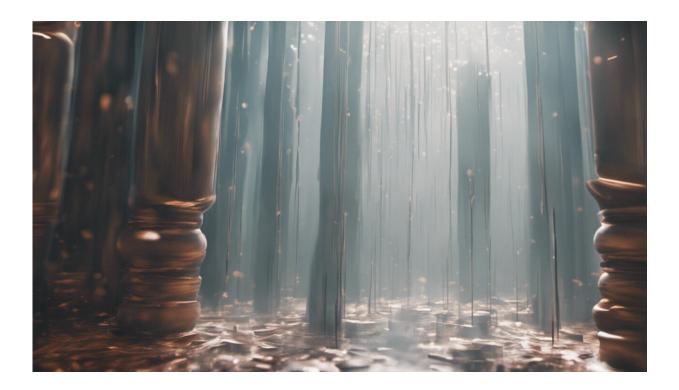# Crying for science

June 18 2012, By Louise Waterson

Credit: AI-generated image (disclaimer)

Work is underway to discover whether human tears can play a role in the early diagnosis of breast and prostate cancer, as well as confirming if a person has a predisposition to developing the diseases.

Central to the project is the study of tear fluid proteins, with the ultimate aim the development of a simple, quick and non-invasive diagnostic and monitoring test for cancer.

Lead researcher, Professor Mark Willcox at the School of Optometry and Vision Science, says breast and prostate cancers were chosen for the study because both conditions are associated with hormone changes that are also involved in the production of tears from the lachrymal gland.

Mammogram screening for breast cancer can often miss small, early-onset cancers, while prostate cancer is diagnosed with a rectal examination – both procedures are unpleasant.

The UNSW research, in collaboration with the Brien Holden Vision Institute, St George Hospital and Minomic International, has already determined the level of a biomarker protein in an individual's tear fluid using mass spectrometry and multiple reaction monitoring.

This knowledge allows the researchers to identify the protein by the amino acids it contains and the sequence in which they appear so these can then be compared with known protein sequences.

It is then possible to compare the potential differences in proteins in people with breast or prostate cancer and those who have no cancer.

Central to the success of the study is identifying the role proteins play when cancer is present. Currently the researchers are examining the biomarkers in tears of prostate and breast cancer patients to detect clear differences in combinations of more than 100 proteins present in the tear fluid.

"We have shown that at east five potential biomarkers are present in tears and will change with cancer," says Willcox, who is chief scientific officer at the Brien Holden Vision Institute.

"What we're hoping to show is that particular proteins are different, and that it's a combination of proteins that's best to predict cancer."

Working with cancer patients from St George Hospital, the team is currently doing a cross-sectional study, with plans to develop longitudinal studies that will assess if the biomarkers of these patients remain stable and are not affected by their ongoing therapies.

It will also follow up with the normal group to see whether any have developed cancer, and examine whether the test could have predicted this happening.

"We want to get the test out there as quickly as feasible," says Willcox, who estimates the test will be on the market in five to 10 years.

The test would be similar in practice to a pregnancy kit, except tears would replace urine. Collecting tears is straightforward and pain free, and involves simply placing a tube at the corner of the eye and extracting one microlitre of tear fluid.

Willcox envisages the tests will enable GPs, optometrists, dentists and nurses to assess whether a patient is likely to get cancer, confirm if they have cancer, and monitor whether their cancer therapy is working.

"It might be that we can do one or all of these," he says.

Provided by University of New South Wales

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