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T-RAYS FOR TUMOURS

T-rays may play a vital role in the battle to save 2000 Australians a year from death by skin cancer - and many more from lethal genetic disorders.

Researchers from the new National T-ray Facility (NTF) at the University of Adelaide are working on a non-invasive imaging technique with potential to reveal whether skin lumps are harmless or malignant and to improve diagnosis of gene disorders.

Terahertz light — or T-rays — are emissions between infra-red and microwaves. They enable scientists to analyse the composition and density of materials the rays contact, as well as imaging them.

T-rays are expected to play an important role in the development of the bio-chip for testing patients for hundreds of different genetic disorders at one time, says the head of the Facility, Professor Derek Abbott.

“One of the things T-rays can do very well is tell if a DNA strand is single or double. These new biochips contain up to 10,000 single-strand DNA detectors – and when they pair up with an identical strand, it means you’ve got the disease.”

Current methods of detecting the paired strands are slow and not very reliable. Prof. Abbott says T-rays offer a much more precise and rapid way of telling if the DNA is double-stranded – and the disease present.

The role of T-rays in disease diagnosis is being explored at the international workshop on TeraHertz for Defence and Security, at the University of Adelaide University over the next two days (December 16-17).

Leading scientists from America, Europe, Asia and Australia will share the latest advances in T-ray technology for detecting crime, preventing terrorism, drug smuggling and improving medical diagnosis.

With 85 per cent of all cancers occurring in the skin, and two out of every three Australians affected by a skin cancer at some point in their lives, finding a faster, simpler and less painful way than surgery to test suspect skin lumps is urgent, says the University of Adelaide’s Dr Sam Mickan.

Dr Mickan heads an NTF team which is exploring why healthy cells, benign cancer cells and malignant cancer cells all seem to give off different signals when illuminated with T-rays.

“We are currently working on cell clusters, to see if we can pick out some other factor that will explain why the signals differ, and if it can be developed into a reliable diagnostic technique for skin cancers.

“If we succeed, we will scale up to pieces of tissue, and ultimately, a way of scanning the whole body with T-rays.”

NTF researcher Dr Tamath Rainsford says that having a device that can continually check to see if there is any cancerous tissue remaining, during surgery, would save not only lives but also a huge amount of repeat surgery and healthcare costs.

American researchers are also experimenting with a T-ray endoscope that might help to diagnose internal cancers, such as bowel or lung cancer.

The National T-Ray Facility has been set up at the University of Adelaide with $2.5m in funding from the Australian Research Council to provide opportunities for researchers across Australia to experiment with T-rays in the detection and diagnosis of various substances, ranging from cancers to genes, drugs to explosive and concealed weapons to food contamination.

SPEAKERS AT THE CONFERENCE WILL BE AVAILABLE FOR MEDIA INTERVIEW

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Conference program:

http://www.eleceng.adelaide.edu.au/thz/program.htm