# Cervassist

Cervical Cancer Analyser

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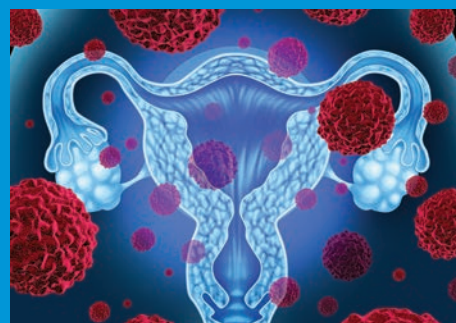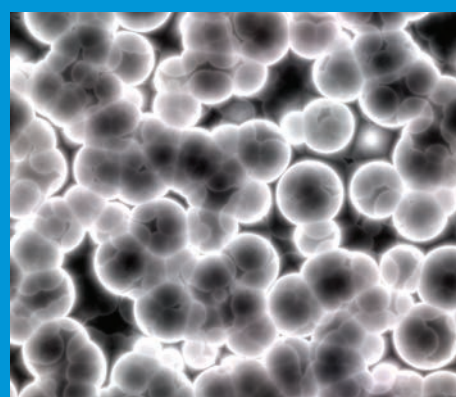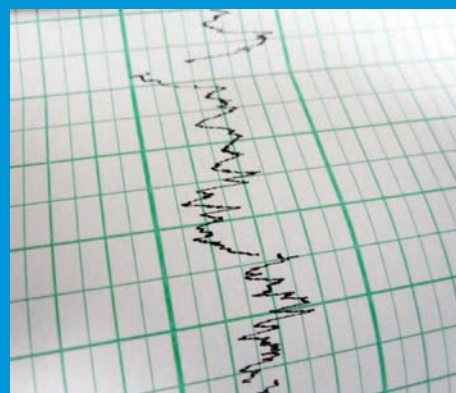
An automated cervical cancer analyser

Cervassist is an automated diagnostic system for screening cervical cancer that has high specificity and high sensitivity.

Currently cervical cancer is detected by cytologists. Either by examining a smear sample under a microscope to visually assess the shape, size and stain pattern and determine if abnormal cells are present, or by using automated image analysis to determine nuclear density and then manually examining the sample to determine the presence of abnormal cells. Both processes are time consuming and costly. They are also prone to human error. Misdiagnosis can be up to 60%.

Cervassist is an easy to use, low cost, automated analyser that uses a pre-defined library of known cell signatures and a proprietary classification algorithm to detect abnormal cells with an accuracy of 99%. The analyser is currently lab-based but may be developed a point-of-care system. The image and the classification can be saved in digital format, stored in a national database, and sent to the medical team or experts worldwide.

This low cost technique uses algorithms to analyse Raman spectra of sample cells and classifies the samples by comparison with a pre-defined sample database. It can be used with conventional microscopes or more advanced image analysers.

The system has significant potential for clinical applications given its automation and less reliance on human subjectivity.

Applications

Cervassist's principal application is as a cervical cancer diagnostic aid. Cervassist will not replace the clinician in the diagnostic process, but it will provide an easily accessible device which informs the patient diagnosis.

Cervassist has applications as a lab-based service, lab-based tool or as a point-of-care system.

Cervassist can also be used for other cell analysis applications e.g. other cancer types, forensics, drug discovery and food contamination.

Opportunity

Cervical cancer is the fourth most common cancer in women.

528,000 new cases were diagnosed worldwide in 2012. 84% of cases occur outside of developed economies.

Treatment, typically radiotherapy or chemotherapy, is costly and debilitating.

Cervical cancer testing typically requires a doctor or nurse to scrape a sample of cells from the cervix, which then undergoes a Pap test or HPV test. Tests are often free for most women aged 25-60 in most developed economies. Cervassist offers a more efficient, less costly test.

Advantages

Cervassist offers a number of unique features:

- **High Sensitivity** – greater than 99% accuracy in the classification of abnormal cells, improving cancer detection and reducing false negatives.

- **High Specificity** – greater than 99% accuracy in the classification of normal cells reducing false positives.

- **Low Cost** – the technique uses a low cost, low resolution Raman spectroscope and operating costs are low as no reagents are needed.

- **Easy to Use** – no specialist training or experience in spectroscopy is required to operate the system and the system works with a common microscope.

- **Low Human Error** – as definite negatives can be eliminated automatically, more time can be given to the analysis of possible positives.

- **Fast** – with low resolution scanning and less subjective interpretation of the results, the screening rate may be automated to run faster than the 5-8 minutes per conventional smear tests.

- **Digital Curation** – digital classification data can be stored in databases and remotely sent to experts for consultation.

> "An easy to use, low cost, automated analyser that uses a pre-defined library of known cell signatures and a proprietary classification algorithm to detect abnormal cells with an accuracy of 99%"

Stage of Development

Cervassist was developed by researchers at DIT's Radiation and Environmental Science Centre (RESC) supported by funding from SFI.

The technology is capable of demonstration in a lab-bench environment but requires further commercial development to automate and productise.

The technology is patent-pending in the US and EP under WO2010070133. Software algorithms related to the analyser are protected as confidential know-how.

The system has been successfully benchmarked against standard tests from two Irish hospitals (National Maternity Hospital, Holles Street; Coombe Women and Infants University Hospital).

Research on additional applications is on-going. DIT is currently seeking expressions of interest from potential business partners interested in developing the technology.

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