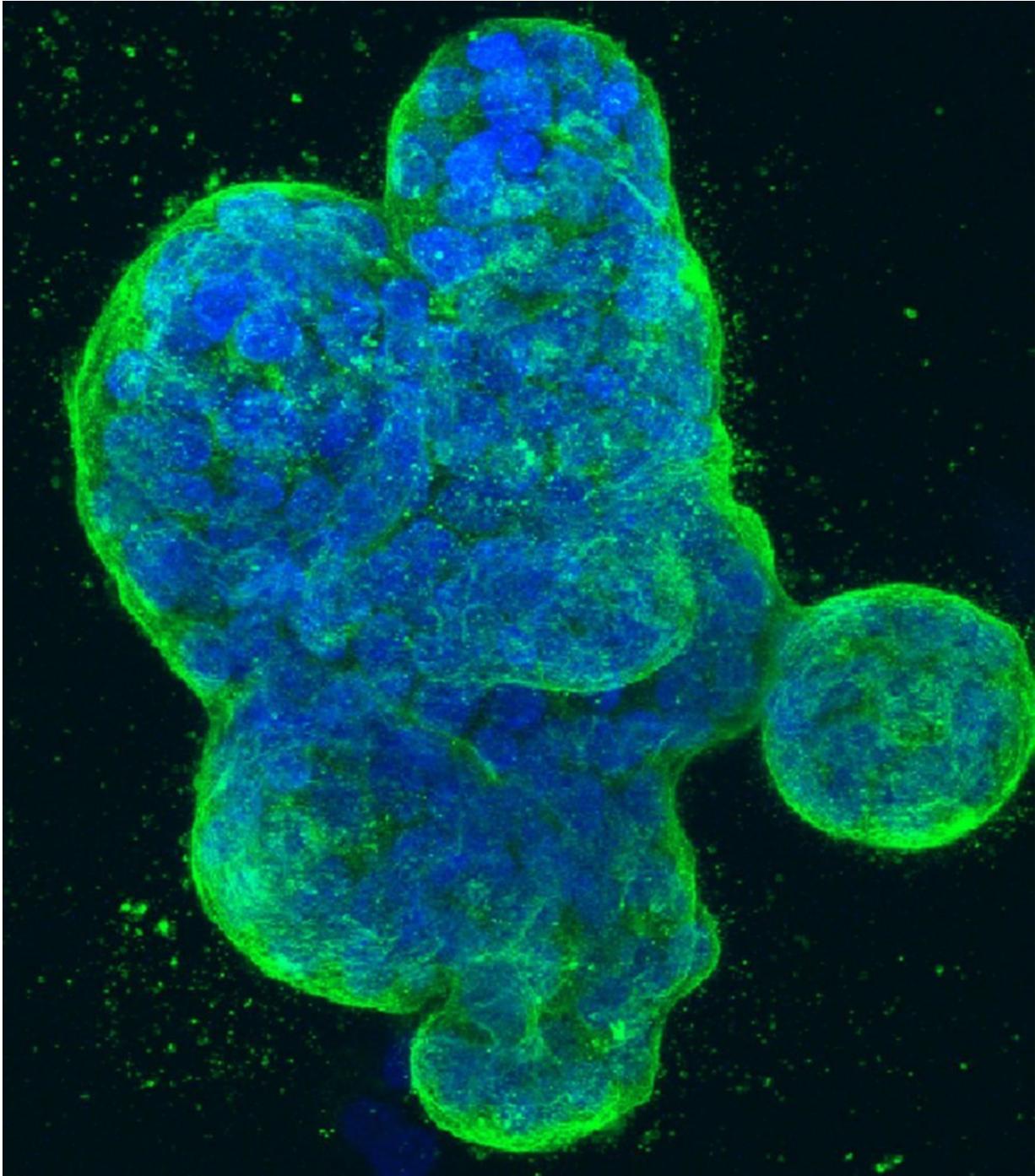


# **New breath and urine tests detect early breast cancer more accurately**

April 25 2018

---



Three-dimensional culture of human breast cancer cells, with DNA stained blue and a protein in the cell surface membrane stained green. Image created in 2014 by Tom Misteli, Ph.D., and Karen Meaburn, Ph.D. at the NIH IRP.

A new method for early and accurate breast cancer screening has been developed by researchers at Ben-Gurion University of the Negev and Soroka University Medical Center, using commercially available technology.

The researchers were able to isolate relevant data to more accurately identify breast cancer biomarkers using two different electronic nose gas sensors for breath, along with gas-chromatography mass spectrometry (GC-MS) to quantify substances found in urine.

In their study published in *Computers in Biology and Medicine*, researchers detected breast cancer with more than 95 percent average accuracy using an inexpensive commercial [electronic nose](#) (e-nose) that identifies unique breath patterns in women with breast cancer. In addition, their revamped statistical analyses of urine samples submitted both by healthy patients and those diagnosed with breast cancer yielded 85 percent average accuracy.

"Breast cancer survival is strongly tied to the sensitivity of tumor detection; accurate methods for detecting smaller, earlier tumors remains a priority," says Prof. Yehuda Zeiri, a member of Ben-Gurion University's Department of Biomedical Engineering. "Our new approach utilizing urine and exhaled breath samples, analyzed with inexpensive, commercially available processes, is non-invasive, accessible and may be easily implemented in a variety of settings."

The study reports breast cancer is the most commonly diagnosed malignancy among females and the leading cause of death around the world. In 2016, breast cancer accounted for 29 percent of all new cancers identified in the United States and was responsible for 14 percent of all cancer-related deaths.

Mammography screenings, which are proven to significantly reduce

[breast cancer](#) mortality, are not always able to detect small tumors in dense [breast](#) tissue. In fact, typical mammography sensitivity, which is 75 to 85 percent accurate, decreases to 30 to 50 percent in dense tissue.

Current diagnostic imaging detection for smaller tumors has significant drawbacks: dual-energy digital mammography, while effective, increases radiation exposure, and magnetic resonance imaging (MRI) is expensive. Biopsies and serum biomarker identification processes are invasive, equipment-intensive and require significant expertise.

"We've now shown that inexpensive, commercial electronic noses are sufficient for classifying cancer patients at early stages," says Prof. Zeiri. "With further study, it may also be possible to analyze exhaled breath and [urine samples](#) to identify other [cancer](#) types, as well."

Provided by American Associates, Ben-Gurion University of the Negev

Citation: New breath and urine tests detect early breast cancer more accurately (2018, April 25) retrieved 21 May 2024 from <https://medicalxpress.com/news/2018-04-urine-early-breast-cancer-accurately.html>

<p>This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.</p>
--