Small non-coding RNA's journey to the mitochondria α π ω Parkinson’s disease

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I. R'ocha[I]

[I]*CENTRO DE INVESTIGACIONES CIENTIFICAS ISLA DE LA CARTUJA , Sevilla, Spain*

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The heart consumes large amounts of energy through the processes of excitation-contraction (EC) coupling in cardiac myocytes. To match energy supply to demand, mitochondria take up Ca2+ via the Ca2+ uniporter (MCU), where Ca2+ stimulates rate-limiting enzymes of the Krebs cycle. The main products of the Krebs cycle, NADH and FADH2, donate electrons to the electron transport chain (ETC) to build up the mitochondrial membrane potential (? m) that is the driving force for ATP production. Furthermore, Ca2+-induced Krebs cycle stimulation also regenerates NADPH for the antioxidative capacity of the mitochondrial matrix. In heart failure, the balance between ADP-induced oxidation and Ca2+-induced reduction of NADH and NADPH is disturbed through changes in cytosolic Ca2+ and Na+ handling, sarcomeric alterations and increased hemodynamic workload. The resulting energetic deficit and oxidative stress result in arrhythmias, maladaptive cardiac remodeling and contractile dysfunction. Pharmacological interventions targeting mitochondria can ameliorate these processes and therefore, may become therapeutic tools to treat patients with heart failure..hondrial membrane potential (? m) that is the driving force for ATP production. Furthermore, Ca2+-induced Krebs cycle stimulation also regenerates NADPH for the antioxidative capacity of the mitochondrial matrix. In heart failure, the balance between ADP-induced oxidation and Ca2+-induced reduction of NADH and NADPH is disturbed through changes ihondrial membrane potential (? m) that is the driving force for ATP production. Furthermore, Ca2+-induced Krebs cycle stimulation also regenerates NADPH for the antioxidative capacity of the mitochondrial matrix. In heart failure, the balance between ADP-induced oxidation and Ca2+-induced reduction of NADH and NADPH is disturbed through changes ihondrial membrane potential (? m) that is the driving force for ATP production. Furthermore, Ca2+-induced Krebs cycle stimulation also regjlksda