USF Available Technologies

Technology Transfer Office

Magnetic Three-Dimensional Cell Culture Model

Researchers at the University of South Florida have developed a long-term three dimensional (3D) mechanism for *in vitro* cell and tissue culture via magnetized suspension.

Current cell and tissue culture set ups do not provide a realistic environment. Conventional cell culturing involves placing a small number of cells into a nutrient-rich media, typically a petri dish or flask, and allowing the cells to grow or multiply. The result is a two dimensional (2D) growth of cells; however, *in vivo* cell and tissue growth occurs in 3D. Other methods require a constant supply of electricity. These methods and devices provide limited insight into *in vivo* cell growth and multiplication.

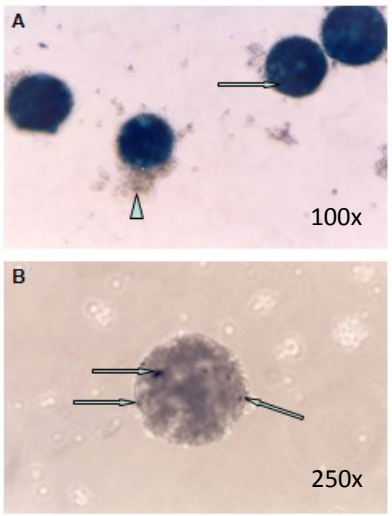
USF researchers have developed a 3D apparatus that simulates real *in vivo* growth conditions to produce *in vitro* models of cells' and tissues' biology and functionality. The model suspends cells with magnetic levitation via microcarrier beads, allowing 3D cell growth.

Since this 3D cellular and tissue growth model provides a much more accurate representation of *in vivo* environments than the 2D models, it can also be utilized to more accurately assess cellular and tissue responses to various pharmaceutical compounds. For example, in practice the new 3D models have demonstrated that some tumor cellular constructs are at least three-fold more resistant to chemotherapeutic agents than previously expected through 2D monolayer techniques. These results indicate 2D monolayers represent a highly artificial environment with limited predictive value for the clinical efficacy of a compound. The new 3D model has the potential for multiple applications because it provides a close *in vivo* model.

ADVANTAGES:

- **No source of electricity required**
- **Useful for tissue regeneration**
- **Promotes spatially unrestricted 3D cell growth and development**
- **Increases predictability of drugs clinical efficacy via cost effective screening**

Apparatus to Simulate 3D In Vivo *Cell Growth via Magnetized Suspension*



A. The Microcarrier Beads (Arrow) Readily Take Up the Dye, Staining Blue, and the Viable Cells (Arrowhead) Extrude the Trypan Blue
B. Small Bits of the Magnetite (Arrows) Present Within the Microcarrier Bead with Cells Attached to the Surface

Tech ID # 03A032 **Patent #: 9,752,139**

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