

Polymer-Cast Inserts for Cell Histology and Microscopy

Summary

The National Cancer Institute (NCI) seeks co-development partners and/or licensees for polymer-cast inserts for cell histology and microscopy; a system for high throughput three-dimensional (3D) cell culture and screening microscopy.

NIH Reference Number

E-196-2018

Product Type

- Research Tools

Keywords

- 3D Cell Culture, Spheroids, Organoids, Histology, Microscopy, Histopathology, High-Throughput Screening, Polymer-cast, Parchment

Collaboration Opportunity

This invention is available for licensing and co-development.

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Description of Technology

Three-dimensional (3D) cell cultures systems are important for studying cell biology because they provide *in vivo*-like microenvironments more physiologically relevant than two-dimensional (2D) culture systems. In 3D culture systems, cells are grown in culture matrixes and turn into spheroids and organoids later processed for downstream analysis by microscopy and histology techniques. The processing of 3D cultures for analysis by microscopy or histology is laborious and time-consuming due to incompatibility of the 3D culture vessels and the microscopy and pathology blocks. Therefore, it is not amenable to high-throughput analysis.

NCI scientists developed polymer-cast inserts for cell histology and microscopy (PICHAM), made of soft biocompatible polymer compatible with immunofluorescence microscopy. The technology encompasses fixation for paraffin embedding and sectioning, into which an array of vertical wells were bored to harbor cells in culture in the form of spheroids,

organoids or other tissue replicas. A PICHAM is cast as a rectangular cuboid designed and fabricated with dimensions to precisely fit into standard histology cassettes. It is envisioned to provide a one-piece system that allows a seamless transition from 3D culture to high-throughput histopathology and microscopy analysis of spheroids and organoids. Due to the compatibility of PICHAMs with both cell culture and histopathology processes, it will eliminate a major roadblock in high throughput processing of 3D cell cultures for microscopy and histopathology analyses.

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Potential Commercial Applications

- Research tool for cell biology
- Growing 3D cell cultures for histology and microscopy analysis
- High-throughput processing of 3D cell cultures for microscopy and histopathology analysis

Competitive Advantages

- Minimizes processing of 3D cell cultures for histopathology analysis
- Saves time by reducing processes and eliminating manual steps
- Enables high-throughput microscopy and histopathology analysis of 3D cultures
- Minimizes disruptions of 3D cell cultures during processing
- Compatibility with both 3D cell culture vessels and histopathology cassettes reduces supplies required

Inventor(s)

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Development Stage

- Prototype

Publications

- Huang H, et al. Peptide hydrogelation and cell encapsulation for 3D culture of MCF-7 breast cancer cells

Patent Status

- **U.S. Provisional:** U.S. Provisional Patent Application Number 63/058,794 , Filed 30 Jul 2020

Therapeutic Area

- Infectious Diseases
- Immune System and Inflammation

- Skin and Subcutaneous Tissue

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