

Letter To The Editor: Recovery Of Depressed Myocardial Energy Levels

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Abstract

Drs. Ingwall and Weiss' recent review article in *Circulation Research* ("Is the failing heart energy starved? On using chemical energy to support cardiac function"¹) addresses an important issue. They conclude, "The requirement of chemical energy in the form of ATP to support systolic and diastolic work of the heart is absolute. We briefly review the basics of myocardial ATP metabolism and describe how this changes in the failing heart."¹ Their insight into the need for adequate high energy phosphate compounds in congestive heart failure has been previously theorized, and is gaining acceptance. Their meticulous discussion in this review as to the need for energy, including mechanistic relationships, is important for both basic and clinical research and serves as a foundation for newly devised metabolic therapies. Further, not only the failing heart, as presented in their review, but other cardiovascular diseases might also demonstrate an equal benefit from preservation or regeneration of cardiac energy stores.

Obviously, energy molecules are essential for the maintenance of cellular integrity and function. Normally, these compounds are continuously produced with production meeting demand. However, this is not the case in cardiac disease states. Production falls behind demand and required tissue levels are seldom achieved, thereby compromising cellular, tissue and ultimately organ function.

A temporal relationship between tissue energetics and function in ischemic hearts has been established.² Ribose, a natural occurring pentose sugar, can enhance the recovery of depressed myocardial energy levels and improve cardiac function following ischemia.³ This benefit has also been found clinically in congestive heart failure patients (classes II and III). Omran et al demonstrated that the addition of ribose to a congestive heart failure patients' diet was well tolerated with a subsequent significant improvement in

diastolic compliance, quality of life, and physical function parameters.⁴ Therapeutic regimens for congestive heart failure aim for both subjective and objective benefits while minimizing adverse reactions. However, in advancing classes of congestive heart failure or progression of failure, encompassing benefits are not commonly found or, if they are with increasing medication dosages, they are not always maintained due to untoward adverse effects. Therefore, new therapeutic options are always of interest both to the patient and their physician.

As summarized by Drs. Ingwall and Weiss' review, the importance of energy compounds in myocardial cellular metabolism is critical. Treatment strategies used in congestive heart failure and potentially other cardiovascular diseases should strongly consider the importance of preserving or replenishing cellular energetics. Ribose alone, or in combination with other metabolic substrates may well offer a therapeutic option in patients with myocardial energy depleted conditions.

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