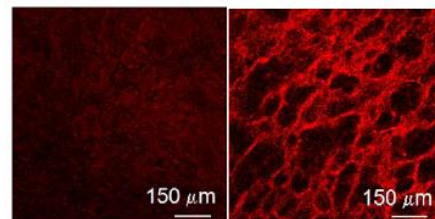


Novel Elastogenic Cues for Tissue Rejuvenation and Vascular Aneurysm Therapy

Description:

Elastin is a critical component in all connective tissue and is not readily regenerated by the body. In order to develop or regenerate functional connective tissue, elastogenic cues to synthesize, organize, and stabilize the extracellular matrix are critical.

The invention includes novel elastogenic cues for injured or developing connective tissues (i.e. cardiovascular, dermal, pulmonary, and other elastin containing tissue) that will encourage the development of functional and structurally sound tissues. These cues include hyaluronan fragments and oligomers, optionally in conjunction with growth factors and/or a source of copper ions. There are multiple attractive potential application including vascular disease treatment, cosmetic skin rejuvenation, tissue engineering advancement and more. Additionally the flexibility of options for delivering the elastogenic agents to the tissue, together with the physiological benefits of the agents themselves, provide a compelling basis for many product development opportunities. In vascular tissue, elastin is an important component of blood vessels associated with retraction of the blood vessel following dilation from blood flow. Stabilization and regeneration of elastin could result in effective treatment of aneurysm. An additional feature of this technology is the usage of hyaluronan oligosaccharides to suppress smooth muscle cell growth and proliferation which are associated with vascular occlusion in atherosclerosis and restenosis.



A treatment containing copper nanoparticles (CuNP) and hyaluronan oligomers (HA-o) dramatically improves elastic matrix deposition and fiber assembly (right) by aortic smooth muscle cells that are inherently deficient at elastogenesis (left). Both images were acquired under identical conditions of exposure.

Applications:

- Vascular tissue therapies (i.e. Vascular Aneurysm Therapy)
- Skin rejuvenation therapies
- Tissue engineering applications (in-vivo, or ex-vivo)
- Development of implantable graft materials and scaffolds using natural or synthetic materials
- Can be incorporated into materials for controlled release

Related Publications:

- Kothapalli, C.R. and Ramamurthi, A. [Copper nanoparticle cues for biomimetic cellular assembly of crosslinked elastin fibers](#). Acta Biomater. 2009; 5(2): 541-53.
- Kothapalli C, Gacchina C, and Ramamurthi A. [Utility of Hyaluronan Oligomers and Transforming Growth Factor-Beta1 Factors for Elastic Matrix Regeneration by Aneurysmal Rat Aortic Smooth Muscle Cells](#). Tissue Engineering Part A. November 2009; 15(11): 3247-3260.

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