

Detecting Threats in Seconds

CHEMISTRY, HEALTH, RESEARCH, DISCOVERY ZONE, COVID-19



Credit: Vivian Abagiu

Editor's update: In 2020, Livia Eberlin is pursuing the feasibility of using mass spectrometry techniques similar to what is described in this article to detect not only cancer but also the life-threatening virus that causes COVID-19. Read on for more about the technique.

A powerful new device would change the experience of cancer surgery: the MasSpec Pen is an innovative, handheld instrument that can rapidly and accurately identify cancerous tissues during surgery. Developed by a team of scientists and engineers at The University of Texas at Austin, the tool stands to improve treatment and reduce the chances of cancer recurrence.

"If you talk to cancer patients after surgery, one of the first things many will say is 'I hope the surgeon got all the cancer out,'" said Livia Schiavinato Eberlin, an assistant professor of chemistry at UT Austin who leads the team. "It's just heartbreaking when that's not the case."

Maximizing cancer removal is critical for improving patient survival, but removing too much healthy tissue also has profound negative consequences, such as nerve damage. Currently, the process of determining the boundary between cancer and normal tissues takes more than thirty minutes, and in up to 20 percent of the cases, the results are unreliable. The MasSpec Pen delivers results in about ten seconds, and in preliminary tests performed on 253 human samples, the device was more than 96 percent accurate for cancer diagnosis.

When held against tissue, the pen releases a drop of water, and small molecules from the tissue migrate into the water. The device drives the water sample into a mass spectrometer, an instrument that detects thousands of molecules as a molecular fingerprint. The "fingerprint" can then be compared to the unique set of biomarkers of various types of cancers.

"Our technology could vastly improve the odds that surgeons really do remove every last trace of cancer during surgery," Eberlin said.

Oops, we couldn't find that track.

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