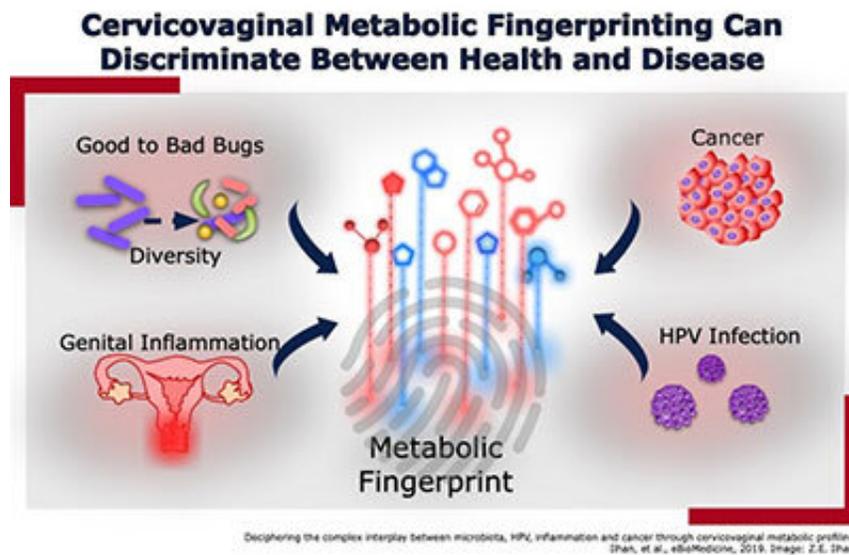


Novel study discovers 'metabolic fingerprint' to help treat, diagnosis and prevent cervical cancer

May 14 2019, by Teresa Joseph



Credit: University of Arizona

Researchers at the University of Arizona have completed the first-of-its-kind study that could aid in the treatment, diagnosis and prevention of cervical cancer by identifying cervicovaginal metabolic signatures, or "fingerprints" that distinguish patients with HPV, pre-cancerous cervical conditions and cancer.

An interdisciplinary team led by Melissa Herbst-Kralovetz, Ph.D.,

associate professor at the UA College of Medicine—Phoenix, integrated cutting-edge analyses, including metabolomics, to reveal new information about how viruses, bacteria, inflammation and disease impact metabolic signatures. During the analysis, the group identified three compounds that distinguish cervical cancer patients from healthy women.

The study, "Deciphering the complex interplay between microbiota, HPV, inflammation and cancer through cervicovaginal profiling" was published online April 24 in *EBioMedicine*. This is the first report on cervicovaginal metabolomes in HPV-associated precancerous cervical conditions and cancer that demonstrates the predictive value of metabolic fingerprinting in abnormal cell metabolism. The study identified 475 metabolites in cervicovaginal samples that changed across progression of disease, resulting in unique metabolic fingerprints.

The metabolome is the collection of biochemicals, or metabolites, present in cells, tissues or body fluids, whereas metabolites are the individual molecules that make up the metabolome. Levels of these metabolites often change in response to disease. Metabolomics is the comprehensive study of the metabolome that has the potential to impact science.

"This study is an example of how scientific research and breakthroughs directly impact patient care," William Cance, MD, deputy director of the UA Cancer Center said. "Dr. Herbst-Kralovetz, also a researcher at the UA Cancer Center, and her colleagues have employed novel biologic analyses to identify metabolic fingerprints that could be used to develop future diagnostics, interventions or therapies for cervical cancer."

The fingerprints identified in the study helped distinguish HPV-infected individuals, women with precancerous conditions and cervical cancer from women who were HPV negative.

"Metabolic fingerprinting has the potential to be used for the development of future diagnostics, preventatives or treatments for cervical cancer to enhance women's [health outcomes](#) here in Arizona and beyond," said Dr. Herbst-Kralovetz, who also is director of the Women's Health Microbiome Initiative at the College of Medicine—Phoenix. "Doing so could aid in reducing mortality to the fourth-leading cause of cancer in women."

Results of the study will allow researchers to better understand [risk factors](#), determine who is at a higher risk for developing cervical cancer and lead to larger clinical trials.

Women diagnosed with invasive cervical cancer, compared to those who were HPV negative, were highly associated with genital inflammation and a higher vaginal pH. In precancerous groups, researchers observed how microbial communities influenced amino acid and nucleotide metabolisms, which are building blocks of cells.

A novel aspect of their analysis revealed how specific metabolites were associated with different vaginal bacterial communities, as well as levels of genital inflammation. An increase in the health-associated *Lactobacillus* correlated with high levels of anti-inflammatory nucleotides. Collectively, they revealed that specific features (HPV infection, genital inflammation and vaginal bacteria) of the reproductive tract's microenvironment profoundly impact cervicovaginal metabolomes.

"Cervical [cancer](#) is a devastating disease, especially in rural areas and developing countries," said Jennifer Barton, Ph.D., director of the UA BIO5 Institute. "These findings could lead to a simple, rapid diagnostic test to help women get the treatment they need."

More information: Zehra Esra Ilhan et al, Deciphering the complex

interplay between microbiota, HPV, inflammation and cancer through cervicovaginal metabolic profiling, *EBioMedicine* (2019). DOI: [10.1016/j.ebiom.2019.04.028](https://doi.org/10.1016/j.ebiom.2019.04.028)

Provided by University of Arizona

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