



National Aeronautics and
Space Administration



Health, Medicine and Biotechnology

High Quality Tissue Formation Method

by using High-Density Spot Seeding (HDSS)

NASA Johnson Space Center seeks interested parties for the licensing and commercialization of the High Density Spot Seeding (HDSS) method patented technology used to create 2D and 3D tissue models. This method can be used to develop tissue models for a variety of applications including wound treatment, therapy, tissue modeling of skeletal muscle, cardiac muscle, nerve, and bone. The HDSS technique uses an easy four step method that does not require expensive reagents, such as specialized serum or growth factors and compared to traditional methods, HDSS has the potential to yield superior-quality tissue samples.

BENEFITS

- Simple: Uses natural process to generate a variety of tissues
- Cost-Effective: Does not require use of expensive reagents
- Superior Quality: Produces highly-aligned, linear, contracting tissue
- Fast Production: Enables quick tissue generation with reliable timescale
- Functional Cells: Produces contracting muscle tissue models

technology solution



NASA Technology Transfer Program

Bringing NASA Technology Down to Earth

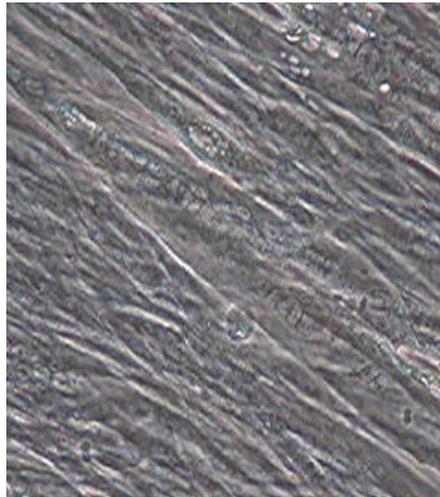
THE TECHNOLOGY

This technology is a simple, reproducible, and cost-effective process that creates 2D and 3D human tissue formations by high-density spot seeding (HDSS) of cells. The method entails the spot seeding of cells at a specific concentration onto a Petri dish, but without the need of extracellular matrix components. Cells are then incubated to allow attachment. The culture is rinsed with a medium to remove unattached cells and a growth medium is added to enable the cells at the periphery of the spot to proliferate and differentiate, outward from the center cells. This pattern of growth results in a 2D model of dense, organized, mature cells. It is proposed that the 2D formations can be stacked upon another via lamination process to create 3D tissues.

By forming tissue using this method, the technology enables the creation of unique models for R&D, pharmaceutical development and perhaps even regenerative medicine. For instance, for basic R&D, the study of mechanistic pathways involved in normal and/or diseased tissue becomes possible. This technology can also be used as an in-vitro tissue model for drug screening and toxicology testing in the pharmaceutical development field. The HDSS method may also be advantageous for high-throughput screening assays, where large volume of screenings are done simultaneously.



The HDSS technique can potentially facilitate tissue patching or wound repair in regenerative medicine field.



Transplantable tissues such as muscle or skin can be developed using the patients own tissue cells.

APPLICATIONS

The technology has several potential applications:

- Basic Research and Development
- Pharmaceutical Development
- Regenerative Medicine
- Drug Screening and Testing

PUBLICATIONS

Patent No: 8,735,116; 9243223

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NASA's Technology Transfer Program pursues the widest possible applications of agency technology to benefit US citizens. Through partnerships and licensing agreements with industry, the program ensures that NASA's investments in pioneering research find secondary uses that benefit the economy, create jobs, and improve quality of life.

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