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Simple test can indicate cervical cancer

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Researchers at the University of Louisville have confirmed that using the heat profile from a person's blood, called a plasma thermogram, can serve as an indicator for the presence or absence of cervical cancer, including the stage of cancer.

The team, led by Nichola Garbett, Ph.D., published its findings online today (Jan. 8, 2014) in *PLOS ONE*.

"We have been able to demonstrate a more convenient, less intrusive test for detecting and staging cervical cancer," Garbett said. "Additionally, other research has shown that we are able to demonstrate if the current treatment is effective so that clinicians will be able to better tailor care for each patient."

To generate a plasma thermogram, a blood plasma sample is "melted" producing a unique signature indicating a person's health status. This signature represents the major proteins in blood plasma, measured by Differential Scanning Calorimetry (DSC). The team, which includes Brad Chaires, Ph.D., Ben Jenson, Ph.D., William Helm, M.D., Michael Merchant, Ph.D., and Jon Klein, M.D., Ph.D., from the University of Louisville School of Medicine, have demonstrated that the plasma thermogram profile varies when a person has or does not have the disease.

The team believes that molecules associated with the presence of disease, called biomarkers, can affect the thermogram of someone with cervical disease. They used mass spectrometry to show that biomarkers

associated with cervical cancer existed in the plasma.

"The key is not the actual melting temperature of the thermogram, but the shape of the heat profile," Garbett said. "We have been able to establish thermograms for a number of diseases. Comparing blood samples of patients who are being screened or treated against those thermograms should enable us to better monitor patients as they are undergoing treatment and follow-up. This will be a chance for us to adjust treatments so they are more effective."

Chaires noted that plasma thermograms have different patterns associated with different demographics, as well as for different diseases. This results in a more thorough application of the test as a person's thermogram can be compared to specific demographic reference profiles or, even better, to the person's own profile. Using a person's unique thermogram would provide the most accurate application of the test which could be used as part of a personalized medicine approach.

Further clinical study could result in the plasma thermogram as a compliment test to the traditional screening method for cervical cancer, the Pap smear and would be less intrusive and more convenient for the patient. Additionally, because the plasma thermogram test could allow treatment effectiveness to be more easily monitored, treatment that was not working could be stopped sooner and replaced with more effective treatment. In summary, the test could result in earlier detection, more effective therapeutic approaches and lowered healthcare costs for screening and treatment of cervical cancer.

The University of Louisville researchers see great promise for their technique being able to detect and monitor in a range of other cancers and diseases. The test is non-invasive and requires only a simple blood draw. The plasma thermogram test has already been applied to identify multiple cancers, including melanoma, lung, cervical, ovarian,

endometrial and uterine cancers and other diseases, including lupus, rheumatoid arthritis, Amyotrophic lateral sclerosis (Lou Gehrig's Disease) and Lyme disease. The test has shown great promise as a prognostic indicator of disease, allowing physicians to monitor cancer patients more closely for remission, response-to-therapy and recurrence.

As a result of the promising research findings, Garbett, Chaires and Jenson have founded a start-up company, Louisville Bioscience, Inc. (LBIdx™), which holds an exclusive license to the University of Louisville's Plasma Thermogram™ (pT™) technology. They also are shareholders in the company.

Provided by University of Louisville