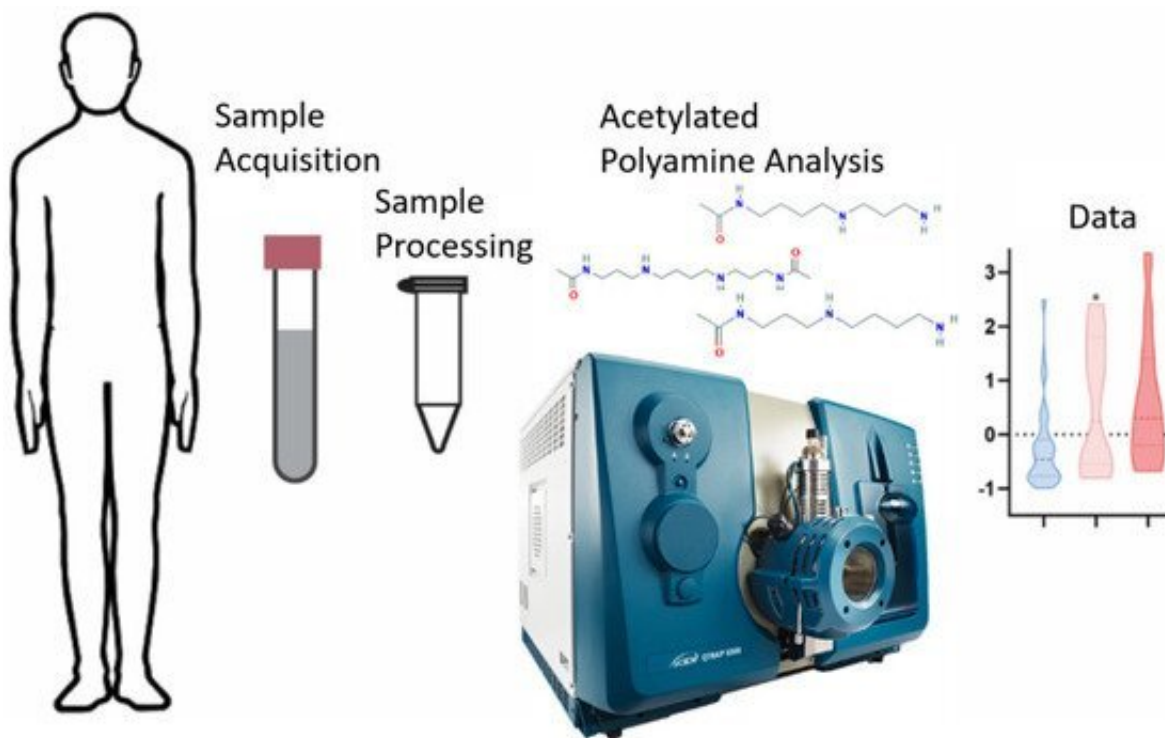


Research team works to develop a non-invasive, low-cost test for head and neck cancer

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Credit: Brian C. DeFelice et al, *Diagnostics* (2022). DOI: 10.3390/diagnostics12040797

Can screening for head and neck cancer one day be as simple as a urine or saliva test?

A team of UC Davis Health researchers is hoping to develop a non-invasive, low-cost test to help screen for possible head and neck cancer (HNC). Their study, published in *Diagnostics*, found that the levels of three polyamine molecules in saliva and urine samples of head and neck cancer patients were significantly higher than those in healthy individuals.

Detecting head and neck cancer

Head and neck cancer forms in the oral cavity, throat, voice box, salivary glands, sinuses or nasal cavity. With over 800,000 new cases and 400,000 deaths annually, it is the seventh most common cause of cancer-related death.

Early detection is critical for effective treatment. In most cases, head and neck cancer is not clinically detected in its early stages.

"Around two-thirds of patients are with advanced stage III or IV tumors at the time of diagnosis," said Andrew C Birkeland, assistant professor at the Department of Otolaryngology-Head and Neck Surgery and co-lead author of the study. "We are always looking for better ways to detect cancer early and catch signs of possible recurrence after treatment."

Patients usually seek medical care after their cancer spreads to their [lymphatic system](#), or they have symptoms linked to later-stage disease. These symptoms include pain, bleeding, ulcers, earache and difficulty swallowing.

Looking for signs of head and neck cancer in biofluids

Polyamines are metabolite components necessary for cellular growth and

tumor progression. Higher polyamine levels have been found in breast, colon and prostate cancer patients and are linked to worse cancer results.

Using very sensitive techniques to study metabolites, the researchers analyzed 107 saliva and 124 urine samples from 39 HNC patients and 89 healthy participants. Nineteen of the patients had cancer in its early stage and 20 in its late stages. Most patients had cancer in their oral cavity or the back of their mouth.

The team measured the levels of three polyamines: N1-acetylspermine (ASP), N8-acetylspermidine (ASD), and N¹,N¹²-diacetylspermine (DAS).

They found higher levels of ASD and DAS polyamines in the urine and ASP in the saliva of HNC patients compared to that of healthy individuals.

"Changes in metabolite levels in biofluids such as the saliva or urine can be important indicators of abnormal cell proliferation," said Johnathon Anderson, assistant professor at the Department of Otolaryngology and co-lead author of the study.

Saliva and urine samples can be obtained in an easy, non-invasive and inexpensive manner. Saliva testing allows patients to gather their samples at home, saving health care costs and enabling a convenient way to collect multiple samples.

"Given the non-invasive nature of saliva and urine collection and the potential cost-effective metabolite analysis options, there are opportunities for developing [screening](#) tools for at-risk patients," Anderson said.

This is a proof-of-concept study. Large scale studies are needed to

provide more support for the preclinical and clinical development of these biomarkers for screening of head and neck cancer.

"To our knowledge, this is the first study to identify elevated levels of ASP, ASD and DAS polyamines in saliva and urine samples of HNC patients," Birkeland said. "We hope science will advance to make testing for [head and neck cancer](#) as simple and accessible as an at-home pregnancy test."

More information: Brian C. DeFelice et al, Polyamine Metabolites as Biomarkers in Head and Neck Cancer Biofluids, *Diagnostics* (2022).

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Provided by UC Davis

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