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A Lab-on-Chip Ultrasonic Platform for Real-time and Nondestructive Assessment of Extracellular Matrix Stiffness

Non-destructive microfluidic platform that measures extracellular matrix stiffness with 93% accuracy.

Researchers at Purdue University have developed a method of in vitro measurement of extracellular matrix (ECM) stiffness that is nondestructive and provides fast readout. ECM stiffness has recently been found to be a contributing factor in cancer or fibrotic disease development including cell differentiation and rapid cell multiplication. Current technologies used to measure ECM stiffness in vitro are often invasive and expensive as well as sometimes limited to detecting cell destruction only after detrimental cell deformations have already occurred. The approach fine-tuned by Purdue researchers includes a noninvasive on-chip platform that can characterize ECM stiffness with up to 93% accuracy. The efficiency and long term stability of this method was validated in various hydrogels with different stiffness levels. Additionally, in vitro cell culture tests showed a reasonable cell viability and survival rate under continuous exposure to an ultrasonic wave inside the platform. The highly selective, biocompatible sensors can also be implemented in applications including drug screening, drug discovery, and 3D cell cultures.

Advantages:

-Low cost

-Nondestructive

-Accurate

Potential Applications:

-Biomedical

-Research

-3D Cell Cultures

Technology ID
2020-RAHI-68964

Category
Biotechnology & Life Sciences/Analytical & Diagnostic Instrumentation

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View online

-Drug Screening

-Therapeutic Efficacy Monitoring

Technology Validation:

The efficiency and long term stability of the ultrasonic stiffness measurement method was validated in various hydrogels with different stiffness levels. Additionally, in vitro cell culture tests showed a reasonable cell viability and survival rate under continuous exposure to an ultrasonic wave inside the platform.

Recent Publication:

A Lab-on-Chip Ultrasonic Platform for Real-Time and Nondestructive Assessment of Extracellular Matrix Stiffness

Royal Society of Chemistry's Lab on a Chip Journal

DOI: 10.1039/C9LC00926D

TRL: 3

Intellectual Property:

Provisional-Gov. Funding, 2020-05-13, United States

Utility-Gov. Funding, 2021-03-08, United States

Keywords: 3D Cell Culture, Biodynamic imaging, Bioinformatics, Biomaterials, Biomedical, Biomedical Engineering, Biopharmaceutical Manufacturing, Biosensors, Biotechnology, Cancer Research, Cancer Screening, Cancer Therapy, Cell Biology, Cell Culture, Cell Targeting, cell therapy, Drug Delivery, Drug Development, Fibrotic Disease, Materials Science, Medical device, Micro & Nanotechnologies, microbiology, Nanotechnology, Pharmaceutical Research, Pharmaceuticals, Pharmaceutics, Signals, Stiff, Transistor