCA positivity was documented in 2.4 percent of Stage I cancers, 3.1 percent of Stage II cancers, and 8.6 percent of Stage III cancers.

The main findings of the study necessitates further exploration of the role of SCCA in breast cancer development, emphasizes Dr. Zong. He and colleagues are currently studying the biological functions of SCCA in cancer initiation and development. They are also finding that SCCA-expressing cells are specifically sensitive to drugs that induce misfolded proteins. Both research paths may pave the way to developing SCCA as a therapeutic target in aggressive breast cancer.

Collaborating on various SCCA studies are researchers within Dr. Zong’s laboratory, as well as researchers in the Departments of Pathology and

Preventive Medicine at Stony Brook University School of Medicine.

More information: www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0019096