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Cell-based imaging for tissue samples

In what is thought to be a world-first, GE Healthcare's IN Cell analyser is being used to study breast cancer tissue to allow researchers to get a closer look in real time at how the disease operates.

The pilot study is a collaboration between GE Healthcare and Molecular Discovery Systems (MDS), a subsidiary of Perth biotech company BioPharmica. The collaboration is based at the Western Australian Institute of Medical Research (WAIMR), which also houses the WA Research Tissue Network.

In addition to studying breast cancer tissue, the project will investigate the action of Hls5, a gene first isolated by Professor Peter Klinken and his team at the WAIMR. Hls5 is a novel member of the ring finger, B box, coiled-coil (RBCC) family of molecules and maps to chromosome 8p21, a region frequently deleted in a number of tumours. When introduced into cancerous or leukemic cells, Hls5 slows their growth and induces cell death and as such is considered a bona fide tumour suppressor gene.

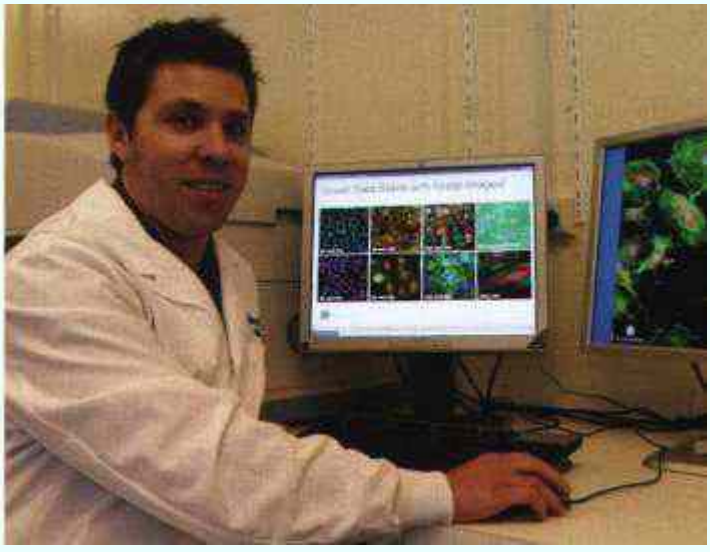
Under the collaboration, MDS will also offer consultancy services to GE Healthcare and use the WAIMR laboratories as a 'show site' to allow GE to showcase its technologies.

GE Healthcare's product specialist Patricia Bresnahan said the use of the company's IN Cell 1000 to study tissue samples was a unique application.

"Its main application is for screening in drug development and it's usually applied to cultured cells," she said. "The unique situation here in Australia is the application towards tissue analysis."

Bresnahan said the IN Cell analyser involved a microscope system with an automated plate handler fitted. The handler moves the plate over the microscope in highly precise movements within five micron implements, she said.

"With that sort of movement it can rapidly acquire images from multiple well plates, 96-well plates. The power in that is two-fold: it's very rapid and



BioPharmica's Dr Malcolm Lyon and the IN Cell.

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it enables a lot of replicates. The importance of that is that in biological systems there can be a lot of variability from sample to sample but when you repeat the same sample many times you can actually measure the variability and in that way you can assess the accuracy of the instrument."

She said the 1000 system was a highly flexible platform that could adapt to multiple types of protocols, particularly for assay development, which is what this project involves.

The collaboration will also involve adapting the instrument's software for statistical analysis of the microscope data.

"The hardware was already enabled for the acquisition of the images – the real collaboration takes place in the analysis side," she said.

"The challenge is to have fully automated analysis of these images. You can imagine manually analysing these images – it's highly fine detail and quantifying those images is really not even possible at the manual level.

"So adapting the software for automated analysis is a real challenge and that's the primary objective. We have the software but it's being adapted for this application."

Another feature of the collaboration is that specialists based at GE Healthcare centres in Wales and the US will be able to connect to the instrument remotely.

"We have development scientists in our Cardiff and our New Jersey sites who are able through the internet to connect to that instrument and not only see the images as they are being acquired, but they can actually take control of the instrument from a remote site and help the customer to develop a protocol for acquisitions," Bresnahan said

"GE does this for clinical and diagnostic instruments and we've now adapted that into the research market, so that's really a unique adaptation."

The deal is the first installation of the IN Cell 1000 in Australia, although there are about 100 installed globally. The company also manufactures a 3000 version, predominantly for very high throughput pharmaceutical screening applications.

GE's business development leader Mark Dupal said the company was in discussions with other groups in Australia, predominantly academic sites that are interested in adapting manual microscopy to an automated system and small biotech companies wanting to adapt cell-based screening assays for early-stage drug development.

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