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At-home bladder cancer detection kit: Urine gelatinase activity as a biomarker for bladder cancer

Shaoli Sun and Emily Li

Medical University of South Carolina, USA

Cancer and its stroma produce a family of gelatinase that are being developed as biomarkers to diagnose cancer. The most popular method to identify gelatinase is zymography, which can quantitate gelatinase activity and provide information on their molecular weight. However, this method can only be done in a well-equipped laboratory and is often limited by its detection of only the most abundant gelatinase species. We designed a convenient at-home test, which can potentially detect all the gelatinase activity in patients' urine. A thin film strip coated with gelatin and silver is used as an indicator. After placing this strip in the urine and incubating for a few days at 37°C, the film becomes transparent if enzymatically active gelatinase is present in the urine. We have applied this method to test the urine of 39 patients including 17 patients with bladder cancer, 11 with prostate cancer, 9 with squamous cancer of the head and neck, and 2 with renal cell carcinoma. In 82 % of the bladder cancer patients, the gelatin-coated film cleared within 2-7 days, while only 18% of patients with non-bladder cancer had detectable gelatinase activity ($p<0.0001$). No gelatinase activity was observed from urine of normal subjects.

This at-home test is simple and the result is easy to read. No specialized laboratory equipment is needed. Patients can repeat the test as many times as necessary to ensure the reliability of the assay. More studies are warranted to validate this method for bladder cancer screening for a high risk population and for detecting recurrence of bladder cancer after the standard therapy.

sunsh@musc.edu