Researchers developing quick, inexpensive test to assess ER+ breast cancers

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Researchers from Case Western Reserve University are teaming with industry and other academics to develop a quick and inexpensive test to predict which women with ER+ breast cancer need chemotherapy and which need only the more tolerable hormonal therapy.

The National Cancer Institute has awarded the group a $3.3 million, five-year grant to produce software that recognizes minute features in pathology images to distinguish between the two groups and develop an image based risk score.

Estrogen receptor-positive, or ER+, is the most common form of breast cancer with nearly 1 million women worldwide diagnosed with the disease annually. Medical guidelines recommend chemotherapy and hormonal therapy, even though researchers estimate that more than half of women who suffer from ER+ don't require or benefit from harsh chemotherapy.

The only test to predict which women require chemo costs about $4,000 and takes up to two weeks to produce results. For many women, especially in developing nations, the test isn't a realistic option.

"With this technology, any woman with suspected breast cancer will have a biopsy, the slides of which can be digitized and analyzed for pennies on the dollar," said Anant Madabhushi, the F. Alex Nason professor II of biomedical engineering at Case Western Reserve and leader of the research.

"This will be especially attractive in low- and middle-income countries," said Madabhushi, who also directs Case Western Reserve's Center for Computational Imaging and Personalized Diagnostics and a member of the Case Comprehensive Cancer Center. "If you can accurately determine the cancer does not require chemotherapy, you are not only sparing the patient from the detrimental effects of the therapy, but

sparing your resources."

Because images can be sent electronically worldwide, patients would be able to receive their results in a day, even hours, saving them weeks of worry, the researchers say.

The academics are partnering with Florida-based Inspirata Inc., to develop a pathway to translate and commercialize the technology quickly.

Inspirata will ensure that the software development follows the protocols necessary for U.S. Food and Drug Administration approval. The company will work with the university-based researchers and plans to create a pre-commercial prototype.

The researchers will use slides from two clinical trial cooperatives: the Eastern Cooperative Oncology Group and the National Surgical Adjuvant Breast and Bowel Project, to validate the tools they develop.

Madabhushi's lab is working with Case Western Reserve School of Medicine's Hannah Gilmore, MD, assistant professor of pathology, and Pingfu Fu, associate professor of biostatistics; Rutger's University's Shridar Ganesan, MD, associate professor of medicine and pharmacology; University of Pennsylvania's Michael Feldman, MD, associate professor of pathology and laboratory medicine; and State University of New York, Buffalo's John Tomaszewski, MD, chairman of pathology and anatomical sciences.

Inspirata founder and Executive Vice President Mark Lloyd, PhD, and Lead Scientist James Monaco, PhD, are leading the company's effort.

Inspirata has licensed eight technologies Madabhushi has helped develop. Madabhushi is a scientific consultant and a member of the company's scientific advisory board and has equity in Inspirata.

Madabhushi's lab has been working for more than a decade on using big data and digital pathology to benefit human health.

In addition to this grant, Madabhushi's lab with Dr. Vinay Varadan, Assistant Professor of General Medical Sciences at CWRU has been awarded a $115,000 grant from Philips Electronics to integrate magnetic resonance images taken before and during treatment, and digital pathology images of Her2+ breast cancers to develop what they hope will be a stronger predictor of outcome Inspirata will also be involved on this project.

Provided by Case Western Reserve University

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