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Sensing Device for Tissue Integrity & Degradation

Biopsies are a common and integral medical procedure, performed to look for conditions such as cancer, infection, inflammation and autoimmune disorders as well as to examine transplant organs for signs of rejection. When tissue is excised from a patient, the removal from its blood supply and temperature-controlled environment causes biological stress. And, unfortunately, once a biopsy is collected, there are no consistent standards, enforcement or accountability regarding specimen handling or measurement of that biological stress. This has led to approximately 3 million patients each year being misdiagnosed or mismanaged due to artefactual data from compromised tissue biopsy samples.

Researchers at Arizona State University have developed a novel device which monitors the overall quality of a tissue biopsy throughout the transportation period from biopsy collection to pathological interrogation. This small, inexpensive and reusable device includes a volatile organic compound (VOC) detecting sensor which measures VOCs emitted from the tissue sample. The device can be easily integrated into a biopsy cup or other collection vial. The measured VOCs provide a snapshot of the metabolic state of the tissue at the time of stabilization. Further, upon sensing that the VOC concentrations are near or above established thresholds, an indication system will be triggered. Data regarding the VOCs is stored for future use.

This device may allow pathologists and healthcare providers to more accurately determine the status of a biopsy sample and subsequently more accurately analyze a patient's health.

Potential Applications

- Monitoring tissue sample integrity to enable accurate and reliable analyses

Benefits and Advantages

- Monitors VOCs as well as time and ambient temperature
- Can be configured to raise alerts as thresholds are approached, facilitating corrective action to ensure sample integrity
- Small and inexpensive system
- The device is reusable
- Simple and easy enough to use such that it doesn't not cause distractions or add extra time to the biopsy process
- Provides accurate, reliable and repeatable results
- May reduce the risk of patient misdiagnoses or mismanagement due to compromised tissue biopsy samples

For more information about this opportunity, please see

[Sharma et al - Thesis Project - 2020](#)

For more information about the inventor(s) and their research, please see

[Dr. Compton's departmental webpage](#)