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In Plane Cell Stretching with Force Characterization and Optical Capabilities

Optical-imaging-integrated device that applies real-time mechanical strain for cancer and drug discovery research.

Researchers at Purdue University have developed a modular platform for in-situ mechanical characterization of biological materials. Existing mechanical stimulation platforms have high throughput but do not possess real-time integrated force sensors and rely on synthetic, non-physiologically relevant materials for cell seeding. Detecting changes in mechanical properties of tissues is vital for understanding cell responses to diverse conditions. However, it remains a significant challenge to simultaneously conduct mechanical stimulation while imaging biological cells.

This multimodal system helps researchers and pharmaceutical companies track the progression of changes in cell morphological effects over time to better understand cell responses to dynamic environments. The technology possesses high-resolution force sensing capabilities and enables axial mechanical characterization of tissues. The platform is a simple and cost-effective solution that addresses the lack of simultaneous biological imaging and mechanical stimulation in tissue engineering. The utilization of this technology will streamline the drug discovery process and improve our understanding of the progression of metastasizing cancer cells.

Technology Validation:

The researchers analyzed the progression of breast cancer cells' mechanical properties while exposed to various dynamic environments. The cells demonstrated aspects of dominance in dynamic environments compared to their static counterparts.

Advantages:

- High resolution force sensors and optical imaging capabilities

- Cost-effective and easy-to-use platform

Technology ID

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Category

Biotechnology & Life Sciences/Analytical & Diagnostic Instrumentation

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View online

- Real-time tracking of changes to cell mechanical properties

Applications:

- Tissue engineering

- Pharmaceutical and biopharma companies

TRL: 3

Intellectual Property:

Provisional-Patent, 2023-10-13, United States

Utility Patent, 2024-10-11, United States

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