Treating Heart Failure by Inhibiting Myosin Interaction with a Regulatory Myosin Binding Protein

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The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing and using peptides that promote cardiac muscle contraction by disrupting the binding of MyBP-C to myosin.

OVERVIEW

In the United States, one in every four deaths is attributed to heart disease. That amounts to about 600,000 people every year. Heart failure can arise due to many causes, such as heart attack and coronary artery disease, and generally is characterized by deficient blood pumping. Diagnosing and supporting patients suffering from these diseases costs hundreds of billions of dollars.

Current medications, like diuretics and beta adrenergic receptor blockers, can have deleterious side effects and do not improve prognosis. Many patients would benefit from new, safe and effective treatment options. One promising approach looks to better understand and harness the molecular mechanisms of heart function.

THE INVENTION

A UW–Madison researcher in collaboration with others has developed peptides for treating and slowing the progression of heart failure. The peptides are designed to disrupt a key interaction involving myosin and Myosin Binding Protein C (MyBP-C).

In healthy hearts, myosin is responsible for generating the force that drives normal cardiac function. It works by continually binding and releasing a protein called actin, in a process that powers heart muscle contractions. In healthy hearts, the process is slowed when myosin is also bound to a regulatory protein, MyBP-C. In compromised hearts, the result of this interaction is to further slow and weaken muscle contractions.

The new peptides target a specific binding site of MyBP-C, thereby blocking attachment to myosin. The peptides could be administered as small-molecule pharmaceuticals in conjunction with other therapies like beta blockers and diuretics.

THE WARF ADVANTAGE

WARF: A Leader in Technology Transfer Since 1925

Since its founding as a private, nonprofit affiliate of the University of Wisconsin–Madison, WARF has provided patent and licensing services to UW–Madison and worked with commercial partners to transform university research into products that benefit society. WARF intellectual property managers and licensing staff members are leaders in the field of university-based technology transfer. They are familiar with the intricacies of patenting, have worked with researchers in relevant disciplines, understand industries and markets, and have negotiated innovative licensing strategies to meet the individual needs of business clients.

The University of Wisconsin and WARF – A Single Location to Accelerate Translational Development of New Drugs

UW–Madison has the integrative capabilities to complete many key components of the drug development cycle, from discovery through clinical trials. As one of the top research universities in the world, and one of the two best-funded universities for research in the country, UW–Madison offers state-of-the-art facilities unmatched by most public universities.

These include the Small Molecule Screening Facility at the UW Comprehensive Cancer Center; the Zeeh Pharmaceutical Experiment Station, which provides consulting and laboratory services for developing formulations and studying solubility, stability and more; the Waisman Clinical Biomanufacturing Facility; the Wisconsin Institute for Medical Research, which provides UW–Madison with a complete translational research facility; and the innovative, interdisciplinary Wisconsin Institutes for Discovery, home to the private, nonprofit Morgridge Institute for Research and its public twin, WID, part of the university's graduate school. The highly qualified experts at these facilities are ready to work with you to create a library of candidates for drug development.

APPLICATIONS

- Treating and slowing the progression of heart failure

KEY BENEFITS

- May dramatically improve speed and strength of heart muscle contractions
- First potential drug of its kind
- Does not stress or require more energy from cardiac cells
- Could support longer, healthier lives for heart failure patients

STAGE OF DEVELOPMENT

Preliminary *in vitro* data suggests that cardiac muscle cells treated with the peptides recovered 40 percent of their contractile force.

ADDITIONAL INFORMATION

Related Technologies

WARF reference number P03166US describes an improved transgenic mouse model of myocardial function.
WARF reference number P01031US describes an open-chested animal teaching video of myocardial infarction.

Publications

Colson B.A., Bekyarova T., Fitzsimons D.P., Irving T.C. and Moss R.L. 2007. Radial Displacement of Myosin Cross-Bridges in Mouse Myocardium Due to Ablation of Myosin Binding Protein-C. J Molec Biol 367, 36-41.

Tech Fields

Pharmaceuticals & Vitamin D - Cardiovascular

CONTACT INFORMATION

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