The heart is an absolutely vital body organ, which requires sufficient amount of active mitochondria for its energy demanding activity. The functionality of a mitochondrial population is maintained through mitochondrial turnover, encompassing mitophagy removing damaged mitochondria and mitochondrial biogenesis responsible for the emergence of new organelles. Dynamic processes of mitochondrial fusion and fission can also contribute to the maintenance of a healthy mitochondrial population. Mitochondrial fusion and fission have not yet been proven in cardiomyocytes, although these cells possess all the proteins required for these events. These processes, however, take on the importance during pathological conditions, when changes in the amount of protein applied in the mitochondrial dynamics occur. The modification in mitochondrial phenotype leads to the cell damage. Understanding the role of mitochondrial dynamics in myocardium may contribute to the development of new heart diseases treatments.