Breast cancer research at McGill could make mammography obsolete

BY AARON DERFEL, POSTMEDIA NEWS APRIL 10, 2012

MONTREAL — Scientists at McGill University have crossed a critical threshold in developing a blood test that could one day detect breast cancer at very early stages and might even render mammography screening obsolete.

Scientists have worked for years on such blood tests without much success. But the McGill team — including scientists specializing in nanotechnology, chemistry and oncology — have made improvements to the existing technology while discovering a biomarker "signature" for a common subtype of breast cancer — that which is estrogen receptor-positive.

They sampled the blood of 11 healthy people and 17 patients with breast cancer. They then measured the concentration of 32 different proteins in the blood samples.

Using the latest in microarray technology, the researchers found that out of the 32 proteins, six could be used to establish a signature for the hormone receptor-positive cancer.

The findings are published in the April edition of Molecular and Cellular Proteomics.
"Mammography is slow and expensive, and it's uncomfortable," said David Juncker, the team's principal investigator and an associate professor in McGill's department of biomedical engineering.

"So here the idea is you could do a test in a droplet of blood, and it could be more accurate than a mammograph. From this small study we cannot really make the claim, but the hope is that this could become more accurate.

"Mammography doesn't work well for women with dense breasts, for example, and so many young women and African-American women are actually not well served by mammography," he added. "So this test could be complementary as well as being more sensitive."

Breast cancer is the most common cancer among Canadian women. One woman in nine is expected to develop breast cancer during her lifetime and one in 29 will die of it, according to the Canadian Cancer Society.

The McGill team's work builds on the pioneering efforts of Dr. Phil Gold, who identified a protein biomarker more than 40 years ago. However, the carcinoembryonic antigen is also found in healthy people, and as a result, cannot be used reliably to detect cancer.

Juncker's team got around that difficulty by examining more than one biomarker.

"The proteins are in such low concentrations — a billion times less concentrated than other molecules in the blood," he explained. "This makes it very hard for the technology to detect in any kind of accurate way without getting interference from other things.

"Your blood goes everywhere in your body," he added. "You have three litres of blood roughly and if your tumour is really small and it releases some molecules in the blood, then it's like looking for a needle in the haystack."

The challenges for the McGill team is to continue fine-tuning the "microfluidics-based microarray" technology and coming up with even more accurate protein signatures.

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