

牛冠動脈ミトコンドリアのカルシウム蓄積能 — 大動脈ミトコンドリアとの比較 —

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Calcium Accumulating Ability of Mitochondria from Bovine Coronary Artery—Comparison with Aortic Mitochondria

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ABSTRACT The calcium accumulating ability of mitochondria isolated both from bovine coronary artery and aorta was investigated. Coronary artery and aorta were pretreated with 0.1% collagenase. Cytochrome c oxidase activities of mitochondria isolated from coronary artery and aorta showed 25-fold and 19-fold increases, respectively, as compared with those of each homogenate, whereas NADPH-cytochrome c reductase, potassium-phosphatase and $\text{Na}^+\text{-K}^+\text{ATPase}$ activities increased less than 2-fold. This suggests that the isolation procedure is capable of obtaining a subcellular fraction highly enriched with mitochondria.

Mitochondrial calcium uptake activity of the coronary artery was approximately 250 nmoles Ca^{2+} /mg protein/10 min, and was markedly depressed with metabolic inhibitors such as NaN_3 , ruthenium red and 2,4-dinitrophenol. Calcium uptake activity of bovine aortic mitochondria showed similar activity and a similar trend in sensitivity to metabolic inhibitors. By contrast, the onset of the calcium binding reaction of the aortic mitochondria was slower and the azide-sensitivity of the mitochondria to magnesium ATPase activity was lower than those for coronary artery mitochondria. The present study has provided a method for isolation of mitochondria with a high capacity of calcium uptake activity, which may prove meaningful for future physiological and pharmacological evaluation of mitochondrial calcium accumulation in vascular smooth muscle.

抄録 牛冠動脈および大動脈からミトコンドリア膜を単離し、そのカルシウム蓄積能を比較検討した。カルシウム uptake 能は共に同じ程度の活性を示し、250 nmoles Ca^{2+} /mg

protein/10 min であった。この活性は NaN_3 , ルテニウムレッド, 2,4-ジニトロフェノールで抑制された。これに対してカルシウム binding 活性反応速度は大動脈のほうが遅く, Mg^{2+} -ATPase に対する NaN_3 抑制も低かった。以上の結果は血管平滑筋でも部位により特異性があることを示した。

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