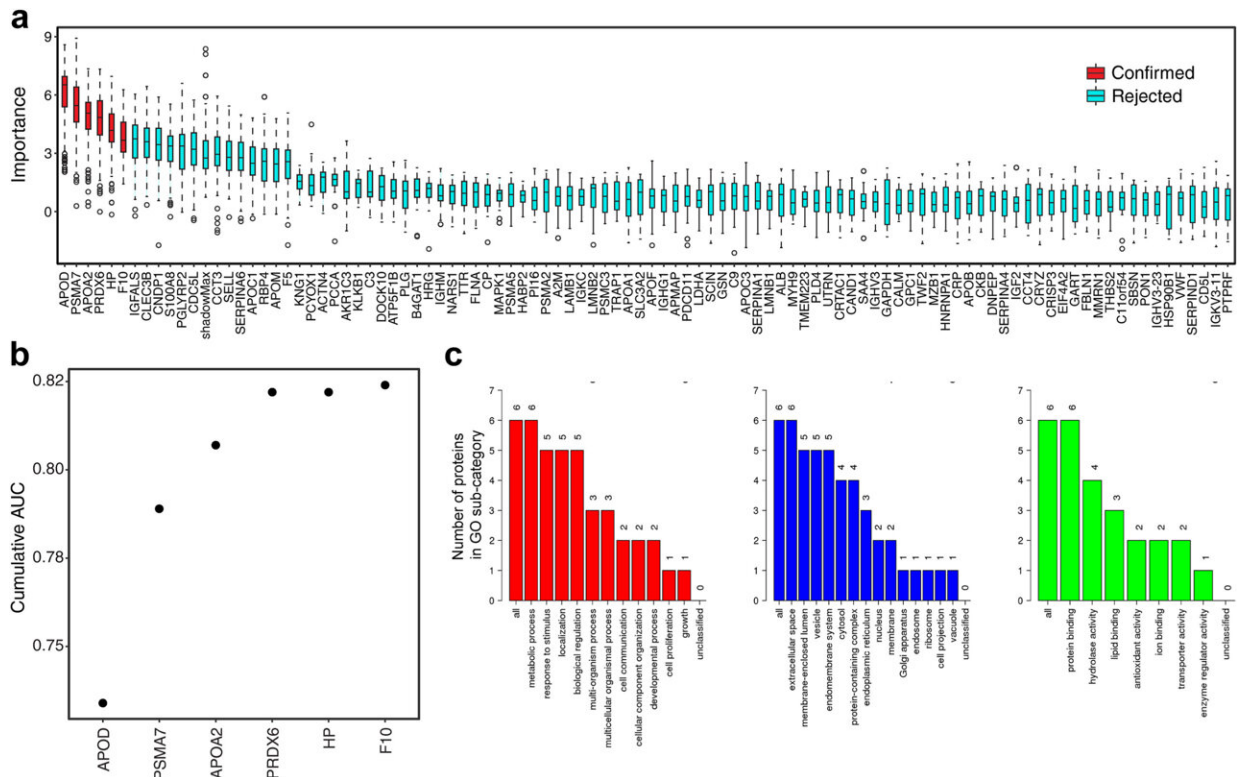# Biomarker test could improve diagnosis of endometrial cancer

March 21 2024, by Mike Addelman

(a) Box plots showing the permutation importance of the plasma proteins confirmed by the Boruta algorithm to be important. (b) Crude cumulative AUC analyses for the Boruta-identified plasma proteins based on multiple forward stepwise logistic regression. (c) Gene ontology analysis of the unique Boruta identified plasma biomarkers using the webserver WebGestalt and showing biological processes (red), cellular components (blue) and molecular functions (green). Credit: *eBioMedicine* (2024). DOI: 10.1016/j.ebiom.2024.105064

A simple, safe and accurate test that identifies women with womb cancer from a sample taken from the vagina has been developed by clinician scientists from The University of Manchester.

The research, published in the journal *eBiomedicine*, reports that the test is more than 95% accurate in identifying post-menopausal women with cancer as the cause of their bleeding, and is more accurate than current methods.

The scientists hope the new test could improve the diagnosis of womb cancer and reduce the need for more invasive, painful and anxiety-provoking tests currently used in hospitals, such as hysteroscopy.

The study, was led by Dr. Kelechi Njoku, academic clinical lecturer and senior clinical oncology specialty registrar and Professor Emma Crosbie, Professor of Gynecological Oncology and Principal Investigator, both from the University of Manchester.

Working with collaborators including Professor Anthony Whetton from the University of Surrey, they identified a five-marker panel of proteins in the vaginal fluid that accurately discriminates those with womb cancer from those that do not have cancer.

Samples were taken from symptomatic post-menopausal women, 53 with and 65 without endometrial cancer.

The scientists used a high-tech method called SWATH-MS, a technique used in mass spectrometry, which measures the masses of molecules, providing information about their composition and structure. SWATH-MS helped them to analyze molecules, and create digital maps of proteins from the samples.

Then, they used machine learning to find the proteins that were most

different between samples, creating a simple and accurate diagnostic model based on proteins.

Womb cancer is the fourth most common cancer in women in the U.K. with about 9,700 new cases every year.

Abnormal bleeding, especially after the menopause, is the main symptom. However, only 5%–10% of women with bleeding have womb cancer as several other benign (non-cancerous) conditions such as polyps and fibroids can also cause bleeding.

Currently in the U.K., women with suspected womb cancer undergo a transvaginal ultrasound scan, where a probe is inserted into the vagina to measure the thickness of the lining of the womb.

Those with a thickened womb lining then have their womb visually inspected by hysteroscopy, in which a narrow telescope with a light and camera is passed into the womb through the vagina and cervix.

Where needed, a biopsy will also be taken. The investigations are invasive and can be painful, and for most, unnecessary, since only 5%–10% of symptomatic women have a sinister underlying condition.

Lead author, Dr. Kelechi Njoku who has also recently been awarded the inaugural Eve Appeal/ Northwest Cancer Research Fellowship said, "The implications of this study are significant. If translated into clinical practice, a non-invasive, cost-effective, and accurate detection tool could improve patient care by swiftly identifying those with womb cancer while sparing many healthy women from unnecessary invasive tests.

"Building on this work and with funding support from the Eve Appeal and Northwest Cancer Research, we will be looking at developing clinically feasible assays based on established technologies like ELISA

or Lumipulse, or even newer platforms like lateral flow tests for point-of-care testing."

Dr. Helena O'Flynn, a General Practitioner and Trustee at Peaches Womb Cancer Trust, said, "This new test has the potential to better streamline the diagnostic process and may be used in primary care as a triage tool for women with suspected womb cancer."

More information: Kelechi Njoku et al, Detection of endometrial cancer in cervico-vaginal fluid and blood plasma: leveraging proteomics and machine learning for biomarker discovery, *eBioMedicine* (2024). DOI: 10.1016/j.ebiom.2024.105064

Provided by University of Manchester

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