Endothelial derived factors to treat heart failure

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Technology description

Summary

Current approaches to the treatment of heart failure target systemic causes of vascular dysfunction. Patients can quickly develop tolerance towards these treatments, however, making them unsuitable for long-term use. This technology presents an alternative approach in the treatment of heart failure, by targeting heart muscle cells, specifically. Further, it identifies molecules that activate endothelial-derived channels, ultimately inducing vasodilation, a critical component in treating heart failure. As such, this technology presents a new class of therapeutics that avoid systemic drug tolerance, improving survival after heart failure and other heart diseases.

Alternative, localized, therapy for the treatment of heart failure

While most current treatments for heart failure target systemic causes of vascular dysfunction, this technology targets the intrinsic dysfunctions of vascular muscle cells. During heart failure, vascular muscle cells display altered electrical properties. This technology limits the depolarizing currents that muscle cells experience during heart failure, by activating endothelial-derived channels through small molecule activators. This leads to vasodilation and improves blood flow and vascular contractility. Furthermore, unlike other marketed therapeutics, this technology is Big Potassium (BK) channel independent, thus circumventing issues of drug tolerance. As a result, this technology presents a new class of therapeutics that is may enhance efficacy in the treatment of heart failure and other related types of heart disease.

This technology has been tested in rat tissues and has been shown to improve coronary blood flow and vascular contractility.

Publications

Wan, E., J.S. Kushner, S. Zakharov, X.W. Nui, N. Chudasama, C. Kelly, M. Waase, D. Doshi, G. Liu, S. Iwata, T. Shiomi, A. Katchman, J. D’Armiento, S. Homma, and S.O. Marx. "Reduced vascular smooth muscle BK channel current underlies heart failure-induced vasoconstriction in mice" FASEB Journal. May 2013; 27(5): 1859-1867.

Application area

Medication to treat myocardial infarction

Medication to improve post heart failure survival

New treatment for hypertension

Small molecule drug libraries for screening endothelial activated SK and IK channel agonists

Mechanistic and pathway biomedical research on hyperpolarization in endothelial and vascular smooth muscle

Mechanistic understanding of SK and IK pathway

New treatment for other heart diseases

Advantages

Improves survival after heart failure

Reduces severity of heart attacks

Circumvents the problem of drug tolerance

Longer half-lives

Higher efficacy

Institution

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Inventors

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