

Study reveals potential route to bladder cancer diagnostics, treatments

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Researchers at the UNC School of Medicine conducted a comprehensive genetic analysis of invasive bladder cancer tumors to discover that the disease shares genetic similarities with two forms of breast cancer. The finding is significant because a greater understanding of the genetic basis of cancers, such as breast cancers, has in the recent past led to the development of new therapies and diagnostic aids.

Bladder cancer, which is the fourth most common malignancy in men and ninth in women in the United States, claimed more than 15,000 lives last year.

The analysis of 262 [bladder cancer](#) tumors, published online in the *Proceedings of the National Academy of Sciences*, revealed that the invasive form of the disease can be classified into two distinct genetic subtypes – basal-like and luminal – which were shown to be highly similar to the basal and luminal subtypes of [breast cancer](#) first described by Charles Perou, PhD, the May Goldman Shaw Distinguished Professor of Molecular Oncology at UNC Lineberger.

"It will be particularly interesting to see whether the bladder subtypes, like the breast subtypes, are useful in stratification for therapy," said lead author William Kim, MD, a researcher at the UNC Lineberger Comprehensive Cancer Center and associate professor in the departments of genetics and medicine at UNC.

Mapping genetic signaling pathways of breast cancer subtypes has led to

the development of drugs to treat patients and diagnostic aids that help physicians determine the best course of therapy for patients. Because the identified bladder cancer subtypes share many of the same genetic signaling pathways of breast cancer, researchers hope that the identification of the genetic subtypes can lead to similar advances.

"Currently there are no approved targeted therapies for bladder cancer," said lead author Jeffrey Damrauer, graduate student in the Curriculum of Genetics and Molecular Biology at the UNC School of Medicine. "Our hope is that the identification of these subtypes will aid in the discovery of targetable pathways that will advance bladder cancer treatment."

The study also revealed a possible answer to why women diagnosed with bladder cancer have overall poorer outcomes compared to males. Analysis showed that female patients had a significantly higher incidence of the deadlier basal-like tumors. But researchers said that more research is needed before a definite link between the subtype and survival rate can be confirmed.

Dr. Kim's lab has developed a gene map – BASE47 – that proved successful as a prognostic aid when applied to the tumor samples in the study. The PAM50 genetic test, a similar genetic map developed in the Perou lab, was recently approved as a clinical diagnostic tool by the FDA.

Additional LCCC members contributing to this work are Katherine Hoadley, PhD; David Chism, MD; Cheng Fan; Christopher Tiganelli, MD; Sara Wobker, MD; Jen Jen Yeh, MD; Matthew Milowsky, MD; and Joel Parker, PhD.

More information: Paper: www.pnas.org/content/early/2011/05/11/10738.full.pdf+html

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