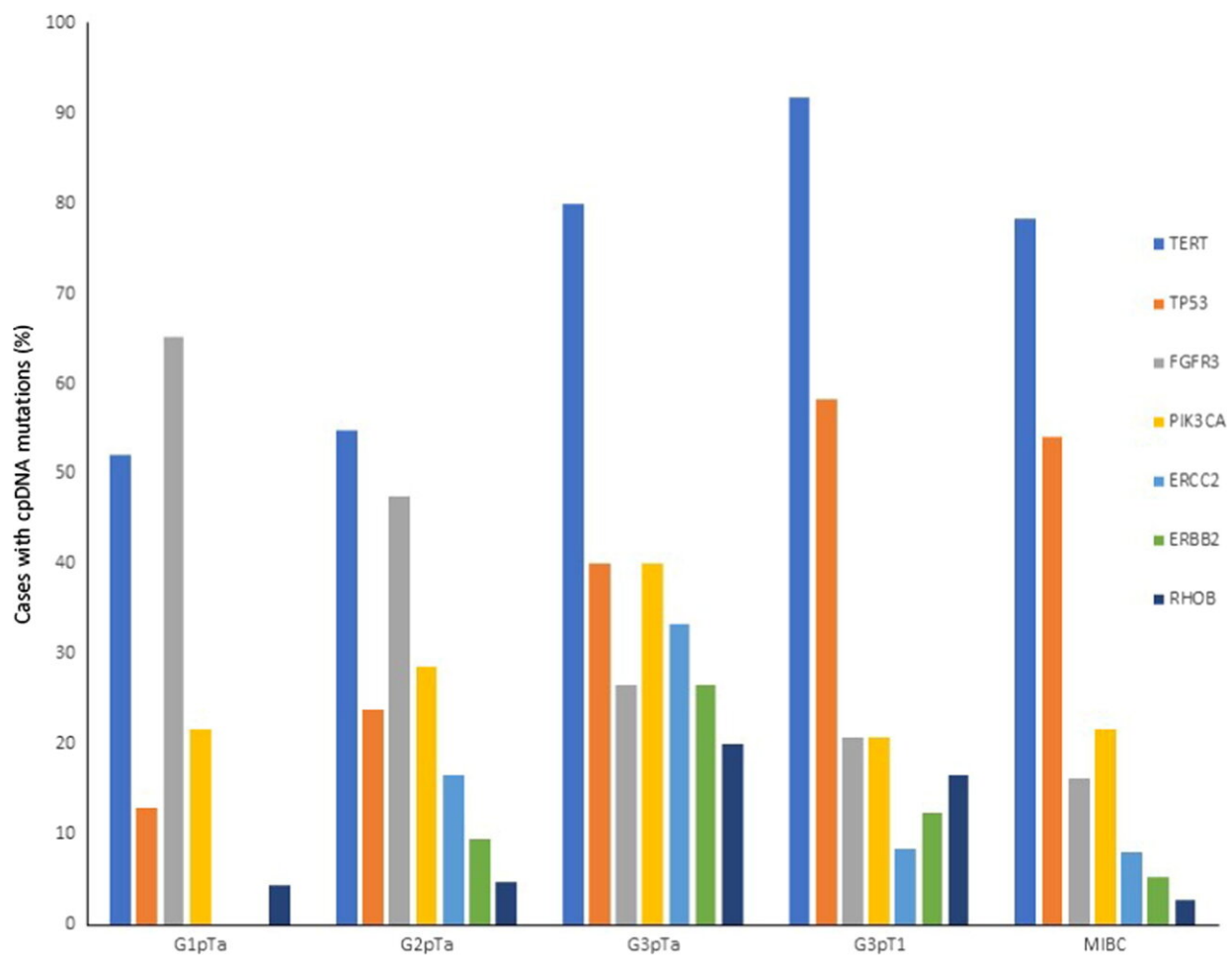


# New urine test for bladder cancer could reduce need for invasive and time-consuming diagnostic procedures

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Mutation frequencies across incident bladder cancer stages and grades. Data are shown for the six genes most frequently mutated (overall) in grade 1 pTa (n = 23), grade 2 pTa (n = 42), grade 3 pTa (n = 15), grade 3 pT1 (n = 24), and grade 2 pTa (n = 37). cpDNA = urinary cell-pellet DNA; MIBC = muscle-invasive

bladder cancer. Credit: *European Urology Oncology* (2022). DOI: 10.1016/j.euo.2022.03.005

Birmingham researchers funded by Cancer Research UK and liquid biopsy company Nonacus have developed a new urine test for bladder cancer, which could reduce the need for invasive and time-consuming procedures to diagnose the disease.

The test will use highly sensitive liquid biopsy technology developed by Nonacus in conjunction with a panel of biomarkers developed and validated by Mr. Rik Bryan and Dr. Douglas Ward from the University of Birmingham's Bladder Cancer Research Center, to detect the presence of bladder cancer by finding DNA from [tumor cells](#) present in the urine.

The biomarker panel, which consists of 443 genetic mutations that are common in bladder cancer has been validated in a deep sequencing study recently published in *European Urology Oncology*.

In this study, which was funded by Cancer Research UK and the Medical Research Council, the researchers used the test to analyze urine from 165 people with bladder cancer that had experienced [hematuria](#) (blood in the urine), and successfully detected the disease in 144 of them (87%).

The researchers also looked at using the test in 293 patients who had already been treated for bladder cancer and were being monitored for the cancer returning. In this setting, the test returned a higher proportion of false positive results compared to when used in the hematuria clinic (37.5% vs 15.2%), with 99 positive urine tests without a tumor being seen by cystoscopy on the same day. However, during their follow up

monitoring, the patients who had those positive results had almost 3-times higher (11% vs 4%) rates of the cancer returning within 24 months indicating that the test could help detect recurrent disease before it is visible by cystoscopy (the camera inspection of the bladder). Further research is needed for the test to be used for surveillance.

Lead researcher Mr. Richard Bryan said: "Even though cystoscopy is good at detecting bladder cancer, it's invasive and time consuming for patients, so we need a better way to diagnose patients. In the future our test could be an easier way to get people with bladder cancer diagnosed faster, and could mean that tens of thousands of cystoscopies on healthy patients can be avoided each year."

Iain Foulkes, Executive Director of Research and Innovation at Cancer Research UK said "These findings show that this urine test could help diagnose bladder cancer more easily. Early detection of cancer is key for improving patient outcomes and research like this could help identify the patients that need treatment soonest, while easing the pressures of diagnostic procedures on the NHS. We look forward to seeing how the test performs in the next clinical trial."

The researchers are working in partnership with Nonacus, a provider of genetic testing products for precision medicine and [liquid biopsy](#), to turn their approach into a clinical test for patients to be used within the NHS, and will start a clinical study involving more than 3,000 patients to evaluate just how powerful the test is at reducing the number of cystoscopies.

Each year, over 300,000 cystoscopies are carried out in England, however, around 80% of patients with hematuria who've had cystoscopy are found to have no cancers or abnormalities. The researchers believe that using the urine test in hematuria clinic could reduce the number of patients requiring a [cystoscopy](#) by at least 45%.

**More information:** Douglas G. Ward et al, Highly Sensitive and Specific Detection of Bladder Cancer via Targeted Ultra-deep Sequencing of Urinary DNA, *European Urology Oncology* (2022). [DOI: 10.1016/j.euo.2022.03.005](https://doi.org/10.1016/j.euo.2022.03.005)

Provided by University of Birmingham

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