

The University of Queensland now has one of only three VECTRA WB360 whole body imaging systems in the world, using 46 cameras to construct a digital 3D avatar with detailed reproduction of the skin.

## UQ focuses on moles to unlock melanoma mystery

While previous work to reduce the burden of melanoma has focused on malignant tumours, much can be learned from increasing our understanding of moles.

Investigating why some moles turn into deadly cancers and others don't is the focus of a major research initiative at The University of Queensland (UQ) to prevent melanoma and improve survival rates. The disease is expected to be responsible for almost 1800 deaths in Australia this year, one and a half times last year's national road toll. While prevention campaigns are making a difference, health authorities estimate 2016 will see more than 13,000 new cases across the nation.

Despite these staggering statistics, there is currently no dedicated population-based screening program. Many melanomas grow adjacent to or within pre-existing moles, and numerous studies have shown the number of moles a person has is a strong predictor of their melanoma risk. New moles form and existing ones change regularly in children and also in adults and most of them will never become a problem. Why some do – and which ones – remains a mystery.

The Centre of Research Excellence for the Study of Naevi has been established to conduct urgently needed research into moles – to better prevent, predict and detect skin cancer. UQ's Chair in Dermatology Professor H. Peter Soyer heads the collaborative project based at the Translational Research Institute in Brisbane which will – in a world-first approach – systematically study how moles change over a lifetime.

Partners include QIMR Berghofer Medical Research Institute, Cancer Council Queensland, The University of Sydney and the Queensland University of Technology. This UQ led Centre of Research Excellence for the Study of Naevi is funded by the National Health and Medical Research Council until the end of 2020. Leading scientists will investigate moles from epidemiological, clinical, dermoscopic, pathological, molecular, genetic, and behavioural perspectives.

Visually, few differences exist between benign and early stage malignant skin tumours, and moles can often show several cellular features that characterize malignancy. An improved understanding of naevus development and transformation, along with recognition of the associated changes is therefore key to understanding melanoma.

UQ's innovative 3D imaging technology is central to the work of the new research centre. This technology has the ability to revolutionise the way naevi are routinely mapped, monitored and melanomas diagnosed, and could be a game changer in the fight against melanoma.

A VECTRA WB360 whole body imaging system has been funded by the Princess Alexandra Hospital Private Trust Fund and installed at the Clinical Research Facility of the Translational Research Institute – one of only three in the world and the first outside of New York. The system uses 46 cameras to construct a digital 3D avatar of a human subject with detailed reproduction of the skin. An extra dermoscopic camera captures highly detailed images of specific lesions – linked to their location on the body – which can show extra features of the lesion lying under the skin's surface. This record of the patient's whole skin surface can be referred to during follow-up visits to identify changing moles, revolutionizing the way skin cancers and conditions are mapped, monitored and diagnosed.

This technology is fundamental to the Centre of Research Excellence's population-based cohort study of naevi in adults living in Brisbane. The Centre of Research Excellence team believe this project will deliver innovative, efficient and reliable solutions for the early detection of melanoma while reducing over-diagnoses and high rates of unnecessary excision and biopsy.

Researchers will follow study participants for three years to track changes in mole number, size, and dermoscopic features and will collect a saliva sample from each participant for genetic analysis. In

addition, the participants' freckling and skin, hair and eye colour will be assessed along with their sun exposure background, personal and family skin cancer history and medication use. The project will document the naevus life cycle and how this varies according to age, sex and body site and will assist with optimising skin self-examination.

Consumers play an essential role in the early detection of melanoma, with current public health guidelines advising people to make skin self-examination a habit and to see a doctor if any changes are observed. Researchers will study the use of mobile technology attached to Smartphones (mobile teledermoscopy), analysing which moles are being selected by participants for monitoring. This will provide insight into whether such devices are useful in helping people keep track of their moles and improve the early detection of potentially malignant moles.

The Centre of Research Excellence researchers will also examine the use of microbiopsies to establish the molecular and genetic characteristics of moles, assessing how well they reflect the histopathological outcomes. Traditional biopsies collect a chunk of skin several millimetres across, requiring local anaesthesia and sutures. In contrast the UQ-developed microbiopsy device takes only a very small skin sample, without the need for anaesthesia and sutures, leaving only a pinprick-like wound behind. This microbiopsy technology has the potential to eliminate the unnecessary excision of 'suspicious' benign lesions, alleviating the fear many people have of excisions in the diagnostic process.

Another program of the Centre of Research Excellence initiative will examine the biology of rapidly changing naevi in people with advanced melanoma. These latest developments build strongly on UQ's international reputation for skin cancer research, and the collaborations UQ has with researchers across Queensland, Australia and the world.

UQ's Faculty of Medicine and Biomedical Sciences is unique in Australia - currently employing four full-time academic dermatologists. Support from philanthropic organisations has helped position UQ as a global leader in the field, with research making a global impact.

Significant donations, from Epiderm, the Merchant Charitable Foundation and Princess Alexandra Research Foundation, leveraged additional funding to reach a total figure of over \$5 million, which supports the integration of the latest technologies with precision and personalised medicine leading to a targeted skin cancer screening program.

The ultimate outcome for all involved is improved risk prediction and early detection, which along with technological advances, will be integrated into clinical practice to further reduce Australia's annual melanoma toll.

For more information about the research being carried out at the University of Queensland, visit [www.uq.edu.au/research](http://www.uq.edu.au/research)

