

Detecting breast cancer recurrence

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Dan Raftery, at left, stands with three colleagues who work in his research facility in Purdue's Herbert C. Brown Laboratory of Chemistry. From left are research scientist Naraimhamurthy Shanaiah, research assistant Vincent Asiago and research scientist Nagana Gowda. Raftery, who is a Purdue professor of chemistry, founded Matrix-Bio Inc., a Purdue Research Park-based company that studies biomarkers for early detection and recurrence of breast cancer. (Photo provided by Purdue Research Foundation)

Connie Krabbe understands the fear and foreboding breast cancer survivors feel when visiting their physicians for post-treatment check-ups. Two of her four sisters died of metastatic cancer related to breast

cancer, enduring bone, brain and ovarian cancer before succumbing to the disease in their early 50s.

"The original diagnosis was devastating, but the panic they felt during follow-up visits was even worse. It was agony to find a recurrence," said Krabbe, who is a retired insurance executive. "For me, it wasn't if the cancer would come back, it was when and would there be time to treat it."

According to the American Association of [Cancer Research](#), [breast cancer](#) recurrence occurs in more than 20 percent of [breast cancer survivors](#).

So the news that a cancer recurrence detection blood test developed by Matrix-Bio Inc. has the potential to detect the recurrence of breast cancer a year in advance of currently available clinical diagnostic tests is something Krabbe applauds.

"Catching the recurrence of cancer early can make all the difference in the world. It can save lives," she said.

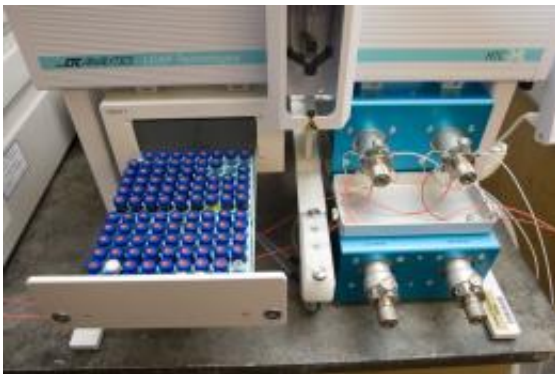
Matrix Bio, which is based in the Purdue Research Park of West Lafayette, uses technology that company founder Dan Raftery discovered at Purdue University, where he also is a professor of chemistry.

On Tuesday (Oct. 19) the peer-reviewed journal *Cancer Research*, a publication of the American Association of Cancer Research, will publish Matrix-Bio's findings, *Early Detection of Recurrent Breast Cancer Using Metabolite Profiling*. Authored by Raftery with Vincent M. Asiago, Leiddy Z. Alvarado, Naraimhamurthy Shanaiah, G. A. Nagana Gowda, Kwadwo Owusu-Sarfo and Robert Ballas, the study's findings support the importance of early breast cancer detection and

recurrence.

Using metabolite-profiling methods, Matrix-Bio's VeraMarker™-BCR blood test correctly predicted a recurrence of breast cancer in 55 percent of the patient survivors an average of 13 months before a clinical diagnosis.

Matrix Bio's cancer monitoring test was developed using a powerful combination of nuclear magnetic resonance (NMR) and mass spectrometry analytical methods. The test also can be run on a single mass spectrometry platform.



A mass spectrometer in Dan Raftery's research facility collects early data through blood samples that could help detect cancer or its recurrence in its earliest stages. The research, conducted at Purdue University, is being used by Raftery's Purdue Research Park-based company Matrix-Bio Inc. (Photo provided by Purdue Research Foundation)

In the study, the test demonstrated the ability to identify metabolite signals between the recurrence of cancer and no evidence of cancer with a sensitivity of 86 percent and a specificity of 84 percent. This result is two times more sensitive than the current cancer monitoring blood tests

CA 27.29 and CA 15-3. In addition, the BCR test opens up a window for second-line therapy by over one year compared to these tests.

"It's important to note that current blood tests do not pick up recurrence in the 20 percent of breast cancer survivors who do express the protein targeted by these CA tests," Raftery said.

For the more than 2.4 million breast cancer survivors in the United States and their physicians, the results of Matrix-Bio's research are extremely promising, according to Raftery, who also is a member of the Purdue Center for Cancer Research and Purdue's Oncological Sciences Center.

"Knowing there's a test that can detect the recurrence of cancer at a far earlier stage when the cancer is more treatable should provide tremendous hope to breast cancer survivors and also relieve the tremendous worry they feel with each visit to their doctor," he said. "Its accuracy and early stage detection offers a much better window for treatment."

Matrix-Bio's cancer monitoring test is non-invasive, simple to administer and non-threatening to patients. Blood is drawn from the patient and sent to a lab for analysis. If the test yields positive results, the oncologist will order additional tests such as a bone scan, MRI, CAT scan, chest X-ray or liver blood tests to identify and locate the tumor.

Most breast cancers recur in the first three to five years after treatment following an original diagnosis. During this time women are closely monitored, visiting their oncologist once a quarter for up to three years and once a year after. Breast cancer can come back in the treated breast or near the mastectomy scar or as a distant recurrence somewhere else in the body (metastatic breast cancer). The most common sites of metastasis include the lymph nodes, bones, liver and lungs.

Matrix-Bio's VeraMarker-BCR test will now be clinically validated in a CLIA licensed laboratory. The company's goal is to make the test commercially available in the United States by mid- to late-2011.

Dr. Kathy Miller, a medical oncologist and associate professor of medicine at the Indiana University Melvin and Bren Simon Cancer Center, commented on Matrix-Bio's findings, saying, "Truly early detection of breast cancer has been an elusive goal. This study offers hope for real progress."

Matrix-Bio has received funding from Main Street Venture Fund, Fort Wayne, Ind., and Purdue University's Emerging Innovations Fund.

Raftery, like Krabbe, has experienced cancer in his own family, which serves as a powerful motivator for his research.

"The existing cancer recurrence tests are inadequate to meet the needs of a large and growing population of breast cancer survivors," he said.

"Making a difference for the estimated 10 million women who are breast cancer survivors globally is the starting point for Matrix-Bio's VeraMarker Platform in the field of metabolite molecular diagnostics blood tests for many forms of cancer that affect both women and men."

Provided by Purdue University

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