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Method And Device For Patterning Cells At Defined Interface

Tech ID: 32177 / UC Case 2015-783-0

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BRIEF DESCRIPTION

The present invention features a method and device that addresses the need for a low-cost and easy-to-use method and device to pattern a sharp interface between two or more cell populations or, more generally, two or more coatings wherein their interfacing properties are of interest. As a result, the present invention enables new types of experiments that analyze cell-cell interactions and the study of tissue biology in general.

FULL DESCRIPTION

There are various methods of patterning an interface between two different cell populations. But these methods have the issue of one cell population cross-contaminating the other and not creating a sharp interface between each other, or the interface becoming ragged and not very sharp because of the wide gap created by a thick barrier between the cell populations, which causes the cells to travel quite a distance to close the gap. Another method used to create a sharp interface is the usage of discrete plates that are first seeded with different cell types and then moved together to form a sharp cell-cell interface. However, such method utilizes a silicon substrate, which is not optically transparent and, as a result, makes the system incompatible with inverted microscopes used in most biology laboratories.

The present invention takes advantage of the elastic properties of elastomeric materials such as, for example, polydimethylsiloxane (PDMS). A small slit is cut into an elastomeric bottom surface of a well (e.g., cut down the middle of the elastomeric bottom surface). The well is stretched to open the slit to form a gap, and a barrier is then inserted into the slit to split the well into two separate compartments. Two coatings of cell suspensions or other particles or species (e.g., protein suspensions or chemical reagents) are disposed into each compartment. After removing any unbound species or cells from each of the compartments, the barrier is removed to allow the gap in the elastomeric bottom surface to close, thereby leaving a sharp interface between the two cell populations (or other particles or species). The separated regions are rejoined with near perfect accuracy, creating a continuous surface with a sharp transition between two different surface treatments.

OTHER INFORMATION

CATEGORIZED AS

» **Medical**
  » Disease: Cancer
  » Research Tools
  » Stem Cell
» **Research Tools**
  » Cell Lines

RELATED CASES

2015-783-0

SUGGESTED USES

Patterning a sharp interface between two different cell populations to analyze phenotypic differences when two different cell populations are mixed and allowed to interact.

ADVANTAGES

· Provides a low-cost and easy-to-use method to pattern a sharp interface between cell populations.
· Improves the accuracy of the interface created, increases robustness of the interface creating process, and allows easier imaging of the interface on a standard microscope.
Allows for the investigation of the role of direct cell-cell contact, gradients in cell signaling, migration and invasion between populations, morphogenesis, scarring and fibrosis, and other forms of cell-cell crosstalk.

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	10,190,083	01/29/2019	2015-783

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