Bi-Functional RGD Peptide to Promote Therapeutic Angiogenesis, Treat Ischemic Diseases (2016-060)

New peptide identifies biological ligands and signaling pathways, promotes therapeutic angiogenesis

Market Overview

This bi-functional RGD peptide helps identify ligands and improve functions of endothelial cells, allowing for the development of biomaterials to treat ischemic diseases. According to the Center for Disease Control and Prevention, over 795,000 people in the United States suffer a stroke each year. Of these cases, 87 percent are caused by ischemia – the restriction of blood flow to tissue. Ischemia causes a reduction in oxygen and energy as well as a build-up of waste products for tissues and organs. In severe cases, it can cause organ failure and lead to diseases such as ischemic heart disease or stroke. Recent research, however, suggests therapeutic angiogenesis holds remarkable promise to treat ischemic diseases and for developing viable tissue engineering strategies. To this end, Clemson University researchers have combined modern bioinformatics and a newly established peptide-functionalized hydrogel microarray to identify a bi-functional RGD peptide that promotes therapeutic angiogenesis. This discovery allows for the development of multi-functional biomaterials for treating ischemic diseases and the fabrication of pre-vascularized tissue engineering constructs.

Application

Biomaterials;
tissue engineering; ischemic diseases

Stage of Development

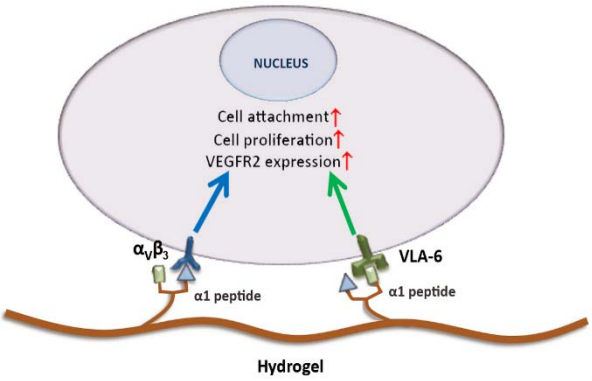
In vivo studies underway

Advantages

- Allows for the development of pro-angiogenic biomaterials, assisting in the treatment of ischemic diseases
- Demonstrates significantly improved properties to promote endothelial cell functions over currently used peptides

Technical Summary

While previous studies have focused on the identification of biological ligands to improve the functions of endothelial cells, Clemson University researchers have combined modern bioinformatics and a newly established peptide-functionalized hydrogel microarray technology to identify peptides with high affinity to endothelial cell integrin. Leveraging the recent advances in



bioinformatics, a library of RGD peptides derived from various vascular endothelium extracellular matrix proteins was constructed. The newly established peptide-functionalized hydrogel microarray was then used to screen the RGD peptide library for the high affinity ligands to endothelial cell integrin. This enabled the identification of a RGD peptide with dramatically enhanced ability to promote endothelial cell adhesion, spreading, and proliferation in comparison with the currently used RGDS/RGDS peptide.

App Type	Country	Serial No.	Patent No.	CURF Ref. Number	Inventors
Provisional	United States	62/405,523	NA	2016-060	Ying Mei, Jia Jia, Chung-Jen James Chou

About the Inventor

Dr. Ying Mei is an Assistant Professor in the Department of Bioengineering at Clemson University. He earned his Ph.D. in Material Chemistry from Polytechnic Institute of New York University. Prior to joining Clemson University, Dr. Mei was a guest researcher at the National Institute of Standards and Technology and was a postdoctoral researcher in the Langer Lab at MIT. His research interests focus on biomaterials, stem cell engineering, and tissue engineering.

For More Information

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