Shedding new light on cancer

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(PhysOrg.com) -- Researchers at the University of St Andrews have developed a powerful technique that could allow earlier cancer detection.

In a joint venture between the Schools of Physics & Astronomy and the Bute Medical School, the St Andrews researchers have advanced new technology that relies on a technique called 'Raman spectroscopy'.

The technique involves the use of monochromatic light which, when directed at a cell, interacts with every biological molecule within it. By analysing the light's frequency and polarisation, researchers are able to identify the cells components and detect disease.

Professor Kishan Dholakia from the School of Physics & Astronomy and Professors C. Simon Herrington and Andrew Riches from the Bute Medical School led the work.

The research, produced by Anna Chiara De Luca, Michael Mazilu, Andrew Riches, Simon Herrington and Kishan Dholakia, is published in the latest edition of the international journal Analytical Chemistry.

Professor Dholakia explained:

"Light may reveal so much information. The Raman signal given off by every type of molecule, by the interaction between different molecules, and by different thicknesses of molecules is unique, and as such, may be used to analyse a molecular species both qualitatively and quantitatively.

"While initial Raman spectroscopy was unable to analyse most biological samples due to the interference from the background fluorescence of water, buffers, or media present in the sample, new types of Raman spectroscopy have been developed that solve this problem."

Team member Michael Mazilu said:

"By quickly changing the laser wavelength, we can extract the Raman information from the strong 'interfering' fluorescence background. In such a way, the problem of tissue fluorescence, which overwhelms the Raman signal of most biological samples, can be easily overcome."

Professor Herrington commented:

"This novel technology eliminates many of the problems that prevent Raman spectroscopy being used in a clinical setting, such as the fluorescence generated by the environment in which cells are embedded. This approach holds great promise for the more accurate identification of cancer cells."

This new tool will hopefully pave the way to early detection of cancer and provide a further diagnostic method for pathologists.

Provided by University of St Andrews