Methods and Treatment of Peripheral Artery Disease (PAD) and Critical Limb Ischemia Using Extracellular Matrices

Tech ID: 22431 / UC Case 2012-053-0

BACKGROUND

Despite recent advances in tissue engineering and regenerative medicine, ischemia related to cardiovascular disease results in the death of more than 100,000 amputations per year from peripheral artery disease (PAD) in the US alone. Very few biomaterials have been examined and of those examined (*e.g.* fibrin, collagen, alginate, and Matrigel). None of these provide all the native components of the skeletal muscle extracellular matrix. Most are limited to improving growth factor and cell delivery.

Currently no material meets all of the properties of an ideal scaffold, namely enhanced neovascularization to reduce the ischemic environment, better cell adhesion, survival, and maturation of endogenous or exogenously added cells. There is a need to develop improved compositions for minimally invasive tissue-engineered therapies for the treatment of critical limb ischemia.

TECHNOLOGY DESCRIPTION

Researchers at the University of California, San Diego have patented tissue specific de-cellularized matrices for treating peripheral artery disease, critical limb ischemia, and have potential for skeletal muscle tissue engineering. Mammalian extracellular matrix provides scaffolds for cell growth, recruitment and replacement as well as a biocompatible material that can be used to deliver drugs to specific tissues (*e.g.* skeletal myoblasts, stem cells, and other cell types relevant to skeletal muscle repair).

UC San Diego is seeking companies to commercially develop this patented technology into products. US patent rights are available for licensing.

RELATED MATERIALS

▶ Hydrogel helps hearts heal after myocardial infarction in animals, taking step toward trials in human heart-attack patients. San Diego Biotechnology Connection News Release (Rex Graham) - 05/03/2012

▶ Singelyn JM, Sundaramurthy P, Johnson TD, Schup-Magoffin PJ, Hu DP, Faulk DM, Wang J, Mayle KM, Bartels K, Salvatore M, Kinsey AM, Demaria AN, Dib N, Christman KL. Catheter-deliverable hydrogel derived from decellularized ventricular extracellular matrix increases endogenous cardiomyocytes and preserves cardiac function post-myocardial infarction. J Am Coll Cardiol. 2012 Feb 21;59(8):751-63. - 02/21/2012

▶ Young DA, DeQuach JA, Christman KL. Human cardiomyogenesis and the need for systems biology analysis. Wiley Interdiscip Rev Syst Biol Med. 2011 Nov-Dec;3(6):666-80. - 12/31/2011

▶ DeQuach JA, Mezzano V, Miglani A, Lange S, Keller GM, Sheikh F, Christman KL. Simple and high yielding method for preparing tissue specific extracellular matrix coatings for cell culture. PLoS One. 2010 Sep 27;5(9):e13039. - 09/27/2010

▶ Singelyn JM, DeQuach JA, Seif-Naraghi SB, Littlefield RB, Schup-Magoffin PJ, Christman KL. Naturally derived myocardial matrix as an injectable scaffold for cardiac tissue engineering. Biomaterials. 2009 Oct;30(29):5409-16 - 10/30/2009

▶ Singelyn JM, DeQuach JA, Christman KL. Injectable myocardial matrix as a scaffold for myocardial tissue engineering. Conf Proc IEEE Eng Med Biol Soc. 2009;2009:2406-8 - 09/03/2009

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	10,251,977	04/09/2019	2012-053
United States Of America	Issued Patent	9,592,256	03/14/2017	2012-053

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OTHER INFORMATION

CATEGORIZED AS

▶ **Medical**
  ▶ Disease: Cardiovascular and Circulatory System
  ▶ Stem Cell
▶ **Research Tools**
  ▶ Reagents

RELATED CASES

2012-053-0

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