

Research raises possibility of effective, quick and reliable new test for bladder cancer

October 3 2012

(Medical Xpress)—Research carried out at the University of Dundee has raised hopes of developing a quicker and more reliable new method of detecting urinary bladder cancer at an earlier stage.

A team from the University's School of Medicine, led by Dr Ghulam Nabi, has found that a process known as Raman spectroscopy (RS) has shown substantive promise in diagnosing [bladder cancer](#).

At present, the most reliable way to test for this type of cancer is to carry out a [biopsy](#) on tissue removed from the patient's bladder. Possible side-effects include bleeding, discomfort and infection, while patient's currently face a two-week wait for the result of the biopsy.

RS is a spectroscopic technique used to study systems such as [human tissue](#). A laser in RS equipment can detect changes in the structure of the tissue by measuring interactions, something with significant potential for diagnosing cancer at an early stage.

They found a correlation of more than 90 per cent in the results, suggesting that RS has potential to be used to make less-invasive and quicker diagnoses. As conclusions can be drawn instantly following the procedure, it may be possible to reduce the [anxiety](#) for patients awaiting the result of their test.

Dr Nabi said that, while the research was still at an early stage, the early results showed great promise for developing a [new test](#) for bladder

cancer in future.

"Obviously, the earlier we diagnose cancer, the better the [prognosis](#) is for the patient," he said. "There are some specific difficulties in making a reliable early diagnosis of bladder cancer, and very often it is not diagnosed until the cancer has manifested itself as a variety of symptoms.

"What we have been looking to do is develop an early and reliable diagnosis of urinary bladder cancer. Raman [spectroscopy](#) tells us about the technical structure of tissue before morphological changes in structure happen as a result of the cancer developing.

"The time that passes between a patient having a biopsy and receiving their results is an extremely anxious one for patients and their families. We believe that RS can remove this anxiety by providing a quick diagnosis and our results so far show that it does indeed show potential as a reliable tool for diagnosis.

"What we need to do now is expand our study population and refine the process until it is as reliable as biopsy but without the negative side-effects."

RS is named after the Indian Nobel Laureate Sir C.V Raman, whose 1928 work on the changes in the wavelength of light paved the way for the development of the technique. It has been used in various applications in chemistry for decades, and it has long been believed to hold potential for non-intrusive diagnosis of cancer.

A previous effort into the use of RS to diagnose bladder cancer was made some years ago but the probe inserted into the bladders of patients was unable to distinguish between cancer and inflammation. Dr Nabi's team built a more powerful probe with increased specifications which

appears to be more effective.

The study, which appears in the edition of *Analytical & Biological Chemistry* published today, examined 14 patients who presented with symptoms of bladder cancer. The diagnosis made using RS was consistent with the biopsy results in 13 cases. Analysis of the results took place at MIT and the Norwegian University of Science.

Having proved the concept, Dr Nabi says the team will concentrate on creating a new probe for use in a far more extensive study.

"The next stage is to make a telescopic probe which we can insert into the bladder and that will tell us whether or not the patient is suffering from cancer as soon as it touches the tissue.

"We will need to look at a much bigger study population to see whether these very promising results translate but we are encouraged by what we have seen so far. If we can devise a probe reliable enough to remove the need for a biopsy this would allow us to diagnose cancer at a much earlier stage. It would also reduce the cost of carrying out a biopsy and then treating cancer at an advanced stage.

"Most importantly, it can improve the outcome for patients, reduce the complications that can arise from a biopsy and dispense with the lengthy wait for their results."

The research was supported by NHS Tayside's Endowment Funds.

In another study involving Dr Nabi recently, he and colleagues from Cambridge University explored whether it was possible to improve another of the tests for bladder cancer.

Patients with the disease pass cancer cells in their urine, and it is likely

that anyone presenting with the symptoms will have a sample examined under a microscope before possibly being referred for a biopsy.

The problem is that the results are not definitive, and a significant variation exists between the interpretations of individual pathologists. The Cambridge/Dundee team proved that [diagnosis](#) can be made much more reliable by staining cells with an antibody-stained to mini microchromosomal protein prior to the test.

The antibody then sticks to the cancer cells, making them more visible as markers when looked at under the microscope.

Provided by University of Dundee

Citation: Research raises possibility of effective, quick and reliable new test for bladder cancer (2012, October 3) retrieved 24 April 2024 from <https://medicalxpress.com/news/2012-10-possibility-effective-quick-reliable-bladder.html>

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