Like prostate cancer, bladder cancer patients may benefit from anti-androgen therapy

September 24 2012

Bladder cancer patients whose tumors express high levels of the protein CD24 have worse prognoses than patients with lower CD24. A University of Colorado Cancer Center study published today in the *Proceedings of the National Academy of Sciences* shows that CD24 expression may depend on androgens – and that anti-androgen therapies like those currently used to treat prostate cancer may benefit bladder cancer patients.

"This is a major finding – bladder cancer development and spread to other organs depends significantly on CD24, which in turn depends on androgens like testosterone. By taking away these androgens, we may be able to greatly diminish the proliferative and metastatic power of bladder cancer cells," says the study's senior author, Dan Theodorescu, MD, PhD, director of the University of Colorado Cancer Center.

Theodorescu and colleagues started with mouse models, showing that mice without the ability to make the protein CD24 had fewer primary bladder tumors and metastases (bladder tumor spread to other organs) compared to mice with CD24 intact. This effect was most marked in male mice. The group moved to human tumor samples, showing that when patients were stratified according to the levels of CD24 expressed in their tumors, especially the male patients had poorer outcomes, including higher rates of relapse and shorter disease-free survival.

"To us, these sex-specific findings implied androgen involvement," Theodorescu says. Sure enough, when the group knocked down

androgen receptors in human bladder cancer cell lines, they saw a corresponding drop in CD24 levels and also decreased cell proliferation. When they artificially added CD24, cell proliferation resumed regardless of androgen levels. In essence, androgen is effectively a hormonal switch that allowed the harmful effect of CD24 to flow.

Together, these finding imply not only a correlative but a causative effect of CD24 – that not only do high levels of CD24 mark more aggressive bladder tumors, but that CD24 in fact drives the aggressiveness of these tumors. While the protein CD24 is difficult to affect directly with current therapies, anti-androgen therapies that would diminish the tumor's ability to express CD24 are already in wide use for prostate cancer.

"We hope the results of these studies show the rationale for clinical studies of anti-androgen therapies with bladder cancer, especially in those tumors that happen to test markedly high in CD24 expression," Theodorescu says. "The next step is moving this promising therapy to clinical trials with human patients."

Provided by University of Colorado Denver