On-Site Diagnosis of Traumatic Brain Injury

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- Biomedical Engineering
- Mechanical Engineering

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- Microresonator
- Proteins
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Microelectromechanical resonators enable sensitive, inexpensive detection of biomarkers, which are indicators of specific diseases, infections, or other medical conditions. However, the detection of s100B, a protein biomarker secreted in the presence of a traumatic brain injury (TBI), is a difficult task to manage. There are numerous methods for identifying biomarkers, but most dependable methods are cumbersome and involve multiple, time-consuming steps that severely limit on-site diagnosis. There is need for a method of detecting biomarkers easily and practically.

Researchers at Purdue University have developed a novel functionalization technique that utilizes a piezoelectrically induced resonant microsystem, a promising medical diagnostic tool with high sensitivity. A plate-style resonator is used to sense biomarkers, including s100B, by detecting changes in mass due to biomarkers. The mechanical resonator demonstrates simple, yet powerful sensor functionality. This could be a feasible solution for successfully diagnosing potential TBI victims at the time of injury.

Advantages:
- Mechanical, label-free sensing
- Provides high-sensitivity sensing in a fraction of the time
- Portable, can use on-site
- Requires only a small amount of fluid for testing
- Allows for dry sensing, which is advantageous for single-use/on-site diagnostic applications

Potential Applications:
- Medical tools for TBI diagnosis
Related Publications:

People:
- Rhoads, Jeffrey Frederick (Project leader)
- Bajaj, Nikhil
- Chiu, George Tsu-Chih
- Murray, Allison Kelly
- Nauman, Eric A
- Tweardy, Mackenzie
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Intellectual Property:

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