Blood Vessel Mimics and Methods of Preparation (11051)

Published date: Sept. 19, 2014

Technology description

Technology

The present technology consists of tissue engineered vascular grafts (TEVG's), blood vessel mimics (BVMs), and methods for using these in in vitro model systems for evaluation of intravascular drugs and devices. The present invention includes devices and methods for preparing TEVGs, BVMs and model systems that mimic blood vessel or tubular structure aneurysms. These structures make use of tubular polymeric scaffolds having luminal surfaces that include at least one layer of cells. These tubular scaffolds are comprised of either expanded polymers or electrospun materials while Stromal Vascular Fraction (SVF) cells are utilized for the generation of luminal surfaces having at least one layer of cells. The present technology also includes of methods of development of aneurysm models using serum-free conditions and scaffold variations.

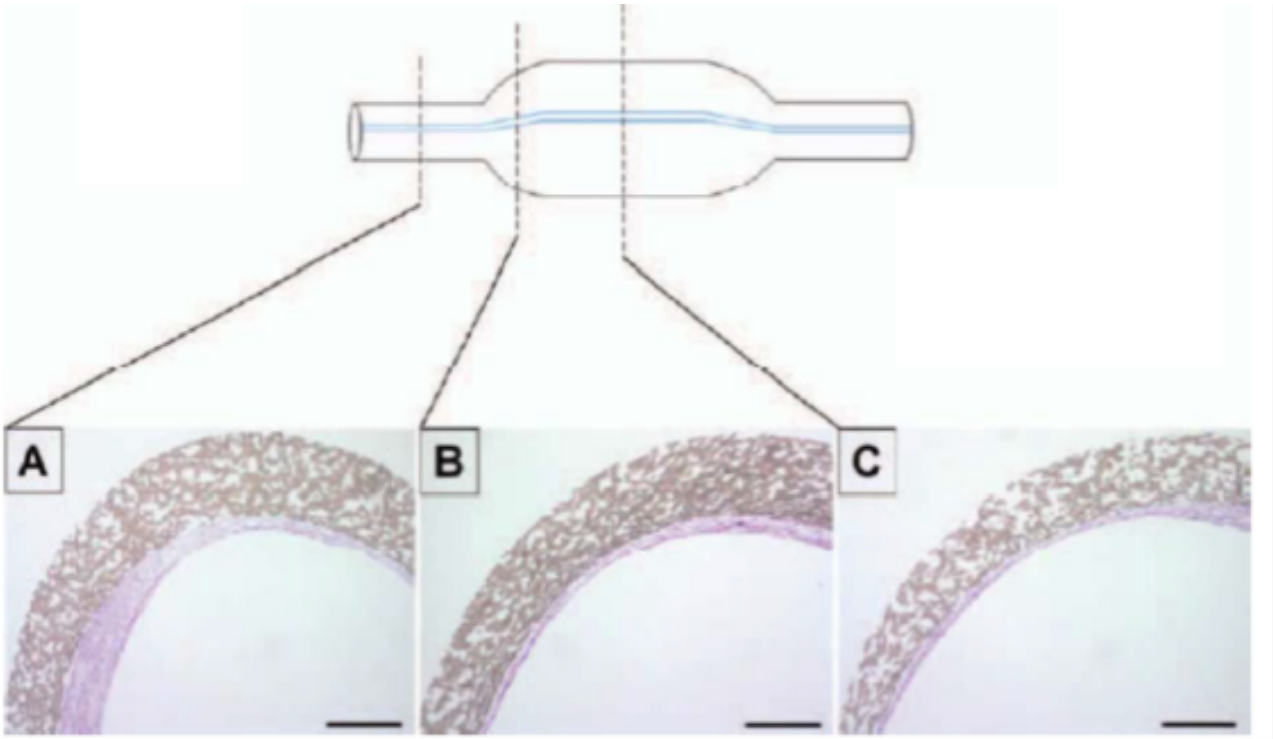

Figure 1: Schematic diagram showing hematoxylin and eosin staining of BVM wherein staining revealed lining of human tissue throughout BVM including the non-dilated (A), transitional (B), and fully-dilated (C) regions of the BVM following 14 days of flow conditioning.

Markets Addressed

Coronary artery disease, the most common form of heart disease, resulted in over 600,000 deaths in 2012, making it the single leading cause of death in the United States. A frequently utilized technique aimed at treating the disease and restoring adequate blood flow to the heart is percutaneous coronary angioplasty accompanied by placement of a stent. Present methods of pre-clinical stent assessment rely on in vivo animal models, including rabbit and pig models. These methods, however, create considerable challenges, namely the long periods of time associated with animal preparation and testing execution, the high costs of animal modeling, and animal to human variability. The technology developed by researchers at the University of Louisville alleviates these problems by providing for blood vessel mimics and methods for preparing the same. Further, this technology allows for development of aneurysm models to allow for improved pre-clinical stent design and testing for the treatment of aneurysms.

Technology Status

Fields of Use Available: All

Publications: "A tissue-engineered aneurysm model for evaluation of endovascular devices," J Biomed Mater Res A. 2012 Dec;100(12):3189-96.; "Bioengineering Human Blood Vessel Mimics for Medical Device Testing Using Serum-Free Conditions and Scaffold Variations," Tissue Eng Part C Methods. 2013 Apr;19(4):307-15.

Advantages

An improved preclinical testing model for stent design and testing.
A blood vessel mimic for in vivo aneurysm simulation.
Improved methods for the preparation of blood vessel mimics utilizing stromal vascular fraction cells.

Institution

University of Louisville

Inventors

Jeremy Touroo
Stuart Williams II

联系我们

叶先生

电 话：021-65679356
手 机：13414935137
邮 箱：yeyingsheng@zf-ym.com