

低酸素負荷後の心収縮力の不完全な回復に おける ATP 代謝物の役割

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Role of ATP metabolites in induction of incomplete recovery of cardiac contractile force after hypoxia

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ABSTRACT The present study was designed to elucidate metabolic factors related to reoxygenation-induced recovery of cardiac contractile force after a period of hypoxia, from the view point of energy metabolism in the myocardium. Rabbit hearts were perfused for 20 mins under various degrees of hypoxic conditions, followed by 45 mins of reoxygenation. Hypoxia induced a rise in resting tension, a cessation of cardiac contractile force, a depletion of high energy phosphates, an increase in tissue calcium and an increase in UV absorbance of the perfusate. High performance liquid chromatography analysis of the perfusate indicated that increase in UV absorbance of the perfusate was attribute to the release of ATP metabolites from the perfused heart. Reoxygenation-induced recovery of cardiac contractile force after 20 mins of hypoxia was predicted by the degree of the rise in resting tension at the final period of hypoxia. The recovery was related to the level of high energy phosphates in the reoxygenated heart as well as the loss of ATP metabolites from the heart but not to the tissue calcium content. The loss of ATP metabolites also correlated with myocardial ATP levels at 45 mins of reoxygenation and a rise in resting tension at 20 mins of hypoxia. The results suggest that loss of ATP metabolites is a vital step in the induction of incomplete recovery of cardiac contractile force after hypoxia.

抄録 低酸素負荷後の再酸素化で回復する心筋収縮力と関連ある指標を検討した。心収縮力の回復は低酸素負荷終了時の静止静力の上昇, 再酸素後の高エネルギーリン酸化合物の回復量, および灌流期間中の ATP 代謝物の遊離量に密接に関連することが分った。遊離 ATP

代謝物量はまた再酸素化後の高エネルギーリン酸化合物の回復量にも逆相関した。これらの結果はATP代謝物の心筋からの遊離が不完全な心収縮力回復に関連あると思えた。

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