Controlling Size and Shape of Stem Cell Colonies with SAM Array

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WARF: P120127US01

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The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing methods for regulating the size and shape of cell aggregates, allowing better control over differentiation.

OVERVIEW

The substrate on which cells are cultured is key to successful growth and tissue generation. For example, it has been shown that attachment to a substrate by human embryonic stem cells influences whether or not they differentiate into mature, tissue-specific cell types.

Many techniques for differentiating pluripotent stem cells begin with forming ball-shaped aggregates of cells called embryoid bodies. Releasing these clumps requires scraping and treatment with enzymes. Aggregates of cells formed in this way have non-uniform shapes and sizes, which can lead to inefficient and uncontrolled differentiation.

An alternative substrate should offer better control over colony formation and avoid burdensome harvesting steps.

THE INVENTION

UW–Madison researchers have developed a method for generating colonies of stem cells in controlled shapes and sizes.

The method uses self-assembled monolayer (SAM) arrays, which are metal-coated slides patterned with small adherent spots. These tools enable researchers to systematically expose cells to various surface-bound molecules — such as proteins, nucleic acids and polysaccharides — and study how they interact.

The SAM spots can have specified diameters and shapes (e.g., circle, oval or star), and the cells that come in contact with them will adhere accordingly. The cells can be cultured for a sufficient time to form a layer that undergoes a morphogenesis process and then detaches so it can be collected for further analysis.

THE WARF ADVANTAGE

Since its founding in 1925 as the patenting and licensing organization for the University of Wisconsin-Madison, WARF has been working with business and industry to transform university research into products that benefit society. WARF intellectual property managers and licensing staff members are leaders in the field of university-based technology transfer. They are familiar with the intricacies of patenting, have worked with researchers in relevant disciplines, understand industries and markets, and have negotiated innovative licensing strategies to meet the individual needs of business clients.

APPLICATIONS

- Studies examining substrate component effects on stem cells, including human embryonic and mesenchymal stem cells
- Screening for factors that may influence early tissue development

KEY BENEFITS

- Control over size and shape of cell aggregates
- Less variable, more efficient cell differentiation
- No special apparatus required for colony harvesting
- Array's inert background prevents non-specific interactions.
- Compatible with a wide range of cell and ligand types
- Supports enhanced throughput

STAGE OF DEVELOPMENT

Arrays featuring more than 100 spots were used to examine the effect of peptide sequence and density on the attachment and behavior of human mesenchymal stem cells, embryonic stem cells, induced pluripotent stem cells, umbilical vein endothelial cells, dermal fibroblasts and fibrosarcoma tumor cells.

ADDITIONAL INFORMATION

Related Technologies

For more information about using the alkanethiolate SAM arrays to investigate cell-surface interactions, see WARF reference number P120126US01.

Tech Fields

Pluripotent Cells - Differentiation
Pluripotent Cells - Tools
Research Tools - Arrays
Research Tools - Media

CONTACT INFORMATION

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