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MEDIA RELEASE

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New technique to aid bladder cancer diagnosis

A new and innovative automated computer technique has been developed by researchers that is able to significantly aid in the diagnosis of bladder cancer.

The technique—which allows suspect lesion images to be quickly and effectively analysed and then classified for cancer risk, has been reported in the medical journal 'Urologic Oncology'.

"What we've done is develop a computer program to carry out an automated analysis of cystoscopy images," says lead author of the research, Dr Martin Gosnell, Researcher at the ARC Centre of Excellence for Nanoscale BioPhotonics (CNBP) at Macquarie University and Director at Quantitative Pty Ltd.

Cystoscopy is one of the most reliable methods for diagnosing bladder cancer explains Dr Gosnell.

"Images are taken of the bladder and its insides for suspicious lesions during a routine clinical patient evaluation. Dependent on the findings, this initial scan can then be followed up by a referral to a more experienced urologist, and a biopsy of the suspicious tissue can be undertaken."

The issue says Dr Gosnell is that the clinician examining the initial images makes a visual judgement based on their professional expertise as to the next steps of action that should be undertaken—such as the need to take a biopsy for subsequent pathological analysis.

"Potential errors and unnecessary further interventions may result from the subjective character of this initial visual assessment."

"What we've done," says Dr Gosnell, "is to create an automated image analysis technique which can identify tissue and lesions as either high-risk or minimal-risk. This is beneficial on multiple levels."

"Following the analysis, high-risk diagnoses can be followed up more closely as a matter of urgent priority. Alternately, minimal-risk lesions can be identified early in the diagnostic process, reducing the number of referrals or biopsies that need to take place."

Professor at Macquarie University, Ewa Goldys, Deputy Director of the ARC Centre of Excellence for Nanoscale BioPhotonics, and senior author on the research paper, explained that the lesion classification system was developed using a specialised colour segmentation process.

“Firstly, cytoscopy images which were taken during routine clinical patient evaluations and supported by biopsy were interpreted by an expert clinician. They were classified as either healthy, veined tissue, inflammation or cancerous”, she says. “This visual assessment was based on aspects such as colour, surface, shape and size of the lesion or tissue of interest.”

“Our task was to then devise a computerised method that could mimic this expert diagnostic capability. We did this by developing an automated imaging program that was able to analyse the specific colour, luminance and texture of each piece of tissue that was being examined, right down to a pixel level.”

“This provided a clear-cut classification system—the presence or non-presence of specific characteristics in the image aligning with the healthy or cancerous nature of the tissue being examined.”

“The results from the automated system were extremely promising,” says Prof Goldys.

“Using our innovative computer program, 100% of the cancerous images were detected. And all benign lesions were also successfully identified.”

Prof Goldys believes that the automated diagnostic system can effectively assist doctors and nurses in their assessment of cystoscopy imagery.

“This system would be particularly useful in supporting less experienced urologists and urology nurses, giving them an objective confirmation of their assessment,” she says.

“This additional analysis also has the potential to reduce the number of patients being given erroneous assessments or unnecessary bladder biopsies, offering increased efficiencies and effectiveness in cancer clinics,” concluded Prof Goldys.

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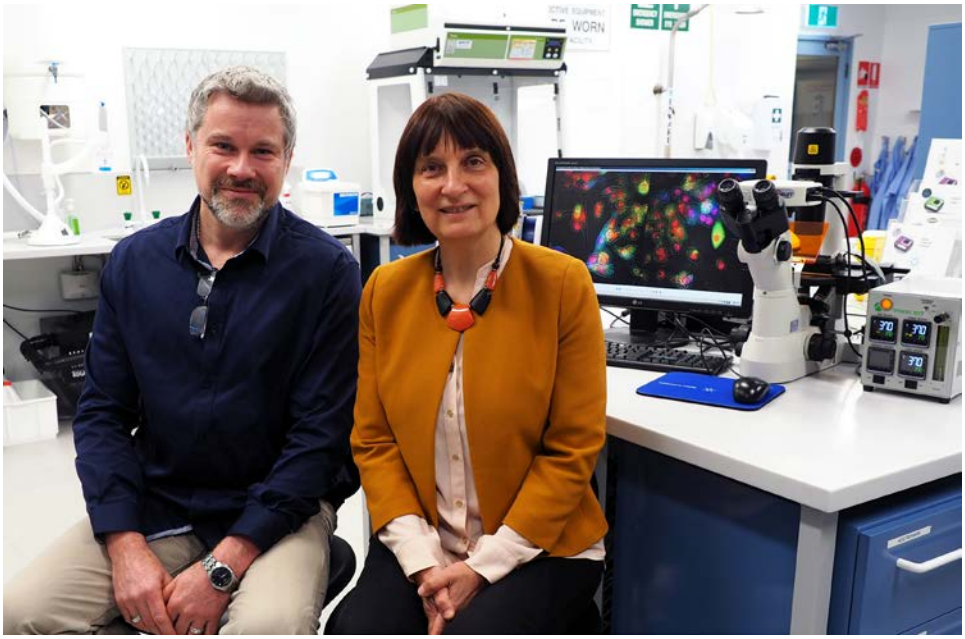

IMAGES:
Dr Martin Gosnell and Prof Ewa Goldys https://flic.kr/p/Kbyr8i
CNBP Deputy Director (Image 1), Prof. Ewa Goldys https://flic.kr/p/YDKJb9

CNBP Deputy Director (Image 2), Prof. Ewa Goldys https://flic.kr/p/F7XrPh

RESEARCH PAPER:
Computer-assisted cystoscopy diagnosis of bladder cancer.
URL: http://www.sciencedirect.com/science/article/pii/S107814391730460X

ABOUT:
The Centre for Nanoscale BioPhotonics (CNBP) is an Australian Research Council Centre of Excellence, with research focused nodes at the University of Adelaide, Macquarie University and RMIT University. A $40m initiative, the CNBP is focused on developing new light-based imaging and sensing tools, that can measure the inner workings of cells, in the living body. http://cnbp.org.au/

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