New Treatment For Aortic Aneurysms

Tech ID: 30474 / UC Case 2019-362-0

BACKGROUND

Aortic aneurysms account for 1-2% of deaths in Western countries, and despite improvements in surgical repair, morbidity and mortality remain high, especially with thoracic aortic aneurysms and dissections (TAAD). Degeneration of the medial layer of the aorta leads to aortic dilation and/or rupture; pathological changes in the media include progressive elastin fiber fragmentation, loss of smooth muscle cells, and proteoglycan accumulation. Mutations causing hereditary TAAD affect proteins regulating transforming growth factor-β signaling (e.g., Loeys-Dietz syndrome and Marfan syndrome), or components of the smooth muscle cell contractile apparatus. Aortic pathology has been attributed to smooth muscle cell phenotypic alterations and activation of stress pathways, leading to increased production of tissue-destructive matrix metalloproteinases and increased oxidative stress. Abdominal aortic aneurysms (AAAs) may share with TAAD some of these pathogenic mechanisms. While blood pressure control with β-adrenergic or angiotensin receptor blockers modestly improve the prognosis of patients with TAAD, there is no treatment to prevent the pathologic changes in the aorta.

TECHNOLOGY DESCRIPTION

Researchers at UC San Diego have used a newly developed, potent antioxidant in mouse studies of TAAD to show that it completely prevented age-related development of aortic media degeneration and aortic dilation.

APPLICATIONS

The therapeutic could potentially be used to prevent and treat a variety of aortic diseases associated with excess oxidative stress, including TAAD and AAA.

STATE OF DEVELOPMENT

This is at the experimental state.

INTELLECTUAL PROPERTY INFO

The technology is patent pending and available for licensing or collaborations.

RELATED MATERIALS

▶ Schwaerzer GK, Kalyanaraman H, Casteel DE, Dalton ND, Gu Y, Lee S , Zhuang S, Wahwah N, Schilling JM, Patel HH, Zhang Q, Makino A, Milewicz DM, Peterson KL, Boss GR, Pilz RB. Aortic pathology from protein kinase G activation is prevented by an antioxidant vitamin B12 analog. Nat Commun. 2019 Aug 6;10(1):3533. doi: 10.1038/s41467-019-11389-1. - 08/06/2019

PATENT STATUS

Patent Pending

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OTHER INFORMATION

KEYWORDS

Aortic aneurysms, aortic disease, Marfan syndrome, oxidative stress, antioxidant

CATEGORIZED AS

▶ **Medical**
▶ Disease: Cardiovascular and Circulatory System
▶ Therapeutics

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