IBT researchers shed light on hormone’s role in prostate cancer

Prostate cancer is both the second most common and fatal cancer in men. Conventional wisdom indicates an androgen called testosterone supports tumor cell growth, and for more than 70 years, doctors have treated swollen prostate glands by removing testosterone to provide temporary relief.

But what about the rare life-threatening malignant tumor cells resistant to testosterone deprivation? Researchers at the Texas A&M Health Science Center (TAMHSC) Institute of Biosciences and Technology are a step closer to the answer.

Led by Wallace McKeehan, Ph.D., J.S. Dunn Professor and director of the Center for Cancer and Stem Cell Biology at the TAMHSC-Institute of Biosciences and Technology, researchers found that a rare epithelial cell type in early stage testosterone-responsive tumors does not contain an androgen receptor. While growth of the cell type does not depend on testosterone and other androgens, it can be inhibited by testosterone when the receptor is expressed.

Their study is online in the journal *The Prostate* and will be in an upcoming print copy.

In the study, researchers learned the rare epithelial cell type may represent a normal cell type in typical prostate development that happened to turn cancerous, yet lacks the androgen receptor. Normally, the combination of the androgen receptor and testosterone directs such cells to become differentiated prostate cells while ultimately limiting their duplication and promoting their ordered differentiation into functional prostate cells. These cancer cells may be the major switching point from androgen-responsive to androgen-refractory prostate cancers.

In addition, the team showed that a fibroblast growth factor receptor (FGFR1) can subvert the growth limiting effects of testosterone in this special cell type, thus contributing to testosterone-independent malignant cancers even though they express the androgen receptor.

“FGFR1 is commonly expressed in normal progenitor or stem cells to promote their growth but becomes silent in normal differentiated prostate epithelial cells that express the androgen receptor,” said Dr. McKeehan, executive associate director of the TAMHSC-Institute of Biosciences and Technology. “The override of the growth controlling effects of androgen by FGFR1 may be involved in the androgen-independent life-threatening stage of malignant prostate cancer.”

As a result, FGFR1 may be a good direct drug target for stopping growth of androgen-refractory malignant cancers, Dr. McKeehan said.

Other contributors to The Prostate study from the Center for Cancer and Stem Cell Biology were Chengliu Jin, Ph.D., Yongde Luo, Ph.D., Fen Wang, Ph.D., and graduate student Yanqing Huang. Masashi Kobayashi and Tetsuji Okamoto of Hiroshima University in Japan also contributed.

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