"Heart-on-a-Chip": Gelatin Hydrogel Membrane for Culturing Heart Cells

Published date: Aug. 15, 2017

Technology description

Market Opportunity

Cardiovascular disease (CVD) is the leading cause of mortality around the world. In the United States alone, heart failure currently affects over 5 million people costing the nation an estimated $32 billion annually. A major limitation in cardiovascular drug development is that current CVD models lack relevance to native human tissue. The “Heart-on-a-chip” device overcomes these limitations, but the synthetic elastomer polydimethylsiloxane (PDMS) it uses for culturing cardiac cells is not suitable for long-term studies. The $120 billion market for CVD drugs will benefit from a device that provides conducive culture conditions to heart cells in a physiological microenvironment.

USC Solution

USC scientists have developed a gelatin hydrogel membrane to serve as the basement layer for culturing cardiac myocytes in a “Heart-on-a-chip” device using PDMS frames and a biodegradable mesh for added mechanical support. They also created a semi-permeable barrier that supports endothelial cells and mimics native vasculature. This device provides a physiological microenvironment conducive to long-term culturing of heart cells.

Application area

Platform for drug development and modeling of cardiovascular diseases

Advantages

“Heart-on-a-chip” mimics natural tissue microenvironment
Allows for cell-to-cell signaling across cell types
Offers new insight into deficits caused by genetic mutations
Platform to validate effectiveness of potential new therapies

Institution

University of Southern California

联系我们

叶先生

电 话：021-65679356

手 机：13414935137

邮 箱：yeyingsheng@zf-ym.com