

# Progress in Patterns: *Directing Cell Migration on Culture Dishes*

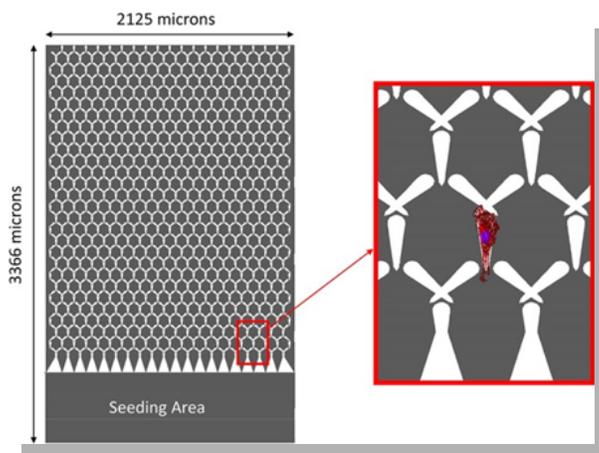
## Chia-Chi Ho, PhD

Cell movement plays a pivotal role in a number of biological responses, including wound healing, tumor formation, and cancer metastasis. Thus, to be able to guide and control the movement of cells has powerful implications in regenerating tissues damaged by injury or disease. Dr. Chia-Chi Ho and her research team are working to do just that, by finding a way to control the movement of cell mixtures simply and inexpensively, using strategically-designed patterns on culture dishes.



## Patterned Culture Dishes

In order to guide cell movement, Ho and her colleagues printed zigzag-shaped patterns on cell-resistant polymer backgrounds and allowed fibroblast cells to travel along the patterned surfaces. These continuous zigzag-shaped “microchannels” amplified the natural movement of cells, without an external gradient or shear stress. The patterns were even able to correct cells with random movement.



The honeycomb pattern, composed of teardrop-shaped islands on a culture dish, create a simple method to guide and sort cells. A cell (red) is constrained to an island.

## Honeycomb Patterns

Recently, Chia-Chi Ho and colleagues decided to test whether honeycomb, or teardrop-shaped patterns could control the movement of cells. They specifically wanted to use the shapes to separate mixtures of cells. Thus, they printed the honeycomb pattern onto culture dishes and allowed a mixture of two types of fibroblast cells to travel along the pathways. The pattern separated the cells based on how quickly they moved, and after 72 hours, the two groups of cells successfully separated on the plate. The team plans to speed up the process either by modifying the shape or spacing of the patterns, or by adding chemical attracts to the culture dish.

Such control over cell movement could eventually lead to diagnostic tools in the medical field, particularly in areas where cell movement plays a role, such as cancer metastasis and wound healing.



## More about

### Dr. Chia-Chi Ho

Dr. Ho specializes in chemical and materials engineering and has been teaching and researching at UC for more than ten years. In 2012, she was selected as a Fulbright Scholar. She received the Outstanding Research Professor Award in 2013 and the Engineering Tribunal Professor of the Quarter in 2004. Her research has garnered more than \$3,000,000 in funding.

### Research Areas

- Tissue Engineering
- Bioseparations
- Nano/Microbiotechnology

## In the News

Ho's work has been highlighted in a number of magazines and news outlets. Click one of the links below to read more about her work:

- [Cells are Under Control at University of Cincinnati](#)
- [Sorting Cells In Dishes](#)

## Recent Publications

- Ko, Y. G., C. C. Co, and C. C. Ho (2013). Directing Cell Migration in Continuous Microchannels by Topographical Amplification of Natural Directional Persistence. *Biomaterials*, 34(2), 353-360
- Co, C. C., C. C. Ho, and G. Kumar (2012). Motility Based Cell Sorting by Planer Cell Chromatograph. *Analytical Chemistry*, 83(4), 10161-10.