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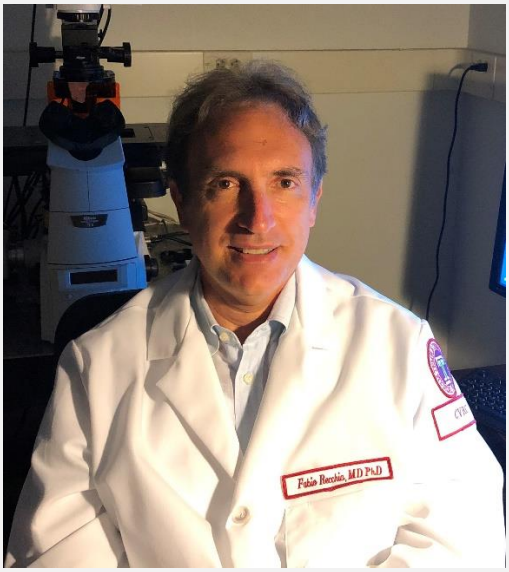
Ketone Bodies to Rescue the Failing Heart



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Short summary

The heart can utilize diverse substrates to generate the chemical energy necessary for its incessant pump function. At rest and during fasting, the normo-perfused myocardium preferentially oxidizes long chain free fatty acids (LCFFA) and, to a lesser extent, carbohydrates, especially lactate. Conversely, after a meal or under pathological conditions, such as ischemia and contractile failure, the cardiac muscle consumes more glucose, while LCFFA oxidation drops considerably. Does the altered LCFFA and carbohydrate oxidation in the failing heart play a pathogenic role? Investigators have tested this hypothesis in a variety of animal models for decades, but there is no definite answer yet. Very recently, the serendipitous discovery that inhibitors of renal sodium-glucose co-transporters (SGLT2) are markedly curative in patients with heart failure revitalized this area of research. Many mechanisms of action have been proposed, and one, in particular, seems to capture the interest of numerous investigators in the field, namely blood ketone bodies elevation caused by SGTL2 inhibition: the heart might utilize

more ketones, due to their increased availability, and this energy substrate might exert beneficial effects that still need to be elucidated. In terms of oxidation for energy production, ketones can be considered like very short fatty acids competing with LCFFA and carbohydrates. Evidence in favor of this mechanism of action is growing; however, the interpretation of the current studies might be less simple than initially thought

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