News Highlights

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Angiogenin sheds light on bladder cancer biology and provides diagnostic value

by Chantal Jackson

HONOLULU, HI - University of Hawai‘i Cancer Center's (UHCC) director of the Clinical and Translational Research program, Dr. Charles Rosser, has received the Center's October 2014 award for "Publication of the Month." The paper is: Miyake M, Goodison S, Lawton A, Gomes-Giacola, Rosser CJ, Angiogenin promotes tumoral growth and angiogenesis by regulating matrix metallopeptidase-2 expression via the ERK1/2 pathway, Oncogene, 2014, February 24, doi: 10.1038/onc.2014.2.

In this paper, Dr. Rosser and his team provide evidence for angiogenin (ANG) as a therapeutic target in bladder cancer. Specifically, these researchers have shown the importance in the ERK1/2 pathway in ANG's ability to promote both tumor growth and angiogenesis, essential in the spread of cancer.

One major area of focus at UHCC is to develop a clinically useful non-invasive method of diagnosing bladder cancer. Through this work, researchers have uncovered 10 biomarkers (combination of genes and proteins) that are abnormal in bladder cancer. ANG is one of these biomarkers. However, prior to the work leading to the paper cited above, the role of ANG in bladder cancer was not clear.

In this study, researchers checked and manipulated ANG levels in cells, both in the petri dish as well as in animals. From this, they determined that higher ANG levels promotes increased cancer cell growth. In particular, when ANG increases, it promotes an increase in matrix metallopeptidase-2 (MMP2). MMP2 breaks down the extracellular matrix which enables cell mobility, thus allowing cancer to spread. MMP2 also increases angiogenesis, essential for both tumor growth and metastasis.

The authors determined that the ERK1/2 pathway plays an integral role in tumor-growth progression and the spread of cancer. Dr. Charles Rosser explains, "This is a project that began in the clinic with the goal of finding a non-invasive way to test for bladder cancer. That is, whether voided urine could be tested to determine the likelihood that a person has bladder cancer. From this test, only persons with a higher likelihood of having bladder cancer would need to undergo invasive testing, such as cystoscopy and biopsy. We demonstrated that ANG is one of a panel of biomarkers capable of diagnosing bladder cancer. Next, we set out to leverage this new knowledge to better understand ANG's role in tumor growth and its possibility to serve as a new therapeutic target."

Through this work on the biology of ANG, these researchers have demonstrated that its presence in cells leads to a growth advantage, capable of further enhancing the
tumor's environment to sustain and promote the growth of human cancers. The ultimate goal in this type of research is to identify ANG as a suitable therapeutic target, leading to new weapons in our fight against cancers.