Revolutionary technology to improve bedside tumor diagnosis in patients

1 June 2015

A mobile mini gamma ray camera is evaluated in the clinic. Credit: University of Leicester

Researchers from the Universities of Leicester and Nottingham are developing a revolutionary mini gamma ray camera that will improve the diagnosis of tumours and lymph nodes from patients' bedsides.

The handheld 'hybrid' technology, which combines optical and gamma imaging, will also improve the efficiency and accuracy of removing tumours during surgery.

The small mobile camera will advance nuclear imaging by allowing imaging procedures at a patient's bedside, in operating theatres and intensive care units. This will allow surgeons to localise and map tumours and sentinel nodes to patient anatomy with greater accuracy during surgery.

The project to develop the mini gamma ray camera is led by Dr John Lees from the University of Leicester's Department of Physics and Astronomy and is funded by the Science and Technology Facilities Council's (STFC) Challenge Led Applied Systems Programme (CLASP).

Dr Lees said: "Our system will improve surgical cancer treatments, reducing mortality and morbidity by enabling surgeons to increase lymph or tumour removal efficiency while minimising damage to normal tissue."

In many circumstances, such as in breast cancer - the most common cancer occurring in women - sentinel node biopsy is routinely used for cancer staging. This procedure is usually carried out using a non-imaging gamma probe, which detects a radioactive tracer injected during surgery.

Although this technique is now benefitting many patients, since in these procedures a non-imaging probe is used, the nodes may be missed, which can lead to misdiagnosis.

Gamma cameras are traditionally large instruments that are normally housed in specialised rooms within nuclear medicine departments. Because of their large size patients need to attend the department to undergo imaging procedures.

The new handheld hybrid technology will mitigate these issues and can be used for small organ imaging, diagnosis, surgical investigation and visualisation of drug delivery.

The researchers are also investigating a range of other clinical applications for the technology including thyroid, lymphatic drainage and 'lacrimal drainage'.

Sarah Bugby, a postgraduate researcher involved in the project, said: "By significantly reducing the size of gamma cameras available we hope to provide far more flexibility for patients and clinicians - the camera doesn't need a dedicated room and can be used by a patient's bedside or even in the operating theatre."

The Universities of Leicester and Nottingham have a spin-out company, Gamma Technologies Ltd

(GTL), which has raised over £250K first stage venture funding as a result of the CLASP project.

Professor Alan Perkins from the School of Medicine at the University of Nottingham added: "This is an exciting project which is taking novel hybrid imaging technology into new clinical areas. This should expand the remit of nuclear medicine for the benefit of patients. Our preliminary clinical studies look very promising indeed."

Provided by University of Leicester